


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of: POWERTECH USA, INC. (Dewey-Burdock In Situ Uranium Recovery Facility)	
	ASLBP #: 10-898-02-MLA-BD01
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OST-11

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	ASLBP No. 10-898-02-MLA-BD01
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

LIST OF CONTENTIONS OF THE OGLALA SIOUX TRIBE
BASED ON THE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.309, and this Board's Scheduling Orders dated November 2, 2010, October 16, 2012, and December 18, 2012, Intervenor Oglala Sioux Tribe (Tribe) hereby sets forth the following additional contentions in this proceeding regarding the Draft Supplemental Environmental Impact Statement (DSEIS) for Powertech (USA) Inc.'s proposed Dewey-Burdock Project in-situ leach (ISL) uranium mine. The Tribe's standing to was confirmed in this Board's Order of August 5, 2010, which was not appealed. As such, pursuant to 10 C.F.R. § 2.309(c)(4), the Tribe is not required to address issues related to standing in this filing.

The Oglala Sioux Tribe is a federally-recognized Indian Tribe, located on the Pine Ridge Reservation. The Oglala Sioux Tribe is a body politic comprised of approximately 41,000 citizens, with territory of over 4,700 square miles in the southwestern portion of South Dakota. The Oglala Sioux Tribe is the freely and democratically-elected government of the Oglala Sioux people, with a governing body duly recognized by the Secretary of Interior. The Oglala Sioux Tribe is the successor in interest to the Oglala Band of the Teton Division of the Sioux Nation, and is a protectorate nation of the United States of America. The Oglala Band reorganized in

1936 as the “Oglala Sioux Tribe of the Pine Ridge Indian Reservation” under section 16 of the Indian Reorganization Act of June 18, 1934, ch. 576, 48 Stat. 987, 25 U.S.C. § 476, and enjoys all of the rights and privileges guaranteed under its existing treaties with the United States in accordance with 25 U.S.C. § 478b. The Tribe’s address is P.O. Box 2070, Pine Ridge, South Dakota 57770-2070.

As discussed at length in the Tribe’s Petition for Hearing filed on April 6, 2010, and supported by declarations of Tribal government officials, the Tribe opted to enter these proceedings because the project may pose serious threats to the Tribe’s cultural, historic, economic, and conservation interests. As detailed herein, the Draft Supplemental Environmental Impact Statement (DSEIS) 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 U.S.C. § 470, *et seq.*, and implementing regulations, including NRC regulations in 40 C.F.R. Part 51. These failures are particularly troubling given that many of the same issues were identified in the Tribe’s initial statement of contentions premised on Powertech’s Environmental Report, Technical Report, and Supplemental Report that comprised the application. Despite the intervening two and one-half years, it appears that very little, if any, additional information was collected by Powertech or required by NRC Staff to resolve the serious environmental and cultural issues identified by the Tribe in its April 6, 2010 filing.

The Tribe also provided substantial comments to the NRC during the public comment period which ended January 10, 2013. These comments are incorporated by reference herein and attached for inclusion within the adjudicatory hearing docket record, to the extent they are not already so included. See Exhibit 1, Comments of the Oglala Sioux Tribe on the Dewey-Burdock Draft Supplemental Environmental Impact Statement, with attachments (referred to herein as

“OST comments on the DSEIS”). Although the Board has applied NRC regulations in a manner that compels presentation of NEPA contentions during an ongoing NEPA process, the Tribe reserves the right to pursue these and additional NEPA claims once the NEPA process is complete.

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 DSEIS carries forward serious problems from the application stage. Despite having years to do so, neither Powertech nor NRC Staff have provided 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 Applicant has entered into a Memorandum of Agreement with the State of South Dakota regarding analysis and evaluation of historic, cultural, and archaeological sites, but has not included the Tribe in this Memorandum.

The attached Supplemental Declaration of Dr. Robert E. Moran details the lack of scientifically-defensible analysis in the DSEIS regarding potential impacts to ground water associated with the proposed Project. See Supplemental Declaration of Dr. Robert E. Moran, attached as Exhibit 2. Importantly, while Dr. Moran’s supplemental declaration supports many of the contentions raised herein, several of the contentions arise from errors of omission – failure

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

II. DSEIS CONTENTIONS

As required by 10 C.F.R. § 2.309, the Tribe sets forth below the specific contentions that it seeks to have litigated in this proceeding. Each contention raises issues with respect to the sufficiency of the DSEIS 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.

DSEIS 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 DSEIS 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. The DSEIS also fails to analyze or demonstrate compliance with the relevant portions of NRC guidance included at NUREG-1569 section 2.4.

Basis and Discussion:

This contention is supported by the Declaration of Wilmer Mesteth, Oglala Sioux Tribe Tribal Historic Preservation Officer (Attached as Exhibit 7 to the Tribe’s April 6, 2010 Petition to Intervene), record documents referenced below and attached hereto, as well as omissions in the DSEIS.

10 C.F.R. § 51.71(d) and NEPA require each draft DEIS to 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. In this case, the DSEIS demonstrates that a significant number of archaeological, historical, and traditional cultural resources on site have not been evaluated because the agency has not completed its cultural resource inventory (DSEIS at xxxix); therefore, the potential impacts to these resources have not been addressed. Despite this confirmed lack of adequate survey, the DSEIS 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 DSEIS analysis, and form the basis for a contention as to whether or not the DSEIS conforms with NRC regulations, the NHPA, and NEPA, and the implementing regulations for these laws.

These same problems were identified in the Tribe’s April 6, 2010 filing, yet despite ample time to do so in the interim time period, no additional analysis has been performed by NRC Staff. While the DSEIS identifies some of the known cultural sites, given the lack of involvement by the Tribe, as discussed below, this number is undoubtedly higher.

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 Native American Tribes in all aspects of decision-making affecting Tribal interests such as those directly impacted by the project. These mandates require NRC to consult with Tribes as early as possible in the decisionmaking process. Here, despite having the applicant’s

materials since 2009, and the Tribe's contentions regarding lack of adequate surveys since April 6, 2010, the NRC has not meaningfully engaged in the required consultation process. These problems have been further described in email and letter correspondence between affected Tribes and the NRC Staff. See communications regarding NEPA and NHPA compliance attached to OST comments on the DSEIS as Exhibit 10; Letter from OST President John Yellow Bird Steele to Mr. Kevin Hsueh, Chief, NRC Environmental Review Branch, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs dated November 5, 2012 (attached as Exhibit 3). In the letter from OST President Steele, the Tribe expresses its "deep dismay" with NRC Staff's proposals for furthering its cultural resources review of the Dewey-Burdock project area. As the letter makes abundantly clear, these problems are a significant issue and reveal that 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 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].”)

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 (4th 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 Project, 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 (10th 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).

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 (9th Cir. 1981) (“any Federal Government action is subject to the United States’ fiduciary responsibilities toward the Indian tribes”).

Here, the application was initially submitted to the NRC in February of 2009, almost a full four years ago. Yet, the SDEIS was released for comment even though no competent cultural survey of the site has yet been conducted with any Tribal participation. To exclude the Tribe from the NEPA/NHPA process until after a draft NEPA document is prepared 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 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 requirement of the NHPA, NEPA, and applicable regulations, the harms to the Tribe began accruing immediately upon NRC consideration of the 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 DSEIS despite the lack of any meaningful involvement in any survey of the affected areas.

The only meaningful relief available in a case as egregious as this is to reissue a draft SEIS for public review and comment. While NRC staff states that it is continuing to consult with certain Tribes, some of this consultation has not been as productive or inclusive as anticipated by the Tribes, including the Oglala Sioux Tribe with respect to historical and cultural survey. See letters from the Tribes to NRC regarding the proposed contract by KLJ with the

Turtle Mountain Band of Chippewa Indians and the Three Affiliated Tribes attached as Exhibit 10 to the OST comments on the DSEIS. These two Tribes contacted the NRC by letter and stated that the proposed project would not affect historic properties of importance and the THPO also stated that “determination of No Historic Properties Affected Is granted for the project to proceed. DSEIS at 1-17 to 1-18. Despite this response to project, the NRC accepted their participation and contract for the survey.

Another great concern as expressed by Oglala Sioux Tribe is that the NRC and Powertech have suggested either enclosing any cultural and religious sites or giving the location so that their employees or contractors will avoid these areas during ground moving activities. DSEIS at 4-141, -142, -148, -150-151. The protection and privacy of the location of these sites must be kept confidential and undisclosed to the public. Otherwise, these identified cultural and religious sites will be open to looting or desecration before, during and after the project area has been deemed reclaimed.

In sum, this contention 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 SDEIS issued for review and comment for the Tribe, Tribal members, the public, and other interested persons.

DSEIS Contention 2: The DSEIS Fails to Include Necessary Information for Adequate Determination of Baseline Ground Water Quality

The DSEIS 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 samples were collected in a scientifically defensible manner, using proper sample methodologies.

Basis and Discussion:

This contention is one of omission, and as such does not require expert support. However, the Supplemental Declaration of Dr. Robert E. Moran (attached as Exhibit 2)(hereinafter “Moran Suppl. Decl.”) provides additional support for this contention. *See e.g.* Moran Suppl. Decl. at ¶58(“The DSEIS, like the Powertech Application, fails to define pre-operational baseline water quality and quantity—both in the ore zones and peripheral zones, both vertically and horizontally.”); ¶¶ 47-74, 75, 82-84, 92-94, 95.

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.” NUREG-1569 section 2.7.1(4) requires that ISL applications must provide an “assessment of available ground-water resources and ground-water quality within the proposed permit boundaries and adjacent properties, including a quantitative description of the chemical and radiological characteristics of the ground water and potential changes in water quality caused by operations.” NUREG-1569 section 2.7.3(4) sets forth acceptance criteria for the Application requiring a “reasonably comprehensive chemical and radiochemical analysis of water samples, obtained within and at locations away from the mineralized zone(s)...to determine pre-operational baseline conditions.” NUREG-1569, section 2.7.3(4). This acceptance criteria also requires an applicant to “show that water samples were collected by acceptable sample procedures....” *Id.* See also NUREG-1569 Section 2.7.4. Lastly,

NUREG-1569 requires that “[t]he applicant should identify the list of constituents to be sampled for baseline concentrations. The list of constituents in Table 2.7.3-1 is accepted by the NRC for *in situ* leach facilities.” NUREG-1569, section 2.7.3.

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 (9th 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.

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 problems that can flow from analysis and models based on poorly gathered information is often characterized as a garbage in/garbage out. This colloquialism is more technically addressed in the attached memo from Dr. Richard Abitz and confirms that the scientific methodology employed for establishing baseline at a proposed ISL mine is important. Abitz Report (2009) attached to the OST comments on the DSEIS as Exhibit 2. 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 DSEIS. As described by Dr. Abitz, valid statistical methods and a systematic grid covering all horizons of the aquifer must be employed with respect to baseline ground water quality collection. This includes water quality information throughout the vertical extent of the affected aquifers and a spatially representative sampling protocol to provide the necessary information on ground water characteristics outside of the proposed mining zone, to accurately characterize site conditions. Lastly, as noted by Dr. Abitz, any proposed methodology that seeks to average site conditions is inappropriate, as it results in a baseline plan which is inappropriately skewed toward demonstrating a lower overall water quality. Such an approach could exaggerate the true extent of any naturally diminished water quality resulting from the presence of uranium and other heavy metals in the aquifer region. Apart from failing to set forth a competent baseline in the DSEIS, the issues described in Dr. Abitz' memo have not been described or otherwise addressed in the DSEIS. See Moran Suppl. Decl. at ¶ 73.

Instead of completing a competent baseline analysis, the DSEIS admits that NRC currently lacks information necessary to establish the baseline groundwater quality at the site.

For example, the DSEIS admits that substantial water quality data collection will only be conducted after license issuance. E.g., DSEIS at 2-16, 7-8, 7-14, 7-17.

One aspect of the baseline characterization that lacks scientific basis is the DSEIS' frequent reliance on Powertech's decision to only consider, review, and proposed monitoring (both quality and quantity) for groundwater wells within 2km of the proposed mining area. E.g., DSEIS at xxxiv, xxxv, 3-6, 4-54, 4-56, 4-57, 4-59, 5-31, 7-4. However, this 2 km figure was derived exclusively using NRC Regulatory Guide 4.14 (1980), which is relied upon by the DSEIS throughout. E.g., DSEIS at 3-94, 3-98, 7-1, 7-4, 7-13, 7-14. However, Regulatory Guide 4.14 was drafted over 30 years ago, in 1980 – and not updated since. Further, the document specifically considers and applies exclusively to conventional uranium mills – and contains no analysis or guidance premised upon any review of in-situ leach uranium mining activities. Thus, reliance on Regulatory Guide 4.14 for determining the extent of the baseline characterization and the subsequent monitoring requirements for impacts is not justified. At minimum, as required by NRC regulations, the DSEIS reliance on Regulatory Guide 4.14 in this regard is required to “be supported by evidence” substantiating that constraining these important baseline characterizing activities to a 2 km review is appropriate. The DSEIS provides no such analysis. See Supplemental Decl. of Dr. Moran at ¶¶ 92-93.

Based on this evidence, the DSEIS 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.

DSEIS Contention 3: The DSEIS Fails to Include An Adequate Hydrogeological Analysis To Assess Potential Impacts to Groundwater

The DSEIS 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 DSEIS 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:

This contention is one of omission and thus requires no expert support. However, the Supplemental Declaration of Dr. Robert E. Moran (attached as Exhibit 2) provides additional support for this contention. See e.g., Moran Suppl. Decl. at ¶33. (“The DSEIS fails to provide detailed, site-specific information / data on the hydrogeologic characteristics of the relevant D-B water-bearing and other bounding geologic units, including the mineralized zones.”), see also e.g., ¶¶33-36, 39-48, 49, 54-56, 82-84, 85.

10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act, and implementing regulations, require each Draft EIS 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. As discussed in NUREG-1569 at 2.7.1(3), the application must include a description of the “effective porosity, hydraulic conductivity, and hydraulic gradient” of site hydrogeology, including any “other information relative to the control and prevention of excursions.” At minimum, the applicant must develop an acceptable conceptual model of site hydrology adequately supported by the data presented in the site characterization. NUREG-1569 section 2.7.2. 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.

In this case, the DSEIS 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 and failure to account for natural and man-made hydraulic conductivity through natural breccias pipe formations and the historic drilling of literally thousands of drill holes in the aquifers and ore-bearing zones in question, which were not properly abandoned.

As discussed above, NEPA CEQ regulations and applicable federal case law require this precise information to be included in an EIS in order to comply with NEPA. See supra at *11. Here, the DSEIS admits that hydrogeologic information necessary to determine the impacts to groundwater from the project is lacking, and will only be obtained at a future time outside of the NEPA process. For example, the DSEIS admits that substantial and necessary hydrogeologic data collection and aquifer pump tests will only be conducted after license issuance. E.g., DSEIS

at 2-16, 7-8, 7-14, 7-17. The DSEIS further admits that un-abandoned bore holes exist and could cause serious environmental impacts by providing a pathway for spread of contamination in the groundwater. DSEIS at 3-20. The DSEIS also admits that pump test data is necessary “to demonstrate that solutions can be controlled with typical wellfield bleed rates and to detect and identify leakage due to anomalies such as improperly plugged wells and exploration boreholes.” DSEIS 2-18. However, instead of requiring that Powertech collect the necessary data for analysis in the DSEIS, NRC attempts to entirely evade this issue with statements that “[w]hile the applicant cannot confirm that all historic borings were properly plugged and abandoned, the applicant has made commitments to ensure that unplugged drill holes will not impact human health or the environment during operations.” DSEIS at 3-20.

The DSEIS states that in the southwest corner of the Burdock area there is “groundwater [] discharging to the ground surface from the Fall River aquifer and Chilson aquifer (Chilson Member of the Lakota Formation) through improperly plugged exploratory boreholes.” DSEIS at 3-23. This information necessitates a more detailed review of the issue of historic wells or bore holes – and requires that any feasible pump tests or other analysis be performed as part of the NEPA process, with necessary opportunities for public and agency review and comment, in order to assess the potential impacts of the project.

Additionally, the DSEIS identifies areas where the Fall River aquifer proposed to be mined is not hydrologically confined. Instead of requiring the collection of the data necessary to determine the potential impacts of mining in this unconfined aquifer, NRC instead suggests that “[t]he applicant has committed, as part of the license condition, to conduct additional hydrogeological investigations....” DSEIS at 3-37. As with the other fundamental gaps in meaningful data, this lack of baseline data collection as part of the NEPA process severely

undermines the public's (and the agencies') ability to understand and evaluate the potential impacts of the operation. Indeed, it appears throughout the DSEIS that any time there is a question about the impacts, instead of requiring collection of the data necessary to do a proper analysis, NRC staff simply allows the company to defer collection of any data to a later (post-NEPA) time. This is not allowable under NEPA and applicable regulatory provisions.

Based on this demonstration, the DSEIS 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.

DSEIS Contention 4: The DSEIS Fails to Adequately Analyze Ground Water Quantity Impacts

The DSEIS violates the National Environmental Policy Act in its failure to provide an analysis of the ground water quantity impacts of the project. Further, the DSEIS 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:

This contention is one of omission and thus need not be supported by an expert. However, the Supplemental Declaration of Dr. Robert E. Moran (attached as Exhibit 2) provides additional support for this contention. See e.g., Moran Suppl. Decl. at ¶21 (“the DSEIS provides imprecise, conflicting information on the volumes of water to be used throughout the various sections of the DSEIS”); ¶¶ 20-32, 37-38, 50-51, 86-91, 101.

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 DSEIS 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 DSEIS has not met the requirements of NRC regulations and NEPA.

The Supplemental Declaration of Dr. Robert E. Moran sets forth the primary concerns related to the DSEIS' lack of credible analysis of ground water quantity impacts:

25. Powertech estimates that approximately 52.6 million gallons of ground water would be required for the Construction phase alone (DSEIS p.5-30). **No data are provided for the volumes of ground water required for the other phases, throughout the life of the project.**

26. Clearly, the DSEIS fails to reveal reliable long-term water use data for all phases of the entire project. Greater uncertainty is shown when one reads the water use data originally presented in the 2009 Powertech Application, ER pg. 8-2 (Table 8.1-1), which states that **ground water consumption will be 320 gpm.**

27. Because no Water Balance is presented, it is unclear how much of this volume is recycled, re-injected as waste in other formations, etc. In addition, one must assume that quality of much of the recycled and re-injected water would be degraded as compared to any reliable preoperational baseline data.

28. Aside from the obvious lack of consistency, the estimates (above) translate into massive amounts of ground water when considered over the full life of the project. Using two of the estimated ground water use rates stated above, total water consumption over the life of the project can be estimated as follows:

65 gpm = 34.2 Million gpy (gals / yr).

After 7 yrs = 239,148,000 gallons, or 239.15 Million gallons.

After 17 yrs = 580,788,000 gals or 580.8 Million gallons.

320 gpm = 168.2 Million gpy (gals. / yr).

After 7 yrs = 1,177,344,000 = 1.2 Billion gallons

After 17 years = 2,859,264,000 gallons = 2.86 Billion gallons.

29. Clearly, this range of estimates indicates that vast quantities of ground water will be extracted from these aquifers over the long-term. At a minimum, Powertech should be required

to construct a credible project water balance and to more seriously investigate the potential that such large-volume water use might impact local / regional ground water levels and well yields.

30. At present, I see no evidence that the Application contains a reliable compilation of *baseline water level and pumping-rate data for the surrounding domestic and stock wells (see discussion below)*. Without such reliable, summarized data, there will be no viable method to demonstrate that ground water levels (and related pumping costs) have not been impacted by project- related activities.

As cited above, apart from the discussion provided herein, other portions of Dr. Moran's analysis also demonstrate the DSEIS' lack of adequate analysis with regard to water quantity impacts.

DSEIS Contention 5: The DSEIS Fails to Demonstrate Adequate technical sufficiency and fails to present information in a “clear, concise” manner to enable effective public review

The DSEIS 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, Regulatory Guide 3.46, and NUREG 1569.

Basis and Discussion:

This contention is one of omission and is additionally supported by the Supplemental Declaration of Dr. Robert E. Moran (Declaration attached as Exhibit 2). See e.g., Moran Suppl. Decl. at ¶¶16-17, 76-77, 78-81.

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 Dewey-Burdock DSEIS 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 DSEIS. The NRC staff’s use of citations to materials incorporated by reference into the DSEIS is inadequate to justify the scientific conclusions presented.

For example, for reference after reference, the document simply refers only to “Powertech 2011” as a source for fundamental conclusions upon which the DSEIS analysis is premised. These assumptions include such basic conclusions as those as to the permeability of the under and over-lying geologic structures (e.g., DSEIS at 2-17, 4-56), and the use of “numerical simulations” to evaluate “groundwater conditions” necessary for evaluating monitoring well spacing to detect impacts from lixiviant excursions (e.g., DSEIS at 2-16). Many more examples exist throughout the entire DSEIS where it is impossible to identify and assess the referenced materials. The generic citation to “(Powertech 2011)” is meaningless without more description and detail of where the information is contained in the document. The Powertech 2011 submittal alone is made up of some 5000 pages of documents. See webpage screen shot showing the list of documents which make up this submittal attached to OST DSEIS comments as Exhibit 1. This problem exists with regard to the NRC’s reliance on other

Powertech submittals as well, including those referenced as “Powertech 2009” and “Powertech 2010” among others. This lack of any specificity makes it virtually impossible to find the precise basis for conclusions made in the DSEIS. The use of generic references obfuscates the technical basis for the analysis and conclusions as to the potential impacts of the project to the point it violates the APA and NEPA, and implementing regulations. See 10 C.F.R. Part 51 (appendix A to subpart A, note 1)(allowing incorporation by reference to material outside a NEPA document, but only “without impeding agency and public review of the action” and only where the material’s content is “briefly described”).

Further, the DSEIS references the draft license produced by NRC Staff for the Dewey-Burdock proposal as support for the conclusions in the document. DSEIS at 2-71, 4-217. However, it appears that NRC Staff recently issued a revised draft license mere days before the close of the public comment period on the DSEIS, rendering these references stale. This unfortunate timing results in the inability of the Tribe and any member of the public to meaningfully review the new draft license, despite the fact that the DSEIS specifically relies on the draft license as a supporting reference. This document was never made publicly available during the comment period, in violation of NRC regulations which require that “no material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment.” 10 C.F.R. Part 51, Appendix A to Subpart A (discussion of footnote 1). 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. Release of a new draft license within just days of the close of comment, without providing any notice, let alone public distribution of the new draft license document itself, does not provide a reasonable opportunity for the public to review and comment.

As a result of these systemic flaws in the manner in which scientific justifications are presented and the lack of time for the public to review information purported to be relied upon in the DSEIS, the document must be re-published in a manner that provides the necessary information, with the commensurate additional public comment period.

DSEIS Contention 6: Failure to Adequately Describe or Analyze Proposed Mitigation Measures

The DSEIS 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.

Basis and Discussion:

This contention is one of omission and thus requires no expert opinion in support. However, the Supplemental Declaration of Dr. Robert Moran provides additional support for this contention. See e.g., Moran Suppl. Decl. at ¶ 114 (“the mitigation consists only of proposals to make plans to restore groundwater in the future. There is no detail as to the effectiveness of these proposed mitigation measures, nor any analysis of whether any such plans have succeeded in the past.”); ¶¶ 92-94, 102-103, 104-113, 116-119.

NRC regulations at 10 C.F.R. §§ 51.10, 51.70, and 51.71 require all DSEIS 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 (9th 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 (9th Cir. 1998). The DSEIS’s reliance on a future, as yet-unsubmitted, 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 DSEIS expressly relies on mitigation in concluding that impacts are “small” and in justifying a preliminary recommendation to issue the proposed license. DSEIS at xlv, xxx. Unfortunately, the proposed mitigation consists largely, if not exclusively, of a list of plans to be developed later, outside the NEPA process. DSEIS at 6-1 through 6-19. Much like the failure to analyze baseline data, the DSEIS 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. For instance, the DSEIS repeatedly refers to Powertech's commitment to restore groundwater back to its pre-mining condition.

"The applicant will also be required to restore groundwater parameters affected by ISR operations to levels that are protective of human health and safety." DSEIS at 2-69. The DSEIS similarly simply states that Powertech will be required to restore aquifers to background concentrations. E.g., DSEIS at 4-51, 5-52, 4-64. However, such assurances, without any evaluation of how effective these restorations efforts are expected to be, do not satisfy NEPA.

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. 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 resolubilization 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)(emphasis added)(attached to OST comments on the DSEIS as Exhibit 4). 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 to OST comments on the DSEIS as Exhibit 5). 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 to OST comments on the

DSEIS as Exhibit 6). These issues echo the issues regarding repeated failures of industry and regulators to meet pollution control assurances as set forth in the Oglala Sioux Tribe's successful Petition to Intervene in the Dewey-Burdock licensing process. Petition to Intervene at 1-11 (attached to OST comments on the DSEIS as Exhibit 7). Lastly, recent investigative journalism pieces have also exposed the lack of effective mitigation for ISL uranium mining operations such as that proposed at Dewey-Burdock. See Lustgarten, Abrahm, "On a Wyoming Ranch, Feds Sacrifice Tomorrow's Water to Mine Uranium Today," ProPublica, Dec. 26, 2012 (attached to OST comments on the DSEIS as Exhibit 8).

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. While the DSEIS presents some general methods for restoration of the groundwater following mining operations, it does not provide detail as to how this proponent expects to succeed where all others have failed, assess any objective criteria to measure the (in)effectiveness of these methods, address any corrective measures should predictable failures occur, nor reveal how these issues affect the potential impacts of the proposed project. This includes the failure in the DSEIS to assess its plan to review groundwater restoration only for a period of 12 months. DSEIS at 2-37. There is no support of basis for this time period, nor any discussion of the basis or effectiveness of such a time period. See Moran Suppl. Decl. at ¶ 115.

A detailed evaluation of the effectiveness of any proposed mitigation measure is required by NEPA. Disclosure and analysis of mitigation alternatives in a DSEIS 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. The current mitigation measure discussion consists of a multi-page chart which simply lists a series of proposed mitigation measure, with no elaboration or other analysis of how the operator expects to accomplish these items, or the expected effectiveness/limitations of each measure, as required by NEPA. 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 the DSEIS for meaningful public and agency review.

DSEIS Contention 7: The DSEIS Fails to Include a Reviewable Plan for Disposal of 11e2 Byproduct Material

The DSEIS indicates that Powertech may or may not use the White Mesa Uranium Mill in Utah, or some other unidentified facility, for disposal of the 11e2 Byproduct generated at the proposed ISL Facility. It is not sufficient, however, for a DSEIS to avoid a meaningful review of impacts by merely stating that permanent disposal will occur in conformance with applicable laws. This lack of analysis violates 10 C.F.R. §§ 51.10, 51.70 and 51.71, and the National Environmental Policy Act and implementing regulations.

The very reason for the NEPA process is to ensure that the problems associated with mill tailings which UMTRCA addresses are fully analyzed and thus do not recur under the modern licensing regime. Nowhere do the regulations or NEPA allow the agency to merely assert that tailings will be handled in accordance with applicable law. The opposite is required by federal law: the DSEIS must analyze all impacts associated with permanent disposal of wastes generated at the facility.

Basis and Discussion:

This contention is one of omission, and thus does not require expert support. The relevant regulations applicable to new uranium processing operations state in plain language:

Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required by the provisions of § 40.31(h) to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling activities.

40 C.F.R. Part 40 Appendix A (emphasis added). This regulation implements the UMTRCA amendments to the Atomic Energy Act, which require the NRC to ensure that the specific proposal for disposition of tailings and wastes involved in milling is subjected to review in the initial license application. However, it is impossible to determine, based on the DSEIS whether any specific plans exist for the disposition of the 11(e)2 Byproduct that will be produced by Powertech and what impacts such disposition would entail. Although specifically referenced, there is no analysis of whether or not Utah law or the Energy Fuels license would allow the transport and disposal of Powertech's 11(e)2 byproduct. Importantly, although Utah law and license terms may be more stringent than NRC's, no analysis is contained in the SDEIS.

The failure to address disposal requirements for 11e2 byproduct is not a technical deficiency that can be ignored or pushed off until a later time. Rather, the agency has a duty to provide specific information on this major feature of an ISL license in a Draft EIS in order to allow the Tribe, the public, NRC, and other government decisionmakers to conduct a meaningful analysis of the full scope of environmental impacts involved with Powertech's license application.

Moreover, the policies set forth by NEPA prevent the NRC staff from segmenting the disposal issues from the inquiry into whether applicant will be allowed to create 11e2 Byproduct

material in the first instance. *In re Pac. Gas & Elec. Co.*, 67 N.R.C. 1, 13 (N.R.C. Jan. 15, 2008)(“There is no genuine dispute that NEPA and AEA legal requirements are not the same [. . .] and NEPA requirements must be satisfied.”). Failure to identify and analyze the permanent disposal facility in the DSEIS avoids examination of all direct, indirect, and cumulative impacts of the proposal, as required by NEPA. *Custer County Action Ass’n v. Garvey*, 256 F.3d 1024, 1035 (10th Cir. 2001)(Where a “federal action” exists, the NEPA process must “analyze not only the direct impacts of a proposed action, but also the indirect and cumulative impacts of ‘past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.’”).

Where “federal action” triggers NEPA -- here, the applicant’s proposal to conduct ISL mining activities -- an agency cannot define “the project’s purpose in terms so unreasonably narrow as to make [NEPA] ‘a foreordained formality.’” *City of Bridgeton v. FAA*, 212 F.3d 448, 458 (8th Cir. 2000)(citations omitted). Here, NEPA mandates that the NRC consider the ISL mining activities which create tailings at the same time it considers the specific method, transportation requirements, and site for tailings disposal. This mandate of federal law attaches at such time as the need for disposal is reasonably foreseeable, which occurs before publication of the DSEIS, and not at a later time to be determined.

The CEQ regulations that apply to each agency’s implementation of NEPA state that the requisite site-specific environmental impact statement should be available at all stages of the decision-making process, not merely at the end of that process as a “rubber stamp” to approve the environmental impacts of the process. Because the DSEIS requires extensive, site-specific consideration -- including but not limited to, access, geology, hydrogeology, quantitative impacts upon water supplies for domestic use, livestock, agriculture, non-domesticated plants and

animals, and qualitative on-going and subsequent impacts to water supplies of all the same due to releases of chemicals into the surface, groundwater and aquifers flowing through the licensed site -- failure of the site-specific environmental impact statement to inform every step of the license application decision-making process means that the final decision cannot comply with NEPA. At a minimum, without a completed, site-specific environmental impact statement as a guide, NRC staff, the public, other governmental entities, and the Tribe have no basis to identify and access alternatives to the license application and find ways to avoid or mitigate possible adverse environmental impacts of the licensed activity.

These NEPA requirements are consistent with the requirement in Subpart 40, Appendix A's *Criteria One*, which requires that the applicant and the NRC examine "alternative tailings disposal sites" when considering a milling application. *See Natural Resources Defense Council v. Hodel*, 865 F.2d 288, 299 (D.C.Cir. 1988)(citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976)(formulation of alternatives during the NEPA disclosure and study process is at the heart of the NEPA-mandated procedures).

DSEIS Contention 8: Requiring the Tribe to Formulate Contentions before a Final EIS is Released and Failing to Follow Scoping Process Violates NEPA

The procedure used by NRC to consider the Powertech application fails to satisfy the public participation and informed decision-making mandates of NEPA, as implemented through 10 C.F.R. §§ 51.28, 51.29, 51.10, 51.70 and 51.71, and the National Environmental Policy Act's implementing regulations.. The procedural requirements of NEPA are designed to benefit those who participate in agency decision-making processes and to require that the agency take a "hard look" at the impacts, alternatives, mitigation measures, and other aspects of a federal action at the earliest stages of the decision process, in recognition that when a "decision is made without

the information that NEPA seeks to put before the decisionmaker, the harm that NEPA seeks to prevent occurs.” *See: Sierra Club v. Marsh*, 872 F.2d 497, 500 (1st Cir. 1989) *quoting Commonwealth of Massachusetts v. Watt*, 716 F.2d 946 at 953 (1st Cir. 1983).

By contrast, the procedure used in the present proceedings denies the Tribe and the NRC the information that a NEPA analysis provides. Importantly, this interdisciplinary analysis and information is provided during the NEPA process by the applicant, staff, and members of the public. All of these sources of information are recognized by NEPA, but the Tribe is prejudiced here when significant sources of information are not available until the NRC has taken final action to accept or deny its contentions. It is of no consequence that the NRC provides an opportunity to seek permission to pursue new or rejected contentions later in the proceedings, based on information revealed in the NEPA analysis. *See: Id.* (“Once large bureaucracies are committed to a course of action, it is difficult to change that course - even if new, or more thorough, NEPA statements are prepared and the agency is told to ‘redecide.’”).

Basis and Discussion:

NRC Staff has violated NEPA by requiring that the Tribe formulate and submit detailed contentions before the NEPA process is complete, denying the Tribe the benefit of a final NEPA analysis. This statutory violation is not remedied by providing a *post hoc* NEPA analysis, as is contemplated by the NRC regulations. Failure to conform to the timing policies and requirements of NEPA wastes resources of both the NRC Staff and the Tribe. The procedural harms are demonstrated by previously aborted attempts to gain approval of plans to mine in the Dewey-Burdock area: “A Draft Environmental Statement (DES) was prepared by TVA to address the impact of a proposed underground mine in the Dewey-Burdock area, but TVA never completed the NEPA process.” Powertech Environmental Report at 1-4.

Conducting NEPA analysis early in the process is necessary to meet the requirement that NEPA analysis must precede the decision-making process, lest the agency unleash a “bureaucratic steam roller” aimed at approval, but without the public participation and informed decisionmaking requirements of NEPA.” See *Davis v. Mineta*, 302 F.3d 1104, 1115 (10th Cir. 2002). In short, the procedures the NRC used for the present application fail to satisfy NEPA’s purpose, which is to influence the decision making process “by focusing the [federal] agency’s attention on the environmental consequences of a proposed project,” so as to “ensure[] that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). Where NRC Staff has applied regulations in violation of a statutory duty, or where the application of the regulations reveals that such regulations violate a statutory duty, NRC cannot rely on such agency regulations as a basis to violate the a statute. *United States v. Haggard Apparel Co.*, 526 U.S. 380, 392 (U.S. 1999)(where a “regulation is inconsistent with the statutory language or is an unreasonable implementation of it [...], the regulation will not control.”).

Relatedly, the DSEIS was issued without the benefit of a required scoping process. 40 C.F.R. § 51.28(a) speaks in mandatory terms (“shall”) when discussing the parties to which the NRC must invite to scoping. These parties include the Tribe, as an admitted party to this proceeding. Further, 40 C.F.R. § 51.29(a) sets forth a detailed procedure for scoping that is necessary to ensure compliance with NEPA. These steps were not conducted in this case. This denied the Tribe the opportunity, among other things, to provide input to help define the proposed action, identify the issues NRC had identified as significant issues to be analyzed in depth, which would be eliminated from study and why, and to ensure that other environmental

review and consultation requirements related to the proposed action may be prepared concurrently and integrated with the DSEIS. 40 C.F.R. § 51.29(a)(1)-(5).

Further, 40 C.F.R. § 51.29(b) requires that NRC “will prepare a concise summary of the determinations and conclusions reached, including the significant issue identified, and will send a copy to each participant in the scoping process.” In this case, no such summary was prepared. The lack of this process, followed by the requirement that the Tribe provide all of its comments and contentions on the DSEIS instead of during scoping deprives the Tribe of the ability to have its concerns raised at the proper time (“as soon as practicable”)(§ 51.29(a)) and to have significant issues identified and addressed, as contemplated by the regulations. The result is a ‘back-ended’ process that requires the Tribe to identify those significant issues only now at the DSEIS stage, and denies the Tribe the opportunity to provide comment on a DSEIS that takes full account of those significant issues. This process fails to comply with NEPA or NRC regulations.

DSEIS Contention 9: The DSEIS Fails to Consider Connected Actions

The Powertech proposal to conduct ISL operations and conduct associated waste disposal activities is being considered by multiple federal agencies. However, NRC, the lead agency for purposes of NEPA - has failed engage these other agencies and therefore has failed to comply with the “action-forcing” mandate and purpose of NEPA. 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:

The mandate and purpose of NEPA is to influence the decision making process “by focusing the [federal] agency’s attention on the environmental consequences of a proposed

project,” so as to “ensure[] that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). The NEPA analysis must be prepared by the NRC in a manner which timely addresses, identifies, and analyzes any actions that are “connected” to the project under review. See 40 C.F.R. § 1508.25; *Utahns for Better Transp. v. United States Dep’t of Transp.*, 305 F.3d 1152, 1182 (10th Cir. 2002), *modified in part on other grounds*, 319 F.3d 1207 (2003). NRC regulations allude to this requirement in providing that “[t]o the **fullest extent** practicable, environmental impact statements will be prepared concurrently or integrated with environmental impacts analyses and related surveys and studies required by other Federal law.” 10 C.F.R. § 51.70(a)(emphasis added).

For example, Powertech has filed an applications with the Environmental Protection Agency (“EPA”) for both a Class III injection well and a Class V injection well. However, the DSEIS fails to conduct any NEPA analysis of the proposal for these injection wells. Both the Class III and Class V injection wells are “connected actions” and even though EPA is the permitting agency, the injection well proposals must be analyzed in the same NEPA analysis as the full Powertech proposal. To the extent NRC Staff or Powertech may argue that the injection well plans could somehow avoid analysis as “connected actions”, these injection well activities must still be fully analyzed in the “cumulative impacts” analysis, or even just as part of the NRC’s “hard look” review – and are expressly incorporated into the contentions presented herein with respect to those issues.

The DSEIS repeatedly relies upon EPA analyses to require appropriate mitigation measures to lessen impacts, and uses those permitting processes to simply defer analysis of impacts to EPA. For instance, in making its determination that impacts from the use of Class V

underground waste injection wells is “small”, the DSEIS defers to the fact that “EPA will evaluate the suitability of the formations proposed for Class V well injection. Class V injection disposal will be allowed only when the applicant demonstrates liquid waste can be isolated safely in a deep aquifer.” DSEIS at 4-44. NRC similarly defers to a future EPA analysis related to the UIC Class III well permitting process and to the South Dakota state processes. DSEIS at 3-39, 4-54, 4-67, 4-68, B-3. In this way, the DSEIS simply defers analysis of the potential impacts to EPA permits under the Safe Drinking Water Act (SDWA) and South Dakota permitting processes. Critically, however, neither EPA UIC permits nor any South Dakota state permits are subject to NEPA. See, 40 C.F.R. § 124.9(b)(6)(explicitly excusing EPA UIC permitting processes from NEPA review).

The NRC is prohibited from such blind reliance on other agencies to conduct its analysis of the baseline, potential impacts, and proposed mitigation associated with a uranium mine proposal. See 10 C.F.R. § 51.71 (“The environmental impact of the proposed action will be considered in the analysis with respect to matters covered by environmental quality standards and requirements irrespective of whether a certification or license from the appropriate authority has been obtained.”). The DSEIS cannot rely on EPA and South Dakota permitting processes to excuse NRC’s responsibilities to fully review the environmental impacts. *South Fork Band Council v. BLM*, 588 F.3d 718, 726 (9th Cir. 2009)(“A non-NEPA document -- let alone one prepared and adopted by a state government -- cannot satisfy a federal agency's obligations under NEPA.”).

Lastly on this point, the DSEIS discusses Powertech’s intent to dispose of its liquid chemical waste via a Class V underground injection control permit. However, the disposal of waste, and particularly radioactive waste, below the lower-most aquifer that serves as an

Underground Source of Drinking Water (USDW), as proposed here, is not a Class V activity. Rather, such disposal is a Class I underground disposal well. Compare, 40 C.F.R. § 144.80(a) (Class I – deep injection) with 40 C.F.R. § 144.80(e) (Class V – shallow injection). Further demonstrating this fact is the State of South Dakota’s Department of Environment and Natural Resources, which classifies any well that proposes to be used for injection of either hazardous or non-hazardous liquid waste, or municipal waste, as a Class I UIC well. See, Chart located on the State of South Dakota’s website: http://denr.sd.gov/des/gw/UIC/UIC_Chart.aspx. Importantly, the State of South Dakota specifically and unambiguously precludes operation or construction of any Class I UIC wells within its borders. Indeed, the applicable regulatory provision is arguably even broader, stating in its entirety: “Class I and IV disposal wells prohibited. No injection through a well **which can be defined as** Class I or IV is allowed.” S.D. Admin. R. § 74:55:02:02 (emphasis added). This is a significant issue that the DSEIS fails to address in any respect.

Overall, the DSEIS is required to review the proposed activities and the potential impacts associated with the other federal and state permits associated with the project, including any proposal to inject waste underground through an Underground Injection Control permit – and has failed to do so.

DSEIS Contention 10: The Narrow Scope of the NEPA Process Conducted by NRC Staff Excluded Actions, Alternatives, Impacts, and Agencies

The Powertech proposal to conduct ISL operations and conduct associated waste disposal activities is being considered by multiple federal, state, and local agencies. However, NRC, the lead agency for purposes of NEPA - has failed engage these other agencies, has not analyzed impacts subject to jurisdiction and control of these other agencies, and therefore has failed to

comply with the “action-forcing” mandate and purpose of NEPA. As a result, the DSEIS violates 10 C.F.R. §§ 51.10, 51.70, 51.71, and the National Environmental Policy Act and implementing regulations.

Basis and Discussion:

The mandate and purpose of NEPA is to influence the decision making process “by focusing the [federal] agency’s attention on the environmental consequences of a proposed project,” so as to “ensure[] that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). The NEPA analysis must be prepared by the NRC in a manner which timely addresses, identifies, and analyzes any actions that are “connected” to the project under review. *See* 40 C.F.R. § 1508.25; *Utahns for Better Transp. v. United States Dep’t of Transp.*, 305 F.3d 1152, 1182 (10th Cir. 2002), *modified in part on other grounds*, 319 F.3d 1207 (2003).

In order to ensure all aspects of a federal action are considered in accordance with the statute, the lead agency must consider the “cumulative impact,” which is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.[...]. 40 C.F.R. § 1508.7. In order for NRC, as lead agency, to satisfy the statutory public participation and informed decisionmaking purposes, these NEPA process must be carried out with the participation of what are termed “cooperating agencies.” *See* 40 CFR §§ 1501.6, 1508.5. These are key components of NEPA’s “one EIS” requirement, which compels all agencies of the federal government to cooperate with each other, as well as tribes, state, and local governments, to ensure the NEPA documentation of

a federal action provides a comprehensive and efficient analysis of the impacts on the environment from the perspective of present and future generations. 42 U.S.C. §§ 4331(a), 4332(2). Here, the unlawfully limited scope and absence of cooperating agencies in the preparation of the DSEIS has omitted these important components of the NEPA process. 40 C.F.R. §1508.25 (definition of “scope”).

For example, Powertech has filed applications with the Environmental Protection Agency (“EPA”), which has jurisdiction and control over issuance of Class III and a Class V injection wells that are integral parts of the federal action. However, the NRC did not invite EPA to participate in the NEPA analysis of the proposal for these injection wells that is necessary to a lawful NEPA analysis of the full scope of effects and impacts of the pending AEA license application. As discussed herein, both the Class III and Class V injection wells are “connected actions” and even though EPA is the permitting agency, the injection well proposals must be analyzed in the same NEPA analysis as the full Powertech proposal.

NRC staff has similarly omitted and/or delayed analysis of impacts involving safety, cultural resources, endangered species, migratory birds, and solid 11e2 byproduct disposal. These and other omissions involving construction, operations and waste disposal phases of the Powertech proposal are detailed in the DSEIS comments provided to staff on January 10, 2013, and are incorporated here by reference in their entirety. NEPA requires that the substantive protections addressed by the National Historic Preservation Act, Endangered Species Act, Migratory Bird Treaty Act, Utah Agreement State implementation of the Uranium Mill Tailings Radiation Control Act, Safe Drinking Water Act, Clean Air Act, among other laws, be considered in the SDEIS. Instead, the SDEIS treats these actions and impacts, some of which are

outside NRC jurisdiction, as outside of the scope of the NEPA analysis. 40 C.F.R. § 1508.25 (definition of “scope”).

The unlawfully narrow scope of the DSEIS is compounded by the failure to invite governmental agencies with jurisdiction and control over various components of the federal action to participate as cooperating agencies. *See* OST Comments on the DSEIS (attached as Exhibit 1) at 19-20. Federal agencies with expertise and/or jurisdiction over impacts of the project include the Army Corps of Engineers, Fish and Wildlife Service, Environmental Protection Agency, Federal Energy Regulatory Commission, and U.S. Department of Transportation, among others. Local and state entities include agencies from South Dakota, Wyoming, Colorado, and Utah such as the Department of Transportation, Department of Public Health and Environment, Wildlife and Parks, Water Engineers Office, and neighboring municipalities. Relevant Indian Tribes, including the Oglala Sioux Tribe should also have been invited to participate as cooperating agencies on a government-to-government basis. Instead, the Tribal interests have been relegated to cultural and archeological interests. Other Tribal governments, including the Ute Mountain Ute Tribe located next to the proposed 11e2 byproduct disposal cells near the White Mesa Ute Community in Utah, must be invited to participate as cooperating agencies.

Here, the Tribe is harmed by NRC’s failure to provide a NEPA process and documentation based on an adequate scope of analysis and with the participation of the necessary government entities. As such, the “[SD]EIS has neglected to mention a serious environmental consequence, failed adequately to discuss some reasonable alternative, or otherwise swept stubborn problems or serious criticism . . . under the rug.”” *Lee v. United States Air Force*, 354 F.3d 1229, 1242 (10th Cir. 2004) *citing* *Sierra Club v. Peterson*, 228 F.3d 559 (5th Cir. 2000).

DSEIS Contention 11: The DSEIS Fails to Adequately Analyze Cumulative Impacts

The DSEIS fails to adequately analyze cumulative impacts associated with the Dewey-Burdock 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:

This contention is one of omission, and therefore does not require an expert in support. “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 in the mining context 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, including the abandoned and unreclaimed uranium mines within the project area, but also present and foreseeable uranium development. In particular, Powertech admits that this facility is proposed to be used as a processing site for ongoing uranium mineral development in the region, even identifying specific projects that would provide future feed the Burdock regional processing/milling facility:

It is likely that the CPP at the Burdock site will continue to operate for several years following the decommissioning of the Proposed Action well fields. The CPP may continue to process uranium from other ISL projects such as the nearby Powertech (USA) satellite ISL projects of Aladdin and Dewey Terrace planned in Wyoming, as well as possible tolling arrangements with other operators.

Dewey-Burdock Project Application for NRC Uranium Recovery License Fall River and Custer Counties South Dakota Technical Report at p. 1-8. Indeed, Powertech specifically asserted that

future processing of ore from the Aladdin and Dewey Terrace facilities are part of the “Proposed Action” included in the Dewey-Burdock license application:

It is likely that the CPP at the Burdock site will continue to operate for several years following the D&D of the project well fields. **The Proposed Action is for the plant to continue to receive and process uranium loaded resins from other Proposed Projects such as Powertech’s nearby Aladdin and Dewey Terrace Proposed Satellite Facility Projects planned in Wyoming or from other licensed ISL operators or other licensed facilities generating uranium-loaded resins that are compatible with the Powertech (USA) production process.**

Dewey-Burdock Project Application for NRC Uranium Recovery License Fall River and Custer Counties, South Dakota, Environmental Report, February 2009 at p. 1-25 (emphasis added).

Despite the project proponent’s inclusion of these future activities in the application, the DSEIS mentions these mining projects only briefly in the “affected environment” portion of the document with no analysis of the impacts. See DSEIS at 3-6. This omission is glaring light of acknowledgment that the Aladdin project is only 8 miles away (DSEIS at 3-6) – and Powertech’s aggressive advancement of the Aladdin project and Dewey-Terrace project. See Powertech press release and NI 43-101 report (attached to the OST comments on the DSEIS as Exhibit 9). Other mining development in and around the Black Hills region must be evaluated, including the Cameco operations in Nebraska and the proposed Bear Lodge rare earth minerals mine.

Also in need of study in the context of cumulative impacts are the impacts associated with the Black Hills Ordnance Depot. Issues of soil and ground water contamination associated with this site are well-documented. A competent cumulative impact analysis must address potential exacerbation of ground water contamination associated with chemicals from the Depot caused by the proposed Dewey-Burdock project, including ground water pumping both for mining purposes and for fresh water use, along with deep injection disposal.

DSEIS Contention 12: The DSEIS Failed to Consider All Reasonable Alternatives

The DSEIS 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:

This contention is one of omission, and thus does not require an expert in support. 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 Env'tl. 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 in violation of NEPA. 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 state-wide law in places such as Colorado. Further, NRC should consider an alternative of allowing the proponent to move forward with mining of additional well-fields only upon a demonstration that it has operated without excursions, and has restored and demonstrated long-term stability of restoration in previously-mined well-fields. Along these lines, NRC should consider an alternative of allowing operations at either the Dewey or Burdock areas only upon a demonstration that the other area has been successfully mined without excursion and with full, stable, restoration, and only allowing uranium extraction to occur in areas of the aquifers demonstrated to be confined – and disallow any extraction from aquifers, or portions of aquifers, for which the applicant has not yet demonstrated confined conditions.

DEIS Contention 13: Failure to Take a Hard Look at Impacts Associated with Air Emissions and Liquid Waste.

The DSEIS 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:

This contention is one of omission and thus does not require expert support. However, this contention is supported by the Supplemental Declaration of Dr. Robert E. Moran (attached as Exhibit 2). See e.g., Moran Suppl. Decl. at ¶¶ 52-53, 99-100.

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 (9th 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). BLM 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 DSEIS lacks current and confirmed information on air emissions and their impacts on various “receptors” in the region. Although not identified or analyzed in the DSEIS, these “receptors” include people, plants, animals, water bodies, soil, National Parks, etc. Instead of analysis based on a competent air emission dispersion model, the DSEIS provides a model based on admittedly incomplete and erroneous information.

This modeling used the initial emission inventory the applicant provided (Powertech, 2010a). However, the applicant revised the mobile source emission inventory in part to incorporate mitigation measures and improve the accuracy of the emissions expected from the ISR activities (Powertech, 2012d).

DSEIS 4-110. The proper course for NRC staff in the face of such lack of data is to delay the DSEIS to allow Powertech to provide correct information and modeling data. Instead, the DSEIS was released prematurely. As such, the document should be completed, then re-issued for public review and comment.

These same problems pervade the DSEIS air impacts analysis:

The applicant has committed to update the air dispersion modeling before the final SEIS is prepared (Powertech, 2012d). The final SEIS analyses would be based on this updated modeling. SEIS Section 4.7.1 describes the scope of this update, which would include PSD and Air Quality Related Values modeling for the Wind Cave National Park. The applicant has yet to complete the formal air quality permit process including providing any SDDENR-required documentation and information (Powertech, 2010a).

DSEIS at 4-114. Further, an emission inventory for PM_{2.5} particulate emissions, to which radioactive elements may attach and be dispersed via regional dispersion, were not available and were not considered in the DEIS dispersion modeling. DSEIS at C-16.

A DSEIS based on Powertech's "commitment" to provide accurate and useful information on air emissions in a final SEIS does not fulfill NRC's NEPA duties. That portions of the emissions permitting is being done by another agency does not relieve NRC of the NEPA duty to analyze the direct, indirect, and cumulative impacts of the project in the DSEIS that is subjected to comment by the public and other agencies. See 10 C.F.R. § 51.70(a) ("To the fullest extent practicable, environmental impact statements will be prepared concurrently or integrated with environmental impact analyses and related surveys and studies required by other Federal law.").

Further, the DSEIS fails to provide the necessary evidentiary support required for its tactic of averaging of wind speed and direction data across years, days, and hours masks the effects of notorious wind gusts that buffet the region. The annual wind rose data fails to account for seasonal differences in wind direction and velocity. DSEIS at 3-6. Narrower intervals should have been collected and used to provide a reliable impacts analysis. The DSEIS methodology is not compliant with any accepted methodology, resulting in an analysis that masks impacts of wind gusts and major wind storm events. The DSEIS does not analyze the impacts of radioactive and non-radioactive particulate emissions will vary greatly across the range from calm surface to the wind-driven waves that the freeboard is designed to hold. DSEIS at 2-57. However, the varying particulate and radon emission rates from the disposal of liquid $11\text{e}2$ byproduct via evaporation is not analyzed.

The DSEIS 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 DSEIS' reliance on incomplete and incorrect emissions and meteorological data. Even though

“[e]levated gamma readings are also present in the northern part of the Dewey area and are likely due to the deposition of windblown dust from the abandoned surface,” (DSEIS at 3-102), the DSEIS does not attempt to explain the meteorological basis for the “Northeast Anomalous Area.” DSEIS at 3-94-96. An explanation is provided by the Custer, S.D. windrose data published that shows the dominant wind direction summer months in many parts of South Dakota blows from southeast, not the northeast, as is assumed by the annually averaged windrose used in the DSEIS. <http://climate.sdstate.edu/windrose/windrose.shtm> . The frequent south and east to north and west dispersal in summer, along with the high wind speeds in July and August, has consequences for “receptors” to the north and east of the Powertech site.

There is no indication that the National Park Service has been invited to participate as a cooperating agency or to otherwise participate in the air emissions analysis, only a suggestion that such input will come after the DSEIS comment period has closed. DSEIS at 4-112. Although the DSEIS does not identify the specific “receptors,” the analysis of the air emissions and the impact on human health and environment must be provided for public review and comment in a DSEIS.

Regarding disposal of liquid wastes, the DSEIS states that the applicant proposes to rely on Reverse Osmosis (RO) for treatment of its liquid wastes. DSEIS 3-105. In fact, for the deep waste disposal alternative, Powertech proposes to rely primarily on RO for water treatment. DSEIS at 2-36, 4-33. However, the DSEIS does not assess the quality of the wastes to be disposed of or the resulting impacts (see Moran Suppl. Decl. at ¶¶ 52-53, 99-100), nor competently account for the extent of the waste that will be generated. The DSEIS states, without any evidentiary support as required by 10 C.F.R. § 51.70(b), that Powertech will recover 70% of the treated water as usable permeate. DSEIS at 2-36, 4-33. However, according to

government estimates, reverse osmosis can result in a loss of upwards to 95% of the liquid, which would be left in the waste, leaving a more significant waste stream than analyzed in the DSEIS. See University of North Dakota State University, “Reverse Osmosis” AE-1047 (2008), attached to OST comments on the DSEIS as Exhibit 11. This government document states that reverse osmosis is also prone to fail if not meticulously maintained, and further is not advised for larger volumes of water due to the significant water loss and waste associated with the process. The DSEIS fails to analyze or otherwise address these potential limitations and failings.

The DSEIS also fails to adequately address disposal options should the Class V Underground Injection Control permit be denied. The DSEIS states that “[i]f EPA does not grant the applicant a UIC permit, the applicant would need to rely solely on the proposed land application or seek an NRC license amendment to approve another disposal option before it initiated operations.” DSEIS at 2-54. Yet, the DSEIS fails to detail these other potential disposal plans as part of its discussion of impacts, alternatives analysis, and discussion of mitigation, in violation of NEPA and NRC regulations.

With respect to the proposed land application disposal, the DSEIS does not detail the water quality expected from the operation, nor detail any anticipated effectiveness of the proposed water treatment proposals. DSEIS at 2-49. The DSEIS does not detail any information regarding plans should the un-reviewed water treatment plan not perform as expected. These gaps are not condonable under NEPA or NRC regulations. The effectiveness of any treatment plan directly affects the anticipated impacts of the proposal. Simply stating that Powertech “would” clean the water to standards, without any detailed analysis, does not meet NEPA’s, and by extension NRC regulatory, analytical requirements.

Further, the DSEIS 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 to OST comments on the DSEIS as Exhibit 12). This expert wildlife agency has published detailed information on the risks of selenium contamination resulting from disposal of ISL wastes via land application. U.S. Fish and Wildlife Service Contaminant Report Number R6/715C/00 (attached to OST comments on the DSEIS as Exhibit 13). The DSEIS 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.

The proposed project does include the option of surface water treatment of the waste produced during the mining process. The applicant identified several federally and state endangered species but failed to state how they will be affected by the project’s waste via land application. DSEIS at 3-43 to 3-60.

DSEIS Contention 14: The DSEIS Fails to Comply with NEPA With Regard to Impacts on Wildlife, and Fails to Comply with the Endangered Species Act and Migratory Bird Treaty Act.

The DSEIS 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.*, and Migratory Bird Treaty Act, 16 U.S.C. § 703-711, and implementing regulations, by failing to consult as required with the U.S. Fish & Wildlife Service.

Basis and Discussion:

This contention is one of omission and thus does not require expert support. However, the Supplemental Declaration of Dr. Robert E. Moran (attached as Exhibit 2) supports this contention. See e.g., Moran Suppl. Decl. at ¶¶ 96-98 (i.e., land disposal waste characterization absent, selenium impacts not addressed).

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 DSEIS 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 DSEIS, as required by NEPA, NRC regulations, and the Endangered Species Act, 16 U.S.C. § 1531, *et seq.* However, the DSEIS at Section 3.6.1.2.2 “explains that sharp-tailed grouse (*Tympanuchus phasianellus*), ruffed grouse (*Bonasa umbellus*), and Greater sage-grouse (*Centrocercus urophasianus*) could potentially occur in the proposed project area.”

Although the Greater Sage-grouse is a candidate species, NEPA analysis is still required for impacts. While relevant information is available, the DSEIS chose to ignore the studies and draft recommendations.

In August 2012, FWS issued a draft report to help achieve sage-grouse conservation objectives before the 2015 decision. Recommendations from these studies could be implemented at the proposed Dewey-Burdock ISR Project when they are finalized and become available.

DSEIS at 4-84. The DSEIS fails to comply with applicable requirements by failing to incorporate this information into the analysis of impacts, and potential mitigation measures for this imperiled species.

The result is that the DEIS fails to provide the required analysis of the conservation objectives that could be adopted to protect the imperiled Greater sage grouse, and its habitat. There is no valid basis to delay the analysis until after the decision is made. Instead, NEPA

requires that the analysis be conducted at the earliest possible time. To the extent that generation of additional information is anticipated about foreseeable impacts, the supplementation process cannot be used to defeat the timely disclosure and analysis purposes.

Further, language used in the DSEIS 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. DSEIS at 4-92.

No federally listed species are known to occur on the proposed Dewey-Burdock ISR Project site (FWS, 2010). No federal- or state-listed sensitive plant species, endangered or threatened plant species, or designated critical habitats were observed within the proposed project site during baseline wildlife surveys (Powertech, 2009a); therefore, there will be no direct impact to these species.

DSEIS at 4-91. 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 DSEIS 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.

Despite the USFWS determination that Whooping Cranes are expected to occur at the site, NRC staff made an arbitrary and contrary conclusion that finds no basis in the record:

NRC staff conclude that migrating whooping cranes will not likely occur at the proposed site based on their traditional migratory pathway (FWS, 2009). If cranes navigate west of the traditional migratory pathway, NRC staff conclude that it is likely cranes will select other appropriate habitat for roosting, resting, and foraging during the proposed ISR facility lifecycle, and that construction activities will not affect the existence of the species' population in the proposed project area.

DSEIS at 4-92.

The appendix contains no effort to consult or gain USFWS concurrence in NRC staff conclusion. 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 DSEIS confirm that a “no effect” determination is not available for the Powertech Project. 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”).

The DEIS also forwards an unreasonably bounded analysis regarding the Black-footed ferret:

Black-footed ferrets (*Mustela nigripes*) are not present in the site vicinity at this time (BLM, 2009a; FWS, 2010; SEIS Section 3.6.3). However, the presence of the black-tailed prairie dog (*Cynomys ludovicianus*) in the northwestern corner of the proposed project area provides potentially suitable habitat for the black-footed ferret. Because there have been no occurrences of black-footed ferrets within the proposed project area and the prairie dog colony on the site is likely too small to support and sustain a breeding population of black-footed ferrets (as described in SEIS Section 3.6.3), NRC staff conclude that the proposed project construction would not result in a direct effect on current or future ferret populations.

DSEIS at 4-92 - 4-93. As with the whooping crane, the DSEIS does not document any attempt to seek USFWS concurrence or consultation regarding a listed species that the Powertech project “may effect.” Instead, the DSEIS reveals that suitable habitat exists within the project area.

On operations, the DSEIS make a “no-jeopardy” conclusion without benefit of the ESA Section 7 consultation process. Although impacts are identified, there is no evidence that NRC’s determination is based on the necessary expertise and investigations.

“the impacts are expected to noticeably alter important attributes of the terrestrial environment; however, staff do not expect these impacts to threaten the continued existence of any species.”

DSEIS at 4-105(emphasis supplied”). *See Bennett v. Spear*, 520 U.S. 154, 158 (U.S. 1997)(describing statutory Section 7 process to ensure an agency does not threaten the “continued existence” of listed species). As described above, the NRC and its employees ignore the ESA consultation requirements “at its own peril.” *Id.* at 169. Further, there is no basis to segregate the ESA consultation from the NEPA analysis.

Similarly, the Migratory Bird Treaty Act, MBTA provides protection to migratory birds (any bird listed in 50 C.F.R. § 10.13) throughout the U.S., Canada, and Mexico. Under the MBTA, taking, killing, and possession of migratory birds, and their eggs, young, or active nest is prohibited unless authorized by permit from the Secretary of the Interior. In conjunction with NEPA analysis, NRC must consult with U.S. FWS concerning potential impacts to migratory birds. 16 U.S.C. § 703.

The individual and combined NEPA/MBTA study and consultation requirements were not met by the DSEIS, and cannot be deferred until a later stage of the licensing proceedings. The need for MTBA consultation is confirmed by the DSEIS, which identifies a “**MODERATE impact on** vegetation, small- to medium-sized mammals, raptors, upland game birds, waterfowl and shorebirds, nongame and **migratory birds**, and reptiles. . .” DSEIS 4-106(emphasis supplied).

Because the action, impacts, and mitigation measures involving impacts to wildlife have not presented in comprehensive manner, the DEIS fails to comply with NEPA. These NEPA violations are interwoven with violations of the ESA and MTBA, all of which must be remedied by invalidating the DSEIS and remanding to NRC Staff for full compliance with NEPA/MBTA/ESA before the next DSEIS issues. By asserting this contention in this limited

administrative proceeding, the Tribe does not waive its rights to pursue these violations in other administrative and judicial forums.

Impacts from disposal of 11e2 byproduct materials, water disposal and decommissioning activities are expected to have a “MODERATE impact on vegetation, small- to medium-sized mammals, raptors, upland game birds, waterfowl and shorebirds, nongame and migratory birds, and reptiles. . .” DSEIS 4-106. However, a detailed examination of the impacts on wildlife from waste disposal is not provided.

Many other impacted and listed species must be examined in a NEPA analysis that is based on a project area for the 11e2 byproduct license that includes the assumed Utah disposal and the transportation routes. Section 7 consultation with USFWS must also be engaged based on a full range of foreseeable impacts of the 11e2 byproduct licensing action, including the confirmed need for off-site disposal of solid radioactive materials during operation and closure.

III. CONCLUSION

For the foregoing reasons, the Tribe has demonstrated that its DSEIS contentions are admissible. Therefore, the Tribe is entitled to a hearing on these contentions.

Respectfully Submitted,

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Dated at Lyons, Colorado
this 25th day of January, 2013

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	ASLBP No. 10-898-02-MLA-BD01
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Statement of Contentions in the captioned proceeding were served via the Electronic Information Exchange (“EIE”) on the 25th day of January 2013, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

/s/ signed electronically by _____

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Re: Comments on Docket ID NRC-2012-0277; Draft Supplemental Environmental Impact Statement, Proposed Dewey-Burdock In Situ Leach Uranium Mine, South Dakota

Ms. Bladey,

Please accept these comments regarding the above referenced docket ID on behalf of the Oglala Sioux Tribe. At the outset, it is important to bring to BLM's and NRC staff's attention some significant problems with the Dewey-Burdock Draft Supplemental Environmental Impact Statement (DSEIS), particularly with regard to presentation of the scientific and technical bases for a large number of assumptions made in the DSEIS.¹ The NRC staff's use of citations to materials incorporated by reference into the DSEIS is inadequate to justify the scientific conclusions presented.

For example, for reference after reference, the document simply refers to "Powertech 2011" as a source for fundamental conclusions upon which the DSEIS analysis is premised. These assumptions include such basic conclusions as those as to the permeability of the under and over-lying geologic structures (i.e., p. 2-17, 4-56), and the use of "numerical simulations" to evaluate "groundwater conditions" necessary for evaluating monitoring well spacing to detect impacts from lixiviant excursions (i.e., p. 2-16). Many more examples exist throughout the entire DSEIS where it is impossible to identify and assess the referenced materials. The generic citation to "Powertech 2011)" is meaningless without more description and detail of where the information is contained in the document. The Powertech 2011 submittal itself is made up of some 5000 pages of documents. See webpage screen shot showing the list of documents which make up this submittal attached as Exhibit 1. This problem exists with regard to the NRC's reliance on other Powertech submittals as well, including those referenced as "Powertech 2009" and "Powertech 2010" among others. This lack of any specificity makes it virtually impossible to find the precise basis for conclusions made in the DSEIS. The use of generic references obfuscates the technical basis for the analysis and conclusions as to the potential impacts of the project to the point it violates the APA and NEPA, and implementing regulations. See 10 C.F.R. Part 51 (appendix A to subpart A, note 1)(allowing incorporation by reference to material outside a NEPA document, but only "without impeding agency and public review of the action" and only where the material's content is "briefly described").

Further, the DSEIS references the draft license produced by NRC Staff for the Dewey-Burdock proposal as support for the conclusions in the document. DSEIS at 2-71, 4-217. However, it appears that NRC Staff recently issued a revised draft license mere days before the close of the public comment

¹ Throughout these comments, to the extent BLM intends to rely on this SEIS as a basis for its approval of any Mining Plans of Operation for the Dewey-Burdock project, the comments herein are specifically directed at BLM as well as NRC staff.

period on the DSEIS, rendering these references stale. This unfortunate timing results in the inability of the Tribe and any member of the public to meaningfully review the new draft license, despite the fact that the DSEIS specifically relies on the draft license as a supporting reference. This document was never made publicly available during the comment period, in violation of NRC regulations which require that “no material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment.” *Id.* 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. Release of a new draft license within just days of the close of comment, without providing any notice, let alone public distribution of the new draft license document itself, does not provide a reasonable opportunity for the public to review and comment.

As a result of these systemic flaws in the manner in which scientific justifications are presented and the lack of time for the public to review information purported to be relied upon in the DSEIS, the document must be re-published in a manner that provides the necessary information, with the commensurate additional public comment period.

Failure to Require or Provide Necessary Baseline Data

Throughout the DSEIS, NRC proposes to allow Powertech to defer collection of critical data that is admittedly necessary to conduct a review of the project and the resulting impacts. According to the DSEIS, substantial information related to baseline conditions at the site, and needed to assess the impacts of the proposed operations, is not proposed to even be collected or reviewed until long after the NEPA process has concluded. This scheme is not allowable under NEPA.

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 (9th 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).

In this case, the DSEIS has not demonstrated that a baseline has been adequately established. For instance, the DSEIS admits that the applicant has failed to acquire necessary information related to groundwater at the site and hydro-geologic information. For example, the DSEIS admits that substantial water quality data collection and aquifer pump tests will only be conducted after license issuance. DSEIS at 2-16, 7-8, 7-14, 7-17. In fact, the document admits that the NRC staff has yet to even require the

company to design proposals for non-production monitoring wells designed to detect leaks of toxic materials above and below the target ore bodies. Id. Despite the critical importance of these monitoring wells, and their design and placement, the DSEIS proposes that the plan for such wells be proposed only after a “pump test” is complete. DSEIS at 2-17. The DSEIS admits that these tests have yet to even be designed, let alone carried out so that the public has the opportunity to comment on the actual plans proposed for this facility. Id.

This scheme deprives the Tribe, the public and any other reviewing parties any opportunity to review or comment on these important plans. Such an “approve first – plan later” tactic renders it impossible to assess or analyze the potential impacts associated with the proposed mining operation. As such, it violates NEPA’s requirement that the affected environment be described in the NEPA document, and within the NEPA process. It is little comfort that “the applicant must present each monitoring well program to EPA for administrative approval before installing proposed wells. In addition, wells completed in overlying and underlying aquifers are subject to sampling procedures, remedial actions, and reporting requirements prescribed in NRC and EPA rules and regulations.” DSEIS at 2-17. These “administrative approvals” have been arbitrarily excluded from the NEPA process, and appear to be completely outside any public review or scrutiny – in violation of NEPA. The same problem exists for the NRC’s reliance on a Safety and Environmental Review Panel (SERP) to review baseline data, including hydrogeologic results and documentation. DSEIS at 2-18. NEPA does not allow the use of such bodies to the exclusion of presenting data in the DSEIS itself. Even if NRC could rely on post-NEPA review by a SERP, the DSEIS fails to discuss the nature of the SERP or how the objectivity would be preserved, let alone how the Tribe and the public could expect to participate in a meaningful way in the review. The time for this review is in the NEPA document, not in some bureaucratic process shielded from timely outside review.

CEQ regulations specifically prohibit an agency from failing to gather necessary data in order to assess the impacts associated with a proposal. 40 C.F.R. § 1502.22 imposes detailed requirements and justifications necessary for any agency to decline to provide necessary and relevant information. None of these tests have been acknowledged, let alone met, by the DSEIS – nor could they likely be, as the test for not acquiring the relevant information turns on the cost to do so being “exorbitant”. In this case, this information is specifically planned to be acquired as part of the project development, but is simply being deferred until after the NEPA process. Deferring the gathering of such information until after the NEPA process based purely on the convenience to the operator, is not allowable.

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 problems that can flow from analysis and models based on poorly gathered information is often characterized as a garbage in/garbage out. This colloquialism is more technically addressed in the attached memo from Dr. Richard Abitz and confirms that the scientific methodology employed for establishing baseline at a proposed ISL mine is important. Abitz Report attached as Exhibit 2. As a precondition to conducting modeling and analysis, NRC and BLM 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 DSEIS. As described by Dr. Abitz, valid statistical methods and a systematic grid covering all horizons of the aquifer must be employed with respect to baseline ground water quality collection. This includes water quality information throughout the vertical extent of the affected aquifers and a spatially representative sampling protocol to provide the necessary information on ground water characteristics outside of the proposed mining zone, to

accurately characterize site conditions. Lastly, as noted by Dr. Abitz, any proposed methodology that seeks to average site conditions is inappropriate, as it results in a baseline plan which is inappropriately skewed toward demonstrating a lower overall water quality. Such an approach could exaggerate the true extent of any naturally diminished water quality resulting from the presence of uranium and other heavy metals in the aquifer region. Dr. Abitz' report, and each of the critiques contained therein (including air sampling protocol issues) along with the references cited, are expressly incorporated into these comments as if fully set forth herein. Apart from failing to set forth a competent baseline in the DSEIS, the issues described in Dr. Abitz' memo have not been described or otherwise addressed in the DSEIS.

Of particular note concerning the lack of meaningful baseline data are the thousands of historic drill and bore holes within the project area. The DSEIS admits that these bore holes exist and could cause serious environmental impacts by providing a pathway for spread of contamination in the groundwater. DSEIS at 3-20. The DSEIS also admits that pump test data is necessary "to demonstrate that solutions can be controlled with typical wellfield bleed rates and to detect and identify leakage due to anomalies such as improperly plugged wells and exploration boreholes." DSEIS 2-18. However, instead of requiring that Powertech collect the necessary data for analysis in the DSEIS, NRC attempts to entirely evade this issue with statements that "[w]hile the applicant cannot confirm that all historic borings were properly plugged and abandoned, the applicant has made commitments to ensure that unplugged drill holes will not impact human health or the environment during operations." DSEIS at 3-20. Such unsupported assertions do not comply with NEPA's "hard look" mandate. NRC does not identify the source of the Powertech's "commitments," nor how Powertech proposes to "ensure" such protections. Indeed, NRC attempts to argue simply that "there is no other evidence indicating that previously unplugged borings are current groundwater flow pathways." *Id.* Citing to a lack of evidence is of little value in terms of NEPA compliance when NRC proposes to simply defer collection of that very data that would provide that information. Simply put, NRC cannot simply state that no evidence exists when there are methods to acquire such information that can, and will be employed at a later date to, analyze this issue. Avoiding scrutiny of a difficult problem by deferring collection and analysis of such critical information until after license approval cannot stand up under NEPA.

Even if deferral of necessary data collection was allowable, there in fact is evidence that the historic drill holes provide a conduit for ground water migration. The DSEIS states that in the southwest corner of the Burdock area there is "groundwater [] discharging to the ground surface from the Fall River aquifer and Chilson aquifer (Chilson Member of the Lakota Formation) through improperly plugged exploratory boreholes." DSEIS at 3-23. This information necessitates a more detailed review of the issue of historic wells or bore holes – and requires that any feasible pump tests or other analysis be performed as part of the NEPA process, with necessary opportunities for public and agency review and comment, in order to assess the potential impacts of the project.

Additionally, the DSEIS identifies areas where the Fall River aquifer proposed to be mined is not hydrologically confined. Instead of requiring the collection of the data necessary to determine the potential impacts of mining in this unconfined aquifer, NRC instead suggests that "[t]he applicant has committed, as part of the license condition, to conduct additional hydrogeological investigations...." DSEIS at 3-37. As with the other fundamental gaps in meaningful data, this lack of baseline data collection as part of the NEPA process severely undermines the public's (and the agencies') ability to understand and evaluate the potential impacts of the operation. Indeed, it appears throughout the DSEIS that any time there is a question about the impacts, instead of requiring collection of the data necessary to do a proper analysis, NRC and BLM simply allow the company to defer collection of any

data to a later (post-NEPA) time – then claim that “no evidence” exists to demonstrate serious impacts would occur. This is backward. The burden is on the applicant in an NRC proceeding to demonstrate the ability to protect the environment and the public health and on NRC to comply with NEPA. Citing to a lack of evidence when it is due to a lack of any meaningful investigation, is not allowable.

Lastly, this lack of meaningful information is not limited to water impacts. For example, with regard to air impacts, the DSEIS states that “[t]he applicant committed to perform additional air dispersion modeling before the final SEIS is prepared.” DSEIS at xxxvii. Deferral of data gathering with respect to air is no more justifiable than for water. Further, presentation of new data in a Final EIS, without disclosing it in a draft and providing for public review and comment, violates NEPA’s public disclosure and participation requirements.

Many of these issues regarding lack of characterization, baseline data collection, or evidence of ability to contain contamination once ISL mining begins were addressed in detail in the Declaration of Robert Moran, which was attached to the Oglala Sioux Tribe’s Petition to Intervene in this matter. Dr. Moran’s previous testimony is attached hereto as Exhibit 3 and is expressly incorporated into these comments, as if set forth fully herein. As a result, NRC and BLM must address each of Dr. Moran’s critiques in the context of the SEIS and its obligation to respond to comments.

Mitigation Measures Are Not Adequately Analyzed

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 (9th 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 (9th Cir. 1998). The DSEIS’s reliance on a future, as yet-unsubmitted, mitigation to prevent/mitigate adverse impacts to these resources also violates NRC and BLM 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 and BLM rely 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 DSEIS expressly relies on mitigation in justifying a preliminary recommendation to issue the proposed license. DSEIS at xlv, xxx. Unfortunately, the proposed mitigation consists overwhelmingly of a list of plans to be developed later, outside the NEPA process. DSEIS at 6-1 through 6-19. Much like the failure to analyze baseline data, the DSEIS 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. For instance, the DSEIS repeatedly refers to Powertech's commitment to restore groundwater back to its pre-mining condition. "The applicant will also be required to restore groundwater parameters affected by ISR operations to levels that are protective of human health and safety." DSEIS at 2-69. The DSEIS similarly simply states that Powertech will be required to restore aquifers to background concentrations. DSEIS at 4-51, 5-52, 4-64. However, such assurances, without any evaluation of how effective these restorations efforts are expected to be, do not satisfy NEPA.

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. 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 resolubilization 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)(emphasis added)(attached as Exhibit 4). 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 5). 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 as Exhibit 6). These issues echo the issues regarding repeated failures of industry and regulators to meet pollution control assurances as set forth in the Oglala Sioux Tribe's successful Petition to Intervene in the Dewey-Burdock licensing process. Petition to Intervene at 1-11 (attached as Exhibit 7). Lastly, recent investigative journalism pieces have also exposed the lack of effective mitigation for ISL uranium mining operations such as that proposed at Dewey-Burdock. See Lustgarten, Abrahm, "On a Wyoming Ranch, Feds Sacrifice Tomorrow's Water to Mine Uranium Today," ProPublica, Dec. 26, 2012 (attached as Exhibit 8).

The ISL industry's historic and ongoing inability to control aquifer contamination and restore groundwater impacted by ISL uranium mining must be acknowledged and competently addressed within the NEPA process. While the DSEIS presents some general methods for restoration of the groundwater following mining operations, it does not provide detail as to how this proponent expects to succeed where all others have failed, assess any objective criteria for the effectiveness of these methods, nor how these issues affect the potential impacts of the proposed project. A detailed evaluation of the effectiveness of any proposed mitigation measure is required by NEPA. This lack of analysis of proposed mitigation measures is expansive, and not limited to ground water mitigation. The current mitigation measure list consists of a multi-page chart which simply lists each proposed mitigation measure, with no elaboration or other analysis of how the operator expects to accomplish these items, or how effective each is expected to be (if at all), as required by NEPA. 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 and BLM must conduct this necessary work, then re-issue the DSEIS for meaningful public and agency review.

Cumulative Impacts Have Not Been Adequately Addressed

“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, including the abandoned and unreclaimed uranium mines within the project area, but also present and foreseeable uranium development. In particular, Powertech admits that this facility is proposed to be used as a processing site for ongoing uranium mineral development in the region, even identifying specific projects that would provide future feed the Burdock regional processing/milling facility:

It is likely that the CPP at the Burdock site will continue to operate for several years following the decommissioning of the Proposed Action well fields. The CPP may continue to process uranium from other ISL projects such as the nearby Powertech (USA) satellite ISL projects of Aladdin and Dewey Terrace planned in Wyoming, as well as possible tolling arrangements with other operators.

Dewey-Burdock Project Application for NRC Uranium Recovery License Fall River and Custer Counties South Dakota Technical Report at p. 1-8. Indeed, Powertech specifically asserted that future processing of ore from the Aladdin and Dewey Terrace facilities are part of the “Proposed Action” included in the Dewey-Burdock license application:

It is likely that the CPP at the Burdock site will continue to operate for several years following the D&D of the project well fields. **The Proposed Action is for the plant to continue to receive and process uranium loaded resins from other Proposed Projects such as Powertech's nearby Aladdin and Dewey Terrace Proposed Satellite Facility Projects planned in Wyoming or from other licensed ISL operators or other licensed facilities generating uranium-loaded resins that are compatible with the Powertech (USA) production process.**

Dewey-Burdock Project Application for NRC Uranium Recovery License Fall River and Custer Counties, South Dakota, Environmental Report, February 2009 at p. 1-25 (emphasis added).

Despite the project proponent's inclusion of these future activities in the application, the DSEIS mentions these mining projects only briefly in the "affected environment" portion of the document with no analysis of the impacts. See DSEIS at 3-6. This omission is glaring light of acknowledgment that the Aladdin project is only 8 miles away (DSEIS at 3-6) – and Powertech's aggressive advancement of the Aladdin project and Dewey-Terrace project. See Powertech press release and NI 43-101 report (attached as Exhibit 9). Other mining development in and around the Black Hills region must be evaluated, including the Cameco operations in Nebraska and the proposed Bear Lodge rare earth minerals mine.

Also of concern with respect to cumulative impacts are those associated with the Black Hills Ordnance Depot. Issues of soil and ground water contamination associated with this site are well-documented. The cumulative impact analysis must address potential exacerbation of ground water contamination associated with chemicals from the Depot caused by the proposed Dewey-Burdock project, including ground water pumping both for mining purposes and for fresh water use, along with deep injection disposal.

The DSEIS Fails to Consider All Reasonable Alternatives

The range of alternatives is "the heart of the environmental impact statement." 40 C.F.R. § 1502.14. 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 Env'tl. Defense Center v. Bonneville Power Admin., 117 F.3d 1520, 1538 (9th Cir. 1997). 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 Env'tl. 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. Further, NRC

should consider an alternative of allowing the proponent to move forward with mining of additional well-fields only upon a demonstration that it has operated without excursions, and has restored and demonstrated long-term stability of restoration in previously-mined well-fields. Along these lines, NRC should consider an alternative of allowing operations at either the Dewey or Burdock areas only upon a demonstration that the other area has been successfully mined without excursion and with full, stable, restoration, and only allowing uranium extraction to occur in areas of the aquifers demonstrated to be confined – and disallow any extraction from aquifers, or portions of aquifers, for which the applicant has not yet demonstrated confined conditions.

The Project Does Not Comply with the 1872 Mining Law or the Administrative Procedure Act

The operation violates the 1872 Mining Law and the Administrative Procedure Act. Powertech proposes to use lode mining claims for purposes entirely unrelated to the extraction of valuable minerals, despite the requirement that all lode mining claims contain valuable mineral deposits. In fact, the materials provided by Powertech to the BLM and EPA demonstrate that Powertech intends not to extract minerals from lode claims, but solely for deep disposal of toxic mining wastes. Instead of applying only the “unnecessary or undue degradation” under 43 C.F.R. part 3809 to these operations, the BLM must apply its full panoply of FLPMA authorities, including a public interest review and payment of fair market value.

The DSEIS rests on the erroneous assumption that Powertech that has a statutory right to develop federal mineral resources at the site. Thus, according to the DSEIS, Powertech has a statutory right to conduct its processing and waste injection disposal and other operations based solely on the fact that the company has blanketed the projects lands with mining claims. Here, Powertech has filed lode mining claims covering the federal surface lands and the private surface/federal mineral lands in the project area, including those where no actual mining is proposed (i.e., dumping, processing, and other ancillary uses).

According to the DSEIS, the filing of these claims establishes a right under the mining laws and confines the analysis of the project under BLM authority to only a review of whether the operation will cause “unnecessary or undue degradation” under FLPMA. DSEIS at xxvii – xxviii. This position is wrong. Such “rights” can only accrue to the company if these claims are valid under the 1872 Mining Law. Here, there is no evidence in the record that these claims are valid.

Without valid rights under the mining laws, Powertech is subject to the full scope of the BLM’s authority under FLPMA, the Multiple Use Sustained Yield Act, and other laws mandating that BLM manage these lands for non-mineral uses. This includes discretionary authority over the project based on a required public interest analysis, and the Fair Market Value (FMV) requirement for the use of public lands not covered by valid mining claims.

The DSEIS’s review and the BLM’s proposed approval of the Project are based on the overriding assumption that Powertech has statutory rights to use all of the public lands and subsurface at the site under the 1872 Mining Law. However, where Project lands have not been verified to contain, or do not contain, such rights, the BLM’s more discretionary multiple use authorities apply. Mineral Policy Center v. Norton, 292 F.Supp.2d 30, 46-51 (D.D.C. 2003); 30 U.S.C. § 22 (only “valuable mineral deposits” are covered by the Mining Law).

A proper application of BLM's multiple use, public interest, and sustained yield mandates to those areas not covered by valid claims would result in a very different Project review, alternatives, and level of protection for public land resources and values, as well as reducing or eliminating the adverse impacts to the use of these lands by members of the public and commenters.

The Mineral Policy Center court specifically recognized the federal government's duty to apply its broader, multiple use authority when mineral development operations are proposed on lands not subject to valid and perfected claims:

While a claimant can explore for valuable mineral deposits before perfecting a valid mining claim, without such a claim, she has no property rights against the United States (although she may establish rights against other potential claimants), and her use of the land may be circumscribed beyond the UUD standard because it is not explicitly protected by the Mining Law.

292 F.Supp.2d at 47.

The court was equally clear as to what was required to "perfect" a mining claim:

The Mining Law gives individuals the right to explore for mineral resources on lands that are "free and open" in advance of having made a "discovery" or perfected a valid mining claim. United States v. Locke, 471 U.S. 84, 86, 105 S.Ct. 1785, 85 L.Ed.2d 64 (1985). The Mining Law provides, however, that a mining claim cannot be perfected "until the discovery of the vein or lode." 30 U.S.C. § 23.

Id. at 46 n.19. For mining claims for which BLM has not determined are valid, pursuant to the Mineral Policy Center decision:

[b]efore an operator perfects her claim, because there are no rights under the Mining Law that must be respected, BLM has wide discretion in deciding whether to approve or disapprove of a miner's proposed plan of operations.

Id. at 48. In its review of the Project, the DSEIS never even considers this "wide discretion" to "approve or disapprove" any part of Powertech's Plan of Operations.

Regarding the requirement for the federal government to obtain Fair Market Value for the use of public lands not covered by valid claims, the court held that, under FLPMA, "the United States [must] receive fair market value of the use of the public lands and their resources unless otherwise provided for by statute." 43 U.S.C. §1701(a)(9). The court held that unless the lands were covered by valid claims (i.e. the situation "otherwise provided for by statute" in § 1701(a)(9)), the agencies must comply with their Fair Market Value duty:

Operations neither conducted pursuant to valid mining claims nor otherwise explicitly protected by FLPMA or the Mining Law (i.e., exploration activities, ingress and egress, and limited utilization of mill sites) must be evaluated in light of Congress's expressed policy goal for the United States to "receive fair market value of the use of the public lands and their resources." 43 U.S.C. § 1701(a)(9).

Id. at 51.

At Dewey-Burdock, the DSEIS fails to consider the application of these multiple use authorities, and related Fair Market Value requirements pursuant to Mineral Policy Center – in violation of FLPMA, the Mining Law, and their multiple use mandates, as well as the APA’s prohibition on arbitrary and capricious decisionmaking.

As the Interior Department has held:

Generally, absent the discovery of a “valuable mineral deposit” on each of the unpatented lode mining claims, ASARCO would not be entitled to the “exclusive right of possession and enjoyment of all the surface [of the claim]” and subsurface rights under 30 U.S.C. §§ 22 and 26, good against the United States, or ultimately to a patent of the claimed lands, pursuant to 30 U.S.C. §§ 22 and 29 (2000). Best v. Humboldt Placer Mining Co., 371 U.S. 334, 335-36 (1963); Wilbur v. Krushnic, 280 U.S. 306, 316-17 (1930); Cameron v. United States, 252 U.S. 450, 460 (1920); Cole v. Ralph, 252 U.S. 286, 294-96 (1920). In such circumstances, BLM would have discretion to modify or even reject an MPO filed to engage in mining operations and related activity. Great Basin Mine Watch, 146 IBLA 248, 256 (1998) (“Rights to mine under the general mining laws are derivative of a discovery of a valuable mineral deposit”).

Center for Biological Diversity, 162 IBLA 268, 278 (2004). “[T]he location of a mining claim does not render a claim presumptively valid and the Department may require a claimant to provide evidence of validity before approving an MPO or allowing other surface disturbance in connection with the claim.” Id. at 281.

In addition, BLM’s decision not to require the payment of Fair Market Value, and to limit its authority over the use of the ancillary lands, must be supported by substantial evidence in the record—evidence which does not exist. The agency cannot simply assume, without any evidence (and indeed the evidence points to the contrary) that the lands to be buried by the dumps and processing facilities are covered by valid mining claims. The Supreme Court has explained:

[A]n agency [decision] would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto Ins. Co., 463 U.S. 29, 43 (1983).

In this case, Powertech claims maps show that the lands proposed for the waste disposal, and other non-extractive uses do not contain the requisite valuable minerals (e.g., the mineralized zone is limited), the DSEIS’s assumptions of “rights” under the Mining Law are erroneous. At a minimum, the agencies’ assumptions of these rights/entitlements should be investigated and supported by detailed factual evidence – evidence lacking in the DSEIS.

The DSEIS Fails to Adequately Address Impacts to Cultural Resources, or Comply with the NHPA

The DSEIS violates NEPA and the NHPA because it fails to include a comprehensive analysis of cultural impacts. In fact, it appears that despite the application having been pending for some three years, there has yet to be done a competent cultural resource inventory of the site. Simply put, the NRC should not have released the admittedly incomplete DSEIS. Powertech had an obligation at the application stage to provide a competent analysis of cultural resources – and it failed to do so. The fact that the company has been either unwilling or unable to gather competent information does not provide a basis to pressure NRC staff to issue an incomplete DSEIS. It is not an excuse that the NHPA section 106 consultation duties are the responsibility of NRC and BLM, rather than that of Powertech. Powertech has no reasonable expectation that its proposed mine in an area of significant cultural importance would not require the requisite detailed review of cultural resources and impacts thereto. The fact that NRC decided instead to issue the DSEIS rather than complete its information violates NEPA's requirements to provide meaningful public comment or review. NRC should suspend the DSEIS process until such information is available, and reissue the draft when the necessary information is acquired and fully reviewed. Making matters worse, NRC appears poised to forgo any draft analysis of the cultural resources impacts, instead indicating only that "[r]esults of the [section 106] consultation will be presented in the final SEIS." DSEIS 1-22. NEPA and the NHPA prohibit any attempt to forgo a complete draft analysis of cultural impacts by going directly to final.

NRC Staff states that it is continuing to consult with certain Tribes. However, some of this consultation has not been as productive as anticipated by the Tribes, including the Oglala Sioux Tribe with respect to historical and cultural survey. See letters from the Tribes to NRC regarding the proposed contract by KLJ with the Turtle Mountain Band of Chippewa Indians and the Three Affiliated Tribes, attached as Exhibit 10. These two Tribes contacted the NRC by letter and stated that the proposed project would not have an affect on historic properties of importance and the THPO also stated that "determination of No Historic Properties Affected Is granted for the project to proceed." DSEIS at 1-17 to 1-18. Despite this response to project, the NRC accepted their participation and contract for the survey.

Furthermore, the Oglala Sioux Tribe and other Sioux Tribes by letters and email to NRC expressed concerns about the proposed contract and company selected (See Letters and Emails to NRC from Tribes from October 2012 to November 2012, including in Exhibit 10). The Oglala Sioux Tribe did request additional time to review the proposed contract but only given additional time to select one individual to participate in the survey with KLJ. (See email from NRC to Oglala Sioux Tribe dated November 2, 2012, included in Exhibit 10).

Significant Historical and Cultural Impacts Are Anticipated for Small Impacts to Local Economy

During the construction phase of the proposed project it is anticipated that there will be a small to large impact upon the historical and cultural resources. DSEIS at xxxix.

NRC is willing to issue a license by allowing Powertech to have an unexpected discovery plan to mitigate or relocate if possible of any historical or cultural resources are found. A plan which has not been drafted or presented to the public or other governmental agencies for review and comment. Id.

The proposed project is expected to have a small impact upon the socioeconomics of the area throughout all phases of the project DSEIS at xl. According to NRC, Operations of the Proposed Dewey-Burdock ISR Project will create new jobs but because of the small workforce size and because most

skilled workers will be drawn from areas outside of the region of influence, impacts on employment will not be noticeable. DSEIS at xl-xli.

The DSEIS Improperly Relies on Other Non-NEPA State and Federal Permits To Defer Review of Impacts

The DSEIS repeatedly relies upon state and other federal agencies to require appropriate mitigation measures to lessen impacts, and uses those permitting processes to simply defer analysis of impacts to these other agencies. For instance, in making its determination that impacts from the use of Class V underground waste injection wells is “small”, the DSEIS defers to the fact that “EPA will evaluate the suitability of the formations proposed for Class V well injection. Class V injection disposal will be allowed only when the applicant demonstrates liquid waste can be isolated safely in a deep aquifer.” DSEIS at 4-44. NRC similarly defers to a future EPA analysis related to the UIC Class III well permitting process and to the South Dakota state processes. DSEIS at 3-39, 4-54, 4-67, 4-68, B-3. In this way, the DSEIS simply defers analysis of the potential impacts to EPA permits under the Safe Drinking Water Act (SDWA). However, neither EPA UIC permits nor any South Dakota state permits are subject to NEPA.

The NRC is prohibited from such blind reliance on other agencies to conduct its analysis of the baseline, potential impacts, and proposed mitigation associated with a uranium mine proposal. See 10 C.F.R. § 51.71 (“The environmental impact of the proposed action will be considered in the analysis with respect to matters covered by environmental quality standards and requirements irrespective of whether a certification or license from the appropriate authority has been obtained.”). The DSEIS’ reliance on South Dakota permitting processes similarly cannot excuse NRC and BLM responsibilities to fully review the environmental impacts. South Fork Band Council v. BLM, 588 F.3d 718, 726 (9th Cir. 2009)(“A non-NEPA document -- let alone one prepared and adopted by a state government -- cannot satisfy a federal agency's obligations under NEPA.”).

Failure to Properly Account for Waste Disposal

The applicant proposes to rely on Reverse Osmosis (RO) for treatment of its liquid wastes. DSEIS 3-105. In fact, for the deep waste disposal alternative, Powertech proposes to rely primarily on RO for water treatment. DSEIS at 2-36, 4-33. The DSEIS does not competently account for the extent of the waste that will be generated. The DSEIS states, without any support, that Powertech will recover 70% of the treated water as usable permeate. DSEIS at 2-36, 4-33. However, according to government estimates, reverse osmosis can result in a loss of upwards to 95% of the liquid, which would be left in the waste, leaving a more significant waste stream than analyzed in the DSEIS. See University of North Dakota State University, “Reverse Osmosis” AE-1047 (2008), attached as Exhibit 11. This government document states that reverse osmosis is also prone to fail if not meticulously maintained, and further is not advised for larger volumes of water due to the significant water loss and waste associated with the process. The DSEIS must accurately review Powertech’s plan regarding waste disposal to analyze and compensate for these factors.

The DSEIS also fails to adequately address disposal options should the Class V Underground Injection Control permit be denied. The DSEIS states that “[i]f EPA does not grant the applicant a UIC permit, the applicant would need to rely solely on the proposed land application or seek an NRC license amendment to approve another disposal option before it initiated operations.” DSEIS at 2-54. The DSEIS must detail these other potential disposal plans as part of its discussion of impacts, alternatives analysis, and discussion of mitigation.

With respect to the proposed land application disposal, the DSEIS does not detail the water quality expected from the operation, nor detail any anticipated effectiveness of the proposed water treatment proposals. DSEIS at 2-49. The DSEIS does not detail any information regarding plans should the un-reviewed water treatment plan not perform as expected. These gaps are not condonable under NEPA. The effectiveness of any treatment plan directly affects the anticipated impacts of the proposal. Simply stating that Powertech “would” clean the water to standards, without any detailed analysis, does not meet NEPA’s analytical requirements.

Further, the DSEIS 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 12). This expert wildlife agency has published detailed information on the risks of selenium contamination resulting from disposal of ISL wastes via land application. U.S. Fish and Wildlife Service Contaminant Report Number R6/715C/00 (attached as Exhibit 13). The DSEIS must fully 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.

The proposed project does include the option of surface water treatment of the waste produced during the mining process. The applicant identified several federally and state endangered species but failed to state how they will be affected by the project’s waste via land application. DSEIS at 3-43 to 3-60.

Reliance on the Generic Environmental Impact Statement is Unwarranted

At the time the GEIS was issued, substantial critical public comments regarding the process for the GEIS were lodged. NRC appears to not have taken up a discussion of any of the critiques offered on that document. As such, reliance on GEIS is not warranted. Because the GEIS itself did not comply with NEPA, both in process and in substance, it cannot be relied upon in this SEIS. NRC must fully review the comments submitted on the GEIS and assess how those comments affect this SEIS. Failure to do so allows the agency to rely on the GEIS without compliance with NEPA – a violation of NEPA that carries forward to the SEIS for the Dewey-Burdock proposal.

Solid 11e2 byproduct Impacts and Environmental Justice

Where a byproduct materials license is being contemplated in the licensing action, NEPA demands that on-site creation and storage of the solid 11e2 byproduct must be fully analyzed in a DSEIS along with an analysis of the plan for off-site shipment and disposal of the waste. Yet, the DSEIS does not analyze the impacts or potential mitigation measures for a range of alternatives available for storing and disposal of solid 11e2 byproduct during operations and during decommissioning and closure. Although some amount of 11e2 byproduct will be created during the operations phase, particularly related to maintenance, repair, and the rolling closure of well-fields, the anticipated type and amount of wastes are not identified in the DSEIS beyond a generic reference. DSEIS 2-10. Further, the DSEIS does not analyze the impacts or alternative plans to store these vaguely referenced solid 11e2 byproduct materials. Instead, the DSEIS contains only a vague intent to ship these materials to the Energy Fuels facility near Blanding, Utah and the Ute Mountain Ute Community at White Mesa. The DSEIS does not reveal that Energy Fuels does not have a disposal cell that is currently licensed to accept direct disposal

of such wastes at any of the Canadian Corporation's U.S. holdings. The confirmed lack of suitable on-site locations for disposal of solid 11e2 byproduct were not revealed or analyzed in the DSEIS.

Because off-site transport and off-site disposal of 11e2 byproduct is an integral part of the present federal action, these impacts and the impacts of on-site storage in anticipation of transport for off-site disposal must be revealed and analyzed in the DSEIS. This DSEIS for the licensing of the creation, storage, transport, and disposal of solid byproduct materials must include disclosure and analysis of reasons why the past and present management of the White Mesa Mill have been unable to meet state and federal standards. According to data published on the Mine Safety Health Administration website, recent inspections identified violations that resulted in tens of thousands of dollars of fines. Other issues of ongoing groundwater contamination and off-site air deposition of radioactive materials at the White Mesa Mill must also receive NEPA analysis. Because NRC relies on White Mesa as the disposal site for the wastes, the agency must analyze impacts associated with the operation and disposal of the Powertech wastes at the White Mesa location. Similarly, alternative disposal sites were improperly not identified or analyzed in the DSEIS – despite admissions that alternate sites may be necessary due to lack of any existing contract for solid 11e2 byproduct disposal space.

Additional and serious environmental justice issues are raised by the assumption that these solid 11e2 byproduct materials will be sent to San Juan County, Utah. Census data confirms that San Juan County, Utah is comprised of 49% “American Indian and Native Alaska persons.” <http://quickfacts.census.gov/qfd/states/49/49037.html>. “White persons not Hispanic” only comprise 44.2% of San Juan County's population, and 29.4% of the county population lives below the poverty line. *Id.*

The NRC's past practice of relying on project proponent assumptions and future promises to find a disposal site at some date after licensed wastes are created did not work at reactors. This repudiated practice of creating waste without a confirmed disposal site cannot be allowed to extend to the D-B ISL project. Even if this were permissible under UMTRCA and applicable NRC rules (esp. Appendix A), which it is not, NEPA requires that NRC must fully disclose and analyze the foreseeable impacts of solid 11e2 byproduct disposal. A new DSEIS must be prepared that confirms whether or not a licensed site currently exists to accept Powertech's solid 11e2 byproduct. Because the answer is likely ‘no,’ the lack of licensed disposal capacity contradicts Powertech's assumptions and a DSEIS built on the assumption that Powertech can obtain a contract for waste disposal space. A new DSEIS analysis must also analyze other potential alternative sites to ensure off-site capacity will be maintained open via license and contract to ensure space is available for disposal of solid 11e2 byproduct materials during decommissioning.

The present DSEIS is fatally flawed, as it fails to disclose and analyze the impacts of creation, storage, transport, and disposal of solid 11e2 byproduct. A new NEPA scoping notice must issue that reveals the project area for the 11e2 byproduct license includes the Utah disposal site and the transportation routes, as well as other reasonable alternative disposal plans.

Threatened and Endangered Species

Endangered Species Act Section 7 consultation was not completed, and imperiled species were glossed over in the DSEIS. However, the DSEIS at Section 3.6.1.2.2 “explains that sharp-tailed grouse (*Tympanuchus phasianellus*), ruffed grouse (*Bonasa umbellus*), and Greater sage-grouse (*Centrocercus urophasianus*) could potentially occur in the proposed project area.”

Although the Greater Sage-grouse is a candidate species, NEPA analysis is still required for impacts. Although relevant information is available, the DSEIS chose to ignore the studies and draft recommendations.

In August 2012, FWS issued a draft report to help achieve sage-grouse conservation objectives before the 2015 decision. Recommendations from these studies could be implemented at the proposed Dewey-Burdock ISR Project when they are finalized and become available.

DSEIS at 4-84. NRC need not, and indeed cannot, issue the DSEIS without incorporating the information into the analysis of impacts, and potential mitigation measures for this imperiled species.

The result is that the DEIS fails to provide the required analysis of the conservation objectives that could be adopted to protect the imperiled Greater sage grouse, and its habitat. There is no valid basis to delay the analysis until after the licensing decision is made. Instead, NEPA requires that the analysis be conducted at the earliest possible time. To the extent that generation of additional information is anticipated about foreseeable impacts, the supplementation process cannot be used to defeat NEPA's timely disclosure and analysis purposes.

Further, language used in the DSEIS 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. DSEIS at 4-92.

No federally listed species are known to occur on the proposed Dewey-Burdock ISR Project site (FWS, 2010). No federal- or state-listed sensitive plant species, endangered or threatened plant species, or designated critical habitats were observed within the proposed project site during baseline wildlife surveys (Powertech, 2009a); therefore, there will be no direct impact to these species.

DSEIS at 4-91. Observation of a listed species within the project site is not relevant to the question of whether or not there will be a direct impact to these species. The analysis, having been arbitrarily constrained, must be presented in a new DSEIS that recognizes the on and off-site impacts on wildlife, including but not limited to those species listed under the Endangered Species Act.

Despite the USFWS determination that Whooping Cranes are expected to occur at the site, NRC staff made an arbitrary and contrary conclusion that finds no basis in the record:

NRC staff conclude that migrating whooping cranes will not likely occur at the proposed site based on their traditional migratory pathway (FWS, 2009). If cranes navigate west of the traditional migratory pathway, NRC staff conclude that it is likely cranes will select other appropriate habitat for roosting, resting, and foraging during the proposed ISR facility lifecycle, and that construction activities will not affect the existence of the species' population in the proposed project area.

DSEIS at 4-92. The appendix contains no effort to consult or gain USFWS concurrence in the NRC staff conclusion. 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 DSEIS confirm that a "no effect" determination is not available for the Powertech Project. 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”).

The DEIS also forwards an unreasonably bounded analysis regarding the Black-footed ferret:

Black-footed ferrets (*Mustela nigripes*) are not present in the site vicinity at this time (BLM, 2009a; FWS, 2010; SEIS Section 3.6.3). However, the presence of the black-tailed prairie dog (*Cynomys ludovicianus*) in the northwestern corner of the proposed project area provides potentially suitable habitat for the black-footed ferret.

Because there have been no occurrences of black-footed ferrets within the proposed project area and the prairie dog colony on the site is likely too small to support and sustain a breeding population of black-footed ferrets (as described in SEIS Section 3.6.3), NRC staff conclude that the proposed project construction would not result in a direct effect on current or future ferret populations.

DSEIS at 4-92 - 4-93. As with the whooping crane, the DSEIS does not document any attempt to seek USFWS concurrence or consultation regarding a listed species that the Powertech project “may effect.” Instead, the DSEIS reveals that suitable habitat exists within the project area.

On operations, the DSEIS makes a “no-jeopardy” conclusion without benefit of the ESA Section 7 consultation process. Although impacts are identified, there is no evidence that NRC’s determination is based on the necessary expertise and investigations.

“the impacts are expected to noticeably alter important attributes of the terrestrial environment; however, staff do not expect these impacts to threaten the continued existence of any species.”

DSEIS at 4-105(emphasis supplied”). See Bennett v. Spear, 520 U.S. 154, 158 (U.S. 1997)(describing statutory Section 7 process that is required to ensure an agency does not threaten the “continued existence” of listed species). As described above, the NRC and its employees ignore the ESA consultation requirements “at its own peril.” Id. at 169. Further, there is no basis to segregate the ESA consultation from the NEPA analysis.

Impacts from disposal of 11e2 byproduct materials, water disposal and decommissioning activities are expected to have a “MODERATE impact on vegetation, small- to medium-sized mammals, raptors, upland game birds, waterfowl and shorebirds, nongame and migratory birds, and reptiles. . .” DSEIS 4-106. However, a detailed examination of the impacts on wildlife from waste disposal is not provided. Most egregious, the impacts of transporting solid 11e2 byproduct materials to Utah are not analyzed. There is no mention of these foreseeable disposal and decommissioning impacts in the 2009 and 2010 correspondence with USFWS. For example, all travel routes to Utah implicate the listed Lynx. Proper consultation with USFWS will no doubt reveal other listed species beyond those identified by NRC staff.

Many other impacted and listed species must be examined in a correlated ESA consultation and NEPA analysis that is based on a project area for the 11e2 byproduct license that includes the assumed Utah disposal and the transportation routes. Section 7 consultation with USFWS must be engaged based on a full range of foreseeable impacts of the 11e2 byproduct licensing action, including the confirmed need for off-site disposal of solid radioactive materials during operation and closure.

Air Emissions

The DSEIS lacks current and confirmed information on air emissions and their impacts on various “receptors” in the region. Although not identified or analyzed in the DSEIS, these “receptors” include people, plants, animals, water bodies, soil, National Parks, etc. Instead of analysis based on a competent air emission dispersion model, the DSEIS provides a model based on admittedly incomplete and erroneous information.

This modeling used the initial emission inventory the applicant provided (Powertech, 2010a). However, the applicant revised the mobile source emission inventory in part to incorporate mitigation measures and improve the accuracy of the emissions expected from the ISR activities (Powertech, 2012d).

4-110. Instead of delaying the DSEIS to allow Powertech to provide correct information and modeling data, the DSEIS was released prematurely.

The applicant has committed to update the air dispersion modeling before the final SEIS is prepared (Powertech, 2012d). The final SEIS analyses would be based on this updated modeling. SEIS Section 4.7.1 describes the scope of this update, which would include PSD and Air Quality Related Values modeling for the Wind Cave National Park. The applicant has yet to complete the formal air quality permit process including providing any SDDENR-required documentation and information (Powertech, 2010a).

DSEIS at 4-114. Further, an emission inventory for PM_{2.5} particulate emissions, to which radioactive elements may attach and be dispersed via regional dispersion, were not available and were not considered in the DEIS dispersion modeling. DSEIS at C-16.

A DSEIS based on Powertech’s “commitment to provide accurate and useful information on air emissions in a final SEIS does not fulfill NRC’s NEPA duties. That portions of the emissions permitting is being done by another agency does not relieve NRC of the NEPA duty to analyze the direct, indirect, and cumulative impacts of the project in the DSEIS that is subjected to comment by the public and other agencies.

Further, averaging of wind speed and direction data across years, days, and hours masks the effects of notorious wind gusts that buffet the region. The annual wind rose data fails to account for seasonal differences in wind direction and velocity. DSEIS at 3-6. Narrower intervals should have been collected and used to provide a reliable impacts analysis. The DSEIS methodology is not compliant with any accepted methodology, resulting in an analysis that masks impacts of wind gusts and major wind storm events. The DSEIS does not analyze the impacts of radioactive and non-radioactive particulate emissions will vary greatly across the range from calm surface to the wind-driven waves that the freeboard is designed to hold. DSEIS at 2-57. However, the varying particulate and radon emission rates from the disposal of liquid 11e2 byproduct via evaporation are not analyzed.

The DSEIS makes no mention of the foreseeable impact of major wind storm events, including tornadoes, on the facility or the dispersion of emissions from the facility.

Unresolved questions of radioactive contamination at the site are related the DSEIS reliance on incomplete and incorrect emissions and meteorological data. Even though “[e]levated gamma readings are also present in the northern part of the Dewey area and are likely due to the deposition of windblown dust from the abandoned surface,” (DSEIS at 3-102), the DSEIS does not attempt to explain

the meteorological basis for the “Northeast Anomalous Area.” DSEIS at 3-94-96. An explanation is provided by published Custer, S.D. wind rose data that shows the dominant wind direction during the summer months in many parts of South Dakota blows from southeast, not the northeast, as is assumed by the annually averaged wind rose used in the DSEIS.

<http://climate.sdstate.edu/windrose/windrose.shtml> . The frequent south and east to north and west emissions dispersal in summer, along with the high wind speeds in July and August, has consequences for “receptors” to the north and east of the Powertech site.

There is no indication that the National Park Service has been invited to participate as a cooperating agency or to otherwise participate in the air emissions analysis, only a suggestion that such input will come after the DSEIS comment period has closed. DSEIS at 4-112. Although the DSEIS does not identify the specific “receptors,” the analysis of the air emissions and the impact on human health and environment must be provided for review and comment in a DSEIS.

Global Warming and Long-Term Impacts

The cumulative impacts analysis limits global warming to an arbitrary 10 year period. Although the project lifetime of the D-B ISL Project is not easily discerned from the DSEIS, it appears that there is a 6 year construction period, followed by 12 year operations, followed by an uncertain number of years for decommissioning. DSEIS at 4-205. The project lifetime set forth in the DEIS thus appears to exceed 20 years. This is in addition to the use of the CPP for additional satellite mines and proposed tolling agreements for other mining operations in the region.

The DSEIS should be reissued with a clearly articulated project lifetime and a cumulative impacts analysis that corresponds with the project lifetime and the foreseeable long-term impacts of the proposed project. Particular to global warming, the carbon disposal capacity of Earth’s atmosphere throughout the lifetime of the project should be addressed in a similar manner to the analysis used for the diminishing availability of solid waste disposal facilities. DSEIS at 3-106 (discussing waste disposal limitations based on receiving capacity). Whether the waste stream is carbon emissions or solid waste, the recognized lack of disposal capacity going forward must be analyzed beyond the arbitrary 10 year period used to bound the global warming analysis.

Cooperating Agencies

Consistent with NEPA’s “one EIS” requirement, all agencies of the federal government are required to cooperate in the analysis of a federal action to ensure a comprehensive and efficient analysis of the impacts on the environment from the perspective of present and future generations. 42 USC §§ 4331(a), 4332(2). The NEPA regulations implement the mandate that Federal agencies prepare NEPA analyses and documentation “in cooperation with State and local governments” and other agencies with jurisdiction by law or special expertise. 40 CFR §§ 1501.6, 1508.5. This requirement is consistent with the NEPA mandates that prevent the federal officials from delaying and segmenting analysis of a project so as to avoid the required analysis of the full project by sweeping difficult problems under the rug. Thus, it is mandatory for all federal agencies to be included as cooperating agencies where such agencies have jurisdiction or special expertise. Although it is not mandatory for all federal, state, and local governments to participate, it is the lead agency’s duty to take the necessary steps at the “earliest possible time” to provide a meaningful opportunity for such government entities to participate as cooperating agencies.

The NRC staff, in preparing the DSEIS, was required to utilize the analysis and proposals of the “cooperating agencies” to the “maximum extent possible.” 40 CFR §§ 1501.6(a)(2). Instead, the NRC has ignored its lead agency responsibilities by unilaterally producing a NEPA analysis that fails to provide the required “hard look” at a range of issues, informed and identified by the participation of relevant state, federal, local, and Tribal agencies.

The DSEIS does not identify any attempt by the NRC to invite or to ensure the participation of all relevant cooperating agencies. This unlawful approach insulates the NRC from the give-and-take NEPA analysis promotes among those agencies with jurisdiction and special expertise. Inviting the participation of “cooperating agencies” is necessary to examine the full range of infrastructure problems and environmental impacts. The participation of these cooperating agencies will allow responsible federal and state agency personnel to voice their concerns and to work with other agencies to identify and address impacts, alternatives, and mitigation measures identified in other portions of these comments.

The DSEIS identifies many entities that are required, by law, to be invited to participate in the NEPA process. Federal agencies with expertise and/or jurisdiction over impacts of the project include the Army Corps of Engineers, Fish and Wildlife Service, Environmental Protection Agency, Federal Energy Regulatory Commission, and U.S. Department of Transportation, among others. Local and state entities include agencies from South Dakota, Wyoming, Colorado, and Utah such as the Department of Transportation, Department of Public Health and Environment, Wildlife and Parks, Water Engineers Office, and neighboring municipalities.

Relevant Indian Tribes, including the Oglala Sioux Tribe should also have been invited to participate as cooperating agencies on a government-to-government basis. Instead, the Tribal interests have been relegated to cultural and archeological interests. Other Tribal governments, including the Ute Mountain Ute Tribe located next to the proposed 11e2 byproduct disposal cells, must be invited to participate as cooperating agencies.

The “cooperating agency” requirement cannot be remedied at this late stage in the NEPA process. Instead, the NRC needs to return to the scoping stage, where the cooperating agencies can assist in constructing a NEPA analysis that reveals the full range of impacts and alternative courses of action that are familiar to the regional governments, but are largely foreign to distant NRC staff. By meeting this requirement, the analysis benefits the fullest range of federal, state, and local government agencies and the public interest.

There is no indication that BLM actually participated in the NEPA process. Instead, the DSEIS confirms that, “To fulfill this requirement, the applicant submitted a POO to BLM for the Dewey-Burdock ISR Project on August 26, 2009. Powertech modified the POO and resubmitted it to BLM on January 28, 2011.” DSEIS at xxvii, same at 1-1. Nothing more appears to have been done to involve BLM in this NEPA process. Although the POO review involved BLM’s FLPMA jurisdiction and land management duties, there is no indication in the DSEIS that BLM has been engaged in the NEPA process in any way other than being named a cooperating agency in the DEIS.

Staff Recommendations Have Unlawfully Preceded Final EIS

It is a basic requirement of NEPA that “the moment at which an agency must have a final statement ready ‘is the time at which it makes a recommendation or report on a proposal for federal

action.” Kleppe v. Sierra Club, 427 U.S. 390, 406 (U.S. 1976) *quoting* Aberdeen & Rockfish R. Co. v. SCRAP, 422 U.S. 289, 320 (1975) (SCRAP II) (emphasis in original).

By contrast, NRC staff has issued numerous recommendations in support of the issuance of the requested license. The most recent are a series of draft licenses - one in July 2012 and one in January 2013. Where the draft licenses serve as an agency recommendation on the action to be taken on the application, staff has acted under its relevant authorities in a manner that violates the statutory mandates of NEPA for fully informed, reasoned decisionmaking. Id.

Although it may have been proper to include a draft license as the “preferred alternative” to be compared across a range of alternatives, the DSEIS did not take that approach. Instead, the draft license has been prepared concurrently with the DSEIS. When the Tribe requested more time to provide comments on the draft license, this request was denied. Email exchange attached as Exhibit 14. Instead, staff confirmed that the DSEIS was issued without first obtaining the necessary information:

To the contrary, the analysis in certain sections of the DSEIS presumes that Powertech will later submit information to address outstanding issues, and the changes to the draft license reflect information that Powertech has submitted over the last five months.

Id. The courts have long rejected NRC staff’s current approach as contrary to one of the substantive statutory purposes of an EIS, which “helps insure the integrity of the process of decision by precluding stubborn problems or serious criticism from being swept under the rug.” Silva v. Lynn, 482 F.2d 1282, 1285 (1st Cir. 1973). Assembling and including information on outstanding issues before the DSEIS is released for comment is a crucial part of the give and take of the NEPA process.

Moreover, where comments from responsible experts or sister agencies disclose new or conflicting data or opinions that cause concern that the agency may not have fully evaluated the project and its alternatives, these comments may not simply be ignored. There must be good faith, reasoned analysis in response.

Id. See also National Audubon Society v. Hoffman, 132 F.3d 7, 12 (2d Cir. 1997) (An EIS “insures the integrity of the agency process by forcing it to face those stubborn, difficult-to-answer objections without ignoring them or sweeping them under the rug’ and serves as an ‘environmental full disclosure law so that the public can weigh a project’s benefits against its environmental costs.’”).

Instead of the following the process required by NEPA, the DSEIS has been prepared in a manner where outstanding issues are being unlawfully shielded from scrutiny of the public and other agencies, both of which are integral to the NEPA process. See 40 C.F.R. § 1508.7 (EIS must analyze direct impacts of a proposed action and the indirect and cumulative impacts of “past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.” These deficiencies cannot be remedied by simply issuing a final SEIS or addressing these “outstanding issues’ after license is issued based on of staff recommendations in the form of a series of draft licenses, all of which were prepared without NEPA scrutiny. These NEPA deficiencies must be remedied by reissuing a scoping notice that identifies these issues, and presents them for review by the Tribe, the public and other agencies in the NEPA document at the earliest possible time.

Submitted this 10th day of January, 2013,

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EXHIBIT 1



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Revised Responses to the Request for Additional Information (RAI) for the Technical Report (TR); Powertech (USA) Inc.'s Proposed Dewey-Burdock Project.

Accession Number: ML112071064

Date Released: Monday, August 1, 2011

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EXHIBIT 2

Geochemical Consulting Services, LLC

Solubility, Speciation, and Reaction-Path Modeling
Groundwater and Soil Geochemistry
Environmental Assessment
Risk Assessment

October 31, 2009

Coloradoans Against Resource Destruction (CARD)
PO Box 143
Wellington, CO 80549

Members of CARD:

Geochemical Consulting Services, LLC (GCS) is submitting the following comments on Powertech's proposed Baseline Plan (R Squared, 2009). The comments are based on best-industry practice, sound scientific analysis, and over 20-years of GCS experience in the fields of environmental investigations, sampling and analysis plans, groundwater monitoring, and remediation of contaminated groundwater and soil.

Comment 1. Section 2.1 Groundwater Monitoring

The importance of groundwater sampling procedures and the collection of 8 representative samples from each well is noted. However, the discussion fails to recognize the importance of using valid statistical methods for locating the wells (e.g., systematic grid or random selection; Gilbert, 1987; EPA, 2002; Matzke et al., 2007) to ensure representative samples are collected from the aquifer. EPA (2002, p. 8) notes that *"A well-planned sampling design is intended to ensure that resulting data are adequately representative of the target population and defensible for their intended use."*

The ore zone is a very small fraction of the total aquifer volume in the proposed exemption zone. The frequency of wells placed in the ore zone should reflect a very small percentage of the wells sampled for baseline water quality of the aquifer (e.g., less than 5 percent of the wells should be placed in the ore zone, or 1 in 20 wells can be in the ore zone). This small percentage of wells in the ore body is accounted for by using a valid statistical method for locating the wells, such as a systematic grid placed over the proposed aquifer exemption zone. For a systematic grid, a 400-by-400 foot grid should be placed over the proposed aquifer exemption area to ensure that a minimum of one well is placed in every 4 acres (NRC, 2003; p. 5-39).

The importance of sampling all horizons of the aquifer is also omitted from the discussion of representative samples. If screened intervals are limited to 20 ft (SOP 5, Section 5.2.1.1, bullet #5), nested wells must be used to obtain water samples from screened intervals throughout the entire aquifer thickness. A sample from a single 20 ft interval (e.g., the ore zone) of a much thicker aquifer is not a representative sample. This situation

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is well described by EPA (2002, p. 8) *"In this case, the sampling units are defined by the investigator and need to be appropriate for selecting a representative sample of material from the medium of interest."* Well completion logs are necessary to determine if the collected samples are representative of the various sand horizons in the aquifer, but do not appear to have been provided for previously drilled wells.

Comment 2. Section 2.1 Groundwater Monitoring

The last paragraph describes the field parameters that will be measured prior to sample collection. Standard Operating Procedure 8, Section 5.2.3 and 5.2.4 note that dissolved oxygen and Eh will be measured in the sampling container. This procedure is problematic in that it introduces oxygen from the atmosphere into the groundwater being measured, which yields a non-representative measurement of the indicated parameters.

Additionally, there is no mention of turbidity measurements in Section 2.1. Standard Operating Procedure 8, Section 5.2.5 states that turbidity may be measured at the time of sample collection. However, the applicant provides no basis for omitting the required turbidity measurement. Proper well development is needed to remove the sediment and contamination prior to collecting the first round of water-quality samples (EPA, 1992b; p. 6-46), and the nephelometric turbidity unit (NTU) should be below 5 NTU prior to sample collection (EPA, 1992b; p. 6-48).

Section 5.3.1 of Standard Operating Procedure 8 describes the acceptance criteria for Quality Control ("QC") checks on field measurements. The QC checks are a standard practice. However, they should not serve as an illusion that fulfillment of the criteria means the measurement is representative of the media sampled. For example, turbidity measurements of 28 NTU and 30 NTU are within 10% (the acceptance criterion), but they indicate significant suspended material in the sample, which may bias analytical results to high levels. Also, meeting the acceptance criteria for DO and Eh measurements is meaningless when the measurements are made on groundwater contacting the atmosphere, as the sample does not represent conditions in the aquifer.

Comment 3. Section 2.4.2 Monitoring of Particulates in Air

Monitoring should be performed around the vacuum dryer and drum loading facility, as a release here could result in significant exposure to workers. Without active monitoring, there is no way to recreate the dose that a worker receives during a release. (Note: this may be covered under an operations plan)

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Comment 4. Section 2.4.3 Monitoring of Radionuclides in Air

In general, high-volume air sampling stations should be placed N, NE, E, SE, S, SW, W, and NW of the property or facility center point. Winds can be highly variable during storms and two stations in the primary down wind direction are inadequate to capture the true distribution of wind-blown particulate. It is unclear why such monitoring is not proposed, as it is an insignificant cost relative to the cost of operations.

Comment 5. Section 2.4.4 Radon in Air

Monitoring should be performed around the ion exchange columns or other equipment that receives pregnant lixiviant. Without active monitoring, there is no way to recreate the dose that a worker receives during a release. (Note: this may be covered under an operations plan)

Comment 6. Section 3.1.

DQOs are briefly discussed, but Powertech does not address how the selected well locations fulfill the objective to obtain representative groundwater samples from the Fox Hills aquifer. In general, the boundary of the project needs to be defined and representative samples must be collected from the proposed aquifer exemption zone (See Comment 1).

Comment 7.

There is no discussion in the plan on an acceptable statistical methodology which will be used to generate baseline values. Guidance on statistical analysis of groundwater data is readily available. (EPA, 1989; EPA 1992a; ASTM, 1998). These widely used standards make it clear that the use of the mean (or average) and standard deviation to establish baseline water quality are only applicable if it can be demonstrated that the data are representative of the media (Comments 1 and 2) and the data set follows a normal or lognormal distribution. However, Powertech relies on the mean and standard deviation to develop the baseline values without the proper testing of data distributions.

The first test that must be performed on a data set is a test to determine if the data follow a normal or lognormal distribution. Statistical tests for normality are widely available through spreadsheet programs (e.g., Microsoft Excel with Analyse It), and the Shapiro-Wilk Test is generally the most robust test for demonstrating that data follow a normal distribution (Shapiro and Wilk, 1965; Shapiro, Wilk and Chen, 1968; Madansky, 1988).

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The probability statistic, p , returned by the Shapiro-Wilk Test determines whether the data follow a normal distribution for the stated confidence interval. For a stated confidence level of 95 percent, p must be greater than 0.05 to accept the null hypothesis that the data follow a normal distribution. If the data do not follow a normal distribution, the data may be log transformed (using the natural logarithm) and re-run to determine if the log-transformed data follow a lognormal distribution. If neither the original data nor log-transformed data pass the Shapiro-Wilk Test (i.e., p less than 0.05), then it must be concluded that the data do not follow a normal or lognormal distribution. When the data do not follow a normal or lognormal distribution, the mean and standard deviation are meaningless because these parameters are defined ONLY for a normal or lognormal distribution.

Data sets that do not follow a normal or lognormal distribution generally include those sets that have a large number of results at or near the detection limit or some results at very high values (i.e., an asymmetrical distribution). This type of data set is a non-normal data set, and its sample distribution must be analyzed with nonparametric techniques (Gilbert, 1987; Madansky, 1988) to define the median, quantiles, and inter-quantile range (IQR), provided the results at the detection limit do not exceed approximately 75 percent of the data points. The non-normal data sets are ordered, from lowest to highest values, and the median is the central value in the ordered data set, while the 0.25, 0.5 and 0.75 quantiles are the values such that 25%, 50% and 75% of all values fall below that value. The IQR is the difference between the 0.75 and 0.25 quantiles. Median and IQR are better indicators of the distribution in a non-normal, asymmetric distribution, because these statistical quantities are influenced less, relative to the mean and standard deviation, by very large or very small values.

Powertech should describe the valid statistical methods that will be used to develop the baseline values in accordance with accepted guidance.

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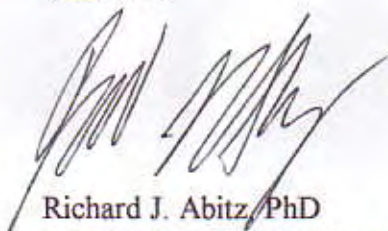
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Geochemical Consulting Services, LLC

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Sincerely,



Richard J. Abitz/PhD
Principal Geochemist/Owner

EXHIBIT 3

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

DECLARATION OF DR. ROBERT E. MORAN

I, Dr. Robert E. Moran, do hereby swear that the following is true to the best of my knowledge:

Professional Qualifications and Introduction

1. I am a hydrogeologist/geochemist with more than 38 years of domestic and international experience in conducting and managing water quality, geochemical, and hydrogeologic work for private investors, industrial clients, tribal and citizens groups, NGO's, law firms, and governmental agencies at all levels. Much of this technical expertise involves the quality and geochemistry of natural and contaminated waters and sediments as related to mining, nuclear fuel cycle sites, industrial development, geothermal resources, hazardous wastes, and water supply development. Much of this experience has involved uranium mining, processing, and related environmental impacts. I have significant experience in the application of remote sensing to natural resource issues, development of resource policy, and litigation support. I have often taught courses to technical and general audiences, and have given expert testimony on numerous occasions. Countries worked in include: Australia, Greece, Mali, Senegal, Guinea, Gambia, Ghana, South Africa, Iraqi Kurdistan, Oman, Pakistan, Kazakhstan, Kyrgyzstan,

Mongolia, Romania, Russia (Buryatia), Papua New Guinea, Argentina, Bolivia, Chile, Colombia, Guatemala, Honduras, Mexico, Peru, El Salvador, Canada, Great Britain, United States.

2. My services have been contracted to supply comments on the Powertech (USA) Inc. Dewey-Burdock (D-B) In Situ Recovery NRC License Application for the express purpose of aiding the Oglala Sioux Tribe, and others, in the drafting of contentions to be submitted to the NRC. My CV is attached.

Literature Reviewed

3. In addition to my professional experience, the opinions and comments that follow are based on review of all, or significant portions of the following documents:

Powertech Application for NRC Uranium Recovery License, Dewey-Burdock Project, Feb. 2009:

- Technical Report (TR)
- Environmental report (ER)
- Supplement to Application, Aug. 2009

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Summary of Comments.

4. As discussed in detail below, the Powertech application is technically deficient and not well organized. The application fails to include and analyze sufficient data to justify the conclusions asserted that the proposed mine will protect water quality, the environment, and human health. In particular, the application is deficient with respect to the baseline ground water, surface water, and hydrogeological characterizations. These aspects are critical to providing a defensible demonstration that mining fluids and mobilized constituents can be contained within the mine production zone and that impacted ground water can be restored to acceptable standards. The application fails to provide an adequate presentation of the potential impacts associated with waste disposal from the proposed mining operations, whether disposal by deep well injection or surface land application. Lastly, the application neglects to provide sufficient discussion of financial assurance calculations or amounts, a critical component for protection of natural and human resources.

Specific Comments

Powertech's Application is Technically-deficient and Disorganized

5. Powertech D-B Application is so disorganized and technically-deficient that it does not comply with the terms of NUREG-1569 and other relevant NRC regulations and should be revised. The various portions of the D-B Application total almost 6000 pages and are composed of:

- Technical Report (TR)-- 3103 pages;

- Environmental Report (ER)-- 2615 pages;
- Supplement to Application-- 66 pages.

The relevant information, if compiled in a direct, transparent manner using predominantly maps, tables and graphs, could easily have been summarized in 150 pages for the main volume. Instead, the Application is so duplicative and poorly-organized that it makes informed review by both the regulators and general public largely impossible. The Table of Contents for both the TR and ER provide no page numbers for the masses of information presented in the Appendices. The Appendices, in places, seem to have been thrown together with little or no logic to the organization. The authors of the main portions of the ER and TR, whoever they are, have made the review process unnecessarily convoluted, for both the NRC and the public. To that point, for numerous sections of the Application, it is not possible to discern whose opinions are being stated – Powertech's, one of their consultants, or some other source.

6. What follows in paragraphs (6-10) are a few examples of the disorganized nature of these documents: For both the ER and TR, the tables of contents present basic titles, but no page numbers for the thousands of pages of appendices. As it is the Appendices that contain much of the corroborating data, such careless organization makes document review and substantiation of claims written in the text unnecessarily difficult. The headings of the appendices, figures, and tables often are far too vague to be useful. For example, regarding ER Append. 3.4-A, the title simply says: WELL LOCATION DATA. This is an inadequate presentation and several questions are evident. Data compiled by whom? When was the data compiled? For what types of wells (domestic? agricultural?)? Are those wells still in use? Are those wells monitored?

7. There are several other similar examples. One title says: Wells in Dewey-Burdock Database. Was this database originally compiled by Powertech? TVA?
8. Surface water sites discussed on pg. 2-192 through 2-194 of the TR have no specific names; they are simply labeled BVC01, BVC04, CHR01, CHR05. The field data for these sites are not integrated with the lab data from the same samples.
9. Application documents fail to provide summary tables and figures where they are most necessary. For example, the ER, pg. 3-39-40 provides no summary of the wells discussed, their uses, water-bearing units / formations, etc.; such tables should be included in the text where the discussions are taking place.
10. Water-related discussions / data are scattered throughout the ER and present inconsistent findings. For example, a reviewer (NRC or public) of water-related issues must search through the following sections:

3.4 Affected Environment [WQ and Q discussions not integrated];

4.6 Potential WR Impacts

6.1.8 GW Sampling

6.2 Physiochemical GW Monitoring

7.4.3 Potential GW Impacts

8.1 Summary of Env. Consequences

Appendices:

3.3A, D

3.4A, B, C, D, E

3.5I

6.1B, C, D, E, F, G

Given the need for the applicant to submit supplemental information, these deficiencies should have been resolved at that time.

An Independent Review of the Application Is Necessary

11. Given the inherent conflict of interest in having the Application preparation directed, partially-prepared, and paid for by the project proponent, some independent party needs to take a more assertive oversight role, including in oversight of actual monitoring methods in the field. This is especially evident in the biased decisions made throughout these Application documents regarding baseline water quality and quantity decisions, as discussed below.

Water Use: The D-B Project will use and contaminate tremendous volumes of ground water

12. The D-B project area is semi-arid, having an average yearly precipitation of about 12 to 13 inches. While the application documents fail to report yearly evapotranspiration (ET), estimates of ET are roughly 70 inches per year, about 5 times the yearly precipitation (ER, pg. 3-176 and 177; Fig. 3.6-27). Because the project is presently expected to operate for between 7 and 20 years, it will require the use of tremendous volumes of local ground water.

13. Unfortunately, the Application documents present conflicting estimates of the volumes of water actually needed to operate the project. The ER, pg. 4-25, section 4.6.2.7.2 Water Requirements for the Proposed Action Facilities states:

“Water requirements of the CPP and other facilities are estimated to have a maximum requirement of **65 gpm**. As this requirement is relatively large, it is expected that most of this water will be derived from a water supply well in the Madison formation. Some of this water may be withdrawn from the Inyan Kara formation, but if so, it will not occur in

a fashion to affect any well field operations.”

While the last sentence is totally unclear as to specific details, the greater problem comes on reading ER pg. 8-2 (Table 8.1-1), which states that ground water consumption will be **320 gpm**. Aside from the obvious lack of consistency, both of the estimates translate into massive amounts of ground water when considered over the full life of the project.

The water usage data for the conflicting water usage numbers referenced in the Application result in total water consumption over the life of the project as follows:

65 gpm = 34.2 Million gpy (gals / yr).

After 7 yrs = 239,148,000 gallons, or 239.15 Million gals.

After 17 yrs = 580,788,000 gals or 580.8 Million gals.

320 gpm = 168.2 Million gpy (gals. / yr).

After 7 yrs = 1,177,344,000 = 1.2 Billion gallons

After 17 years = 2,859,264,000 gallons = 2.86 Billion gallons.

14. The TR, pg. 2-181, also says water requirements will be 65 gpm, but the subsequent discussion (pg. 2-181 and 2-182) indicates great uncertainty. These inconsistencies need to be rectified to enable effective public and NRC staff review. Clearly, both of these estimates indicate that vast quantities of ground water will be extracted from these aquifers over the long-term, and it seems overly-optimistic to simply state that no significant impacts will occur. At a minimum, Powertech should be required to construct a credible project water balance and to more seriously investigate the potential that such large-volume water use might impact local / regional ground water levels. At present, I see no evidence that the Application contains a reliable compilation of baseline water

level data for the surrounding domestic and agricultural wells (see discussion below).

Without such reliable, summarized data, there will be no viable method to demonstrate that ground water levels (and related pumping costs) have not been impacted by project-related activities.

15. The public must assume that Powertech will pay no cost for the actual water (the commodity) used during operations---while numerous other users do. The specifics of this issue should be addressed by Powertech in writing.

Baseline Water Quality

16. The Powertech Application fails to define pre-operational baseline water quality and quantity—both in the ore zones and peripheral zones, both vertically and horizontally.

Without adequate baseline water quality data (both ground water and surface water), there is no reasonable method for either the public or the NRC to evaluate the success or failure of either fluid containment or aquifer restoration. The Powertech Application documents repeatedly attempt to convey the impression that the D-B ground water quality is already degraded, rather than compile statistically-defensible data from both the ore zones and non-mineralized zones. This approach contradicts NRC guidance, which requires that pre-mining baseline conditions be defined before licensing (NRC, 2003, pg. 2-24).

17. Clearly the Powertech ground water baseline data should include, as a minimum, the chemical constituents listed in Table 2.7.3.1 of the NRC's Standard Review Plan (NRC, 2003, pg. 2-25). It seems only logical that the actual list of baseline constituents should be based on analyses of pregnant solutions resulting from leach testing of the D-B ores and lixiviants—not on theoretical assumptions about what might be the chemical

composition.

18. Frequently, uranium roll-front ores will also mobilize significant concentrations of additional constituents, such as antimony, lithium, and strontium (Moran, 1976). In addition, it is common to detect elevated concentrations of aluminum, sometimes as the result of well-drilling and completion techniques. Thus, it is recommended that these constituents be included in routine determinations of baseline water quality. In fact, standard lab analytical scans, such as ICP (inductively-coupled plasma spectroscopy) routinely report all (or most) of these metals and metalloids at the same cost. It should be noted that almost all of these constituents were included in the data in Appendix 3.4-C of the ER. I suggest that ammonia determinations be included to preclude future disputes regarding impacts (ammonia may enter the aquifer via numerous agricultural or industrial activities) along with ion balances, to assist in evaluating the reliability of the analytical data (Hem, 1985).

19. Section 2.7 of NRC (2003) is unclear whether applicants shall provide water quality data from unfiltered (Total concentrations) or 0.45-micrometer-filtered samples (“dissolved”). Much of the D-B data in the Application Appendices include both. It is recommended that unfiltered samples be collected and analyzed, as a minimum, for baseline ground water evaluation. These provide more *conservative* characterization of the ground waters, and waters used in rural areas (human and livestock consumption from wells; other agricultural uses; irrigation; fisheries) are not filtered. Furthermore, contaminants carried in particulate form are ingested by humans and other organisms when consuming unfiltered waters. These particles / colloids are dissolved by the extreme biochemical conditions found in the guts of such organisms, mobilizing the contaminants

into the blood and other tissues. In addition, many trace constituents are mobile in ground waters as colloidal particles (McCarthy, 1989; Ramsey, 2000), which would be removed by filtration, generating unreasonably-low concentrations.

20. The D-B baseline data should include statistical comparisons of the field and lab determinations of pH, and S.C. for the same samples. See section....below for further discussion.

21. The D-B project area has been historically mined and thousands of exploration holes have been drilled within the properties. Hence, it is imperative that high-quality baseline data be supplied to evaluate the actual extent of past impacts to water resources, and the success of future containment or aquifer restoration.

22. No coordinated, statistically-sound data set for **all** Baseline Water Quality data (both surface and ground water) is presented in these documents—as is required in NUREG--1569. For example, on pg. 2-14 and 2-15 of the Technical Report (TR), Sect. 2.2.3.2.2., Powertech states: “At the project site, baseline groundwater sampling was conducted in general (sic) accordance with NRC Regulatory Guide 4.14 (NRC, 1980). ... A summary of the results and methods for the groundwater quality monitoring program, as well as the historical TVA data, is presented in Section 2.7.” However, when the reader goes to TR Section 2.7, there are no tables that actually statistically summarize complete baseline field and lab water quality data for the complete data sets—both historic and recent. Instead, for ground waters, Powertech presents statistics for field data from individual wells or selected aquifers, but fails to statistically-summarize the laboratory data and leaves out the historic TVA data. Powertech then states (TR, pg. 2-203): “Complete groundwater quality data results are available in Appendix 2.7-G.” However, on TR, pg.

2-205 (Sect. 2.7.3.2.2.2, Results for Laboratory Parameters) Powertech then states:

“Summary statistics for baseline monitoring program laboratory samples are contained in Appendices 2.7-H and 2.7-I. Appendix 2.7-H gives statistics for all groundwater constituents detected at or above PQL by constituent.” Thus, it appears that Powertech has not included “qualified values,” that is data reported as “less than” some concentration. By deleting the “less than” values, Powertech has severely biased the data set, rendering it useless as a reliable source for evaluating baseline conditions.

23. Furthermore, Powertech states (TR, pg. 2-217-218) that they have arbitrarily selected some analyses from the voluminous historic TVA data, but the reviewer is never allowed to see a statistical summary of the total original data set. Portions of the relevant data are scattered throughout the Appendices of the various documents, and disingenuously organized to leave out all baseline data that had concentrations reported below the detection limits (i.e. “less than” values). Obviously, this approach biases the data.

Powertech must statistically summarize all historic water quality data and all recently collected data in separate tables, including all “less than values.” Both historic and recent baseline data should be segregated by water-bearing unit. Even should averaging of water quality data over a portion of the aquifer be acceptable, the methodology employed in the Application of discounting relevant data points is untenable.

24. To further confuse the baseline issues, Powertech’s Supplement to the Application (August 2009) states on pg. 3-3: “A minimum of eight baseline water quality wells will be installed in the ore zone in the planned well field area.” Thus it appears that the Applicant intends that the massive amounts of water quality data (historic and recent) presented in both the TR and ER (Environmental Report) will not actually be used to

determine baseline. More importantly, it is unclear whether Powertech has baseline (pre-operational) ground water quality data that describes the **non-ore zone regions of the relevant aquifers**. It is imperative that baseline data for the non-ore zone ground waters be collected and summarized separate from those of the ore zones. Lastly, the Application should already contain a statistically-reliable database of baseline ground water quality data from all known wells within at least a one-kilometer radius of the project boundary.

Surface Water Quality Baseline Data: Application fails to include statistically-reliable summaries of detailed data.

25. The D-B Application casually dismisses the possibility of any significant impacts to surface water resources [ER, Pg. 4-14: 4.6 Potential Water Resource Impacts.] Page 4-16 of the ER states: “ISL operations do not involve the consumption of surface waters. Nor do the operations proposed require a long- term discharge to surface waters. For these reasons, no significant impacts to surface water quantity and use are anticipated.”

26. On ER, pg. 4-16 (Section 4.6.1.2 Potential Surface Water Impacts from Operations) it further states: “Potential impacts from accidental spills or permitted temporary discharge to surface water may include the release of process materials into the environment or a release or spill from the operation or well field (e.g., handling of fuels, lubricant, oily wastes, chemical wastes, sanitary wastes, herbicides, and pesticides). Surface water monitoring and spill response procedures will limit the impact of potential spills to surficial aquifers.”

These statements are far too simplistic and self-serving. They fail to mention that all such operations generate short-term discharges to surface waters, as a minimum. More importantly, the Application fails to provide a summarized, statistically-reliable surface

water quality baseline database. As such, there will be no defensible method for verifying whether impacts to surface water quality have or have not occurred.

27. ER pg. 4-16 also states: “Most ISL operations extract slightly more groundwater than they re-inject into the uranium bearing formation. *The groundwater extracted from the formation could result in a depletion of flow in nearby streams and springs if the ore-bearing aquifer is hydraulically connected to such features.* However, because most, if not all ISL operations are expected to occur where the ore- bearing aquifers are confined, local depletion of streams and springs is unlikely, and potential impacts would be anticipated to be SMALL (NUREG-1910, 2008).”

28. As stated above, there is ample evidence to suggest that portions of the impacted water-bearing zones are, in fact, in hydraulic connection with each other and are also likely to be hydraulically-connected with local surface waters, springs, and seeps, especially when **long-term operating conditions** are considered. More importantly, Powertech has failed to provide a reliable baseline spring and seep survey. Hence there would be no way to verify whether future impacts were the result of the D-B operations. The Application provides no support for such statements. Thus, it is imperative that reliable surface water quality baseline data be made public and that a viable seep and spring survey be performed, prior to the issuance of any licenses.

The presence of high-quality ground waters within the D-B Project boundary have not been adequately defined.

29. Much of the Application discussion concerning ground water quality seems focused on showing that the site waters are already contaminated. This would not be surprising given the presence of the uranium mineralization and the past mining and exploration activities---all of which would have caused increased concentrations of numerous

chemical constituents above true pre-mining baseline. However, based on statements made in the ER, pg 1-16, Powertech has not adequately defined whether zones peripheral to the D-B ore-bearing geologic formations and bounding formations (above and below) also contain zones of high-quality, possibly potable ground water. Such zones should already have been defined as part of the Application documents.

The Application documents fail to present an adequate database and summary of Baseline Ground Water Levels, both within the project boundary or outside.

30. ER, pg. 4-18: states that “Background water levels will be monitored in regional wells.” Such monitoring of water levels should already have been completed for numerous episodes over at least a one-year period prior to issuance of any permits. The Application also fails to provide a map and detailed program describing which wells will be included in such water-level monitoring.

31. Rather than presenting actual water level data, the Application (ER, pg. 4-21 through 4-23: Drawdown Estimates) attempts to substitute predictions of future water levels, all of which are based on unrealistic, theoretical assumptions. The public and regulators need to see actual baseline water-level data.

32. Also, the public and regulators should note the great range of uncertainty the ER presents for predictions of water level declines after 8 years of continuous pumping:

- at the nearest domestic well in the Fall River Aquifer, located 15,075 feet from the approximate center of pumping is **9.9 to 42.8 feet** (Pg 4-23);
- at the nearest domestic well in the **Lakota Aquifer**, located 10,915 feet from the approximate center of pumping is **4.9 to 12.6 feet**.

With such uncertainty, it is quite possible that some neighboring wells will be negatively impacted.

A Baseline Spring and Seep Survey is not presented in the Application.

33. The Application ER, pg 3-58 states that the region surrounding the D-B project contains numerous springs in both the Madison and Minnelusa formations.

Baseline surveys of springs and seeps are crucial in studies where large volumes of ground water are to be extracted. The flows of such seeps and springs often decline or stop after large-scale, long-term ground water extraction begins, especially in arid or semi-arid regions, such as the D-B area. If such impacts begin to occur, disputes will arise as to the possible roles of the project water extraction and overall climate change, for example. Hence, it is imperative that such a survey be performed prior to issuance of any licenses, and such a survey should include, as a minimum:

- locate and survey all springs and seeps within some reasonable radius of the project boundary;
- measure and record flow / discharge quarterly for at least one year prior to issuance of any licenses;
- during all field episodes, make field measurements of in-situ pH, water temperature, and S.C.(specific conductance) and collect samples for laboratory analysis. Samples should be analyzed for the same list of constituents noted in the Baseline water Quality comments above. Spring and seep water quality data should be interpreted as representative of local ground water quality (Freeze and Cherry, 1979; Hem, 1985).

Chemical Analyses (Detailed) of Ores, Pregnant Leach Solutions, Liquid Wastes are not presented in the Application.

34. The Application fails to provide actual, detailed chemical analyses (numerous) of representative pregnant leach solutions (ore reacted with lixiviant), both before and after undergoing ion exchange treatment. Such data would routinely include both in-situ

measurements of fluid temperature, pH, specific conductance, possibly D.O. (dissolved oxygen) and Eh (redox). Similar representative, detailed data should also have been included for the detailed chemical composition of liquid wastes to be disposed of via deep-well injection or land application.

35. Because most mining projects at a similar stage of advancement have already conducted extensive laboratory testing and prepared Feasibility Studies to present to potential investors, such detailed chemical composition data would be available. It is not sufficient to present theoretical / expected chemical compositions, as has been done on ER, pg. 4-83. Smith & Assoc. (2005), pg. 5, reports that TVA, one of the previous mineral right holders, had a “pre-mine feasibility study” prepared, probably in the late 1970’s or 1980’s. If TVA had obtained such detailed data in earlier decades, certainly Powertech would have / should have also. Clearly some information in Feasibility Studies is considered proprietary, but detailed chemical composition data on the pregnant solutions and liquids / wastes described above should be included in any complete Application.

The D-B water-bearing units are hydrogeologically interconnected.

36. The application presents overly-optimistic conclusions about the isolation of the ore-bearing zones, aquifers, and the lack of fluid excursions that will occur, both vertically and horizontally. Powertech’s description and evaluation of possible water-related impacts [ER pg. 8-2 (Table 8.1-1)] are unreasonably optimistic. It is unlikely that the process waters can be contained within the project boundaries given the following sources of the evidence.

37. The D-B uranium deposits occur in subsurface, fluvial channel, sandstone deposits in the Lakota and Fall River formations (Smith, 2005). These sandstones inter-finger with finer-grained silts and shales, often associated with lignites and coals, which form the typical lithologic sequences often seen in classic sedimentary uranium deposits (Abitz, 2005; Gott, 1974; Henry, 1982; Galloway, 1982; Henry, 1980; Harshman, 1972).

38. Hydraulically, such sedimentary packages typically allow ground waters to flow between the inter-fingering facies, both vertically and horizontally, when the coarser-grained sediments are stressed by long-term pumping. The hydraulic inter-connections are verified by conducting long-term aquifer tests integrated with sequential water quality sampling and in-situ measurement of field parameters (Henry, 1982; Galloway, 1982; Moran, R.E.—hydrogeochemical research activities, U.S.G.S., Water Resources Div., 1973—1978).

39. Thus, ore-bearing sandstones in typical sedimentary packages associated with roll-front uranium deposits do not routinely behave as hydraulically-isolated bodies.

Numerous specific lines of evidence from the D-B Application documents indicate that the project sediments possess various pathways for the migration of water and contaminants from the ore zones into neighboring sediments, both vertically and laterally. For example, thousands of exploration boreholes have been drilled since the 1950's at the D-B site (Smith, 2005; TR, ER), many of which were not correctly plugged and abandoned (TR, Pg. 2-157; Append. 2.7-B, sub-Appendix D, pg. 1484; TR, Append. 2.6-A, pg. 972-1111). In addition, several sources (Smith, 2005, pg. 9; ER, pg. 3-106) report that the area contains historic shallow mine workings, both open pits and short tunnels that would provide additional flow pathways.

40. There are numerous old and existing water wells and old oil test wells in the D-B area, many with rusty and leaky casings, often unplugged or partially-plugged, drilled through several formations which act as potential pathways for flow between water-bearing units (ER, pg.3-40; TR, Append. 2.2-A, pg. 740-779; 2.2-B, especially pg. 864-902).

41. The TR, pg. 2-153-154, states that hydraulic connections between local D-B aquifers often result because confining units thin or are absent in many areas (ER, pg.3-56-57). In addition, Gott (1974) and others have mentioned the presence of breccia / evaporite pipes (collapse structures), which create vertical permeability pathways between aquifers. Gott (1974, pg. 27-29) and others discuss the common presence of faults and joints throughout the region, which could easily act as flow pathways.

42. Vertical and lateral hydraulic connectivity between the ore zones and the neighboring facies / formations are also indicated by the aquifer test results conducted in both 1979 and 2008 (ER, pg.3-56-57; TR, pg. 2-170 & 2-180, for example; TR Append. 2.7-B, Knight-Piesold Pumping Test Report, pg. 1290).

43. It seems obvious that the aquifer testing already performed demonstrates leakage between the various formations / facies bounding the ore zone. However, it seems equally likely that longer-duration aquifer tests conducted at even higher pumping rates would demonstrate even more clearly the leaky nature of these site sediments.

44. Repeatedly throughout the Application, Powertech states that the project will bleed 0.5 to 3% of leachate to maintain a cone of depression, which will prevent flow of leachate outwards (i.e. ER, pg. 1-14). Rather than supporting this allegation with long-term, technical data from other operating sites, Powertech has inserted a public relations

statement from the mining industries' lobbying group, the National Mining Association (NMA, 2007).

45. D-B Application Supplement, pg. 5-5 describes an aquifer exemption boundary, which acts as an additional buffer zone outside the monitor well rings **“to provide protection to adjacent water from the excursions that occur in the normal course of operations.”** Page 5-6 of the Supplement further states that the aquifer exemption boundary is proposed to be up to 1200 ft. outside the monitor well ring, and **would be considered the point of regulatory compliance. Apparently simply pumping to create an inward flow direction is not adequate to control “excursions.”** It appears this aquifer exemption boundary is actually an expanded ground water sacrifice zone.

Potential hydrogeologic pathways to nearby wells have not been adequately investigated and documented.

46. The discussion above presents ample evidence that the D-B area sediments contain numerous possible subsurface pathways for project leach fluids to migrate vertically between water-bearing units and outside the project boundaries. Unfortunately, as noted above, Powertech has not adequately defined the baseline water levels or water quality conditions of neighboring wells within a 1 to 2 mile radius of the D-B project. In addition, the TR, pg. 2-180, states that no public data are available on the use of aquifers in Fall River or Custer counties. Such data should have been compiled by Powertech as part of the Application, and should be required before any licenses are given.

Potential impacts to ground waters have been unrealistically minimized and inadequately characterized.

47. Powertech has failed to provide adequate baseline data to demonstrate that portions of the ore-bearing zones do not contain high quality ground water. On pg. 4-18 of the ER

they misleadingly state that all D-B ore zone ground water quality is degraded by natural mineralization processes. They have failed to provide the data to support this allegation and in many similar situations it is simply not true. Furthermore, many ground water-bearing zones in mineralized areas do not contain elevated concentrations of metals, non-metals, etc. until they have been exposed to air and bacteria---often as the result of previous mining or exploration drilling—as has occurred here. Even following exploration and mining activities, some portions of ore-bearing formations continue to contain high-quality ground water.

48. Hence, it is not defensible for Powertech to state, as they do in Sect. 4.6.2.2 (Potential Impacts of Production on Ore Zone Groundwater Quality) that: “Potential environmental impacts to groundwater are changes to water quality in well fields within the exempted aquifer. The impact, in and of itself, it is of limited significance, due to the fact that the groundwater quality is very poor prior to ISL operations; due to the presence naturally occurring radionuclides, heavy metals, and other constituents that exceed EPA and/or state drinking water limits. Accordingly, the exempted aquifer is not and can never serve as a USDW (HRI, 1997; NMA, 2007).” The citations provided here by Powertech do not pertain to the specific D-B situation and one, the NMA citation, is simply a routine public relations statement made by the industry’s lobbying group.

49. The public relations statements continue on ER, pg 4-18, where they state: “Powertech (USA) has proposed to use gaseous oxygen and carbon dioxide lixiviant. The interaction of the lixiviant with the mineral constituents of the exempted ore zone results in a slight increase in trace elements and primary constituents of sulfate, chloride, cations and TDS above pre production levels. There is no introduction of non-naturally occurring

constituents from the leach fluids into the ore body.”

50. To support these unsubstantiated statements, Powertech needs to supply actual, detailed chemical analyses of the pregnant leach solutions (multiple analyses)--solutions resulting from the chemical interaction of the proposed lixiviant and the ore zone rocks. All responsible parties knowledgeable about ISL operations are aware that the introduction of these lixiviants 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, etc. It is a total “red-herring” to claim that: “There is no introduction of non-naturally occurring constituents.....”

51. In addition, there is ample evidence in the technical and regulatory literature to show that the leached aquifers at most, if not all ISL operations, have never truly been restored to their pre-operational, baseline water quality.

Land application is not an approved method of radioactive liquid waste disposal.

52. Powertech has proposed that various liquid wastes may be disposed via land application. However, US EPA (2008) guidance states that such land application is not an approved method for disposal of such wastes. Equally importantly, Powertech has failed to supply detailed chemical analyses of these proposed wastes (see discussion above) to clarify the chemical nature of the materials being disposed.

53. It is ironic that the Supplement to the Application states on pg. 4-7 that irrigation pivots have been used to dispose of non-hazardous wastes via surface application “ with no deleterious effect on the environment” at Hobson, Mount Lucas, and Highland. In

2008, the operators of the Highland and Smith ISL mines in Wyoming were forced into a settlement agreement with the WY Dept. of Environ. Quality, because land application of liquid wastes containing elevated concentrations of selenium had contaminated soils. Part of the settlement agreement required the operators of Highland to immediately pay \$8 million to accelerate reclamation activities and to increase their financial assurance bonds for these two sites to \$80 million (WY DEQ, 2008). Furthermore, Faillace and others (1997) report that release of such waters will contaminate the soil at the land application areas. Radionuclides adsorbed by the soil will become a source term for radioactive release through wind erosion processes.

Deep Well Injection of Liquid Wastes. The Application fails to provide necessary details on the chemical composition of the wastes and water treatment specifics.

54. ER, Pg 4-21 (4.6.2.6 Potential Impacts of Groundwater Consumption During Operations and Restoration) states: “The majority of groundwater used in the ISL process will be treated and injected.” However, no details are provided on the (actual) chemical composition of either the untreated or treated liquid wastes. Instead, ER, Pg 4-83 states: “The physical and chemical properties of the wastes will be similar to the estimated quality of wastes provided in **Table 4.15-1 for land application**. The process waters for deep well injection will meet the regulatory provisions in 10 CFR 20.2002 and be within the dose limits in 10 CFR 20.1301.” Table 4.15-1 lacks many of the constituents for which water quality standards / criteria exist. Powertech should be required to provide actual, detailed analyses for such wastes.

55. In addition, the Application presents no details on the specific methods of water treatment that would be used prior to injection. As discussed above, such details are routinely known at this stage of a project.

Ground water sampling results presented in ER, section 6.1.8 (Groundwater Sampling, pg 6-62) should be combined and integrated with those in ER, Chapter 3.

56. ER, pg 6-69 states: “A groundwater quality constituent list was developed based on NUREG-1569 groundwater parameters, NRC 4.14 parameters, and added parameters from a constituent-list review with SD DENR.” It is recommended that the constituent list be expanded to include all constituents for which any water quality standards or use criteria exist.

57. Which specific personnel performed the actual field activities (sampling and measurement)? Do field sheets exist to demonstrate that samples were preserved in the field?

The technical and regulatory literature amply documents the numerous failures to restore aquifer water quality at other ISL sites. Thus, it is reasonable to assume that portions of the D-B ground water surrounding the leached zones will have degraded water quality and may be unfit for future uses.

59. Powertech repeatedly makes optimistic statements about aquifer restoration such as: “Powertech (USA) will restore GW in each depleted well field consistent with pre-operational or baseline WQ conditions.....” ER, pg. 1-1. However, there is no demonstration as to other in-situ operations that have been able to do so. Indeed, the historical reality from other operating or closed ISL sites demonstrates an inability to restore to pre-operational or baseline WQ conditions for all constituents. (Otton, 2009; Hall, 2009).

The Application fails to adequately describe the common names (in addition to commercial names) and quantities of chemicals, fuels and explosives to be used and stored per year at the D-B site.

60. The ER, pg. 1-32, presents some information on the chemicals to be used, but no quantities are given. ER, pg. 1-34, Sect. 1.4.7.9 presents a very limited mention of the

fuels to be used, but again no details on the quantities. All categories of chemicals, explosives, fuels, and any other potential environmental contaminants need to be summarized in a simple table including estimated quantities to be used per year. *Equally importantly, all categories of baseline monitoring should determine chemical constituents that will indicate the possible presence of these compounds (organic and inorganic) in the environment.*

What Commercial Products will be Extracted?

61. Does Powertech intend to produce only uranium yellowcake as a commercial product or will other products be generated? [Any molybdenum, selenium, etc. products anticipated?]

Improper Technical Conclusions.

62. The Application is inadequate in its attempt to demonstrate that the ground water quality data are of suitable quality, as on ER pg. 3-61, 62. Here they state that a comparison of field and lab pH and specific conductance data “are within reasonable limits.” Despite the vagueness of the language, this statement / section demonstrates a failure to understand the basics of applied water quality. Ground water chemistry routinely changes between the time a water sample is lifted from a well--where field pH and S.C. measurements should be made immediately--and much later when investigated in a laboratory. Hence, it is inappropriate to argue that, for example, the highest measured field pH was 12.67 and it “was verified by the contracting laboratory which reported a pH of 12.4 in the sample” (p. 3-62). Of course the chemistry changed as the temperature and pressure of the sample changed, the sample de-gassed, and various chemical reactions occurred. However, the authors failed to comment on the significance of the actual

reported pH of 12.67. In such a hydrogeologic setting, a site that had been previously drilled by thousands of exploration boreholes, and possibly previously mined, the logical conclusion is that such a pH represents evidence of some form of contamination -- possibly from the incorrect completion of a well with cement and / or bentonite grout, a spill of some alkaline chemicals, or from some past attempts to test the leachability of these ores using an alkaline lixiviant. The same is true for the insufficient discussion of the field versus lab specific conductance values at well 677, which were reported to be 12,220 $\mu\text{S}/\text{cm}$ versus 11,000 $\mu\text{S}/\text{cm}$ (pg. 3-62). The authors ignore the more reasonable conclusions that some form of contamination has occurred.

63. However, someone preparing the Powertech ER knows that water quality data should be summarized statistically, as is evidenced by the format of ER Table 3.4-4, for all Powertech field parameters. Unfortunately, the Powertech documents fail to summarize the *laboratory data* in the same fashion. Nowhere else in the body of the ER is a similarly-detailed, statistical summary of water quality data presented. Also, they fail to include the previous water quality data from the historic TVA and other data in these summaries. Worse, they have chosen to leave out of their water quality summaries all lab data that have *qualified values* -- that is, values reported as “less than” some concentration. This approach totally biases the various data sets, because it neglects to include all determinations that had very low concentrations.

Compliance: The actual regulatory role of US EPA here is unclear.

64. Application Supplement, pg. 5-6 states: “EPA Region 8 has stated that they want to limit the distance outside the monitor well ring to minimize potential environmental impact. There is an idea that if there is an excursion out to the aquifer exemption

boundary, operations will be shut down.” This description does not provide a sufficient description of the EPA’s regulatory program. The application should define these specifics, including a full description of “the idea that if there is an excursion out to the aquifer exemption boundary, operations will be shut down.”

UCL Parameters should be approved by NRC.

65. Application Supplement, pg. 5-6, Sect. 5.2.7 states: “Powertech management has always used Chlorides, Sulfate, and Uranium as Upper Control Limit (UCL) Parameters. Sometimes Total dissolved Solids is used.” This statement seems disingenuous as Powertech has never operated an ISL mine. Once a reliable baseline ground water database has been approved (for the various zones described above, not simply the ore-bearing zone), the NRC should approve the constituents designated as UCL parameters.

Powertech’s proposed ALARA goal for limiting uranium concentrations in site soils

66. The ER, Pg 4-80 states: “Powertech (USA) Uranium USA proposes an ALARA goal of limiting the natural uranium concentration in the top 15 cm soil layer to 150 pCi/g averaged over the impacted areas. Subsurface soil (greater than 15 cm) natural uranium concentrations should be limited to 230 pCi/g averaged over the impacted area based on chemical toxicity.” NRC should make public its opinion on this proposed goal prior to the issuance of any licenses.

Soil contamination (radiation and metals / metalloids) from past mining and exploration should be incorporated into determining baseline

67. ER, pg. 6-13 (Monitoring Programs--Surface Mine Area) states: “In the surface mine area, the gamma-ray count rates ranged from 5,550 to 460,485 cpm and the median was 12,717 cpm. In general, clusters of higher readings are associated with un-reclaimed open pit uranium mines, waste rock, rocky outcrops, and drainages in the surface mine area.”

“It is clear that the surface mine area in the eastern quarter of the site exhibits radiological impacts from historic and/or current anthropogenic activities within the area. In addition, gamma-ray count rates in the anomalous north area also are clearly distinct from those in the wider main PAA. **The precise sources of the differences are not relevant in the context of this investigation since they are part of the baseline or background radiological characteristics of the site.**”

68. The site is clearly contaminated from past activities, and no reclamation has been required. Powertech has a conflict of interest if allowed to determine which data are relevant here. The NRC should make public its opinions on these matters prior to issuance of any licenses.

Baseline soil and stream sediment databases should include data for a broad suite of other chemical constituents (metals, organics, etc.) besides simply selected radiochemical constituents.

69. The ER, pg 6-21 and 22 (6.1.3 Soil Sampling) states: Soil samples were analyzed for radium-226 while two were also analyzed for natural uranium, thorium-230, and lead-210. Baseline soil data should include data for a many additional chemical constituents, especially those that are routinely considered to be potentially toxic at hazardous waste sites. Similar comments pertain to stream sediment samples, which are described on ER, pg 6-41.

Financial Assurance.

70. The NRC and the general public know several general facts about the usefulness of most company-generated financial assurance estimates:

1-They generally are based on overly-optimistic assumptions about future water quality, thereby under-estimating costs. Kuipers (2000) conducted a survey of bonding practices at metal mines throughout the western U.S. and found that the bond amounts available were hundreds of millions of dollars below that necessary to conduct actual clean-ups. Many of the “problem” sites have been foreign-owned entities, especially those with their corporate headquarters and assets based in Canada.

2-Aquifer restoration at most, if not all previously-licensed and operated ISL sites fail to actually return ground water quality to baseline conditions [Hall (2009); Otton and Hall (2009);

3-Predictions of future aquifer restoration success made by the project proponents seldom use truly conservative assumptions. Calculation of financial assurance amounts made by representatives of the party that stands to profit from project licensing represent an extreme conflict of interest.

4-The technical literature is filled with documentation that quantitative predictions of future water quality at specific sites cannot be done reliably [Sarewitz, et. al. (2000); Moran (2000); Pilkey & Pilkey-Jarvis(2007); Kuipers & Maest (2006)], and the general failure to restore aquifers back to pre-operational baseline concentrations supports this. At an academic level, this approach must be totally rejected because it assumes one can make accurate and precise *deterministic* predictions.

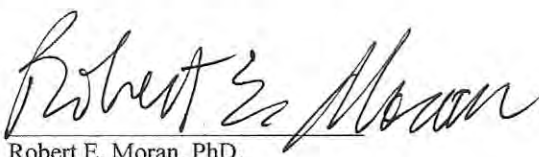
71. For these reasons, the financial assurance calculations should be made by some independent party, not paid or directed by the project proponents. These calculations should also consider the actual reclamation and restoration costs incurred, long-term, from a statistical sampling of the previously-licensed ISL sites. Furthermore, these

financial assurance amounts and mechanisms should be made public prior to award of any licenses.

72. To ensure protection of the general public, such financial assurance vehicles (bonds, etc.) should be made with the parent corporation, not simply the local operating entity.

Pursuant to 10 C.R.F. § 2.304(d) and 28 U.S.C. § 1746, I declare under penalty of perjury, that the foregoing is true and correct to the best of my knowledge and belief.

Signed on the 4th day of April, 2010,

A handwritten signature in cursive script, reading "Robert E. Moran".

Robert E. Moran, PhD.

EXHIBIT 4

In-situ recovery uranium mining in the United States: Overview of production and remediation issues

J.K. Otton, S. Hall

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In 2007, in-situ recovery (ISR) methods produced about 95% of U.S. production of 4.53 million pounds. Eleven new and five expansion ISR applications or letters of intent were filed with the U.S. Nuclear Regulatory Commission for the period from 2007-2009. ISR mining can be conducted in water-saturated, permeable, hydrologically confined sandstone beds where the uranium is soluble. Contamination of ground water during and after ISR operations has become a major issue for nearby residents, and for local, county and state governments. Colorado has raised ISR mining requirements and established a burden of proof that operations can return water quality to baseline conditions. Similar concerns are affecting mining plans in Wyoming, Texas, New Mexico, South Dakota, and Nebraska. Major issues affecting restoration at ISR mining operations include the following:

- Baseline water quality: Is the water presently potable or suitable for livestock or irrigation? What parts of the local aquifer should be sampled to establish baseline? What sampling methods are required to establish water quality conditions?
- Control of fluid flow during operations: How much hydrologic understanding of the ore zone is necessary to avoid flow problems?
- Ground-water restoration: To what standard should the ground water be restored? How long should monitoring occur after mining is completed?
- Ground-water restoration: What technologies work or might work?

To date, no remediation of an ISR operation in the United States has successfully returned the aquifer to baseline conditions. Often at the end of monitoring, contaminants continue to increase by reoxidation and resolubilization of species reduced during remediation; slow contaminant movement from low to high permeability zones; and slow desorption of contaminants adsorbed to various mineral phases. New remediation technologies are being examined, including bioremediation and monitored natural attenuation. Bioremediation can occur through addition of a carbon source such as acetate or molasses to augment the natural bacterial population which can induce simultaneous reduction and precipitation of uranium in solution. Bioremediation experiments are presently being conducted at U.S. Department of Energy sites in western states. Monitored natural attenuation suggest that ground-water flow that created the deposit moved from an oxidized zone through the orebody to a reduced zone. Re-establishment of ground-water flow after mining should move contaminants from the mined orebody into the reduced zone where natural processes can reduce the contaminants and remove them from the ground water. Questions: 1) Is current ground-water hydrology suitable? 2) What is the reducing capacity of the reduced zone? 3) Do kinetics of reduction reactions in the reducing zone vs. speed of ground water flow? 4) Effects of heterogeneity in mining zone and reducing zone? 5) Can all analytes of concern be attenuated? 6) Monitored attenuation- can the limited time frame preferred by operators be achieved?

EXHIBIT 5

SOUTHWEST GROUNDWATER CONSULTING, LLC

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**Report on Findings Related to the Restoration of In-Situ
Uranium Mines in South Texas**

**Submitted to
Blackburn & Carter
4709 Austin Street
Houston, Texas 77004**

September 29, 2008

SOUTHWEST GROUNDWATER CONSULTING, LLC

7425 Amanda Ellis Way

Austin, TX 78749

512-560-9131

bkdarling@southwestgroundwater.com

September 29, 2008

Mr. Jim Blackburn
Blackburn & Carter
4709 Austin St.
Houston, TX 77004

RE: Report on Findings Related to the Restoration of In-Situ Uranium Mines in South Texas

Dear Mr. Blackburn:

You have asked me to research the files of the Texas Commission on Environmental Quality (TCEQ) to determine the track record of the Underground Injection Control (UIC) office with regard to the restoration of aquifers after mining operations have been completed. As part of my investigation, I have talked with representatives of the office of Underground Injection Control (Mr. Ben Knape, and Mr. David Murry). Mr. Knape made available, for inspection and copying, ring binders of documents related to each in-situ mining site in south Texas; and Mr. Murry gave me a collection of spreadsheets that allow for comparison of Original Restoration Target Values, Amended Restoration Target Values, and Last Sampled Values of 26 water quality indicators listed on each table of restoration values approved by TCEQ. It will be necessary to verify data from the ring binders and the spreadsheets made available by Mr. Knape and Mr. Murry with data from microfiche and microfilm files in the Central Records office of TCEQ. I found the microfiche and microfilm files in Central Records to be unorganized and difficult to navigate, without reference to paper and digital copies from which the data in Central Records were copied.

The spreadsheets were compiled by Mr. John Santos, retired geologist with the UIC program. A copy of the spreadsheet with dates that restoration tables were amended is included with this report as Attachment A. Tables of Original Restoration Target Values, Amended Restoration Target Values, and Final Sample Values are listed as Attachments B

through D. Comparisons of Original Restoration Target Values with Amended Restoration Target Values and Last Sampled Values for uranium, radium-226, arsenic, and sulfate are included as Attachments E through H. I am pulling together information from the large volume of data scanned from the files of UIC in an effort to re-produce and update all of Mr. Santos' spreadsheets. The final step will involve reconciliation of the above data with data from Central Records.

Regulation of In-Situ Uranium Mining

The regulation of in-situ uranium mining in Texas falls under the Texas Railroad Commission (TRC) and the Texas Commission on Environmental Quality (TCEQ). TRC oversees exploration, and TCEQ handles mine permitting, applications for aquifer exemptions, and aquifer restoration. The U.S. Environmental Protection Agency (USEPA) grants aquifer exemptions, based on recommendations made by TCEQ.

Restoration

Restoration is one of the final steps in the process of in-situ uranium mining. TCEQ sets restoration standards (in the form of Restoration Tables) in the mining permits of operators, based on 26 water quality indicators. Restoration standards vary from one Production Area to another, using background data and data from proposed Production Areas, as collected and submitted by mining companies. My survey of records at UIC and Attachments A through H reveals that Restoration Tables are routinely amended by TCEQ. Relaxed restoration standards allow operators to depart from original groundwater cleanup objectives.

Amended Restoration Tables

The columns in Attachment A list (1) the names of the in-situ uranium mines, (2) Production Area Authorization (PAA) numbers, (3) restoration methods used at each Production Area, (4 and 5) the starting and ending dates of restoration programs, (6) pore volumes of water removed, (7) millions of gallons of water removed, (8) the date a Restoration Table was amended, (9) the dates that wells at a Production Area were plugged, and (10) the revocation date of the mining permit.

Attachment A lists 76 Production Areas and 51 dates on which TCEQ approved Amended Restoration Tables. Some of the Production Areas have been combined, but the final count in **this** report is based on the number of sites listed in Column 1. Eighty sites are listed in Attachments B through H, and it will be important to reconcile discrepancies between listings in those attachments and the listings of Attachment A.

Some of the sites listed in the first column of Attachment A, such as Gruy, were never mined, and others, such as Kingsville Dome, are in production. In the latter case, the Original Restoration Tables remain applicable, until the operator requests amended values. New sites, such as Goliad, are not listed because Production Areas have not been delineated and Restoration Tables assigned. Thus far, I have not found, in UIC's records, evidence that requests for Amended Restoration Tables have been denied by TCEQ.

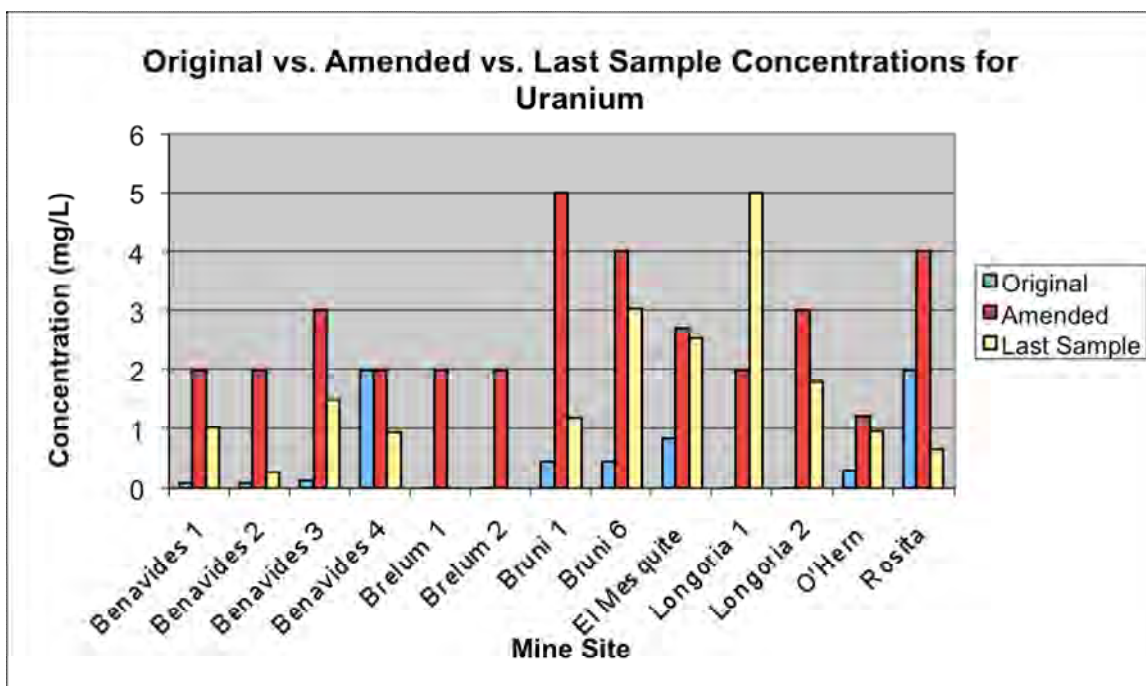
Figures

Figures 1 through 4 show, in the form of bar charts, the Original Restoration Target Values, Amended Restoration Target Values, and Last Sampled Values for uranium, radium-226, arsenic, and sulfate from mining sites for which all three values were recorded by Mr. Santos (Attachments E through H). The figures are based on data in the spreadsheets listed as Attachments B through D. Attachment B is the list of Original Restoration Target Values; Attachment C is the list of Final Restoration Target Values; and Attachment D is the list of Last Sample Values for all 26 water quality indicators. Attachments E through H list the differences and percent change between the Original Restoration Target Values and the Amended and Final Sample Values for uranium, radium-226, arsenic, and sulfate, respectively. The following observations are made with respect to Figures 1 through 4:

Uranium

- In all but two cases (Benevides 4 and Rosita), the Amended Restoration Table Values and the Last Sampled Concentrations of uranium for the Production Areas listed on Figure 1 (next page) exceed the Original Restoration Table Values approved by TCEQ.
- The Primary Drinking Water Standard (PDWS) for Uranium is 0.03 mg/l (or 30 µg/l).
- In all cases, the Amended and Last Sampled Concentrations of uranium exceed the PDWS.
- The higher Amended Restoration Values and the Last Sampled Concentrations are results of the inability of site operators to reduce uranium concentrations based on their respective proposed groundwater restoration programs. This calls into question the operators' understanding of the geochemistry of the hydrogeologic systems that they are exploiting.

Figure 1

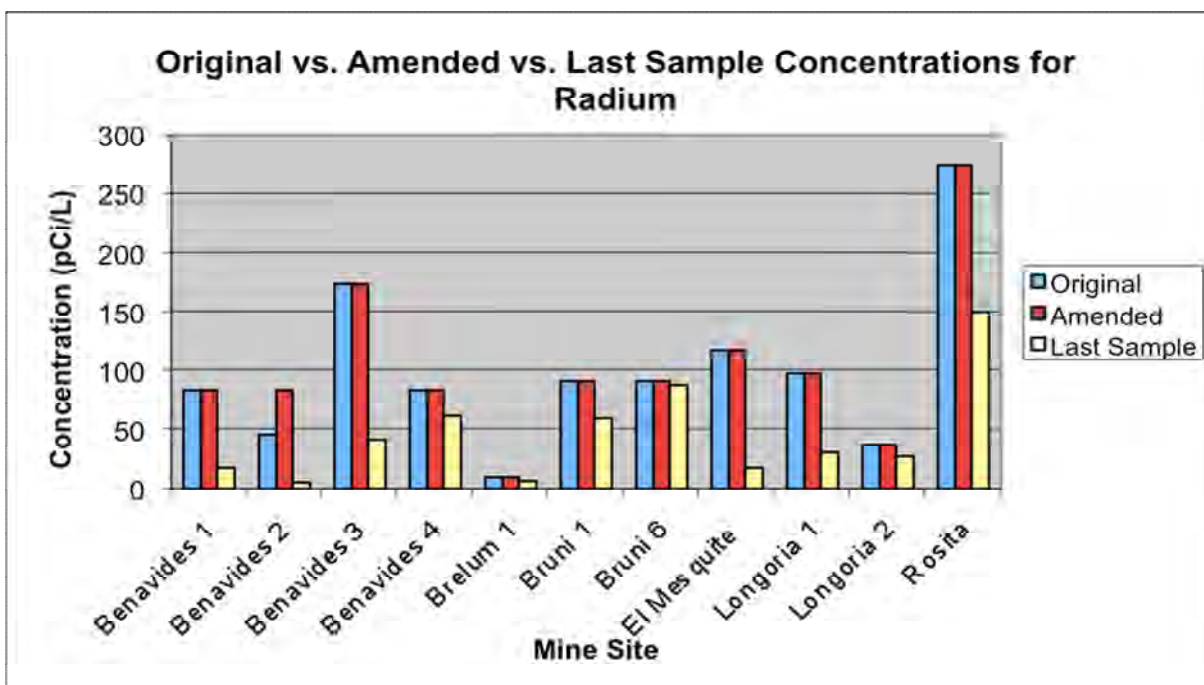


Radium-226

- All of the 12 Last-Sampled values were less than the Original Restoration Target Values (Attachment F).
- In all cases, radium-226 of the Amended Restoration Tables and Last Samples exceed the combined radium-226 and radium-228 PDWS of 5 picocuries per liter (pCi/L) (Attachment F; Figure 2, next page).
- The Original Restoration Table Values of radium-226 also exceed the radium-226/radium-228 PDWS of 5 pCi/L (Attachment F). What has not been established is the range of pre-exploration background radium-226 activities because (1) the Texas Water Development Board seldom includes radiochemical data in its groundwater chemistry database, and (2) the operators' methods of exploration have not been demonstrated not to destabilize uranium orebodies enough to release uranium and daughter products in sufficient concentrations and activities above

true background and pre-mining levels. In other words, adequate pre-exploration background studies have not been conducted.

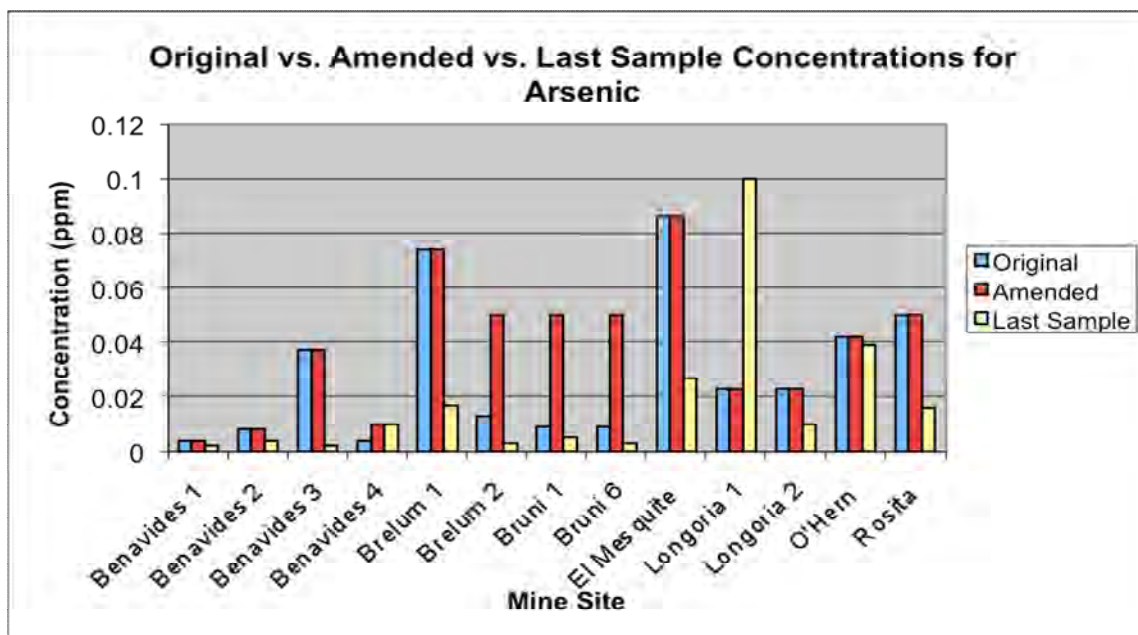
Figure 2



Arsenic

- In 53 of 73 cases, the Original Restoration Target Values exceed the current PDWS of 0.01 mg/l (10 µg/l) (Attachment G).
- In 25 cases, the Amended Restoration Target Values exceed the 53 Original Restoration Target Values (Attachment G).
- Seven of the 13 Last Sample Values are either equal to or greater than the PDWS of 0.01 mg/l (10 µg/l) (Figure 3, next page).
- The previous PDWS for arsenic was 0.05 mg/l.
- At 12 of the Production Areas, the Original Restoration Target Valued exceeded the old PDWS.

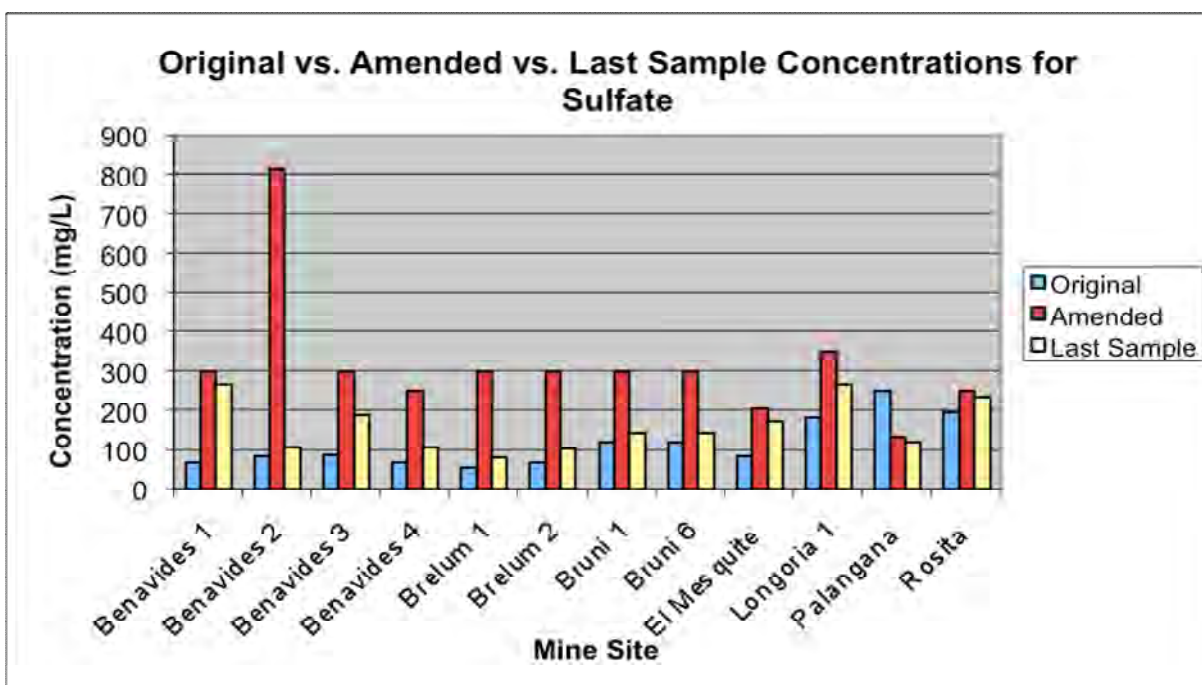
Figure 3



Sulfate

- With one exception, the Amended Restoration Target Values and Last-Sampled Concentrations of sulfate exceed the Original Restoration Target Values (Attachment H; Figure 4, next page).
- Although there is no PDWS for sulfate, the increased Amended and Last Sampled concentrations of sulfate underscore the potential for in-situ leach mining to increase major dissolved solids that affect the aesthetic properties of drinking water.

Figure 4



CONCLUSION

Based on data that I have evaluated as of the date of this letter report, I have found a minimum of 76 authorized in-situ uranium mining Production Areas in south Texas, and 51 dates on which Original Restoration Tables were amended by TCEQ (Attachment A). Other spreadsheets (Attachments B through H) show as many as 80 Production Areas. At least one of the mining areas (Gruy) was never developed. Others such as Kingsville Dome are still in production, so that amended restoration tables have not been issued.

Thus far, I have found it necessary to rely on data organized in ring binders at UIC, along with spreadsheets compiled by a retired geologist with the UIC program. The files in Central Records are on microfiche or microfilm, and there is no straightforward way to locate specific records without going through each file frame by frame. The system seems to be designed to make it difficult to find specific files at Central Records. This makes it necessary to rely on paper records and digital files which representatives of UIC are reluctant to certify as official records, even though official seals are affixed to

paper copies. TCEQ must find a way to make available certified paper records and digital files and to affirm the accuracy of each. Otherwise, researchers are condemned to sort through a morass of poorly organized microfiche and microfilm files at Central Records.

The large number of amended restoration tables indicates that TCEQ routinely grants requests for relaxed restoration standards at in-situ uranium mining sites. As of this date, I have found no evidence in correspondence between UIC and site operators that TCEQ has denied requests for Amended Restoration Tables.

The revision of a Table of Restoration Target Values is an admission, after the fact, that the operator of an in-situ uranium mine is unable to meet the original restoration standards for one or more of 26 water-quality indicators. Furthermore, there is no reasonable guarantee that natural conditions within an aquifer will lead to the restoration of contaminated groundwater from an in-situ uranium mine any sooner than would an aggressive program employing the latest groundwater treatment technologies.

I appreciate the opportunity to be of assistance on this matter. As noted above, I will continue to evaluate the large body of data made available by representatives of UIC, along with data from Central Records. Please call or contact me by email if you have questions regarding this letter report.

Sincerely,
SOUTHWEST GROUNDWATER CONSULTING, LLC

Bruce K. Darling, Ph.D., P.G.

Attachment A

Restoration History

Restoration History							
MINE	PAA	Method	Restoration		pore vol.	pore vol. =	Rest. table
			Start	End	removed	Mill. gal.	amended
Benavides		RO					8/12/91
Benavides	4	RO					
Boots/Brown	1						9/5/02
Brelum 106-20	1	RO					
Brelum 106-20	2	RO					
Bruni	1	changed to 05					
Bruni	2	changed to 05					
Bruni	3						
Bruni	4	added to 03					
Bruni	5-1	RO	Feb-90	Sep-90	2.4	14	2/25/91
Bruni	5-2	RO					2/3/92
Burns Ranch	1						8/14/89
Burns Ranch	2						
Burns/Moser	1						12/12/02
Burns/Moser	2						12/19/02
Burns/Moser	3						12/19/02
Burns/Moser	4						12/5/02
Clay West	1						9/9/99
Clay West	2						9/9/99
El Mesquite	1	RO					8/14/89
El Mesquite	2	RO & inj	Oct-90	Dec-99	6.4	66.8	5/6/01
El Mesquite	3	GW sweep, RO	Jan-94	Jan-04	11.5	29.5	11/3/04
El Mesquite	4	RO & inj	Jan-94	Oct-01	8.56	252	9/9/03
El Mesquite	7						
Gruy	1						
Gruy	2						
Gruy	3						
Hobson	1	GW sweep					1/8/90
Holiday	1						
Holiday	2	RO	Oct-90	May-99	6		3/9/00
Holiday	3	RO					2/20/89
Holiday	4	RO & inj	Sep-99	Nov-01	12.2	1.6	9/9/03
Holiday	5	RO & inj	Oct-00	Mar-04	12.5	27.3	1/31/93
Holiday	6	RO & inj	Sep-99	Apr-01	15.9	25	10/31/02
Holiday	7						
Kingsville Dorn	1						
Kingsville Dorn	2						
Lamprecht	1						
Lamprecht	2						
Lamprecht	3						
Lamprecht	4						
Las Palmas	1						2/14/93
Las Palmas	2						6/13/93

Restoration History							
MINE	PAA	Method	Restoration		pore vol. removed	pore vol. = Mill. gal.	Rest. table amended
			Start	End			
Las Palmas	3						7/13/92
Longoria	1	GW sweep					8/12/91
Longoria	2	GW sweep					8/12/91
McBryde	1	GW sweep					8/12/91
Mt Lucas	1						9/9/97
Mt Lucas	2	RO & inj	Mar-90	Mar-96	10.3		9/9/97
Mt Lucas	3						9/9/99
Mt Lucas	4						8/2/98
Mt Lucas	5	RO & inj	Jun-92	Mar-96	9.3		9/9/97
Mt Lucas	6	RO & inj	Mar-92	Sep-98	9		9/9/99
Mt Lucas	7	RO & inj	Jun-92	Oct-99	25.7	183	1/23/00
Mt Lucas	8	RO & inj	Jun-92	Dec-98	23.5		9/9/97
Nell	1	ion exchange					6/13/88
O'Hern	1						9/5/02
O'Hern	2	RO					
O'Hern	3						
O'Hern	4	RO & inj	Jan-94	Mar-01	10	15.4	10/31/02
Palangana							
Pawlik							6/22/00
Pawnee							10/22/98
Rosita							
Rosita	2						
Tex-1		RO & inj			12	152	1/23/00
Trevino		EDR			4.5	32.95	8/12/91
Trevino	2a	EDR	Aug-89	Jul-91	10	47.46	1/13/92
Trevino	2b	EDR	Sep-88	Nov-89	7.6	12.8	4/9/90
West Cole		RO & inj	Dec-93	Jun-00	10.7	39.1	6/28/01
West Cole	2	RO & inj	Dec-93	Dec-01	19	9.6	1/27/04
West Cole	3	RO & inj	Apr-95	Oct-03	12.1	225.9	3/12/06
Zamzow		RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	2	RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	3	RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	4	RO & inj	Nov-90	Oct-98	7		6/28/01

Restorati		
MINE	Wells	Permit/PAA
	plugged	revoked
Benavides		4/2/03
Benavides	Jan-91	4/2/03
Boots/Brown	Jul-03	8/18/03
Brelum 106-20		2/2/89
Brelum 106-20		2/2/89
Bruni		
Bruni		
Bruni		
Bruni		
Bruni	Oct-91	
Bruni	Jan-93	
Burns Ranch		1/24/91
Burns Ranch		
Burns/Moser	Aug-03	
Burns/Moser	Dec-03	
Burns/Moser	Dec-03	
Burns/Moser	Mar-03	
Clay West		2/15/04
Clay West		
El Mesquite		
El Mesquite	Oct-01	
El Mesquite	Feb-05	
El Mesquite	Nov-03	
El Mesquite		
Gruy		
Gruy		
Gruy		
Hobson	Nov-91	1/24/91
Holiday		
Holiday	Jul-01	
Holiday	Dec-89	
Holiday	Nov-03	
Holiday	Dec-05	
Holiday	Mar-02	
Holiday		
Kingsville Dom		
Kingsville Dom		
Lamprecht		3/7/00
Lamprecht		3/7/00
Lamprecht		3/7/00
Lamprecht		3/7/00
Las Palmas		3/2/03
Las Palmas		3/2/03

Restorati		
MINE	Wells	Permit/PAA
	plugged	revoked
Las Palmas		3/2/03
Longoria		4/2/03
Longoria		4/2/03
McBryde		1/26/93
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Nell	Dec-88	7/25/89
O'Hern	Oct-03	1/25/07
O'Hern	Jan-92	1/25/07
O'Hern	May-01	1/25/07
O'Hern	Dec-02	1/25/07
Palangana		
Pawlik	Oct-00	4/2/02
Pawnee		3/7/00
Rosita		
Rosita		
Tex-1		3/2/03
Trevino	Dec-91	2/89
Trevino	Oct-92	2/89
Trevino	Oct-92	2/89
West Cole	Nov-01	
West Cole	Feb-04	
West Cole	May-06	
Zamzow		11/2/01
Zamzow		11/2/01
Zamzow		11/2/01
Zamzow		11/2/01

Attachment B
Original Restoration Target Values

ORIGINAL RTV													
* corrected values		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Benavides	1	22	6.2	402	14	2	239	69	517	0.48	2.87	26	38146
Benavides	*2	35	13	559	19.9	0.1	181	85	814	0.43	1.3	20.4	8.1
Benavides	3	32	9.4	475	13.6	5	218	86	653	0.55	2.25	21	8.6
Benavides	4	50	15	410	14	2	400	69	517	0.48	2.87	26	6.5-8.5
Boots/Brown	1	50	9	221	11	--	300	43	266	0.98	0.2	45	38146
Brelum 106-200	1	40.66	3.5	2138	52.1	14.6	273	54.14	3129.7	1.5	0.33	49.7	8.46
Brelum 106-200	2	21.39	5.28	2356	101	10.6	419.08	67.08	3505	1.035	0.19	43.67	8.23
Bruni	1	241	58.3	382	18.3	4.1	160	118	1010	0.21	10	16.3	38146
Bruni	2												
Bruni	3	200	150	465	18	--	500	125	680	1.8	12	15	
Bruni	4	22	30.2	316	13	--	125	80	672.9	0.2	2	27	
Bruni	38107	241	58.3	382	18.3	--	160	118	1010	0.21	10	16.3	
Bruni	38108	241	58.3	382	18.3	--	160	118	1010	0.21	10	16.3	6.5-8.5
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1	49	9	321	13	--	296	39	463	1.44	0.17	43	
Burns/Moser	2	60	11	264	15	--	267	123	320	1	0.11	36	38175
Burns/Moser	3	48	9	174	9	--	250	18	225	1.2	0.04	40	38175
Burns/Moser	4	46	12	191.5	11	1.8	355	10.3	213.5	0.9	0.83	37	6.5-8.5
Clay West	1	65	12	282	13	--	247	85	371		0.4	50	7.9
Clay West	2	75	16	354	17	--	320	201	424	1.1	0.06	43	8.2
El Mesquite	*1	6.16	0.87	382	8.9	8.4	249	61	423	0.53	2.8	18.6	8.58
El Mesquite	2	4.98	0.75	279.1	8.95	17.92	308.62	90.62	186.46	0.96	2.15	24.07	38146
El Mesquite	3	4.13	0.477	279.5	6.38	17.9	324.3	83.2	196.9	0.96	4.25	23.05	8.74
El Mesquite	4	5.2	1.5	340	7.2	17	295	102	301	1	0.47	17	8.98
El Mesquite	7	7.5	1.9	328	8.6	15	288	96	338	0.92	1.94	26	8.74
Gruy	1	95.4	45.2	352	18.2	--	285	1197	542	0.94	3.09	65	7.7
Gruy	2	116	50	340	21	--	282	214	555	0.74	0.9	56	7.85
Gruy	3	121	43	239	22	--	235	144	471	0.6	2.84	66	7.94
Hobson	1	49.1	2	345	29	6.6	230	156	377	0.76	0.33	58	8.15
Holiday	1	9.5	2.3	304	8.1	2.9	295	78	268	0.89	3	21	8.29
Holiday	2	8.5	1	239	6.8	11.8	196	92.6	174	1.2	1.8		19.7
Holiday	3	38.8	15.4	449	16.4	3.8	244.8	92.6	630.4	0.47	3.06	20.4	8.45
Holiday	4	5.5	2.5	335	7.9	14	296	90	289	1.15	0.97	18	8.88
Holiday	5	22	8.3	445	11.1	4.4	240	80	582	0.58	1.87	20	38146
Holiday	6	52.2	24.6	424	15.3	1.5	232	112	643	0.53	2.7	22	8.23
Holiday	7	16	4.8	371	10.56	8	240	61	467	0.57	3.9	21	38146
Kingsville Dome	1	20.8	5.1	344	7.67	38	268	204	234	0.56	0.75	17.9	8.74
Kingsville Dome	2	25.3	5	323	8.2	7	327	224	224	0.65	0.89	27	7.37-8.66
Lamprecht	1	192.8	24.5	431	29.2	3.6	277.1	60.35	517.9	0.6	1.02	37.6	7.64
Lamprecht	2	182	22.8	527	26.4	--	250	617	656	0.6	1.87	32.2	38146
Lamprecht	3	210.3	25.1	425.6	30.4	--	267.7	636.5	514.8	0.64	0.76	45.5	38146
Lamprecht	4	210	40.4	471	34.2	5	367	520	619	1.41	1.73	37.3	38146
Las Palmas *	1	126.88	31.35	272.47	18.8	--	174.8	96.2	566.2	0.318	2.96	42.24	7.7
Las Palmas *	2	132.1	32.3	304	20.3	--	176	94	631.1	0.35	5.3	45	8.09
Las Palmas *	3	108	24	272	19	--	174	103	527	0.39	6.3	45	7.83

ORIGINAL RTV													
* corrected values		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Longoria	1	54.5	15.5	619	20.2	2.3	239.6	182.5	854.5	0.56	0.82	36	8
Longoria	2	77	19	610	23	3.4	238	206	856	0.62	2.68	42	8.28
McBryde	1	197	44	350	43	5	244	138	692	1.2	5	76	8.39
Mt Lucas	1	31	6.8	212.3	7.8	--	389	76.2	128	2	0.2	31.2	7.91
Mt Lucas	2	30	7.92	224.2	9.51	--	405	77.2	140.5	1.08	1.11	28	8.11
Mt Lucas	3	28.2	8.3	225	10	--	416	83.4	122.5	1.3	0.16	24.9	8
Mt Lucas	4	21.3	5.5	372	6.7	--	342	26	423	0.76	0.01	20	8.1
Mt Lucas	5	30.8	9.1	212	11.4	--	401	72	133	1.28	0.21	25	6.5-8.5
Mt Lucas	6	50.2	9.2	477	15.4	--	271	192	574	0.33	0.46	23	6.5-8.5
Mt Lucas	7	31.2	6.8	351	10.1	--	336	167	316	0.32	0.03	26	38146
Mt Lucas	8	32.2	6.6	295	10.9	--	372	145	213	0.35	0.97	36	6.5-8.5
Nell	1	79.2	4.14	1932	93	4.6	411.6	15.8	2956	0.78	0.031	55.25	38146
O'Hern	1	0.2	2.9	347	9.7	--	347.8	141	295.6	1.31	2.78	43.7	8.05
O'Hern	2	13.7	2.7	310	9.7	1.78	347	129	254	1.37	0.86	43.7	8.2
O'Hern	*3	200	150	300	12	--	500	160	300	1.8	10	45	38146
O'Hern	*4	14.12	2.8	307.7	9.06	17.57	190.1	132.1	278.8	0.96	2.79	55.1	
Palangana	1	200	125	245	19.3	11	500	250	250	1.8	10	44	38176
Pawlik	1A	144	29	750	32	--	197	14	1405	0.76	0.05	39	38146
Pawlik	1B	51	11	290	16	--	321	20	386	1.08	0.03	37	38146
Pawnee	1	200	125	200	--	--	500	250	250	1.8	10		38146
Rosita	1	155	53	422	26	--	204	196	866	0.81	1.79	50	6.5-8.5
Rosita	2	170	62	420	28	--	216	248	870	0.77	1.3	53	38175
Rosita	3	153	47	751	34	--	231	496	952	1.37	0.97	36	6.5-8.5
Tex-1	1	69.4	2.4	365	34	--	317	147	443	0.64	0.21	98	6.5-8.5
Trevino	1	150	47	380	23	--	264	189	641	0.778	0.22	51.4	7.11
Trevino	2a	95.9	50.2	392.6	26.4	--	388.8	239.5	572.4	0.81	0.16	53.9	6.9
Trevino	2b	95.9	50.2	392.6	26.4	--	388.8	239.5	572.4	0.81	0.16	53.9	
West Cole	1	6.64	1.5	295	10	16.4	333	92.4	201	1.95	1.19	57.8	8.71
West Cole	2	8.8	4	345	23	14	369	122	259	1.4	1.6	47	8.5
West Cole*	3	16.8	6.5	398	18.6	17	378	197	301	1.06	2.1	52	8.63
Zamzow	1	286	42.7	425	30.7	--	308	745	567	0.5	0.19	49	38146
Zamzow	2	306	33	341	24	--	282	773	514	0.5	0.1	48	38146
Zamzow	3	369	30	449.5	35.5	--	290.5	1018	499.5	0.55	0.01	62	7.31
Zamzow	4	395	39.5	430	59.5	--	328	793	720	0.7	0.05	58	6.5-7.5

ORIGINAL RTV													
* corrected values		mg/l	µmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Benavides	1	1211	0	0	0.004	0.0003	2.45	0.023	0.365	0.0003	0.004	0.03	0.083
Benavides	*2	1663	2982	149	0.008	0.01	1.2	0.05	0.41	0.001	0.01	0.03	0.078
Benavides	3	1356	2269	184	0.037	0.01	0.1	0.05	0.01	0.001	0.025	0.05	0.12
Benavides	4	1211	2161	199	0.004	0.0003	2.45	0.023	0.365	0.001	0.004	0.03	2
Boots/Brown	1	811	1423	252	0.059	0.0001	0.12	0.003	0.05	0.001	0.001	0.2	0.28
Brelum 106-200	1	5970.8	9979	248	0.074	0.0031	2	0.022	0.078	0.001	0.089	1.09	0.037
Brelum 106-200	2	6349	11160	349	0.013	0.0126	5.49	0.0134	0.128	0.0009	0.001	0.068	0.0308
Bruni	1	2282	3499	134	0.009	0.005	1.945	0.027	0.139	0.0009	0.022	0.57	0.461
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	38107												
Bruni	38108	2282	3499	134	0.009	0.005	1.945	0.027	0.139	0.0009	0.022	0.57	0.461
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1	960	1579	241	0.076	0.01	0.42	0.028	0.103	0.0027	0.07	0.1	0.3
Burns/Moser	2	954	1674	219	0.02	0.0006	0.53	0.003	0.62	0.0055	0.003	0.05	0.05
Burns/Moser	3	628	1110	205	0.007	0.0002	0.65	0.002	0.02	0.0006	0.002	0.2	0.082
Burns/Moser	4	746.5	1318	291	0.001	0.0001	0.18	0.001	0.025	0.001	0.001	0.21	0.02
Clay West	1	945	1840		0.05	0.0003		0.006	0.12	0.0009	0.001	0.22	0.4
Clay West	2	1320	2431	262	0.044	0.0018	6.1	0.008	1.195	0.0002	0.004	0.62	0.477
El Mesquite	*1	1071	1885	202.5	0.007	0.0005	0.12	0.019	0.014	0.0002	0.004	0.023	0.039
El Mesquite	2	794	1326.9	282.76	0.038	0.0002	0.313	0.516	0.034	0.00014	0.008	0.0456	0.085
El Mesquite	3	785.7	1346.3	285.8	0.086	0.00012	0.25	0.45	0.028	0.00025	0.028	0.49	0.84
El Mesquite	4	940	1628	268	0.002	0.0002	0.18	0.17	0.016	0.0003	0.006	0.09	0.062
El Mesquite	7	965	1640	261	0.001	0.0002	0.23	0.084	0.02	0.0001	0.012	0.1	0.097
Gruy	1	1510	2430	24	0.035	0.0001	0.02	0.001	0.04	0.0001	0.013	0.12	1.12
Gruy	2	1544	2488	231	0.083	0.0001	0.03	0.001	0.27	0.0001	0.08	0.02	0.045
Gruy	3	1261	2100	193	0.043	0.0001	0.073	0.001	0.04	0.0001	0.008	0.1	0.739
Hobson	1	1111	1758	195	0.15	0.0009	0.54	0.04	0.1	0.00064	0.008	0.244	0.025
Holiday	1	884	1498	247	0.03	0.01	2.08	0.05	0.05	0.002	0.02	0.21	0.23
Holiday	2	694	1211	181	0.03	0.005	0.32	0.03	0.02	0.009	0.6	0.2	0.2
Holiday	3	1442	2374	206.5	0.08	0.0001	0.272	1.97	0.22	0.0001	0.026	0.138	1.6
Holiday	4	934	1599	266	0.008	0.0001	0.27	0.065	0.017	0.0002	0.002	0.05	0.036
Holiday	5	1322	2358	204	0.015	0.0001	0.09	0.002	0.013	0.0001	0.007	0.12	0.063
Holiday	6	1486	2626	192	0.02	0.0001	0.2	0.001	0.02	0.0001	0.014	0.1	0.368
Holiday	7	1110	1930	209	0.05	0.0003	0.17	0.003	0.02	0.0001	0.014	0.14	0.1
Kingsville Dome	1	997	1717	272	0.005	0.01	0.04	0.02	0.01	0.001	0.007	1.06	0.164
Kingsville Dome	2	1035	1662	280	0.006	0.0002	0.03	0.004	0.02	0.0001	0.014	0.15	1.89
Lamprecht	1	2022.9	3062.5	193.5	0.013	0.004	0.332	0.014	0.121	0.0009	0.012	0.5	0.16
Lamprecht	2	2178	3466		0.011	0.002	0.332	0.016	0.132	0.0002	0.01	0.91	0.266
Lamprecht	3	2076	3083	193.5	0.026	0.004	0.506	0.018	0.132	0.003	0.026	0.64	0.9
Lamprecht	4	2118	3399	313	0.01	0.002	0.46	0.014	0.127	0.002	0.006	0.07	0.9
Las Palmas *	1	2124	2330	143.4	0.0272	0.0001	0.12	0.0053	0.089	0.0006	0.01	0.02	2.913
Las Palmas *	2	1490	2430	163	0.01	0.0001	0.45	0.02	0.087	0.0001	0.14	0.039	0.566
Las Palmas *	3	1208	2061	143	0.03	0.0001	0.55	0.005	0.046	0.0001	0.137	0.07	2.4

ORIGINAL RTV													
* corrected values		mg/l	µmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Longoria	1	1928			0.023	0.0001	0.04	0.003	0.02	0.0003	0.002	0.01	0.047
Longoria	2	2013	3509	201	0.023	0.0001	0.24	0.028	0.111	0.0003	0.003	0.01	0.037
McBryde	1	1580			0.041	0.0017	0.59	0.228	0.28	0.001	0.049	1.7	0.831
Mt Lucas	1	687.8	1140	318.6	0.0057	0.00014	0.18	0.0018	0.015	0.0001	0.001	0.348	0.293
Mt Lucas	2	740	1174	333.4	0.0014	0.0001	0.078	0.001	0.0134	0.0001	0.0013	0.116	0.076
Mt Lucas	3	728.5	1180	341	0.008	0.0001	0.2	0.001	0.016	0.0001	0.001	0.17	0.77
Mt Lucas	4	1096	2076	284	0.015	0.0001	0.3	0.001	0.026	0.0001	0.001	0.09	0.097
Mt Lucas	5	727	1166	329	0.003	0.0001	0.03	0.001	0.01	0.0001	0.003	0.12	0.258
Mt Lucas	6	1508	2567	222	0.003	0.0001	0.02	0.001	0.01	0.0001	0.004	0.03	0.125
Mt Lucas	7	1115	1817	275	0.003	0.0001	0.02	0.001	0.01	0.0001	0.001	0.07	0.047
Mt Lucas	8	967	1541	305	0.005	0.0001	0.01	0.001	0.01	0.0001	0.002	0.06	0.334
Nell	1	5383	9539	337.4	0.028	0.001	1.21	0.455	0.257	0.0005	0.0012	7.49	0.041
O'Hern	1	1052	1728	278	0.2	0.01	2.9	0.25	5.06	0.0003	0.002	2.1	0.28
O'Hern	2	979	1626		0.2	0.01	3.52	0.25	0.124	0.445	0.01	0.77	0.371
O'Hern	*3	1000			0.05	0.01	6.3	0.05	0.3	0.00003	0.01	0.5	2
O'Hern	*4	952			0.042	0.011	0.63	0.02	0.019	0.008	0.012	0.052	0.307
Palangana	1	878	1281	251	0.05	0.01	0.6	0.1	0.1	0.002	0.11	5	2
Pawlik	1A	2607	4566		0.003	0.0002	0.27	0.001	0.028	0.0001	0.001	0.2	0.002
Pawlik	1B	1002	1748	263	0.001	0.0001	0.29	0.001	0.037	0.0001	0.001	0.12	0.002
Pawnee	1	903	1310		0.05	0.01	0.3	0.05	0.059	0.002	0.05	0.1	2
Rosita	1	1933	3388	169	0.009	0.0005	0.105	0.002	0.06	0.0003	0.008	0.38	0.35
Rosita	2	2045	3519	177	0.014	0.0002	0.02	0.001	0.03	0.0001	0.006	0.08	0.547
Rosita	3	2524	4276	189	0.068	0.002	0.13	0.003	0.04	0.0001	0.034	0.16	0.586
Tex-1	1	1367	2160	260	0.028	0.0001	0.04	0.001	0.11	0.0001	0.002	0.12	0.05
Trevino	1	1577	2761	221	0.089	0.01	0.2	0.04	0.245	0.001	0.001	0.054	0.015
Trevino	2a	1635			0.032	0.01	0.25	0.02	0.32	0.0003	0.001	0.07	0.036
Trevino	2b												
West Cole	1	882.8	1441	296	0.121	0.0001	0.217	0.018	0.046	0.0002	0.006	0.09	0.169
West Cole	2	1036	1656	324	0.044	0.0001	0.72	0.009	0.115	0.0001	0.008	0.06	0.662
West Cole*	3	1234	1938	339	0.028	0.0008	0.58	0.017	0.041	0.0001	0.001	0.09	1.66
Zamzow	1	2289	3204	275	0.013	0.001	0.29	0.004	0.174	0.0007	0.01	0.22	0.01
Zamzow	2	2234	3155	245	0.01	0.001	0.15	0.001	0.14	0.0004	0.01	0.3	0.017
Zamzow	3	2575	3200	238	0.001	0.0001	1.06	0.004	0.38	0.0001	0.001	0.76	0.85
Zamzow	4	2510	3585	269	0.01	0.0001	4.06	0.006	0.39	0.0001	0.001	0.71	0.217

ORIGINAL RTV			
* corrected values		mg/l	pCi/l
		Molybdenum	Radium
Benavides	1	0.01	83
Benavides	*2	0.1	45.17
Benavides	3	0.1	173.1
Benavides	4	0.01	83
Boots/Brown	1	0.12	9.45
Brelum 106-200	1	0.152	9.36
Brelum 106-200	2	0.016	1536.5
Bruni	1	0.121	90.5
Bruni	2		
Bruni	3		
Bruni	4		
Bruni	38107		
Bruni	38108	0.121	90.5
Burns Ranch	1		
Burns Ranch	2		
Burns/Moser	1	0.4	246.6
Burns/Moser	2	0.01	
Burns/Moser	3	0.1	758
Burns/Moser	4	0.01	568
Clay West	1	0.256	235
Clay West	2	0.1	420
El Mesquite	*1	0.015	9.98
El Mesquite	2	0.024	14.7
El Mesquite	3	0.036	116.68
El Mesquite	4	0.01	6.2
El Mesquite	7	0.03	10.3
Gruy	1	0.016	272
Gruy	2	0.02	24
Gruy	3	0.01	159
Hobson	1	0.133	45.1
Holiday	1	0.3	9.1
Holiday	2	0.1	5.45
Holiday	3	0.116	429.8
Holiday	4	0.01	6.8
Holiday	5	0.05	14.9
Holiday	6	0.06	19.6
Holiday	7	0.06	8.7
Kingsville Dome	1	0.06	21.63
Kingsville Dome	2	0.38	92
Lamprecht	1	0.144	150.7
Lamprecht	2	0.155	76.7
Lamprecht	3	0.291	127.6
Lamprecht	4	0.17	290
Las Palmas *	1	0.04	133.6
Las Palmas *	2	0.01	92.3
Las Palmas *	3	0.03	155

ORIGINAL RTV			
* corrected values		mg/l	pCi/l
		Molybdenum	Radium
Longoria	1	0.03	97
Longoria	2	0.03	36.72
McBryde	1	0.03	365
Mt Lucas	1	0.06	535.8
Mt Lucas	2	0.042	391
Mt Lucas	3	0.11	314.6
Mt Lucas	4	0.05	150.8
Mt Lucas	5	0.1	323
Mt Lucas	6	0.02	225.4
Mt Lucas	7	0.07	56.2
Mt Lucas	8	0.08	171
Nell	1	0.126	57.2
O'Hern	1	0.3	39
O'Hern	2	1.1	46.2
O'Hern	*3	1	
O'Hern	*4	0.2	29.49
Palangana	1	1	164
Pawlik	1A	0.01	92.5
Pawlik	1B	0.01	22.7
Pawnee	1	1	274
Rosita	1	0.05	183
Rosita	2	0.06	130.3
Rosita	3	2.53	87.29
Tex-1	1	0.014	246
Trevino	1	0.34	13.8
Trevino	2a	0.1	19
Trevino	2b		
West Cole	1	0.01	8.98
West Cole	2	0.01	*19.6
West Cole*	3	0.011	46
Zamzow	1	0.006	107.9
Zamzow	2	0.2	363.49
Zamzow	3	0.01	45.25
Zamzow	4	1.05	481.9

Attachment C
Final Restoration Target Values

Final Restoration Target Values																
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU pH	mg/l	mmhos/cm	mg/l
	PAA	Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica		TDS	Conductivity	Alkalinity
Benavides	1	75	6.2	402	14	2	350	300	517	0.48	2.87	26	6.5-8.5	1211		
Benavides	2	100	13	559	19.9	0.1	325	814	814	1.3	8.1	20.4	8.1	2100	2982	149
Benavides	3	76	9.4	475	13.6	5	300	300	653	0.55	2.55	21	8.6	1358	2269	184
Benavides	4	50	15	410	14	2	400	250	517	0.48	2.87	26	7	1211	2161	199
Boots/Brown	1	75	14	221	12	0	350	75	266	1.2	0.2	45	6-8	811	1423	260
Brelum 106-20	1	75	30	2138	52			300	3130	1.5	10	49.7	6-9	5971		
Brelum 106-20	2	75	30	2356	101			300	3505	1.8	10	43.67	6-9	6349		
Bruni	1	270	150	410	35		700	300	1100	1.8	10	40	6.5-8.5	2282		
Bruni	2															
Bruni	3	139														
Bruni	4	139														
Bruni	5-1	270														
Bruni	5-2	241	58.3	382	35		700	300	1010	1.8	10	40	6.5-8.5	2282		
Burns Ranch	1															
Burns Ranch	2															
Burns/Moser	1	85	13	321	18		400	90	463	1.44	0.17	43		970	1579	306
Burns/Moser	2	103	17	264	16		290	160	320	1	0.35	36	7-8	948	1674	234
Burns/Moser	3	120	13	174	12		390	90	225	1.2	0.04	40	7-8	645	1110	315
Burns/Moser	4	220	36	191.5	16	1.8	370	350	270	0.9	0.83	37	6.5-8.5	1265	1936	300
Clay West	1	100	16	282	15		300	110	371	1.8	0.4	50	6.5-8.5	945	1840	
Clay West	2	95	16	354	17	0	320	300	424	1.1	0.06	43	8.2	1320	2431	262
El Mesquite	*1	75														
El Mesquite	2	20	3	315	8.95	17.92	420	100	200	0.96	2.15	24.07	6-9	875	1480	350
El Mesquite	3	21.5	3.9	320	7.5	17.9	410	205	196.9	0.96	4.25	23.5	6-9	910	1520	340
El Mesquite	4	36	8.5	370	8.5	17	440	300	301	1	0.47	17	6-9	1180	1830	362
El Mesquite	7															
Gruy (Not Min	1															
Gruy Not Mine	2															
Gruy (Not Min	3															
Hobson	1	70	3.5	370	35.8	6.6	429	253	425	0.94	0.33	75	8.15	1492	2408	313
Holiday	1															
Holiday	2	30	4	300	6.8	11.8	400	92.6	174	1.2	1.8	19.7	6-9	900	1500	350
Holiday	3	38.8	15.4	449	16.4	3.8	244.8	92.6	630.4	0.47	3.06	20.4	6-9	1442	2374	206.5
Holiday	4	70	16	490	13	14	440	455	350	1.15	0.97	18	6-9	1610	2500	365
Holiday	5	46	17	445	11.1	4.4	385	285	582	0.58	1.87	20	6-9	1322	2358	320
Holiday	6	65	24.6	424	15.3	4	4480	270	643	2.7	0.53	22	8.23	1482	2626	395
Holiday	7															
Kingsville Dom	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kingsville Dom	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lamprecht	1	198	32.6	444	30.8	3.1	300	523	574	1.05	1.36	37.6	7.4	2059	3221	276
Lamprecht	2	combined with PAA1														
Lamprecht	3	combined with PAA1														
Lamprecht	4	combined with PAA1														
Las Palmas	1	220	43	292	21		300	230	610	0.55	8.8	49	6.5-8.5	1600	2625	250
Las Palmas	2	132.1	32.3	304	23	0	225	180	690	0.57	12.5	45	6.5-8.5	1656	2773	183

Final Restoration Target Values																
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU pH	mg/l	mmhos/cm	mg/l
	PAA	Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica		TDS	Conductivity	Alkalinity
Las Palmas	3	200	35	272	19		270	250	570	0.6	6.3	45	6.5-8.5	1500	2500	220
Longoria	1	100	15.5	619	20	2.3	400	350	854	0.56	0.82	36	6.5-8.5	1928		
Longoria	2	100	19	610	23	3.4	400	450	856	0.62	2.68	42	6.5-8.5	2200	3509	201
McBryde	1	250	60	350	43		350	500	692	1.2	5	76	6.0-9.0	1738		
Mt Lucas	1	75	13	212.3	11		425	1000	128	2	0.2	31.2	6.5-8.5	776	1210	349
Mt Lucas	2	80	10	224	25		406.5	100	140.5	1.3	1.11	28	6.5-8.5	740	1174	333.4
Mt Lucas	3	70	12	225	10		416	95	122.5	1.3	0.16	24.9	6.5-8.5	728.5	1180	341
Mt Lucas	4	90	12	375	10		510	150	437	1	0.035	21	6.5-8.5	1122	1984	430
Mt Lucas	5	75	15	212	11.4		450	110	133	1.28	0.21	25	6.5-8.5	775	1200	375
Mt Lucas	6	160	24	477	18		370	250	574	0.5	0.46	23	6.5-8.5	1550	2567	300
Mt Lucas	7	90	15	351	12	0	425	250	316	0.4	0.03	26	6.5-8.5	1115	1817	350
Mt Lucas	8	125	18	295	12	0	425	225	213	0.45	0.97	36	6.5-8.5	967	1541	330
Nell	1	100	30	1932	93			300	2956	1.8	10	55.25		5383		
O'Hern	1	32	8	347	9.7	2	347.8	200	295.6	1.31	2.78	43.7	6.5-8.5	1052	1728	
O'Hern	2	14.7														
O'Hern	*3	table not amended														
O'Hern	*4	36	7	307.7	9.06	17.57	325	132.1	278.8	0.96	2.79	55.1		952		
Palangana	1	200	125	245	19.3	11	500	250	250	1.8	10	44	6.5-8.5	878	1750	410
Pawlik	1A	225	50	750	32		325	275	1405	0.9	0.05	39	6-9	2607	4566	290
Pawlik	1B	51	11	290	16		321	20	386	1.08	0.03	37	6-9	1002	1748	263
Pawnee	1	200	125	200			500	250	250	1.8	10		6-9	903	2400	
Rosita	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rosita	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rosita	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tex-1	1	125	5	377	45		327	400	445	0.62	0.12	110	6.0-8.5	1500	2400	269
Trevino	1	200	47	375	25	0	265	500	639	0.76	0.29	52	6.6-8.0	1700	2806	222
Trevino	2a	130	70	420	26.4	130	450	450	650	1	0.16	60	6.6-8.2	1884		
Trevino	2b	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
West Cole	1	25	10	350	15	16.4	670	92.4	201	1.96	1.19	57.8	6-9	1000	1640	550
West Cole	2	15	7	345	23	14	560	122	259	1.4	1.6	47	6-9	1036	1700	470
West Cole	3	16.8	6.5	398	18.6	17	532	197	301	1.17	2.1	52		1234		
Zamzow	1	317	38.4	450	30.3	0	750	793	538	0.54	0.16	51.6	6.5-8.5	2289	3204	500
Zamzow	2	combined with PAA1														
Zamzow	3	combined with PAA1														
Zamzow	4	combined with PAA1														

Final Restoration												
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	PAA	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium	Molybdenum	Radium
Benavides	1	0.004	0.0003	2.45	0.023	0.365	0.0003	0.004	0.03	2	0.01	83
Benavides	2	0.008	0.01	1.2	0.05	0.41	0.001	0.01	0.03	2	0.1	83
Benavides	3	0.037	0.01	0.1	0.05	0.01	0.001	0.025	0.05	3	0.1	173.1
Benavides	4	0.01	0.01	2.45	0.02	0.37	0.001	0.01	0.05	2	0.01	83
Boots/Brown	1	0.059	0.0001	0.2	0.003	0.05	0.0011	0.002	0.5	0.28	1	150
Brelum 106-20	1	0.074	0.0031	2	0.022	0.078	0.001	0.089	29	2	1	9.36
Brelum 106-20	2	0.05	0.0126	5.49	0.0134	0.128	0.0009	0.01	29	2	1	1536.5
Bruni	1	0.05	0.01	1.945	0.056	0.139	0.002	0.051	200	5	1	90.5
Bruni	2											
Bruni	3											
Bruni	4											
Bruni	5-1											
Bruni	5-2	0.05	0.005	1.945	0.027	0.139	0.0009	0.051	200	4	1	90.5
Burns Ranch	1											
Burns Ranch	2											
Burns/Moser	1	0.275	0.01	65	0.028	0.15	0.003	0.07	5	0.3	3.9	450
Burns/Moser	2	0.02	0.0006	0.503	0.003	0.64	0.0055	0.06	1.2	1.7	0.07	529
Burns/Moser	3	0.059	0.0002	2	0.002	0.27	0.0006	0.002	0.2	1.25	0.1	758
Burns/Moser	4	0.65	0.0001	8	0.001	0.35	0.001	0.001	0.21	0.2	0.5	675
Clay West	1	0.07	0.0003	1.5	0.006	0.75	0.0009	0.02	2.9	0.8	2.9	380
Clay West	2	0.044	0.0018	6.1	0.008	3.3	0.0002	0.05	0.62	0.477	0.3	420
El Mesquite	*1											
El Mesquite	2	0.038	0.0002	0.313	0.516	0.05	0.00014	0.08	0.045	1.35	0.13	46
El Mesquite	3	0.086	0.00012	0.25	0.45	0.028	0.00025	0.105	0.49	2.7	0.11	116.68
El Mesquite	4	0.009	0.0002	0.18	0.002	0.06	0.0003	0.215	0.09	1.95	0.07	20
El Mesquite	7											
Gruy (Not Min	1											
Gruy Not Mine	2											
Gruy (Not Min	3											
Hobson	1	0.422	0.009	2.09	0.04	0.331	0.00064	0.008	75.5	0.29	3.55	70
Holiday	1											
Holiday	2	0.03	0.005	0.32	0.03	0.02	0.009	0.6	0.2	0.5	0.1	26.6
Holiday	3	0.08	0.0001	0.272	1.97	0.022	0.0001	0.026	0.138	2	0.116	429.8
Holiday	4	0.008	0.0001	0.27	0.0065	0.05	0.0002	0.155	0.12	2.55	0.075	19
Holiday	5	0.015	0.0004	0.09	0.002	0.04	0.0001	0.061	0.012	1.095	0.19	28.5
Holiday	6	0.02	0.0001	0.2	0.001	0.1	0.0001	0.37	0.1	2.3	0.11	71
Holiday	7											
Kingsville Dom	1	–	–	–	–	–	–	–	–	–	–	–
Kingsville Dom	2	–	–	–	–	–	–	–	–	–	–	–
Lamprecht	1	0.013	0.007	0.332	0.014	0.121	0.0009	0.012	0.635	0.757	0.144	218.3
Lamprecht	2											
Lamprecht	3											
Lamprecht	4											
Las Palmas	1	0.073	0.0001	0.2	0.0053	0.5	0.0006	0.564	10	7	0.04	134
Las Palmas	2	0.019	0.0001	0.45	0.02	0.31	0.0001	0.14	0.167	2	0.06	100

Final Restoration												
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	PAA	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium	Molybdenum	Radium
Las Palmas	3	0.03	0.0001	0.55	0.005	0.4	0.0001	0.137	0.15	5	0.15	170
Longoria	1	0.023	0.0001	0.04	0.003	0.02	0.0003	0.002	0.01	2	0.03	97
Longoria	2	0.023	0.0001	0.24	0.028	0.111	0.0003	0.003	0.01	3	0.03	37
McBryde	1	0.041	0.0017	0.59	0.228	0.5	0.001	0.049	1.7	4	0.03	100
Mt Lucas	1	0.0057	0.00014	0.18	0.0018	0.05	0.0001	0.003	0.348	0.55	0.5	962
Mt Lucas	2	0.007	0.0001	0.078	0.001	0.1	0.0001	0.0013	0.116	0.5	0.8	950
Mt Lucas	3	0.02	0.0001	0.2	0.002	0.064	0.0001	0.35	0.17	1.75	1	940
Mt Lucas	4	0.1	0.0001	0.09	0.001	0.1	0.0001	0.003	0.08	1.6	1.6	300
Mt Lucas	5	0.2	0.0001	0.03	0.001	0.5	0.0001	0.025	0.12	1.5	0.6	750
Mt Lucas	6	0.005	0.0001	0.02	0.001	0.1	0.0001	0.015	0.03	2	0.6	750
Mt Lucas	7	0.15	0.0001	0.02	0.003	0.15	0.0001	0.01	0.05	1	0.75	250
Mt Lucas	8	0.006	0.0001	0.01	0.001	0.25	0.0001	0.002	0.06	1.25	1.5	550
Nell	1	0.028	0.001	1.21	0.455	0.257	0.0005	0.0012	7.49	2	1	57.2
O'Hern	1	0.2	0.01	2.9	0.25	5.06	0.36	0.61	2.1	1.55	2.1	
O'Hern	2											
O'Hern	*3											
O'Hern	*4	0.042	0.011	0.63	0.02	0.1	0.008	0.04	0.052	1.2	0.75	
Palangana	1	0.05	0.01	0.6	0.1	0.1	0.002	0.11	100	2	1.7	275
Pawlik	1A	0.003	0.0002	0.27	0.002	0.09	0.0001	0.001	0.2	0.02	0.07	92.5
Pawlik	1B	0.001	0.0001	0.29	0.001	0.037	0.0001	0.001	0.11	0.002	0.01	22.7
Pawnee	1	0.05	0.01	0.3	0.05	0.059	0.002	0.05	240	4	5	274
Rosita	1	–	–	–	–	–	–	–	–	–	–	–
Rosita	2	–	–	–	–	–	–	–	–	–	–	–
Rosita	3	–	–	–	–	–	–	–	–	–	–	–
Tex-1	1	0.35	0.0001	25	0.001	1	0.0001	0.002	0.14	1	0.1	372
Trevino	1	0.2	0.01	1	0.06	1	0.001	0.01	5	2	0.5	131
Trevino	2a	0.05	0.01	0.25	0.02	1	0.0003	0.01	5	2		226
Trevino	2b	–	–	–	–	–	–	–	–	–	–	–
West Cole	1	0.121	0.0001	0.217	0.018	0.046	0.0002	0.018	0.09	2.75	0.03	21.5
West Cole	2	0.12	0.0001	0.72	0.009	0.115	0.0001	0.04	0.09	2.5	0.025	
West Cole	3	0.13	0.0008	0.58	0.0017	0.041	0.0001	0.024	0.09	3.15	0.02	46
Zamzow	1	0.2	0.001	0.915	0.004	0.224	0.0006	0.01	200	3	5	200
Zamzow	2											
Zamzow	3											
Zamzow	4											

Attachment D
Last Sampled Values

Last Sampled Values													
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Benavides	1	67	13	418	11.5	6	3.3	265	432	0.29	0.53	13.7	8.36
Benavides	2	39	20	601	16	0	176	105	903	0.44	2.1	23	8.17
Benavides	3	76	18.6	442	12.6	0	224	188	629	0.32	0.41	18	8
Benavides	4	37	9	372	7	0	254	107	497	0.37	0.1	16	7.7
Boots/Brown	1												
Brelum 106-20	1	44	3.6	2184	49			81	3226	1.6	0.01	31	7.97
Brelum 106-20	2	49	5.9	2247	70			102	3326	1	0.01	33	7.89
Bruni	1	120	34.6	253	17		390	142	684	0.3	1.5	30	7.8
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	5-1												
Bruni	5-2	129	33.5	248	19		373	142	643	0.325	2.17	39	
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1												
Burns/Moser	2												
Burns/Moser	3												
Burns/Moser	4												
Clay West	1												
Clay West	2												
El Mesquite	*1												
El Mesquite	2												
El Mesquite	3	17.9	3.8	274	7.2	4.1	406	170	138	0.71	0.81	13.4	8.32
El Mesquite	4												
El Mesquite	7												
Gruy	1												
Gruy	2												
Gruy	3												
Hobson	1												
Holiday	1												
Holiday	2												
Holiday	3												
Holiday	4												
Holiday	5												
Holiday	6												
Holiday	7												
Kingsville Dorr	1												
Kingsville Dorr	2												
Lamprecht	1												
Lamprecht	2												
Lamprecht	3												
Lamprecht	4												
Las Palmas	1												
Las Palmas	2												
Las Palmas	3												

Last Sampled Values													
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Longoria	1	85	20.6	562	13	6	315	265	712	0.55	0.28	30	8.33
Longoria	2	116	29	652	17	3	366	3881	905	0.51	0.59	30	8.27
McBryde	1												
Mt Lucas	1												
Mt Lucas	2												
Mt Lucas	3												
Mt Lucas	4												
Mt Lucas	5												
Mt Lucas	6												
Mt Lucas	7												
Mt Lucas	8												
Nell	1												
O'Hern	1												
O'Hern	2												
O'Hern	*3												
O'Hern	*4	35.7	5	215.1	7.3	1.37	322.9	121.1	155.8	0.6		28.3	
Palangana	1												
Pawlik	1A												
Pawlik	1B												
Pawnee	1	37	9	169	17	7	484	235	242	0.5	0.02	26	8.11
Rosita	1												
Rosita	2												
Rosita	3												
Tex-1	1												
Trevino	1												
Trevino	2a												
Trevino	2b												
West Cole	1												
West Cole	2												
West Cole	3												
Zamzow	1												
Zamzow	2												
Zamzow	3												
Zamzow	4												

Last Sampled Value													
Units =>		mg/l	mmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Benavides	1	1359	2383	253	0.002	0.01	0.01	0.03	0.01	0.001	0.005	0.1	1.04
Benavides	2	1875	3448	145	0.004	0.0001	0.01	0.004	0.01	0.0001	0.033	0.04	0.279
Benavides	3	1560	2715	184	0.002	0.0001	0.01	0.001	0.18	0.001	0.04	0.16	1.5
Benavides	4	1088	2173	208	0.01	0.01	2.7	0.02	0.18	0.001	0.01		0.95
Boots/Brown	1												
Brelum 106-20	1	6065			0.017	0.0002	0.12	0.001	0.031	0.0001	0.002	12.7	0.025
Brelum 106-20	2	6155			0.003	0.0001	0.16	0.001	0.063	0.0001	0.001	5.54	0.013
Bruni	1	1395			0.005	0.0001	0.12	0.001	0.02	0.0001	0.012	109.67	1.185
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	5-1												
Bruni	5-2	1366			0.003	0.0002	0.186	0.002	0.018	0.0001	0.015	89	3.02
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1												
Burns/Moser	2												
Burns/Moser	3												
Burns/Moser	4												
Clay West	1												
Clay West	2												
El Mesquite	*1												
El Mesquite	2												
El Mesquite	3	900	1461	338	0.027	0.0001	0.03	0.05	0.014	0.0001	0.102	0.05	2.53
El Mesquite	4												
El Mesquite	7												
Gruy	1												
Gruy	2												
Gruy	3												
Hobson	1												
Holiday	1												
Holiday	2												
Holiday	3												
Holiday	4												
Holiday	5												
Holiday	6												
Holiday	7												
Kingsville Dorr	1												
Kingsville Dorr	2												
Lamprecht	1												
Lamprecht	2												
Lamprecht	3												
Lamprecht	4												
Las Palmas	1												
Las Palmas	2												
Las Palmas	3												

Last Sampled Value													
Units =>		mg/l	mmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Longoria	1	1860	3200	269	0.1	0.01	1	0.05	0.2	0.002	0.05		5
Longoria	2	2208	3697	307	0.01	0.01	0.02	0.01	0.01	0.01	0.001	0.17	1.8
McBryde	1												
Mt Lucas	1												
Mt Lucas	2												
Mt Lucas	3												
Mt Lucas	4												
Mt Lucas	5												
Mt Lucas	6												
Mt Lucas	7												
Mt Lucas	8												
Nell	1												
O'Hern	1												
O'Hern	2												
O'Hern	*3												
O'Hern	*4	706.3			0.039	0.01	0.07	0.001	0.1	0.001	0.039	0.05	0.96
Palangana	1												
Pawlik	1A												
Pawlik	1B												
Pawnee	1	710	2127	408	0.016	0.0001	0.02	0.001	0.02	0.0001	0.001	120	0.672
Rosita	1												
Rosita	2												
Rosita	3												
Tex-1	1												
Trevino	1												
Trevino	2a												
Trevino	2b												
West Cole	1												
West Cole	2												
West Cole	3												
Zamzow	1												
Zamzow	2												
Zamzow	3												
Zamzow	4												

Last Sampled Value			
Units =>		mg/l	pCi/l
		Molybdenum	Radium
Benavides	1	0.05	17.35
Benavides	2	0.01	5.2
Benavides	3	0.02	40.5
Benavides	4	0.01	61.3
Boots/Brown	1		
Brelum 106-20	1	0.08	5.8
Brelum 106-20	2	0.02	18.7
Bruni	1	0.3	59.6
Bruni	2		
Bruni	3		
Bruni	4		
Bruni	5-1		
Bruni	5-2	0.5	88
Burns Ranch	1		
Burns Ranch	2		
Burns/Moser	1		
Burns/Moser	2		
Burns/Moser	3		
Burns/Moser	4		
Clay West	1		
Clay West	2		
El Mesquite	*1		
El Mesquite	2		
El Mesquite	3	0.097	17.1
El Mesquite	4		
El Mesquite	7		
Gruy	1		
Gruy	2		
Gruy	3		
Hobson	1		
Holiday	1		
Holiday	2		
Holiday	3		
Holiday	4		
Holiday	5		
Holiday	6		
Holiday	7		
Kingsville Dorr	1		
Kingsville Dorr	2		
Lamprecht	1		
Lamprecht	2		
Lamprecht	3		
Lamprecht	4		
Las Palmas	1		
Las Palmas	2		
Las Palmas	3		

Last Sampled Value			
Units =>		mg/l	pCi/l
		Molybdenum	Radium
Longoria	1		30
Longoria	2	0.01	27
McBryde	1		
Mt Lucas	1		
Mt Lucas	2		
Mt Lucas	3		
Mt Lucas	4		
Mt Lucas	5		
Mt Lucas	6		
Mt Lucas	7		
Mt Lucas	8		
Nell	1		
O'Hern	1		
O'Hern	2		
O'Hern	*3		
O'Hern	*4	0.72	
Palangana	1		
Pawlik	1A		
Pawlik	1B		
Pawnee	1	0.64	149
Rosita	1		
Rosita	2		
Rosita	3		
Tex-1	1		
Trevino	1		
Trevino	2a		
Trevino	2b		
West Cole	1		
West Cole	2		
West Cole	3		
Zamzow	1		
Zamzow	2		
Zamzow	3		
Zamzow	4		

Attachment E
Uranium Restoration History

Uranium					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Benavides	1	0.083	2	2309.63855	
Benavides	2	0.078	2	2464.10256	
Benavides	3	0.12	3	2400	
Benavides	4	2	2	0	
Boots/Brown	1	0.28	0.28	0	
Brelum 106-20	1	0.037	2	5305.40541	
Brelum 106-20	2	0.0308	2	6393.50649	
Bruni	1	0.461	5	984.598698	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	0.461	4	767.678959	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	0.3	0.3	0	
Burns/Moser	2	0.05	1.7	3300	
Burns/Moser	3	0.082	1.25	1424.39024	
Burns/Moser	4	0.02	0.2	900	
Clay West	1	0.4	0.8	100	
Clay West	2	0.477	0.477	0	
El Mesquite	*1	0.039	0		
El Mesquite	2	0.085	1.35	1488.23529	
El Mesquite	3	0.84	2.7	221.428571	
El Mesquite	4	0.062	1.95	3045.16129	
El Mesquite	7	0.097	0		
Gruy	1	1.12	0		
Gruy	2	0.045	0		
Gruy	3	0.739	0		
Hobson	1	0.025	0.29	1060	
Holiday	1	0.23	0		
Holiday	2	0.2	0.5	150	
Holiday	3	1.6	2	25	
Holiday	4	0.036	2.55	6983.33333	
Holiday	5	0.063	1.095		
Holiday	6	0.368	2.3	525	
Holiday	7	0.1	0		
Kingsville Dom	1	0.164	–		
Kingsville Dom	2	1.89	–		
Lamprecht	1	0.16	0.757	373.125	
Lamprecht	2	0.266	0		
Lamprecht	3	0.9	0		
Lamprecht	4	0.9	0		
Las Palmas	1	2.913	7	140.302094	
Las Palmas	2	0.566	2	253.35689	

Uranium					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Las Palmas	3	2.4	5	108.333333	
Longoria	1	0.047	2	4155.31915	
Longoria	2	0.037	3	8008.10811	
McBryde	1	0.831	4	381.347774	
Mt Lucas	1	0.293	0.55	87.7133106	
Mt Lucas	2	0.076	0.5	557.894737	
Mt Lucas	3	0.77	1.75	127.272727	
Mt Lucas	4	0.097	1.6	1549.48454	
Mt Lucas	5	0.258	1.5	481.395349	
Mt Lucas	6	0.125	2	1500	
Mt Lucas	7	0.047	1	2027.65957	
Mt Lucas	8	0.334	1.25	274.251497	
Nell	1	0.041	2	4778.04878	
O'Hern	1	0.28	1.55	453.571429	
O'Hern	2	0.371	0		
O'Hern	*3	2	0		
O'Hern	*4	0.307	1.2	290.879479	
Palangana	1	2	2	0	
Pawlik	1A	0.002	0.02	900	
Pawnee	1B	0.002	0.002	0	
Rosita	1	2	4		
Rosita	1	0.35	–		
Silver Lake	2	0.547	–		
Silver Lake	3	0.586	–		
Tex-1	1	0.05	1	1900	
Trevino	1	0.015	2		
Trevino	2a	0.036	2		
Trevino	2b	0	–		
West Cole	1	0.169	2.75	1527.21893	
West Cole	2	0.662	2.5	277.643505	
West Cole	3	1.66	3.15	89.7590361	
Zamzow	1	0.01	3	29900	
Zamzow	2	0.017	0		
Zamzow	3	0.85	0		
Zamzow	4	0.217	0		

Attachment F
Radium-226 Restoration History

Radium 266					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		pCi/l	pCi/l		
Benavides	1	83	83	0	
Benavides	2	45.17	83	83.7502767	
Benavides	3	173.1	173.1	0	
Benavides	4	83	83	0	
Boots/Brown	1	9.45	150	1487.30159	
Brelum 106-20	1	9.36	9.36	0	
Brelum 106-20	2	1536.5	1536.5	0	
Bruni	1	90.5	90.5	0	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	90.5	90.5	0	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	246.6	450	82.4817518	
Burns/Moser	2	0	529		
Burns/Moser	3	758	758	0	
Burns/Moser	4	568	675	18.8380282	
Clay West	1	235	380	61.7021277	
Clay West	2	420	420	0	
El Mesquite	*1	9.98	0		
El Mesquite	2	14.7	46	212.92517	
El Mesquite	3	116.68	116.68	0	
El Mesquite	4	6.2	20	222.580645	
El Mesquite	7	10.3	0		
Gruy	1	272	0		
Gruy	2	24	0		
Gruy	3	159	0		
Hobson	1	45.1	70	55.210643	
Holiday	1	9.1	0		
Holiday	2	5.45	26.6	388.073394	
Holiday	3	429.8	429.8	0	
Holiday	4	6.8	19	179.411765	
Holiday	5	14.9	28.5	91.2751678	
Holiday	6	19.6	71	262.244898	
Holiday	7	8.7	0		
Kingsville Dome	1	21.63	–		
Kingsville Dome	2	92	–		
Lamprecht	1	150.7	218.3	44.8573324	
Lamprecht	2	76.7	0		
Lamprecht	3	127.6	0		
Lamprecht	4	290	0		
Las Palmas	1	133.6	134	0.2994012	

Radium 266					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		pCi/l	pCi/l		
Las Palmas	2	92.3	100	8.34236186	
Las Palmas	3	155	170	9.67741935	
Longoria	1	97	97	0	
Longoria	2	36.72	37	0.76252723	
McBryde	1	365	100	-72.6027397	
Mt Lucas	1	535.8	962	79.5446062	
Mt Lucas	2	391	950	142.966752	
Mt Lucas	3	314.6	940	198.792117	
Mt Lucas	4	150.8	300	98.938992	
Mt Lucas	5	323	750	132.198142	
Mt Lucas	6	225.4	750	232.741792	
Mt Lucas	7	56.2	250	344.839858	
Mt Lucas	8	171	550	221.637427	
Nell	1	57.2	57.2	0	
O'Hern	1	39	0		
O'Hern	2	46.2	0		
O'Hern	*3	0	0		
O'Hern	*4	29.49	0		
Palangana	1	164	275	67.6829268	
Pawlik	1A	92.5	92.5	0	
Pawnee	1B	22.7	22.7	0	
Rosita	1	274	274	0	
Rosita	1	183	–		
Silver Lake	2	130.3	–		
Silver Lake	3	87.29	–		
Tex-1	1	246	372	51.2195122	
Trevino	1	13.8	131	849.275362	
Trevino	2a	19	226	1089.47368	
Trevino	2b	0	–		
West Cole	1	8.98	21.5	139.420935	
West Cole	2	*19.6	0		
West Cole	3	46	46	0	
Zamzow	1	107.9	200	85.3568119	
Zamzow	2	363.49	0		
Zamzow	3	45.25	0		
Zamzow	4	481.9	0		

Attachment G
Arsenic Restoration History

Arsenic					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Benavides	1	0.004	0.004	0	
Benavides	2	0.008	0.008	0	
Benavides	3	0.037	0.037	0	
Benavides	4	0.004	0.01	150	
Boots/Brown	1	0.059	0.059	0	
Brelum 106-20	1	0.074	0.074	0	
Brelum 106-20	2	0.013	0.05	284.615385	
Bruni	1	0.009	0.05	455.555556	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	0.009	0.05	455.555556	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	0.076	0.275	261.842105	
Burns/Moser	2	0.02	0.02	0	
Burns/Moser	3	0.007	0.059	742.857143	
Burns/Moser	4	0.001	0.65	64900	
Clay West	1	0.05	0.07	40	
Clay West	2	0.044	0.044	0	
El Mesquite	*1	0.007	0		
El Mesquite	2	0.038	0.038	0	
El Mesquite	3	0.086	0.086	0	
El Mesquite	4	0.002	0.009	350	
El Mesquite	7	0.001	0		
Gruy	1	0.035	0		
Gruy	2	0.083	0		
Gruy	3	0.043	0		
Hobson	1	0.15	0.422	181.333333	
Holiday	1	0.03	0		
Holiday	2	0.03	0.03	0	
Holiday	3	0.08	0.08	0	
Holiday	4	0.008	0.008	0	
Holiday	5	0.015	0.015		
Holiday	6	0.02	0.02	0	
Holiday	7	0.05	0		
Kingsville Dorr	1	0.005	–		
Kingsville Dorr	2	0.006	–		
Lamprecht	1	0.013	0.013	0	
Lamprecht	2	0.011	0		
Lamprecht	3	0.026	0		
Lamprecht	4	0.01	0		
Las Palmas	1	0.0272	0.073	168.382353	

Arsenic					
Restoration Table Amendment History					
MINE	PAA	Original mg/l	Amended mg/l	% Change	
Las Palmas	2	0.01	0.019	90	
Las Palmas	3	0.03	0.03	0	
Longoria	1	0.023	0.023	0	
Longoria	2	0.023	0.023	0	
McBryde	1	0.041	0.041	0	
Mt Lucas	1	0.0057	0.0057	0	
Mt Lucas	2	0.0014	0.007	400	
Mt Lucas	3	0.008	0.02	150	
Mt Lucas	4	0.015	0.1	566.666667	
Mt Lucas	5	0.003	0.2	6566.66667	
Mt Lucas	6	0.003	0.005	66.6666667	
Mt Lucas	7	0.003	0.15	4900	
Mt Lucas	8	0.005	0.006	20	
Nell	1	0.028	0.028	0	
O'Hern	1	0.2	0.2	0	
O'Hern	2	0.2	0		
O'Hern	*3	0.05	0		
O'Hern	*4	0.042	0.042	0	
Palangana	1	0.05	0.05	0	
Pawlik	1A	0.003	0.003	0	
Pawnee	1B	0.001	0.001	0	
Rosita	1	0.05	0.05	0	
Rosita	1	0.009	–		
Silver Lake	2	0.014	–		
Silver Lake	3	0.068	–		
Tex-1	1	0.028	0.35	1150	
Trevino	1	0.089	0.2	124.719101	
Trevino	2a	0.032	0.05	56.25	
Trevino	2b	0	–		
West Cole	1	0.121	0.121	0	
West Cole	2	0.044	0.12	172.727273	
West Cole	3	0.028	0.13	364.285714	
Zamzow	1	0.013	0.2	1438.46154	
Zamzow	2	0.01	0		
Zamzow	3	0.001	0		
Zamzow	4	0.01	0		

Attachment H
Sulfate Restoration History

Sulfate					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Benavides	1	69	300	334.782609	
Benavides	2	85	814	857.647059	
Benavides	3	86	300	248.837209	
Benavides	4	69	250	262.318841	
Boots/Brown	1	43	75	74.4186047	
Brelum 106-20	1	54.14	300	454.118951	
Brelum 106-20	2	67.08	300	347.227191	
Bruni	1	118	300	154.237288	
Bruni	2	0	0		
Bruni	3	125	0		
Bruni	4	80	0		
Bruni	5-1	118	0		
Bruni	5-2	118	300	154.237288	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	39	90	130.769231	
Burns/Moser	2	123	160	30.0813008	
Burns/Moser	3	18	90	400	
Burns/Moser	4	10.3	350	3298.05825	
Clay West	1	85	110	29.4117647	
Clay West	2	201	300	49.2537313	
El Mesquite	*1	61	0		
El Mesquite	2	90.62	100	10.3509159	
El Mesquite	3	83.2	205	146.394231	
El Mesquite	4	102	300	194.117647	
El Mesquite	7	96	0		
Gruy	1	1197	0		
Gruy	2	214	0		
Gruy	3	144	0		
Hobson	1	156	253	62.1794872	
Holiday	1	78	0		
Holiday	2	92.6	92.6	0	
Holiday	3	92.6	92.6	0	
Holiday	4	90	455	405.555556	
Holiday	5	80	285		
Holiday	6	112	270	141.071429	
Holiday	7	61	0		
Kingsville Dorr	1	204	–		
Kingsville Dorr	2	224	–		
Lamprecht	1	60.35	523	766.611433	
Lamprecht	2	617	0		
Lamprecht	3	636.5	0		
Lamprecht	4	520	0		
Las Palmas *	1	96.2	230	139.085239	

Sulfate					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Las Palmas *	2	94	180	91.4893617	
Las Palmas *	3	103	250	142.718447	
Longoria	1	182.5	350	91.7808219	
Longoria	2	206	450	118.446602	
McBryde	1	138	500	262.318841	
Mt Lucas	1	76.2	1000	1212.33596	
Mt Lucas	2	77.2	100	29.5336788	
Mt Lucas	3	83.4	95	13.9088729	
Mt Lucas	4	26	150	476.923077	
Mt Lucas	5	72	110	52.7777778	
Mt Lucas	6	192	110	-42.7083333	
Mt Lucas	7	167	250	49.7005988	
Mt Lucas	8	145	250	72.4137931	
Nell	1	15.8	225	1324.05063	
O'Hern	1	141	300	112.765957	
O'Hern	2	129	200	55.0387597	
O'Hern	*3	160	0		
O'Hern	*4	132.1	0		
Palangana	1	250	132.1	-47.16	
Pawlik	1A	14	250	1685.71429	
Pawlik	1B	20	275	1275	
Pawnee	1	250	20	-92	
Rosita	1	196	250	27.5510204	
Rosita	2	248	—		
Rosita	3	496	—		
Tex-1	1	147	—		
Trevino	1	189	400	111.640212	
Trevino	2a	239.5	500	108.768267	
Trevino	2b	239.5	450	87.8914405	
West Cole	1	92.4	—		
West Cole	2	122	92.4	-24.2622951	
West Cole*	3	197	122	-38.071066	
Zamzow	1	745	197	-73.557047	
Zamzow	2	773	793	2.58732212	
Zamzow	3	1018	0		
Zamzow	4	793	0		

EXHIBIT 6

Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain



Open-File Report 2009–1143

Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain

By Susan Hall

Open-File Report 2009–1143

**U.S. Department of the Interior
U.S. Geological Survey**

U.S. Department of the Interior

KEN SALAZAR, Secretary

U.S. Geological Survey

Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2009

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Hall, Susan, 2009, Groundwater restoration at uranium in-situ recovery mines, south Texas coastal plain: U.S. Geological Survey Open-File Report 2009–1143, 32 p.



Introduction

This talk was presented by U.S. Geological Survey (USGS) geologist Susan Hall on May 11, 2009, at the Uranium 2009 conference in Keystone, Colorado, and on May 12, 2009, as part of an underground injection control track presentation at the Texas Commission on Environmental Quality (TCEQ) Environmental Trade Fair and Conference in Austin, Texas.

Texas has been the location of the greatest number of uranium in-situ recovery (ISR) mines in the United States and was the incubator for the development of alkaline leach technology in this country. For that reason, the author chose to focus on the effectiveness of restoration at ISR mines by examining legacy mines developed in Texas. The best source for accurate information about restoration at Texas ISR mines is housed at the TCEQ offices in Austin. The bulk of this research is an analysis of those records.



USGS Uranium ISR Research

Phase 1: Forensic Chemistry (Nearing Completion)

- Compile historic chemistry of ISR operations throughout the United States
- Characterize groundwater chemistry in past ISR operations
- Compare effectiveness of restoration techniques (monitor ongoing studies)

Phase 2: Long-term Monitoring (Site and Funding Search Underway)

- Resample old well fields to test for long-term aquifer contamination
- Measure capacity of host formations to naturally attenuate ISR well field waters
- Resample around well fields to determine if contamination has moved outside original monitor wells
- Determination of mineralogic transformations through mining and reclamation

Phase 3: Improved Restoration Techniques (Preliminary Testing Initiated)

- Bench scale testing to try to develop more effective geochemical techniques for groundwater restoration in ISR mines
- Pilot studies implementing new techniques



USGS Uranium ISR Studies

The USGS initiated a study of the effects on groundwater by ISR mining in 2008 in response to increased activity in uranium exploration and mining and the increasing number of applications for ISR mines to the U.S. Nuclear Regulatory Commission. USGS geologists were particularly intrigued with the widespread assertion that “Groundwater has never been returned to baseline at any ISR mine.”

USGS ISR studies are broken down into three phases:

1. Compilation of forensic chemistry: the examination of legacy projects.
2. Investigations of groundwater chemistry over time.
3. Development of improved restoration techniques.

The USGS is nearing completion of Phase 1, the forensic chemistry portion of our project, and these are some of the interim results of this work. The search for a suitable field site and funding to evaluate long-term impacts and natural attenuation of groundwater in ISR well fields (Phase 2) is underway, and preliminary testing of new restoration technologies for ISR well fields (Phase 3) has begun.



Outline of Presentation

To determine the effectiveness of groundwater restoration at ISR mines, the following topics will be addressed:

1. The establishment of baseline and restoration goals.
2. Effectiveness of groundwater restoration.
3. Long-term stability of well fields.
4. An evaluation of best restoration technologies, including:
 - (a) Pump and treat techniques (Texas),
 - (b) The addition of reductants (Wyoming and New Mexico), and
 - (c) Bioremediation (Nebraska and Wyoming).

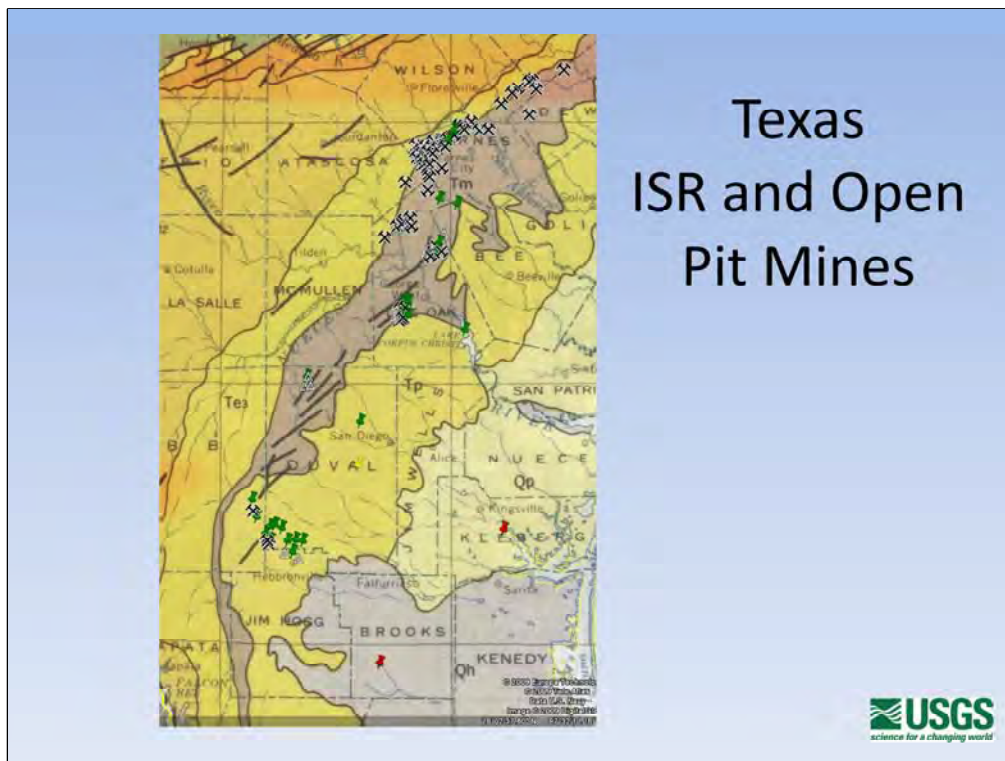


Background

The United States has been steadily producing uranium using ISR mining since the mid-1970s. In April 2009 there were four active mines in the United States (red markers): Cameco's Smith Ranch/Highland property in Wyoming and Crow Butte mine in Nebraska, and Mestena Uranium's Alta Mesa mine and URI's Kingsville Dome mine, both located in Texas.

Most uranium production from ISR mines has come from mines in Wyoming and Texas (green markers), with only pilot projects testing mining and restoration techniques developed in New Mexico (Crown Point, Mobil) and Colorado (Grover, Wyoming Minerals). More than 20 ISR mines anticipate or have begun the process of applying for licensing (yellow markers).

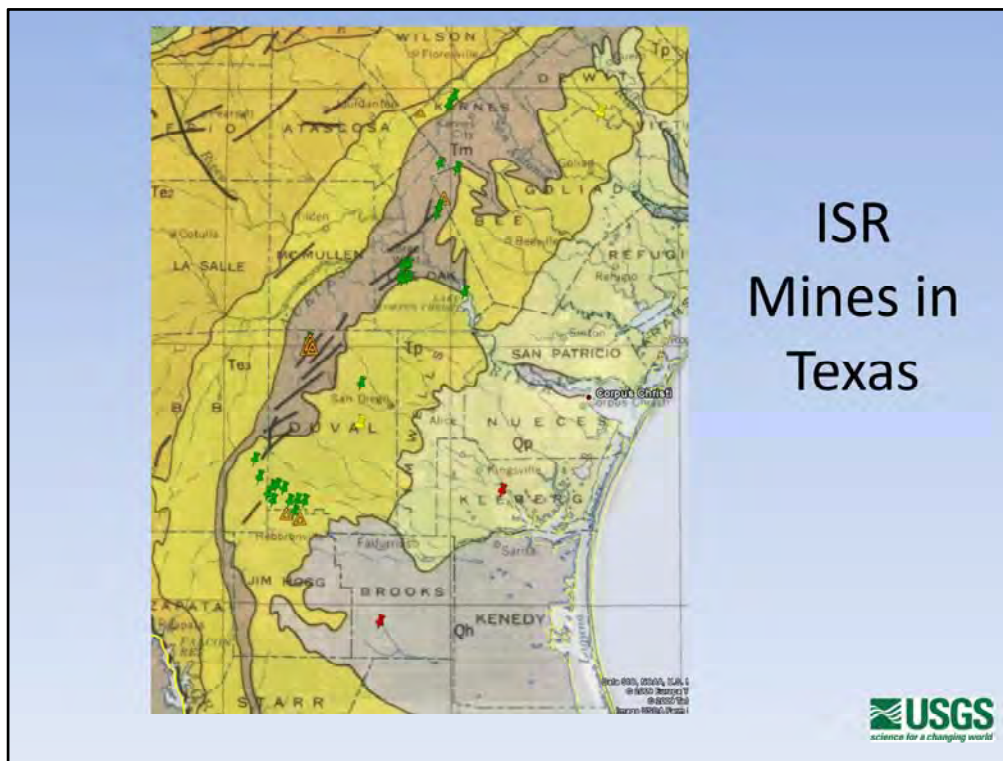
According to the Energy Information Agency, the United States imported 82 percent of its uranium in 2007 (Energy Information Agency, 2009) and 38 percent of U.S. uranium reserves are classified as ISR amenable (Nuclear Energy Agency, 2008). Thus, the safe and effective use of ISR technology in mining uranium deposits is a potentially critical element in the movement towards energy independence in the United States



Texas Coastal Plain Uranium District

Historically, uranium in Texas has been produced from Tertiary units along the southwest coastal plain. Uranium was first mined from a series of open-pit deposits developed in the Whitsett Formation (Jackson Group) and Catahoula Formation, starting in the late 1950s, when uranium was discovered during radiometric surveys in support of oil and gas exploration in Texas.

Black crossed mine symbols are uranium properties identified by the USGS Mineral Resources Data System database (<http://tin.er.usgs.gov/>) and show mostly historical open-pit mines located near Karnes City, Texas. The green markers represent closed ISR mines, and the red markers indicate operating ISR mines as of April 2009.



Along the southwest Texas coastal plain, uranium is mined, using ISR techniques, from the:

- Goliad Formation (Tp); a series of Miocene mudstone, conglomerates, and limestones, which is host to seven ISR mines
- Oakville Sandstone and Catahoula Formation (Tm); Miocene and Oligocene sandstone, clays, mudstones and Catahoula tuffs hosting 27 mines; 15 mines in the Oakville Sandstone and 13 mines in the Catahoula Formation
- Whitsett Formation (Te, Jackson Group); Oligocene mudstones, sandstones and tuffs which host two mines.

Thirty-six sites were authorized in Texas; seven were never mined (orange triangles), one was a tailings project (white square), and one was combined with another property. This leaves 27 mines (green markers) that were developed by construction of 77 well fields, termed Production Authorization Areas (PAAs) in Texas. The term “well field” and “PAA” will be used interchangeably throughout this presentation. Baseline and “amended restoration” values are available for all 27 mines/ 77 PAAs in TCEQ records.

Currently two mines are active in Texas: the Kingsville Dome mine in Kleberg County, operated by Uranium Resources International (URI), and the Alta Mesa mine in Brooks County, operated by Mestena Uranium (red markers). Two mines are in standby or shut down (green markers): the Vasquez and Rosita mines, both URI properties in Duval County. Two ISR mines are in the process of being permitted (yellow markers): Goliad in Goliad County (Uranium Energy Corporation) and La Palangana, a South Texas Mining Ventures property in Duval County.

Table 1: Baseline Water Quality for Zamzow PAA-1

ATTACHMENT G
BASELINE WATER QUALITY TABLE

TEXAS WATER COMMISSION
GROUNDWATER ANALYSIS REPORT SUMMARY
BASELINE WATER QUALITY - Evaluation Mining

Site Name: ZEL Torn
Site Area: 280.2 ac
Well Area: 30.1 (New and Existing Data)
Data Acquisition: October 31, 1998

BASELINE WATER QUALITY TABLE

PARAMETER	UNIT	NON-PRODUCTION ZONE**			PRODUCTION ZONE			WELL I.D. BY AREA*				
		Low	Average	High	MINE AREA**		PRODUCTION AREA		NON-PROD. ZONE	PROD. ZONE		
					Low	Average	High	Low			Average	High
1 Calcium	mg/l				132	21.2	652	196	759	304		
2 Magnesium	mg/l				15	28.4	84.7	5.0	71.1	56		
3 Sodium	mg/l				739	382	760	235	382	444		
4 Potassium	mg/l				19	30.3	49	18.9	26.7	50		
5 Carbonate	mg/l				0	0	0	0	0	0		
6 Bicarbonate	mg/l				128	297	400	157	269	346		
7 Sulfate	mg/l				454	733	1,520	441	801	940		
8 Chloride	mg/l				350	602	936	304	538	862		
9 Fluoride	mg/l				0.16	0.54	1.19	0.01	0.36	0.50		
10 Nitrate-N	mg/l				<0.01	0.16	0.9	<0.01	0.14	0.49		
11 Silica	mg/l				31	51.6	85	11	43.9	74		
12 pH	Std. unit				6.6	7.0	7.64	6.68	7.0	7.45		
13 TDS	mg/l				1,627	2,282	3,220	1,810	2,037	2,360		
14 Conductivity	umhos				2,720	3,404	4,300	2,680	3,049	3,430		
15 Alkalinity	Std. unit				105	275	400	206	238	304		
16 Acidity	mg/l				<0.001	0.009	0.03	<0.001	0.006	0.044		
17 Cadmium	mg/l				<0.0001	0.001	0.002	<0.0001	0.0006	0.003		
18 Lead	mg/l				0.01	0.015	0.0	0.03	0.074	0.26		
19 Zinc	mg/l				<0.001	0.001	0.006	<0.001	0.004	0.02		
20 Manganese	mg/l				0.003	0.024	0.05	0.01	0.018	0.15		
21 Arsenic	mg/l				<0.0001	0.0004	0.0018	<0.0001	0.0006	0.001		
22 Selenium	mg/l				<0.001	0.01	0.01	<0.001	0.004	0.01		
23 Uranium	mg/l				0.001	0.171	1.4	0.001	0.200	0.78		
24 Chromium	mg/l				<0.001	0.121	1.7	<0.001	0.079	0.132		
25 Molybdenum	mg/l				<0.001	0.01	0.06	<0.001	0.004	0.1		
26 Radium-226	pCi/l				1.15	1.19	1.99	0.19	1.02	1.44		

* LIST THE IDENTIFICATION NUMBERS OF WELLS USED TO OBTAIN THE LOW, AVERAGE AND HIGH VALUES. ** MONITOR WELLS



TCEQ ISR Restoration Database

The ISR restoration database is housed in the TCEQ offices in Austin, Texas. The database consists of binders for each mine in a data room adjacent to regulator offices. TCEQ does not represent these data as validated. Official data are on microfiche in an adjacent building, but the data are poorly organized and difficult to search. A digital database, compiled by a retired TCEQ employee, was also made available to the USGS. This digital database was cross-checked against original data sheets from the TCEQ data room, which forms the basis of this research.

TCEQ employees were extremely helpful in allowing the USGS full access to their data and copying facilities and were always available to answer questions about the database or permitting process.

This table is a typical data sheet summarizing pre-mining groundwater baseline data for a Texas PAA. In Texas, 26 chemical constituents are measured before mining to establish a baseline, as shown in Table 1. Restoration values are initially set as baseline, with operators selecting the highest average concentration from either the production or mine area as their restoration goal. At this Zamzow well field, PAA-1, 0.171 milligram per liter uranium was the highest average value from the mine or production area for uranium, as highlighted in Table 1.

Table 2 : Initial Restoration Table for Zamzow PAA-1

Production Area Authorization
Permit No. URO2108-011

Page 3

ATTACHMENT A
RESTORATION TABLE

Parameter	Unit	Concentration
Calcium	mg/l	317
Magnesium	mg/l	38.4
Sodium	mg/l	387
Potassium	mg/l	30.3
Carbonate	mg/l	0
Bicarbonate	mg/l	297
Sulfate	mg/l	793
Chloride	mg/l	538
Fluoride	mg/l	0.54
Nitrate-N	mg/l	0.16
Silica	mg/l	61.6
pH	Std. Unit	7
TDS	mg/l	2,269
Conductivity	umhos	3,204
Alkalinity	Std. Unit	275
Arsenic	mg/l	0.009
Cadmium	mg/l	0.001
Iron	mg/l	0.013
Lead	mg/l	0.004
Manganese	mg/l	0.224
Mercury	mg/l	0.0006
Selenium	mg/l	0.01
Ammonia	mg/l	0.374
Molybdenum	mg/l	0.226
Uranium	mg/l	0.171



Table 2 is a copy of the initial restoration table for Zamzow PAA-1. Note that the restoration goal for uranium in groundwater is set as 0.171 milligram per liter, as highlighted on the table, which was the highest average uranium content from the PAA mine area, as shown on Table 1.

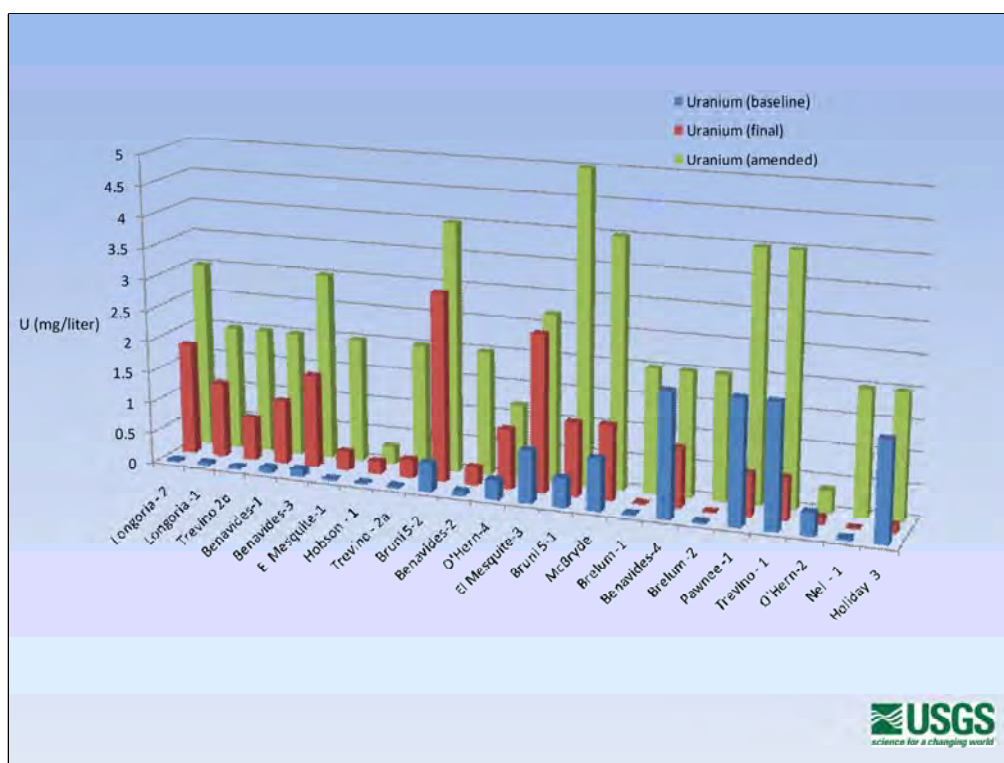
Table 3: Amended Restoration Table for Zamzow PAA-1

ATTACHMENT A
RESTORATION TABLE
(Amended)

Parameter	Unit	Concentration
Calcium	mg/l	317.
Magnesium	mg/l	38.4
Sodium	mg/l	450.
Potassium	mg/l	30.3
Carbonate	mg/l	0
Bicarbonate	mg/l	750.
Sulfate	mg/l	793.
Chloride	mg/l	538.
Fluoride	mg/l	0.54
Nitrate-N	mg/l	0.16
Silica	mg/l	51.6
pH	std. units	6.5 - 8.5
TDS	mg/l	2289.
Conductivity	µmhos	3204.
Alkalinity	std. units	500.
Arsenic	mg/l	0.2
Cadmium	mg/l	0.001
Iron	mg/l	0.915
Lead	mg/l	0.004
Manganese	mg/l	0.224
Mercury	mg/l	0.0006
Molybdenum	mg/l	5.
Selenium	mg/l	0.01
Uranium	mg/l	3.
Ammonia-N	mg/l	200.
Radium-226	pCi/l	200.



All PAAs in Texas have received amended restoration goals for at least one element after operators have expended a reasonable degree of effort to restore groundwater, as determined by TCEQ regulators, following established guidelines. The final restoration table for Zamzow PAA-1 shows an amended limit of 3.00 milligrams per liter for uranium. This amended restoration value is believed to be a relatively arbitrary value set by the regulators, as illustrated by the number of PAAs that set amended values at rounded whole numbers that were unrelated to any restoration level actually achieved in the PAAs. As there are no “final sample” data for Zamzow PAA-1, no information is available to describe the degree to which this well field was restored.



This graph of uranium concentration for various Texas PAAs illustrates the relationship between baseline, final values, and amended restoration goals in the PAAs where final values were available. The blue bars represent baseline restoration goals for uranium as set by the highest average uranium concentration in baseline samples from either the mine or the production area. Well-field designations are shown on the X-axis of this chart. Red bars represent “final values” for uranium prior to release of the PAAs, and green bars represent amended restoration goals for uranium. There is no clear relationship between the final value achieved for uranium in groundwater at the PAAs, and the amended restoration goals. Amended restoration goals do not reflect the degree of restoration achieved at the PAAs in Texas for which final values are available. Therefore, only those fields for which final values were available were chosen for this analysis.

Only 22 PAAs from 13 mines have final sample values. These 22 PAAs form the basis of the study of restoration at these well fields.

**Table 4: Baseline Groundwater in United States
ISR Mines – Constituents with EPA MCLs**

Baseline Groundwater Characteristics of U.S. Uranium ISR Projects								
Chemical Constituent (mg/L unless stated otherwise)	EPA MCL	Texas Baseline Range (71- 77 PAAs)	Texas - Number of PAAs Where Average Baseline Exceeds MCL/total # of PAAs & percentage	New Mexico Crown Point ISL Pilot	Colorado Grover ISL Pilot	Wyoming (SR WF1, CR MU2-6, Irigaray MU1- 5)	Nebraska Crow Butte (MU 1-5 & R&D Site)	
USEPA Primary Maximum Contaminant Levels (MCLs):								
Arsenic	0.010	0.0010 - 0.2000	45/73	62%	0.004	0.01	0.006	0.001
Barium	2	-	-	-	0.1	0.03	0.073	0.10
Cadmium	0.005	0.0001 - 0.126	21/73	29%	0.006	0.002	0.016	0.006
Chromium	0.1	-	-	-	0.007	0.003	0.259	0.01
Copper	1.3	-	-	-	0.01	0.06	0.043	0.012
Cyanide	0.2	-	-	-	0.088	-	-	-
Fluoride	4	0.2 - 2.0	0/73	0%	0.39	0.7	0.307	0.69
Gross Alpha (pCi/L)	15	-	-	-	-	87.67	-	-
Gross Beta (millirems/year)	4	-	-	-	-	15.23	-	-
Lead	0.015	0.001 - 1.970	35/73	48%	0.003	0.02	0.038	0.032
Mercury	0.002	0.00003 - 0.44500	6/73	8%	0.00024	0.0002	0.001	0.0007
Nitrate	10	0.01 - 12.0	1/77	1%	0.09	1.4	3.01	0.07
Nitrite	1	-	-	-	-	-	0.168	0.004
Radium (²²⁶ & ²²⁸ Ra: pCi/L)	5	5.45 - 1536.5	71/71	100%	<14.1	13.4	293.15	405.4
Selenium	0.05	0.001 - 0.600	7/73	10%	0.01	0.01	0.015	0.002
Uranium	0.03	0.002 - 2.913	66/73	90%	0.01	0.086	0.193	0.103

Baseline Characterization of Groundwater in U.S. ISR Well Fields

Baseline standards for all 77 Texas PAAs can be used to characterize Texas ISR well fields that serve as a basis of comparison with baseline values determined for other ISR well fields in the United States. The argument is commonly made that before mining, groundwater in ISR well fields is so contaminated that it should not be used for human consumption. Before mining, these aquifers are typically granted exemptions from the Clean Water Act, termed aquifer exemptions, by the U.S. Environmental Protection Agency (USEPA).

In Texas, more than 25 percent of PAAs are characterized by baseline groundwater above the maximum contaminant level (MCL) for arsenic, cadmium, lead, radium, and uranium (shown highlighted on Table 4). MCL is set by the U.S. Environmental Protection Agency (USEPA;

<http://www.epa.gov/safewater/contaminants/index.html>) for those elements with well-established links to negative human health effects. All PAAs contain radium above MCL, and 90 percent contain uranium above MCL. Although baseline is artificially elevated in this database because the operator is selecting the highest average value within the production or mine area, this value does serve to identify elements of concern in these well fields.

In the Crown Point pilot project in New Mexico, only cadmium was elevated above MCL. At the Grover pilot project in Colorado, baseline water showed gross alpha, gross beta, radium, and uranium above MCL. In Wyoming, averaged values for the Smith Ranch 1, Christensen Ranch 2-6, and Irigaray 1-5 mine units were elevated above MCL for cadmium, chromium, lead, radium, and uranium.

In Nebraska (Crow Butte mine units 1-5 and the Crow Butte R & D site), average cadmium, lead, radium, and uranium were elevated above MCL. Elements above MCL are highlighted in the table.

With the exception of the New Mexico deposit (Crown Point), these well fields are characterized by groundwater elevated in multiple MCLs prior to mining. Radium is almost always elevated above MCL while uranium is typically elevated and cadmium and lead commonly elevated. These well fields would require pretreatment to be used as a source for drinking water.

Table 5: Baseline Groundwater in U.S. ISR Mines – Constituents with EPA Secondary (recommended) Standards

Baseline Groundwater Characteristics of U.S. Uranium ISL Projects								
Chemical Constituent (mg/L unless stated otherwise)	EPA Secondary Standard	Texas Baseline Range (71 77 PAAs)	Texas - Number of PAAs Where Average Baseline Exceeds Secondary Standards/total # of PAAs & Percentage (highlighting if > 75% of PAAs Exceed Secondary Standards)		New Mexico Crown Point ISL Pilot	Colorado Grover ISL Pilot	Wyoming (SR WFF, CR MU-6, Highway MU1- 5)	Nebraska Crow Butte (MU 1-5 & R&D Site)
EPA Secondary Recommended Standards:								
Aluminum	0.200	-	-	-	0.02	0.537	0.117	-
Chloride	250	122.5 - 3505.0	64/77	83%	20.3	7	9.8	202.6
Iron	0.30	0.01 - 6.3	32/72	44%	0.67	0.7	0.648	0.04
Manganese	0.05	0.01 - 5.06	37/73	51%	0.05	0.02	0.018	0.03
Silver	0.10	-	-	-	<0.01	0.003	-	-
Sulfate	250	10.3 - 1197	10/77	13%	38	38.3	300	353
Total Dissolved Solids	500	628 - 6349	73/73	100%	357	295	616	1177
Zinc	5	-	-	-	0.01	0.04	0.073	0.017

Recommended secondary standards are set by the USEPA for constituents that, in high enough concentrations, negatively affect the esthetic quality of groundwater, but are not conclusively linked to any negative human health effect. Of those elements for which secondary standards are set by the USEPA, iron, sulfate, and total dissolved solids (TDS) are commonly elevated above recommended levels in pre-mining water at ISR facilities. Chloride and manganese are commonly high in Texas PAAs before mining, while TDS is elevated above the recommended standard in all pre-mining Texas PAAs. Elements elevated above secondary standards are highlighted in Table 5.

Table 6: Baseline Groundwater in U.S. ISR Mines – Constituents with no MCL or Secondary Standard

Baseline Groundwater Characteristics of U.S. Uranium ISR Projects						
Chemical Constituent (mg/L unless stated otherwise)	USEPA MCL	Texas Baseline Range (71- 77 PAAs)	New Mexico Crown Point ISR Pilot	Colorado Grover ISR Pilot	Wyoming ISR W1-1, CR MU2-6, Ingary MU1-5)	Nebraska Crow Butte (MU 1-5 & R&D Site)
<i>No Established MCL or Recommended Secondary Standard:</i>						
Alkalinity (as CaCO ₃)	-	24 - 349	-	154.7	116.1	-
Ammonia-N	-	0.01 - 7.49	0.47	0.25	0.344	0.26
Bicarbonate	-	125 - 500	228	220.1	171.6	344
Boron	-	-	0.1	0.1	0.1	0.93
Calcium	-	0.2 - 395	5.8	9.1	29.4	12.97
Carbonate	-	0.10 - 38	-	4.31	22.4	369
Cobalt	-	-	<0.05	-	-	-
Conductivity (umhos/cm)	-	1,110 - 11,160	-	380.7	1051	1947
Magnesium	-	0.48 - 150.0	-	1.1	5.324	3.27
Molybdenum	-	0.01 - 2.53	0.172	0.02	0.100	0.05
Nickel	-	-	0.02	0.2	0.093	0.03
Phosphorous	-	-	-	0.05	-	-
Potassium	-	6.38 - 101.1	-	4.43	9.810	13.10
Silica	-	15 - 98	-	5.45	10.496	16.7
Sodium	-	174 - 2,356	114	85.2	155	410
Thorium	-	-	-	0.7417	-	-

Table 6 shows average concentrations and a range of concentrations in Texas PAAs, within pre-mining baseline groundwater for those analytes for which no primary or secondary standards have been set by the USEPA.

Table 7: Groundwater Chemistry of Texas In-situ Uranium Production Authorization Areas (22 PAAs where final analyses are available)							
Analyte	USEPA and TCEQ Drinking Water Standards (mg/l)	Baseline Range	Post-Restoration Range	PAAs with Baseline Above MCL or Recommended Standards	PAAs with Post-Restoration Water Above MCL or Recommended Standards	PAAs Where Post-Restoration Analyses Exceed Baseline	PAAs Where Post-Restoration Analyses are Below Baseline
USEPA and TCEQ Primary Maximum Contaminant Levels (MCLs):							
Arsenic	0.01	0.04 - 0.23	0.02 - 0.323	77%	55%	18%	82%
Cadmium	0.005	0.0001 - 0.0126	0.0001 - 0.01	45%	23%	27%	73%
Fluoride	4	0.21 - 1.8	0.29 - 1.6	0%	0%	31%	69%
Lead	0.02	0.003 - 1.97	0.001 - 0.05	81%	16%	9%	91%
Mercury	0.002	0.0001 - 0.445	0.0001 - 0.01	9%	0%	22%	64%
Nitrate	10	0.031 - 10.0	0.001 - 2.8	0%	0%	4%	96%
Selenium	0.05	0.001 - 0.049	0.001 - 0.102	18%	4%	54%	45%
Radium (226 & 228 Ra: Po/l)	5 pei/l	0.36 - 429.8	6.2 - 149	100%	100%	4%	96%
Uranium	0.03	0.025 - 2.0	0.013 - 3.02	95%	86%	68%	32%
TCEQ Secondary Recommended Standards							
Sulfate	300	15.8 - 250	78 - 3881	0%	16%	86%	14%
Chloride	300	196.9 - 3505	138 - 3326	86%	86%	22%	78%
Total Dissolved Solids	1000	785.7 - 6349	706.3 - 6155	81%	77%	31%	55%
Iron	0.3	0.04 - 5.48	0.01 - 2.7	54%	9%	4%	96%
Manganese	0.05	0.01 - 0.41	0.01 - 0.84	77%	50%	40%	60%
No Established MCL or Secondary Standards							
Calcium	-	4.13 - 241	14.7 - 191			77%	23%
Magnesium	-	0.477 - 125	2.27 - 53			72%	28%
Sodium	-	200 - 2356	189 - 2247			31%	65%
Potassium	-	6.38 - 101	6.1 - 70			14%	86%
Carbonate	-	0.1 - 17.9	0 - 14.6			50%	30%
Bicarbonate	-	160 - 500	160 - 500			66%	25%
Silica	-	16.3 - 76	13.4 - 77.6			19%	81%
Conductivity (umhos/cm)	-	1310 - 11180	1429 - 3697			76%	24%
Alkalinity (as CaCO ₃)	-	134 - 349	145 - 408			81%	10%
Molybdenum	-	0.01 - 0.2	0.0001 - 3.38			42%	54%
Ammonia-N	-	0.01 - 7.49	0.04 - 120			76%	24%
Baseline and post-restoration data was available for all 22 PAAs with the exception of: Ra, Mo, K, Si, Bicarbonate, Ammonia (21), Conductivity (14), Alkalinity (11) & Carbonate (10).							

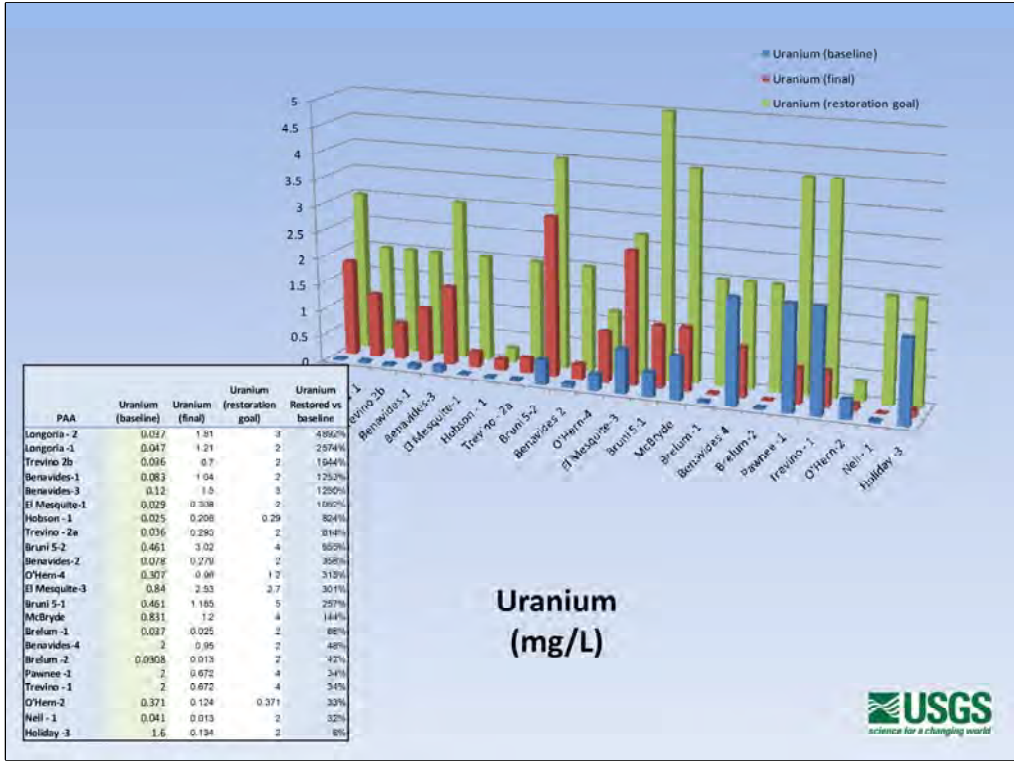
Restoration Results for Texas PAAs

Table 7 shows the average value, post-restoration, and baseline ranges of chemical constituents for all 22 well fields that have post-restoration analyses in the TCEQ records.

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.

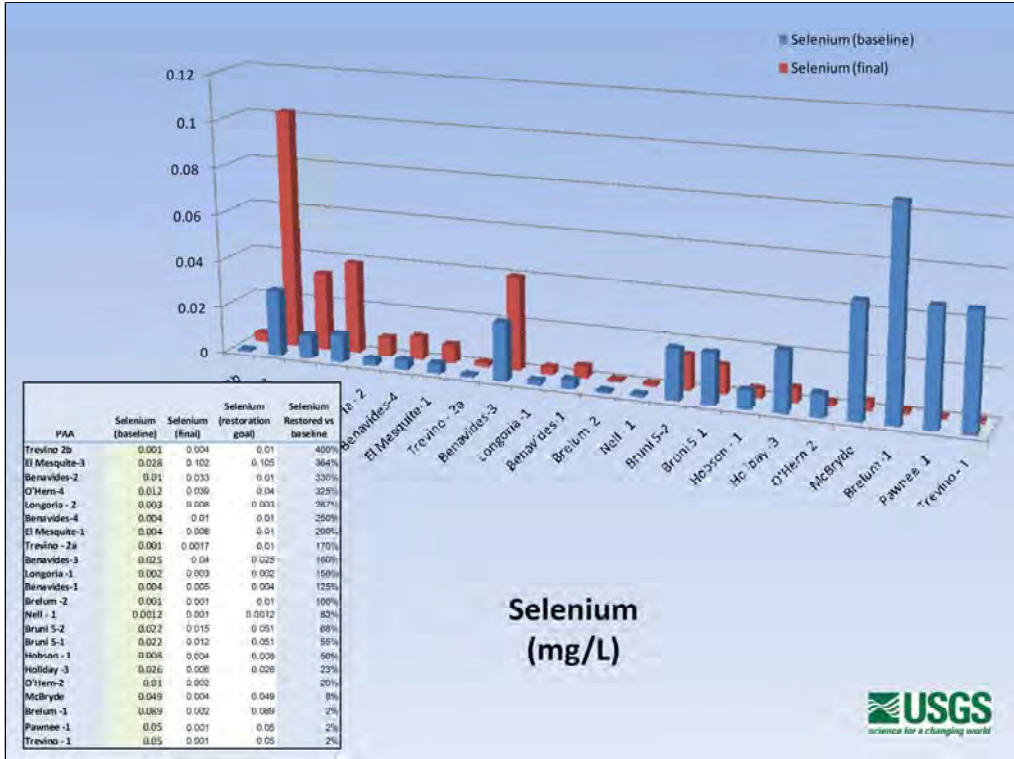
As compared to baseline values for the PAAs, uranium and selenium are elevated in the majority of PAAs. More than half of PAAs show a decrease in As, Cd, Fl, Pb, Hg, nitrate, and Ra after mining.

The following slides examine these trends in detail.

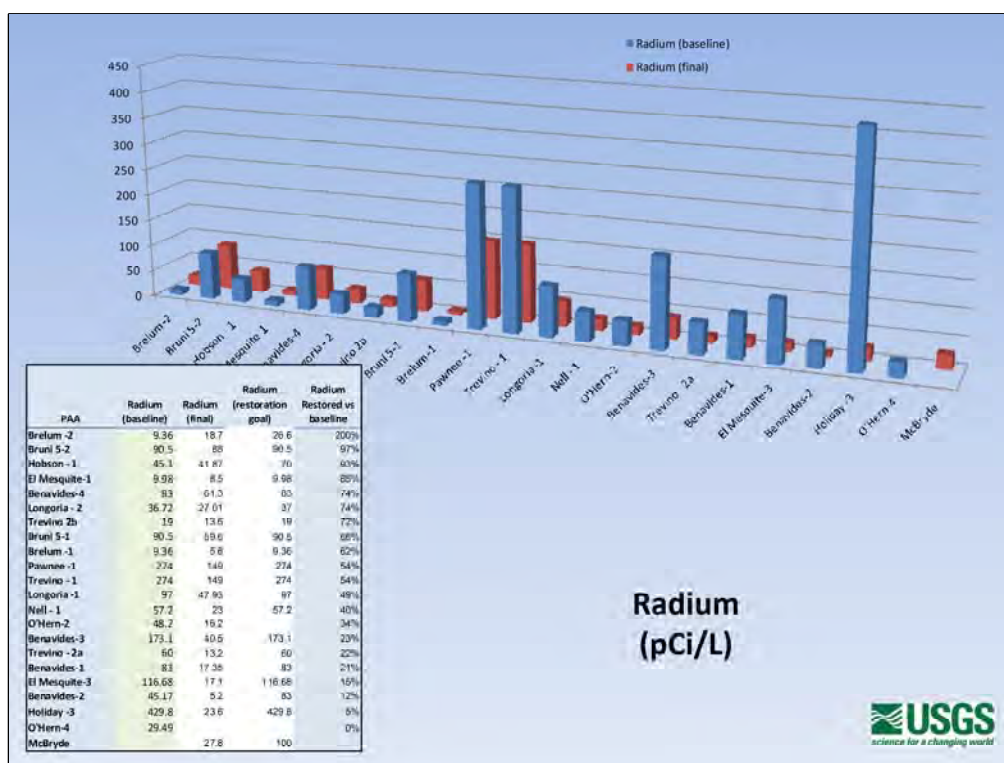


The USEPA-established MCL for uranium in drinking water is 0.03 milligram per liter. Ninety-five percent of Texas PAAs have a baseline value above MCL. Only the Hobson-1 and El Mesquite–1 PAAs were below the MCL for uranium and El Mesquite “rounded out” to equal MCL.

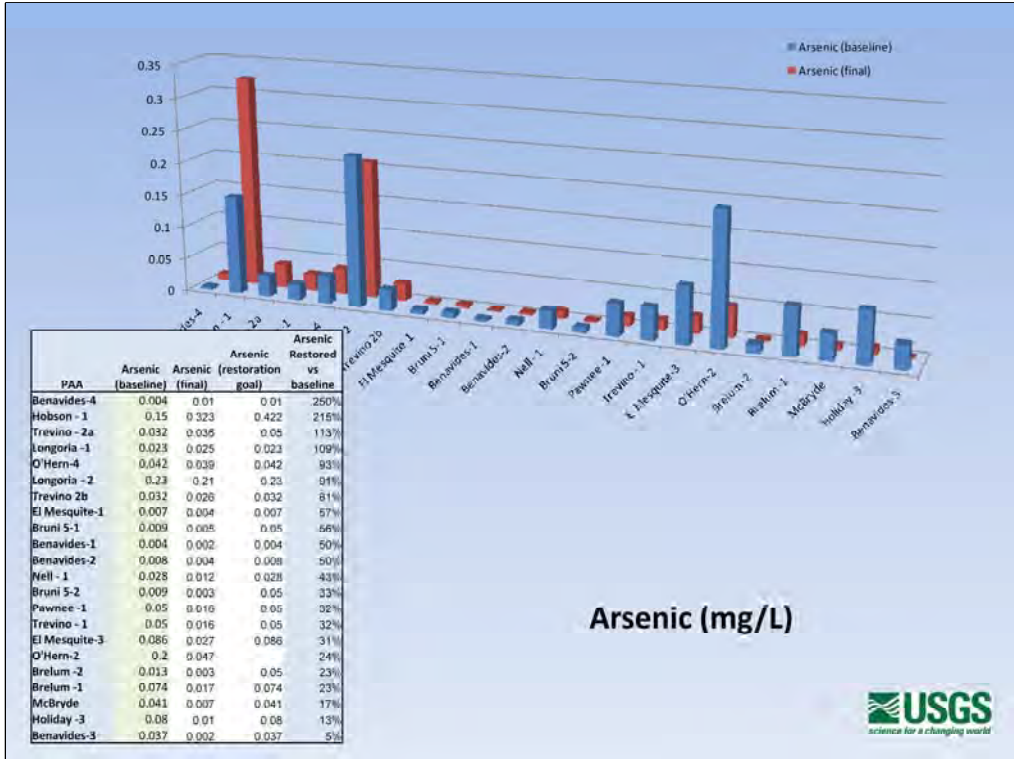
Eighty-six percent of Texas PAAs show a final restoration above MCL. In 68 percent of PAAs, final value exceeded baseline, and in 32 percent of PAAs, restoration was below baseline for uranium.



The MCL for selenium is 0.05 milligram per liter in drinking water. In 18 percent of PAAs, baseline of groundwater was above MCL, and in 24 percent of PAAs, the final restoration value was above MCL. After mining and restoration, 55 percent of PAAs exceeded baseline and 45 percent of PAAs were below baseline.

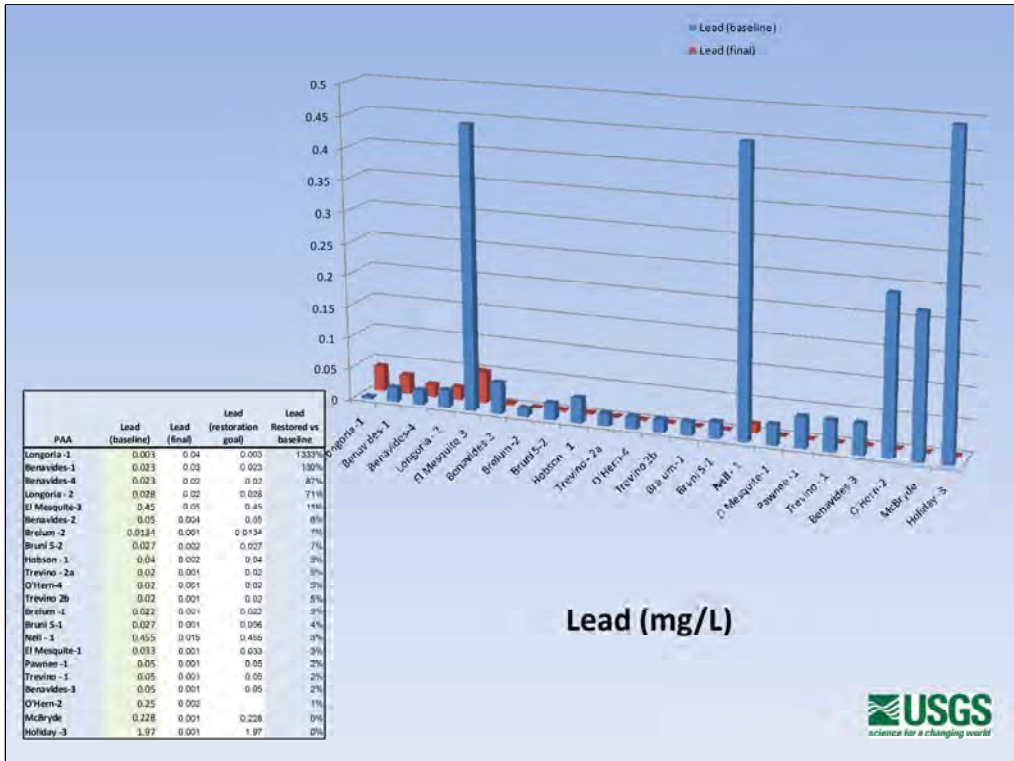


The MCL for radium (^{226}Ra and ^{228}Ra) is 5 pCi/L in drinking water. All PAAs are characterized by baseline and post-restoration radium concentrations above MCL. After mining and restoration, 4 percent of PAAs were above baseline, and 96 percent of PAAs were below baseline.



The MCL for arsenic is 0.01 milligram per liter in drinking water. Before mining, 77 percent of PAAs showed arsenic above the MCL, and after restoration 55 percent of PAAs were above the MCL.

After restoration, 18 percent of PAAs exceeded baseline and 82 percent of PAAs were below baseline.



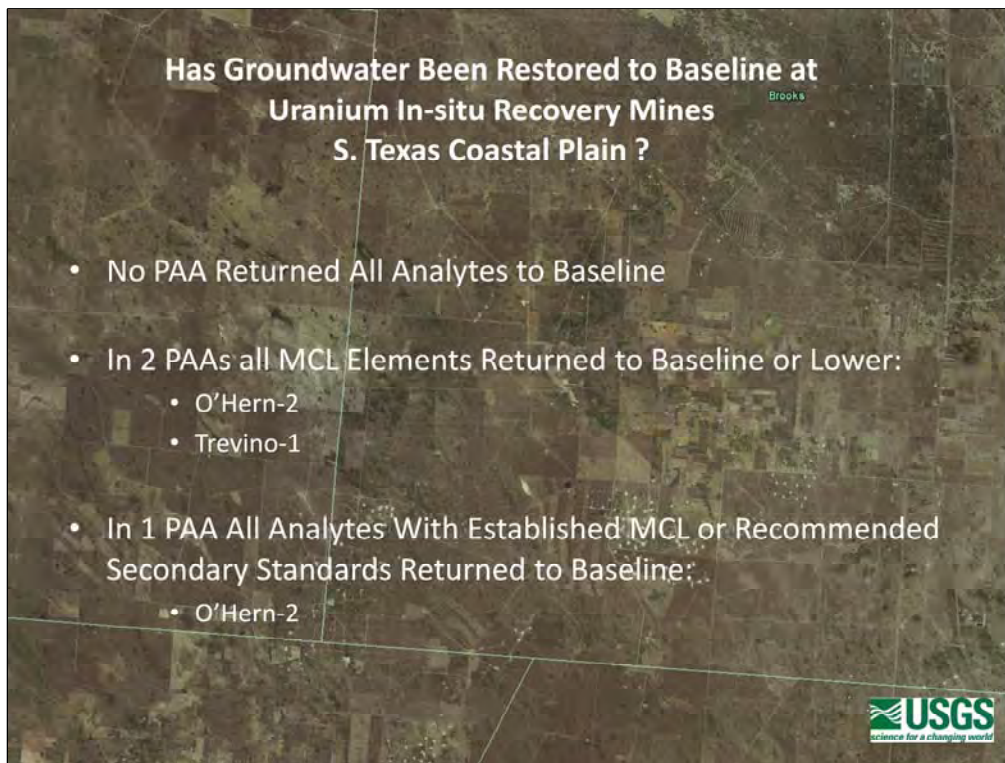
The MCL for lead is 0.02 milligram per liter in drinking water. Eighty-one percent of PAAs have baseline levels above MCL, and 18 percent of PAAs are characterized by final restoration values above MCL.

After mining and reclamation, 9 percent of PAAs were above baseline and 91 percent of PAAs were below baseline.

Table 7: Ground-water Chemistry of Texas In-situ Uranium Production Authorization Areas (22 PAAs where final analyses are available)							
Analyte	USEPA & TCEQ Drinking Water Standards (mg/L)	Baseline Range	Post-Restoration Range	PAAs with Baseline Above MCL or Recommended Standards	PAAs with Post-Restoration Water Above MCL or Recommended Standards	PAAs Where Post-Restoration Analyses Exceed Baseline	PAAs Where Post-Restoration Analyses are Below Baseline
USEPA & TCEQ Primary Maximum Contaminant Levels (MCLs)							
Arsenic	0.01	0.04 - 0.23	0.02 - 0.323	77%	55%	18%	82%
Cadmium	0.005	0.0001 - 0.0126	0.0001 - 0.01	45%	23%	27%	73%
Fluoride	4	0.21 - 1.8	0.29 - 1.6	0%	0%	31%	89%
Lead	0.02	0.003 - 1.97	0.001 - 0.05	81%	18%	9%	91%
Mercury	0.002	0.0001 - 0.445	0.0001 - 0.01	9%	0%	22%	64%
Nitrate	10	0.031 - 10.0	0.001 - 2.8	0%	0%	4%	96%
Selenium	0.05	0.001 - 0.049	0.001 - 0.102	18%	4%	54%	45%
Radium (226 & 228 Ra: Pci/L)	5 Pci/L	9.36 - 429.8	5.2 - 149	100%	100%	4%	96%
Uranium	0.03	0.025 - 2.0	0.013 - 3.02	95%	86%	68%	32%
TCEQ Secondary Recommended Standards							
Sulfate	300	15.8 - 250	78 - 3881	0%	18%	86%	14%
Chloride	300	196.9 - 3505	138 - 3326	86%	86%	22%	78%
Total Dissolved Solids	1000	765.7 - 6349	706.3 - 6155	81%	77%	31%	55%
Iron	0.3	0.04 - 5.49	0.01 - 2.7	54%	9%	4%	96%
Manganese	0.05	0.01 - 0.41	0.01 - 0.84	77%	50%	40%	60%
No Established MCL or Recommended/Secondary Standard							
Calcium	-	4.13 - 241	14.7 - 191			77%	23%
Magnesium	-	0.477 - 125	2.27 - 53			72%	28%
Sodium	-	200 - 2356	189 - 2247			31%	65%
Potassium	-	6.38 - 101	6.1 - 70			14%	86%
Carbonate	-	0.1 - 17.9	0 - 14.6			50%	30%
Bicarbonate	-	160 - 500	160 - 500			86%	25%
Silica	-	16.3 - 76	13.4 - 77.6			19%	81%
Conductivity (umhos/cm)	-	1310 - 11160	1429 - 3897			76%	24%
Alkalinity (as CaCO ₃)	-	134 - 349	145 - 408			81%	19%
Molybdenum	-	0.01 - 0.2	0.0001 - 3.38			42%	54%
Ammonia-N	-	0.01 - 7.49	0.04 - 120			76%	24%
Baseline and post-restoration data was available for all 22 PAAs with the exception of: Ra, Mo, K, Si, Bicarbonate, Ammonia (21), Conductivity (14), Alkalinity (11) & Carbonate (10).							

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). Of constituents for which secondary standards are established by the USEPA, sulfate increased in the majority of well fields after mining and restoration, whereas chloride, TDS, iron, and manganese decreased in the majority of well fields.

Of those chemical constituents for which there are no established MCLs or secondary standards, calcium, magnesium, bicarbonate, conductivity, carbonate, alkalinity and ammonia increased; sodium, potassium and silica decreased in the majority of well fields after mining and restoration. Statistically, molybdenum decreased in the small majority of well fields after mining.




Regarding the original question of whether or not groundwater has been restored to baseline in Texas uranium ISR well fields, it was observed that no well field for which final sample results were found in TCEQ records returned every element to baseline. However, two PAAs returned all elements for which USEPA has established MCLs to baseline: the O'Hern-2 and Trevino-1 PAAs.

Trevino-1, which was mined from the Oakville Sandstone and restored using electrodialysis, shows restored sulfate to 164 percent of baseline. Reclamation at O'Hern-2 returned constituents with secondary standards or MCLs to baseline values or below.

Table 8: Baseline and Final Chemistry of Groundwater at the O'Hern PAA-2 Well Field

O'Hern-2 Groundwater Sweep and Reverse Osmosis	Analyte	Baseline	Final
Analytes for which EPA and TCEQ have set Maximum Contaminant Levels	Arsenic	0.2	0.047
	Cadmium	0.01	0.0005
	Fluoride	1.37	0.73
	Lead	0.25	0.002
	Mercury	0.445	0.0001
	Nitrate-N	0.86	0.47
	Selenium	0.01	0.002
	Radium	48.2	16.2
	Uranium	0.371	0.124
	Sulfate	129	102
Analytes for which TCEQ has set Secondary Recommended Upper Limits	Chloride	254	220
	TDS	979	890
	Iron	3.52	0.02
	Manganese	0.124	0.03
	Ca	13.7	14.7
	Mg	2.7	2.27
	Na	310	289
	K	9.7	6.6
	Carbonate	1.78	2.6
	Bicarbonate	347	
	Silica	43.7	35
	Conductivity	1626	1429
	Alkalinity		
	Ammonia-N	0.77	0.3
	Molybdenum	1.1	0.24



Specifically looking at restoration details from the O'Hern PAA-2, this well field was developed by Cogema from 1979 to 1982 in the Catahoula Formation. Groundwater sweep and reverse osmosis were both used to restore groundwater after mining. Calcium and carbonate were both slightly elevated above baseline following mining and reclamation, as shown in Table 8 above.

The aquifer overlying O'Hern-2 is characterized by an average calcium of 27 milligrams per liter and carbonate of 10.1 milligrams per liter, so post-restoration elevation of these elements in the O'Hern-2 PAA seems inconsequential in the scheme of local hydrochemistry. No final values for bicarbonate or alkalinity were reported, so the specific degree to which this PAA was restored is unknown.

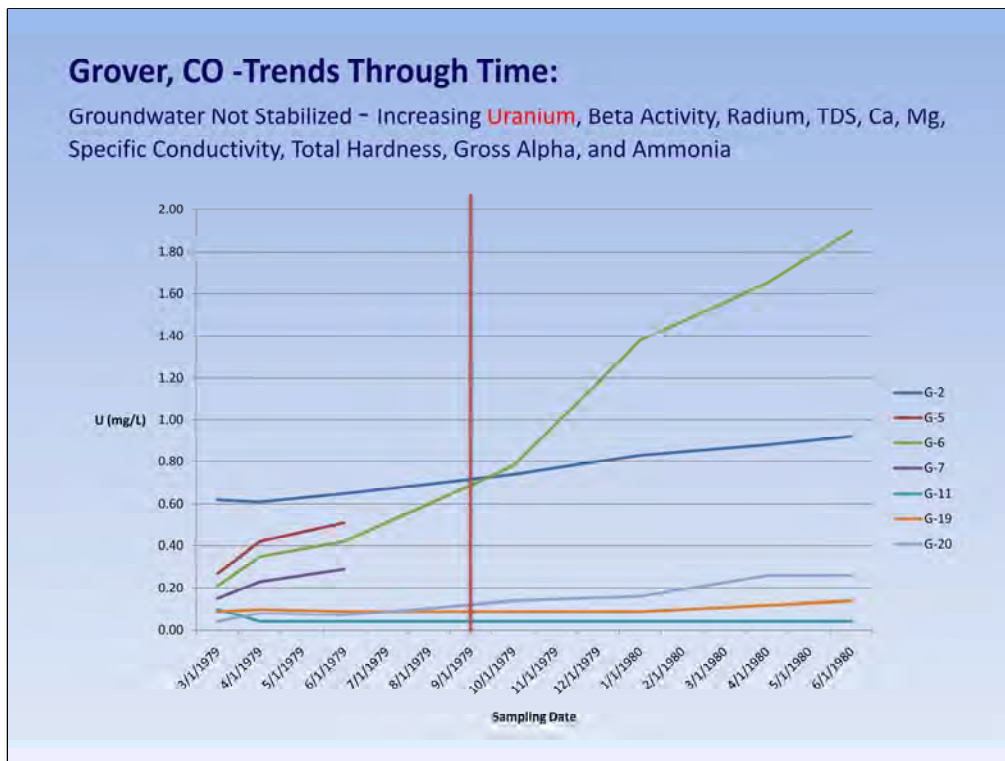
There is a notation in the TCEQ database that O'Hern PAA-3 did not receive any amendments. However, this could not be corroborated by TCEQ records.



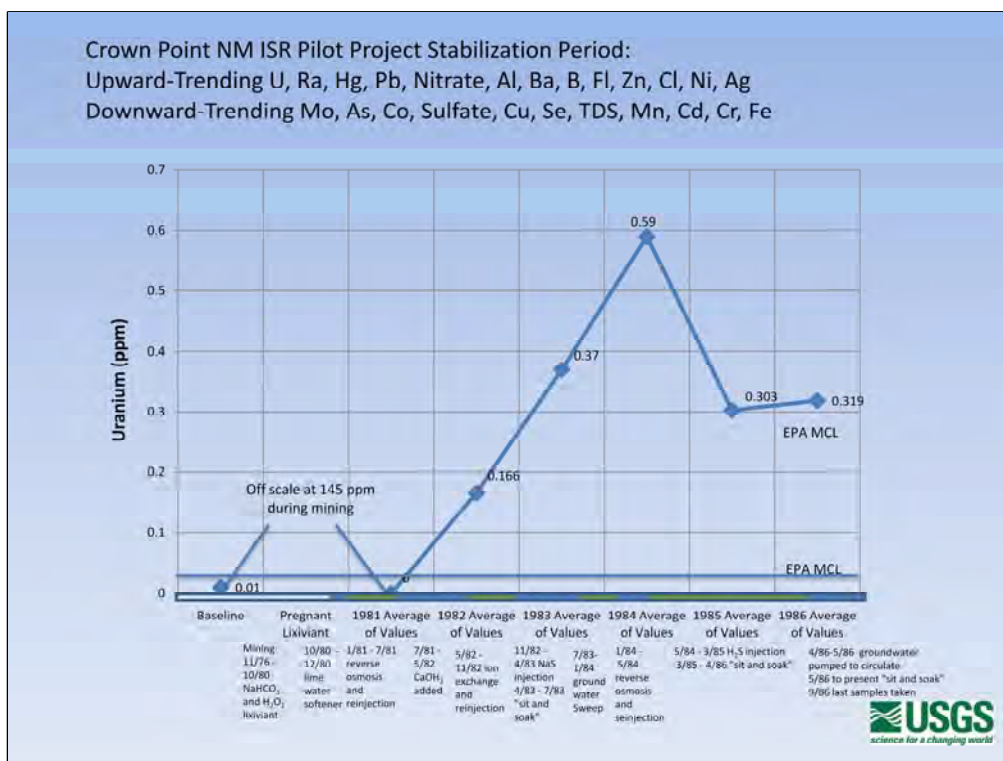
Long-Term Stability and Natural Attenuation

In Texas, after ISR mining ceased and restoration of the well fields was completed, PAAs were monitored for a minimum of 6 months. This period of monitoring has recently been increased to one year if no amendments to the restoration table are requested, and to two years if the operator requests an amendment to the restoration table.

Some well fields monitored for longer periods of time during the post-mining and remediation stability period show trends of increasing analyte concentration, as noted by USGS geologists while examining records at pilot projects in Colorado (Grover), New Mexico (Crown Point), and throughout Wyoming.

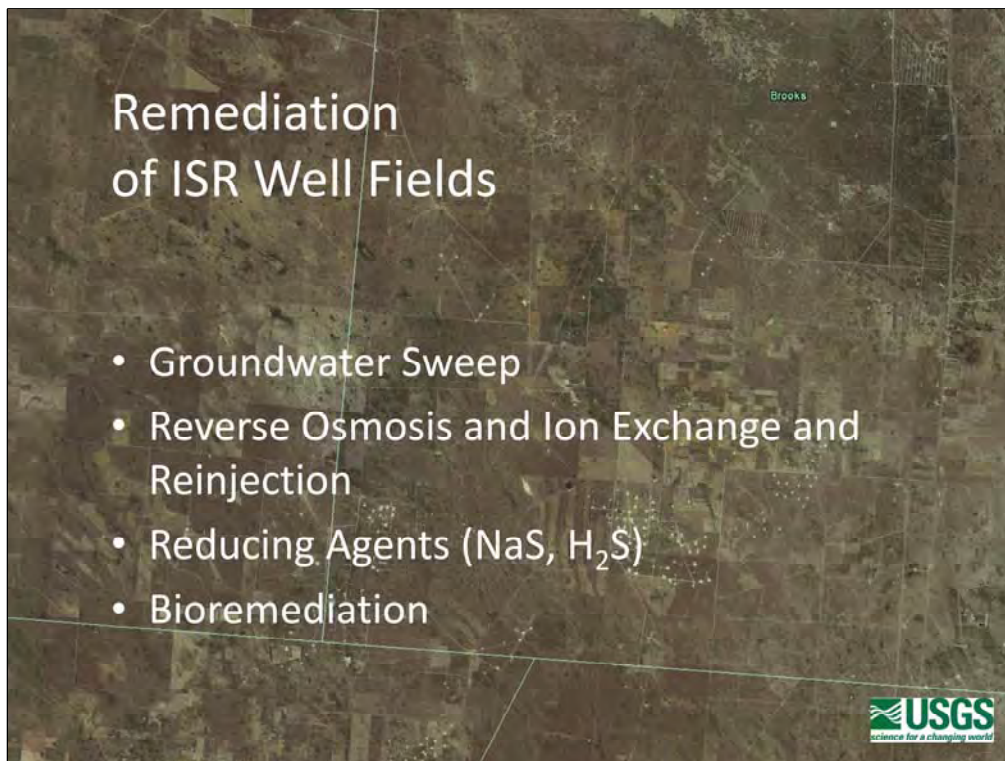


At the Grover, Colorado, pilot test site, pump and treat technologies did not return groundwater to baseline. Analysis of data collected by Colorado State regulators showed upward-trending uranium, beta activity, radium, TDS, calcium, magnesium, specific conductivity, total hardness, gross alpha, and ammonia. Results from individual wells differentiated using solid colored lines are shown above in the time series plot of uranium concentration. Note that the vertical red line indicates the end of the 6-month stabilization period required for Texas PAAs. These increasing concentrations of analytes indicate groundwater may not have stabilized when the Grover well field was released.



During the one-year stabilization period that followed restoration at Mobil's Crown Point, New Mexico ISR pilot project, both upward and downward trends in various chemical constituents were noted (Mobil, 1981). The Crown Point data are not detailed enough to analyze these trends, but the data indicate that groundwater may not have stabilized when the final samples were collected, similar to the Grover, Colorado, project.

Examples from Grover, Colorado, Crown Point, New Mexico, and ISR pilot projects in Wyoming indicate that the 6-month stability period mandated by Texas ISR rules may not have been long enough to adequately determine if groundwater in well fields had stabilized. Recent rule changes in Texas allow for longer term monitoring and could yield valuable data about the chemical stability of groundwater after ISR mining.



Effectiveness of Restoration Techniques

After mining has ceased, a restoration method called groundwater sweep can be used whereby groundwater in a mined aquifer is pumped from the well field either to a deeper aquifer, an adjacent well field where mining is being initiated, or to surface ponds where it is allowed to evaporate. Local groundwater then “sweeps in” to replace the displaced water. This is typically the first method of restoration applied to a well field (Mays, 1994).

Reverse osmosis and ion exchange are methods of removing contaminants from groundwater in well fields. The cleaned water is then reinjected into the well fields (Mays, 1994).

Reducing agents (H, NaS and H₂S) have been added to well-field groundwater in an attempt to return groundwater and host rocks to reducing conditions, thereby reversing the effects of oxidizing mining solutions (lixiviants) within the aquifer.

Bioremediation, the stimulation of native bacteria within the aquifer whose life processes fix metals from solution, is another remediation technique currently receiving much attention (Long and others, 2008).

Table 9: Elements with USEPA and TECQ Primary Maximum Contaminant Levels Restored vs. Baseline for Texas Well Fields With Known Restoration Methods										
PAA	Restoration Method	Arsenic	Cadmium	Fluoride	Lead	Mercury	Nitrate-N	Selenium	Radium	Uranium
Hobson - 1	GW Sweep Only	215%	1%	134%	5%	16%	9%	50%	93%	824%
Lorigoria -1	GW Sweep Only	109%	10000%	98%	1333%	333%	34%	150%	49%	2574%
Longoria - 2	GW Sweep Only	91%	10000%	82%	71%	333%	22%	267%	74%	4892%
McBryde	GW Sweep Only	17%	6%	50%	0%	10%	56%	8%		144%
Average for GW Sweep Only		108%	5002%	91%	353%	173%	30%	119%	72%	2109%
Benavides-4	RO	250%	3333%	77%	87%	100%	3%	250%	74%	48%
Bruni 5-1	RO	58%	2%	143%	4%	11%	15%	55%	66%	257%
Bruni 5-2	RO	33%	4%	155%	7%	11%	22%	68%	97%	655%
O'Hern-4	RO	93%	91%	63%	5%	13%	NR	325%	NR	313%
Average for RO only		108%	858%	110%	26%	34%	13%	175%	79%	318%
El Mesquite-1	RO and Ion Exchange	57%	17%	117%	3%	50%	22%	200%	85%	1062%
El Mesquite-3	RO and Ion Exchange	31%	83%	74%	11%	40%	19%	364%	15%	301%
Holiday -3	RO and Ion Exchange	13%	200%	94%	0%	100%	53%	23%	5%	8%
Average for RO and ion exchange		34%	100%	95%	5%	63%	31%	196%	35%	457%
Brelum -1	GW Sweep and RO	23%	6%	107%	5%	10%	3%	2%	62%	68%
Brelum -2	GW Sweep and RO	23%	1%	97%	7%	11%	5%	100%	200%	42%
O'Hern-2	GW Sweep and RO	24%	5%	53%	1%	0%	55%	20%	34%	33%
Average for GW Sweep and RO		23%	4%	86%	4%	7%	21%	41%	99%	48%
Trevino - 1	Electrodialysis	32%	1%	82%	2%	5%	5%	2%	54%	34%
Trevino - 2a	Electrodialysis	113%	1%	83%	5%	33%	8%	170%	22%	614%
Trevino 2b	Electrodialysis	81%	1%	81%	5%	33%	19%	400%	72%	1944%
Average for Electrodialysis		75%	1%	82%	4%	24%	10%	191%	49%	931%

Pump and Treat Technology

Texas provides a database that can be used to examine the effectiveness of the “pump and treat” technologies of groundwater sweep, reverse osmosis, ion exchange, and electrodialysis. Historically, pump and treat techniques were the only restoration techniques used in ISR mines developed in Texas.

Uranium in groundwater is 2,109 percent of baseline in well fields using groundwater sweep only, yet is 48 percent of baseline when groundwater sweep is combined with reverse osmosis (Table 9). Similar trends are shown for arsenic, cadmium, lead, mercury, and selenium. Trends for fluoride and nitrate are not as clear.

Analysis of patterns in Texas PAAs show restoration using groundwater sweep coupled with reverse osmosis results in the greatest decrease in concentration of chemical constituents. These coupled techniques are commonly used in many well-field restoration projects nationwide.



Table 10: Summary of ISR Mines Where Chemical Reduction Was Used to Remediate Groundwater

Type of Reductant	Sites	Pros	Cons
H ₂ S	Smith Ranch, Irigaray and Collins Draw, WY; Crown Point, NM	Good Reducer	Volatile, difficult to use, mixed results, well clogging
Na ₂ S	Crown Point, NM; Highland, WY	Less expensive than bioremediation	Overall mixed results, likely doesn't have reducing capacity necessary to effect any noticeable improvement in groundwater quality, may produce transitory effects
H ₂	Kingsville Dome, TX	Good Reducer	2009 pilot project. results not yet available



Chemical Reduction

Inorganic chemical reductants are designed to reverse the effects of oxidizing lixiviant solutions on host rock and groundwater. Overall, these techniques when used in remediation of U.S. ISR mines, show mixed results (Table 10). Crown Point and Irigaray did not appear to significantly benefit from the addition of reductants into groundwater at the levels applied (LQD/DEQ Response Document, 2005; Mobil, 1981). Uranium Resources International is completing a pilot project in Texas to test the restoration effectiveness of hydrogen gas in removing analytes from groundwater (M. Pelliza, oral commun., May 2009). Results of this study are not yet available.

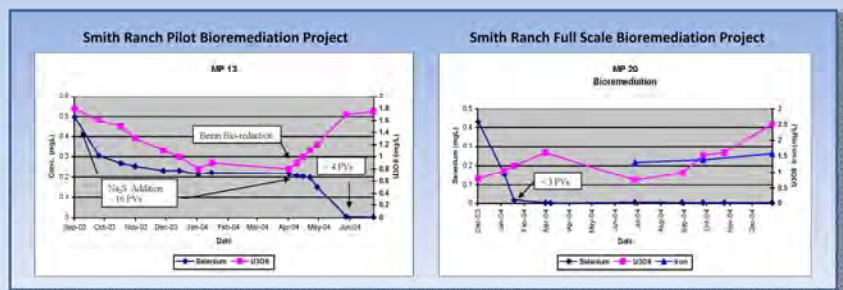
Bioremediation

Crow Butte, NE

- Jan. 2009: Emulsified oil substrate added to six production wells in Mine Unit 4 after groundwater sweep, ion exchange

Smith Ranch, WY

- 2003 – Methanol and molasses (Highland Well field B)
- Selenium rapidly to non-detection levels, uranium shows upward trend

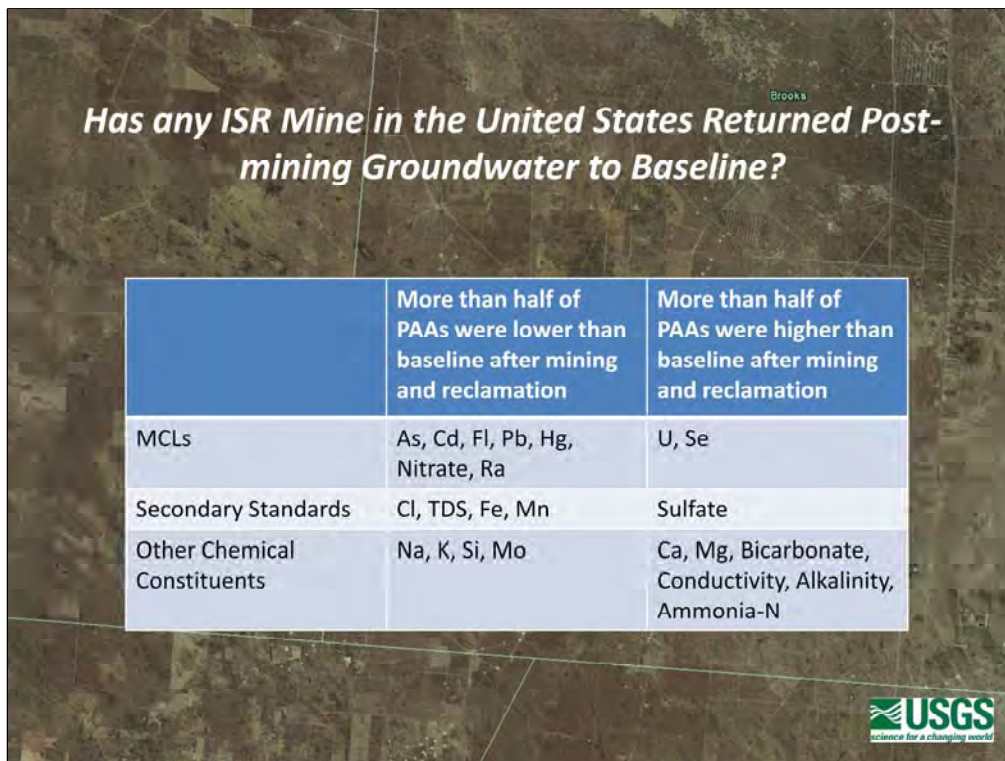


Bioremediation

Nutrients, such as acetate, methanol, and molasses, can be added to groundwater as a food source to stimulate native bacteria populations. As bacteria populations rise in response to increased food, metal concentrations decrease in groundwater; however the exact mechanism is uncertain.

In January 2009, an emulsified oil substrate was added to 6 production wells at the Crow Butte ISR mine as part of remediation of groundwater in Mine Unit 4 (NDEQ, 2009). The first 4 months of preliminary results do not show a significant reduction in uranium. At a Smith Ranch/Highland ISR remediation project in 2003, methanol and molasses were added to wells in the Highland B well field, first as a pilot project following chemical reduction (Na_2S) and then in a full-scale remediation project without prior chemical reduction (Reimann and Huffman, 2005). Selenium in groundwater was rapidly reduced in both the pilot (MP13) and full-scale (MP20) fields, although uranium concentration initially increased (see graphs above). Uranium increases noted in groundwater after bioremediation had been initiated may be attributable to the dissolution of iron oxyhydroxides and the concomitant release of their contained uranium in response to increasingly reducing conditions created during bioremediation (Reimann and Huffman, 2005). In subsequent bioremediation projects at Smith Ranch, cheese whey coupled with methanol has been used as a biostimulant.

The USGS continues to gather and process records from State agencies to track the effectiveness of these bioremediation methods.



Conclusions

Can we answer the question: “Has any ISR mine in the United States returned post-mining groundwater to baseline?”

Answer: Not based upon analysis of the Texas database because “final value” records were found for only 22 of 77 PAAs (13 of 36 mines).

We can conclude that in Texas, ISR mines are characterized by high baseline arsenic, cadmium, lead, selenium, radium, and uranium. After mining and restoration, for those well fields that reported “final values” in TCEQ records, more than half of the PAAs had lowered levels of many elements, including some that dropped below MCL.

Of those elements for which MCL is established, the majority of PAAs showed increases in uranium and selenium after mining and restoration and decreases in arsenic, cadmium, fluoride, lead, mercury, nitrate, and radium to below baseline for the majority of well fields.

Analytes for which secondary standards have been established show that sulfate is the only constituent that increased in the majority of well fields after mining and remediation, whereas chloride, TDS, iron, and manganese decreased. Chemical constituents for which no MCL or secondary standards were set are higher than baseline for calcium, magnesium, bicarbonate, conductivity, alkalinity, and ammonia. Sodium, potassium, silica, and molybdenum were lower than baseline in the majority of well fields after mining and remediation.

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EXHIBIT 7

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

**PETITION TO INTERVENE AND REQUEST FOR HEARING
OF THE OGLALA SIOUX TRIBE**

I. INTRODUCTION

Pursuant to 10 C.F.R. § 2.309, the notice published by the Nuclear Regulatory Commission (NRC or Commission) at 75 Fed.Reg. 467 (Jan. 5, 2010), and the Commission Order of March 5, 2010, Petitioner Oglala Sioux Tribe (Tribe or Petitioner) hereby requests a hearing and petitions to intervene in this proceeding regarding the application of Powertech (USA) Inc. (Powertech) for a uranium recovery license for the Dewey-Burdock Project, a proposed in-situ leach (ISL) uranium mine in Custer and Fall River Counties, South Dakota. The Tribe's standing to intervene is described in Section II of this pleading, and the Tribe's contentions are set forth in Section III.

The Tribe submits this petition because the project may pose serious threats to the Tribe's cultural, historic, economic, and conservation interests. As detailed herein, the Environmental Report, the Technical Report, and the Supplemental Report that comprise the application contain serious defects, such that the application as a whole fails to satisfy the requirements of federal law, including the Atomic Energy Act, the National Historic Preservation Act, and the National Environmental Policy Act, along with the implementing regulations for these laws. As discussed in more detail in Section III on contentions, the primary concerns are the lack of compliance with

both federal law and NRC regulations and guidance regarding protection of 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 the lack of a defensible baseline ground water characterization or 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.

With respect to the environmental impacts of ISL operations, the long-term track record of ISL mine sites in the United States is replete with examples of failure to accurately predict groundwater dynamics, especially with respect to prevention of horizontal or vertical excursions and the inability to restore ground water to pre-mining conditions. These impacts have occurred despite the repeated assurances from prospective mine operators that ISL mining is a safe and even "benign" activity. *See, e.g.,*

http://www.eoearth.org/article/In_situ_leach_%28ISL%29_mining_of_uranium (World Nuclear Association co-author of article). The recent factual record demonstrates that these projects are not benign, and that grounds for serious concerns exist concerning proper regulation of ISL mining.

For instance, despite being directly subject to NRC regulatory authority, the Smith Ranch-Highland ISL operation was cited by the State of Wyoming in 2008 for multiple serious violations of law, some dealing with fundamental aspects of protection for public health, ground water, and against taxpayer liabilities. March 7, 2008 Notice of Violation (attached as Exhibit 1). These violations were far from insignificant. In its Investigative Report accompanying the Notice of Violation, the State of Wyoming reprimands the operation:

Given that PRI's [Power Resources, Inc.] operation has for many years been the major uranium producer in Wyoming, there is an expectation that the operation might serve as a model for excellence in ISL mining. Unfortunately, that is not the case. There are a number of major long-standing environmental concerns at this operation that demand immediate attention.

Wyoming Department of Environmental Quality Report of Investigation (attached as Exhibit 2) at 1.

The Report of Investigation goes on to charge the facility with numerous violations, including "major deficiencies" in both of its state permits. *Id.* at 2. Among the more serious problems are inadequate reclamation, where "[i]t is readily apparent that groundwater restoration is not a high priority for PRI," in part because "both production and restoration timeframes have doubled or tripled and yet additional wellfields are being brought into production." *Id.* at 3. Further, the Report details "an inordinate number of spills, leaks and other releases," such that "it appears that such occurrences have become routine." *Id.* at 4. Lastly, with respect to bonding, the Report finds that "[r]ough calculations based primarily on PRI's figures reveal an alarming scenario," such that the mine's approved reclamation and bonding plan "is totally infeasible and unsupported by any critical path timeline or water balance," resulting in a finding that "clearly the public is not protected." *Id.* at 4-5. These findings, just two years old, raise serious doubts for the Tribe as to the adequacy of the regulatory framework applicable to ISL uranium mining. At minimum, these concerns are ones that the federal regulatory system ought to have been well aware of and corrected long before they were ever allowed to reach such extremes.

Unfortunately, the apparent inability of ISL uranium mines to succeed in accomplishing ground water restoration is not an isolated occurrence. For example, the U.S. Geological Survey has recently confirmed that "[t]o date, no remediation of an ISR operation in the United States has successfully returned the aquifer to baseline conditions." Otton, J.K., Hall, S., *In-situ*

recovery uranium mining in the United States: Overview of production and remediation issues (Abstract), U.S. Geological Survey, 2009, IAEA-CN-175/87ISL (attached as Exhibit 3). This report goes on to express its authors' findings that "[o]ften at the end of monitoring, contaminants continue to increase by reoxidation and resolubilization of species reduced during remediation; slow contaminant movement from low to high permeability zones; and slow desorption of contaminants adsorbed to various mineral phases." *Id.* See also Hall, Susan, *Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain*, U.S.G.S. Open-File Report 2009–1143 (2009) at 30 (attached as Exhibit 4).

As demonstrated, the NRC Staff routinely allows for reductions in ground water standards away from baseline water quality. Thus, it appears from all the available evidence that all NRC-regulated ISL mining has resulted in some degradation of ground water quality over the long-term. The question then becomes one of how much ground water degradation the NRC will allow, and how far the resulting contamination will spread. In view of this track record, and particularly in considering standing, the Board must assume a certain level of ground water contamination.

Apart from the risks associated with ISL mining, as discussed above, recent testimony before the Commission from NRC Staff and U.S. Environmental Protection Agency ("EPA") representatives demonstrates that the regulatory guidance and processes currently in place for ISL mining application reviews are in some instances sorely out of date, and being substantially revised at the current time. For instance, at a March 2, 2010 briefing to the Commission, NRC Staff explicitly recognized that its "regulatory infrastructure, the regulatory guidance, the Standard Review Plans" for ISL mine applications are out of date, and that "the staff is actively working on updating those documents." March 2, 2010 U.S. NRC Briefing on Uranium

Recovery, at 6 (attached as Exhibit 5). The fact that projects such as the Dewey-Burdock Project are currently moving through a regulatory regime that is admittedly out of date raises serious concerns with respect to the ability of such a project to adequately protect the public health and environment, along with the Tribe's other concrete interests.

Indeed, throughout the March 2, 2010 NRC briefing, the broad extent of the needed and ongoing revisions to the NRC's regulatory oversight of ISL mining became clear. NRC staff testified that because of the outdated nature of the ISL regulatory framework "[s]taff is currently revising the standard review plan for in-situ recovery application reviews and ten regulatory guides." Exhibit 5 at 13. NRC staff also indicated that a major revision to the applicable regulatory requirements for ground water protection and restoration at ISL mines was imminent and would be submitted to the Commission as early as April of 2010 (this month). *Id.* at 9.

Representatives from EPA also testified at the March 2, 2010 briefing that the EPA is updating its fundamental regulations under 40 C.F.R. Part 192 with respect to ISL mining, which the NRC is bound by statute to implement at all ISL mine sites. With respect to the need for this update, EPA representatives confided that:

These regulations have not been substantially changed to recognize the environmental challenges faced by significantly increased use of in-situ leaching recovery technology, as well as possible use of heap leaching by the uranium industry. Nor have they been revised to incorporate potentially relevant recent changes in EPA groundwater and drinking water standards, as well as the most recent updates in good science for radon and radiation protection since the rule was last revised.

Id. at 47-48. This is in addition to the changes EPA is making to its regulatory controls for ISL mines with respect to hazardous air pollutants, including radon under 40 C.F.R. Part 61, Subpart W, and "doing so with recognition of the environmental challenges faced by significantly increased use of ISL recovery technology by the uranium industry." *Id.* at 49.

In addition to this testimony regarding the outdated nature of the regulatory program, EPA has recently submitted comments on an ongoing NEPA process for ISL uranium mining in Wyoming, expressing substantial concerns with respect to the integrity of the environmental analysis. March 3, 2010 Letter from Carol Rushin, Acting Regional Administrator, Region 8, U.S. EPA to Michael Lesar, Chief, Rulemaking and Directives Branch, NRC (attached as Exhibit 6). This EPA comment letter rates the NEPA documents for three ISL uranium mines in Wyoming as “inadequate” in part because of the failure of NRC to “evaluate the potential effects that non-attainment of baseline groundwater restoration would have on surrounding [underground sources of drinking water].” Among the primary concerns raised related to ground water are the frequent use of alternate concentration limits and a lack of sufficient discussion of the causes of excursions at ISL uranium mine sites. *Id.* at 4-5.

Overall, the significant problems evidenced at ISL mine sites in Wyoming and elsewhere, which are under direct NRC regulatory authority, and the candid admissions from both the NRC staff and the EPA that the regulatory structure for the protection of public health and the environment at ISL mine sites is out of date, elevates the Tribe’s concerns with respect to the ability of the Dewey-Burdock Project to achieve such protections in the context of this regulatory process. As a result, the strictest review must be afforded to this project, and better yet, review should be delayed until a current and legally sound regulatory framework can be put in place.

II. STANDING

The Oglala Sioux Tribe is a federally-recognized Indian Tribe, located on the Pine Ridge Reservation. The Oglala Sioux Tribe is a body politic comprised of approximately 41,000 citizens, with territory of over 4,700 square miles in the southwestern portion of South Dakota. The Oglala Sioux Tribe is the freely and democratically-elected government of the Oglala Sioux

people, with a governing body duly recognized by the Secretary of Interior. The Oglala Sioux Tribe is the successor in interest to the Oglala Band of the Teton Division of the Sioux Nation, and is a protectorate nation of the United States of America. The Oglala Band reorganized in 1936 as the “Oglala Sioux Tribe of the Pine Ridge Indian Reservation” under section 16 of the Indian Reorganization Act of June 18, 1934, ch. 576, 48 Stat. 987, 25 U.S.C. § 476, and enjoys all of the rights and privileges guaranteed under its existing treaties with the United States in accordance with 25 U.S.C. § 478b. The Tribe’s address is P.O. Box 2070, Pine Ridge, South Dakota 57770-2070.

Pursuant to 10 C.F.R. § 2.309(d)(1), a request for hearing must address: 1) the nature of the petitioner’s right under the Atomic Energy Act (“AEA”) to be made a party to the proceeding, 2) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding, and 3) the possible effect of any order that may be entered in the proceeding on the petitioner’s interest.

The AEA states that “the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding.” 42 U.S.C. § 2239(a)(1)(A). Given this broad and inclusive language, the Atomic Safety and Licensing Board (“ASLB”) has summarized these standing requirements as follows:

A petitioner’s participation in a licensing proceeding hinges on a demonstration of the requisite standing. The requirements for standing are derived from section 189a of the Atomic Energy Act of 1954 (AEA), which instructs the NRC to provide a hearing “upon the request of any person whose interest may be affected by the proceeding.” The Commission’s implementing regulation, 10 C.F.R. § 2.309(d), directs a licensing board, in ruling on a request for a hearing, to consider (1) the nature of the petitioner’s right under the AEA or the National Environmental Policy Act (NEPA) to be made a party to the proceeding; (2) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding; and (3) the possible effect of any decision or order that may be

issued in the proceeding on the petitioner's interest. In that regard, the Commission has long applied the test employed in the federal courts in resolving standing issues — i.e., the petitioner must allege “a concrete and particularized injury that is ... fairly traceable to the challenged action and [is] likely to be redressed by a favorable decision.” In addition, the claimed injury must be arguably within the zone of interests protected by the governing statute. In order to determine whether an interest is in the “zone of interests” of a statute, “it is necessary ‘first [to] discern the interests “arguably ... to be protected” by the statutory provision at issue,’ and ‘then to inquire whether the [petitioner’s] interests affected by the agency action are among them.’”

In The Matter of Crow Butte Resources, Inc. (In Situ Leach Facility, Crawford, Nebraska), 68 N.R.C. 691, 701-702 (2009)(citations omitted). When NEPA is among the relevant statutes, the zone of interests is quite wide and includes procedural protections and impacts to aesthetic and other non-economic values. See, *Rocky Mt. Oil & Gas Assoc. v. United States Forest Serv.*, 157 F. Supp. 2d 1142, 1144 (D. Mont. 2000), *aff’d*, 12 Fed. Appx. 498 (2001) *cert denied* 534 U.S. 1018 (holding that “the possibility of oil and gas technology spoiling the pristine scenery and diverse resources” and “value of place” are proper factors to consider when raised by the public in a NEPA analysis).

The Tribe's standing to participate in this proceeding is demonstrated by the attached declarations of Oglala Sioux Tribe government officials, Wilmer Mesteth, the Oglala Sioux Tribal Historic Preservation Officer (Declaration attached as Exhibit 7), and Denise Mesteth, Director of the Oglala Sioux Tribal Land Office (Declaration attached as Exhibit 8). These Declarations testify to the Tribe's interest in protecting its cultural and historical resources, along with its lands, natural resources, economic prosperity, and the health, safety, welfare of the tribal members as well as the public. Further, these declarations, along with the attached Declaration of Dr. Robert E. Moran and the Declaration of Dayton Hyde (submitted previously in this proceeding by other proposed petitioners), demonstrate the threats to the Tribe's interest from the proposed project.

As set forth in the Declaration of Wilmer Mesteth, the Tribe seeks to participate in this proceeding to protect its historical, archaeological, and traditional cultural values and sites included within the proposed project area. The Tribe also seeks standing under the National Historic Preservation Act (NHPA) based on the Tribe's procedural rights in identifying, evaluating, and establishing protections for historic and cultural resources. These substantive and procedural interests in protecting cultural and historic resources related to the Tribe's heritage have recently been held by the Commission to adequately establish standing of the Oglala Sioux Tribe to intervene in a source material licensing proceeding. *In The Matter of Crow Butte Resources, Inc. (In Situ Leach Facility, Crawford, Nebraska)*, CLI-09-09, Nuclear Reg. Rep. P 31589, at 3-4 (May 18, 2009).

As stated in the Declaration of Wilmer Mesteth, the project lands are within the traditional aboriginal territory of the Oglala Sioux Tribe. This is confirmed by the fact that the project lands were included in the 1851 Fort Laramie Treaty and the 1868 Fort Laramie Treaty (15 Stat., 635). Further, as set forth in Mr. Mesteth's Declaration, and detailed in the Environmental Report for the Project, a significant number of cultural, historic, and archaeological resources have been identified in the Project area. ER at 3-178 to 3-180. Powertech's Application materials indicate that a small number of identified Euroamerican sites are eligible for the National Register of Historic Places. ER, Appendix 4.10-A, at ii. A large number of the sites identified (87) remain unevaluated for eligibility for the National Register of Historic Places. Id.

The Tribe has not had the opportunity to be involved in the assessment or determination of the significance of the identified sites, nor had the opportunity to identify additional sites that may warrant evaluation or listing. The Applicant has entered into a Memorandum of Agreement

with the State of South Dakota regarding analysis and evaluation of historic, cultural, and archaeological sites, but has not included the Tribe in this Memorandum.

The Tribe also asserts a concrete interest in the protection of its lands, natural resources, economic prosperity, and the health, safety, and welfare of tribal members, which are all threatened by the proposed project. This basis for standing is premised on the Tribe's ownership of lands in proximity to the proposed Project such that the Project may cause air, water, and ground water impacts to the Tribe's land. As set forth in the Declaration of Denise Mesteth, Director of the Oglala Sioux Tribal Lands Office, the Tribe owns lands in the vicinity of the proposed Project, which it leases for domestic, agricultural, water development, conservation, and other purposes. The Tribe relies on revenue from these leases to provide essential services for Tribal members. The Tribe also derives benefit and value, economically and otherwise, from its lands, and has a strong interest, economic and otherwise, in ensuring that these lands and the water resources associated with them remain in an unpolluted state. Thus, any impacts to these lands or to the air, water, or ground water associated with them from the proposed Project will negatively affect the Tribe's interests.

Included among the Tribe's lands are parcels leased to Mr. Dayton Hyde, a proposed Petitioner in this proceeding. See Declaration of Dayton Hyde (attached as Exhibit 9). As described therein, Mr. Hyde owns and operates a horse sanctuary on lands in the direct vicinity of the proposed Project. Portions of the lands Mr. Hyde uses for such purposes are leased from the Oglala Sioux Tribe. Thus, any negative impacts to Mr. Hyde's properties as a result of the Project that threaten his ability to maintain his operations threaten his ability to maintain the lease for lands with the Tribe.

The attached Declaration of Dr. Robert E. Moran details the potential impacts to ground water associated with the proposed Project (Declaration attached as Exhibit 10). In particular, Dr. Moran points to the fractured geology of the area, and to the historic drilling and other anthropogenic disturbances in the area that could serve as pathways for contaminated ground water from the Project area to migrate into adjoining aquifers, thus potentially contaminating other properties in the vicinity of the proposed Project. These properties include lands owned by Mr. Hyde and lands owned by the Tribe. As such, the Tribe has a particularized interest in this proceeding by virtue of its land ownership and economic and aesthetic interests in lands that it leases in the area.

These interests as described above will be protected should the project not obtain a license for any reason. Further, the Tribe's interests will be protected to the extent the Applicant is required to demonstrate full compliance with all federal laws and regulations.

III. CONTENTIONS

As required by the federal register notice and 10 C.F.R. § 2.309, the Tribe sets forth below the specific contentions that it seeks to have litigated in this proceeding. Each contention raises issues with respect to the sufficiency of the Application under NRC regulations, as specified therein, as well as compliance with the National Environmental Policy Act ("NEPA"). Although no NRC NEPA document has yet been prepared for this project, the Tribe references NEPA to preserve its ability to raise these same issues, or others based on any newly available information, once a NEPA document is prepared. See 10 C.F.R. § 2.309(f)(2). The Tribe also contends that the failure to have a completed site-specific environmental impact statement available to (and informing the process of) NRC Staff evaluation of the license application violates the NEPA and its implementing regulations.

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 Application fails to meet the requirements of 10 C.F.R. §§ 51.60 and 51.45, and the National Environmental Policy Act because it lacks an adequate description of either the affected environment or the impacts of the project on archaeological, historical, and traditional cultural resources. The Application also fails to demonstrate compliance under the National Historic Preservation Act, and the relevant portions of NRC guidance included at NUREG-1569 section 2.4.

Basis and Discussion:

This contention is supported by the Declaration of Wilmer Mesteth, Oglala Sioux Tribe Tribal Historic Preservation Officer (Attached as Exhibit 7).

10 C.F.R. § 51.60 requires each applicant to submit with its application an environmental report containing the information specified in 10 C.F.R. § 51.45. 10 C.F.R. § 51.45(b) requires a “description of the environment affected” and a discussion of the “impacts of the proposed action on the environment.” These requirements are also mandated under the National Environmental Policy Act. In this case, the Environmental Report, at Appendix 4.10-A, demonstrates that a significant number of archaeological, historical, and traditional cultural resources on site have not been evaluated; therefore, the potential impacts to these resources have not been addressed. Among these are 87 known sites. ER, Appendix 4.10-A at ii. Given the lack of involvement by the Tribe, however, as discussed below, this number may be higher. Further, there are discrepancies between the number of sites identified in the report included in the Application at ER, Appendix 4.10-A and sworn testimony given by the state historic preservation officer in a State of South Dakota proceeding related to this matter, such that it appears that some significant

sites may not be included or discussed in the Application. See Declaration of Wilmer Mesteth at ¶¶ 15-19.

NUREG-1569 Section 2.4 imposes several requirements in terms of Section 2.4.3 Acceptance Criteria that have not been met in this case. In particular, Section 2.4.3(1) requires a listing for all properties included in, or eligible for inclusion in, the National Register. As stated, the application materials admit that scores of sites have not been evaluated for listing eligibility. Section 2.4.3(3) specifically mandates consultation with tribal authorities on the likely impacts on Native American cultural resources, which has not occurred in this case. Similarly, section 2.4.3(4) requires evidence of contact with appropriate state historical preservation office and tribal authorities – information lacking in the application with respect to tribal contact. Lastly, section 2.4.3(5) explicitly contemplates a memorandum of agreement “among the state historic presentation officer, tribal authorities, and other interested parties regarding their satisfaction with regard to the protection of historic, archaeological, architectural, and cultural resources during site construction and operations.” The Memorandum of Agreement presented in the application includes only the state personnel, ignoring tribal authorities and other interested parties. ER, Appendix 4.10-B. Given these inadequacies, the application should never have been deemed complete.

Among the additional requirements are those under the National Historic Preservation Act (“NHPA”) and related Executive Orders. Under these authorities, the NRC is required to fully involve Native American Tribes in all aspects of decision-making affecting Tribal interests such as those directly impacted by the project. These mandates require NRC to consult with Tribes as early as possible in the decisionmaking process. Here, despite having the applicant’s materials for approximately a year, and already having begun review of the project with respect

to completeness of the application, the NRC has not yet engaged in the required consultation process. This is especially troubling as the applicant has included an entire report on what it believes is the significance of the archaeological, historical, and traditional cultural resources it has identified at the site, but at no time has the Tribe been involved in the determination as to the significance of these resources or the completeness of the proffered Report, as contemplated by the NHPA. The failure to engage the Tribe in a meaningful way at the earliest possible time 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 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 EA.”)

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 (4th 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 Project, 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 (10th 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 CFR § 800.2(c)(2)(ii).

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 (9th Cir. 1981) (“any Federal Government action is subject to the United States’ fiduciary responsibilities toward the Indian tribes”).

In another proceeding before the Commission involving the Oglala Sioux Tribe, it was determined that the contention regarding compliance with the consultation requirements of the NHPA was not ripe. *See In The Matter of Crow Butte Resources, Inc. (In Situ Leach Facility, Crawford, Nebraska)*, CLI-09-09, Nuclear Reg. Rep. P 31589, at 9-11 (May 18, 2009). However, the legal and factual issues in this case are sufficiently distinguishable. Specifically,

in this case, the Tribe argues that the NHPA requires consultation under Section 106 to begin as early as possible in the consideration of an undertaking.

Here, as discussed above, the application was initially submitted to the NRC in February of 2009, well over a year ago. Further, the NRC Staff has already begun processing the application, including making an affirmative determination that the information contained in the application was acceptable to the agency. This analysis necessarily considered whether the applicant's efforts to identify and assess the impacts on historic and cultural resources, as presented in the application, meet the NRC's standards under the NHPA. To exclude the Tribe until a NEPA document is prepared harms the Tribe's ability to participate in the initial identification of historic/cultural properties 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 requirement of the NHPA, the harms to the Tribe began accruing immediately upon NRC consideration of the Application in the absence of tribal consultation. Thus, the harms to the Tribe are ongoing, and the Tribe's contention with respect to this issue is ripe.

Contention 2: Failure to Include Necessary Information for Adequate Determination of Baseline Ground Water Quality

The Application violates 10 C.F.R. § 51.45 and the National Environmental Policy Act, requiring a description of the affected environment, in that it fails to provide an adequate baseline groundwater characterization or demonstrate that ground water samples were collected in a scientifically defensible manner, using proper sample methodologies.

Basis and Discussion:

This contention is supported by the Declaration of Dr. Robert E. Moran (attached as Exhibit 10), particularly ¶¶ 16-24, 29, 33, 47-51, 62.

10 C.F.R. § 51.45 and the National Environmental Policy Act require a description of the affected environment containing sufficient data to aid the Commission in its conduct of an independent analysis. 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.” NUREG-1569 section 2.7.1(4) requires that ISL applications must provide an “assessment of available ground-water resources and ground-water quality within the proposed permit boundaries and adjacent properties, including a quantitative description of the chemical and radiological characteristics of the ground water and potential changes in water quality caused by operations.” NUREG-1569 section 2.7.3(4) sets forth acceptance criteria for the Application requiring a “reasonably comprehensive chemical and radiochemical analysis of water samples, obtained within and at locations away from the mineralized zone(s)...to determine pre-operational baseline conditions.” NUREG-1569, section 2.7.3(4). This acceptance criteria also requires an applicant to “show that water samples were collected by acceptable sample procedures....” *Id.* See also NUREG-1569 Section 2.7.4. Lastly, NUREG-1569 requires that “[t]he applicant should identify the list of constituents to be sampled for baseline concentrations. The list of constituents in Table 2.7.3-1 is accepted by the NRC for *in situ* leach facilities.” NUREG-1569, section 2.7.3.

The Declaration of Dr. Robert E. Moran, at ¶ 16, states:

The Powertech Application fails to define pre-operational baseline water quality and quantity—both in the ore zones and peripheral zones, both vertically and horizontally. Without adequate baseline water quality data (both ground water and surface water), there is no reasonable method for either the public or the NRC to evaluate the success or failure of either fluid containment or aquifer restoration. The Powertech Application documents repeatedly attempt to convey the impression that the D-B ground water quality is already degraded, rather than compile statistically-defensible data from both the

ore zones and non-mineralized zones. This approach contradicts NRC guidance, which requires that pre-mining baseline conditions be defined before licensing (NRC, 2003, pg. 2-24).

Dr. Moran continues to describe in depth the analytical deficiencies associated with the ground water baseline characterization as set forth in the application materials:

22. No coordinated, statistically-sound data set for **all** Baseline Water Quality data (both surface and ground water) is presented in these documents—as is required in NUREG--1569. For example, on pg. 2-14 and 2-15 of the Technical Report (TR), Sect. 2.2.3.2.2., Powertech states: “At the project site, baseline groundwater sampling was conducted in general (sic) accordance with NRC Regulatory Guide 4.14 (NRC, 1980). ... A summary of the results and methods for the groundwater quality monitoring program, as well as the historical TVA data, is presented in Section 2.7.” However, when the reader goes to TR Section 2.7, there are no tables that actually summarize, statistically, complete baseline field and lab water quality data for the complete data sets—both historic and recent. Instead, for ground waters, Powertech presents statistics for field data from individual wells or selected aquifers, but fails to statistically-summarize the laboratory data and leaves out the historic TVA data. Powertech then states (TR, pg. 2-203): “Complete groundwater quality data results are available in Appendix 2.7-G.” However, on TR, pg. 2-205 (Sect. 2.7.3.2.2.2, Results for Laboratory Parameters) Powertech then states: “Summary statistics for baseline monitoring program laboratory samples are contained in Appendices 2.7-H and 2.7-I. Appendix 2.7-H gives statistics for all groundwater constituents detected at or above PQL by constituent.” Thus, it appears that Powertech has not included “qualified values,” that is data reported as “less than” some concentration. By deleting the “less than” values, Powertech has severely biased the data set, rendering it useless as a reliable source for evaluating baseline conditions.

23. Furthermore, Powertech states (TR, pg. 2-217-218) that they have arbitrarily selected some analyses from the voluminous, historic TVA data, but the reviewer is never allowed to see a statistical summary of the total original data set. Portions of the relevant data are scattered throughout the Appendices of the various documents, and disingenuously organized to leave out all baseline data that had concentrations reported below the detection limits (i.e. “less than” values). Obviously, this approach biases the data. Powertech must statistically summarize all historic water quality data and all recently collected data in separate tables, including all “less than values.” Both historic and recent baseline data should be segregated by water-bearing unit. Even should averaging of water quality data over a portion of the aquifer be acceptable, the methodology employed in the Application of discounting relevant data points is untenable.

24. To further confuse the baseline issues, Powertech’s Supplement to the Application (August 2009) states on pg. 3-3: “A minimum of eight baseline water quality wells will be installed in the ore zone in the planned well field area.” Thus it appears that the Applicant intends that the massive amounts of water quality data (historic and recent)

presented in both the TR and ER (Environmental Report) will not actually be used to determine baseline. More importantly, it is unclear whether Powertech has baseline (pre-operational) ground water quality data that describes the **non-ore zone regions of the relevant aquifers**. It is imperative that baseline data for the non-ore zone ground waters be collected and summarized separate from those of the ore zones. Lastly, the Application should already contain a statistically-reliable database of baseline ground water quality data from all known wells within at least a one-kilometer radius of the project boundary.

Declaration of Dr. Moran at ¶¶ 22-24.

Dr. Moran goes on to discuss the deficiencies in the Application with respect to the inadequate characterization of the non-ore regions of the relevant aquifers. Dr. Moran states:

Much of the Application discussion concerning ground water quality seems focused on showing that the site waters are already contaminated. This would not be surprising given the presence of the uranium mineralization and the past mining and exploration activities--all of which would have caused increased concentrations of numerous chemical constituents above true, pre-mining baseline. However, based on statements made in the ER, pg 1-16, Powertech has not adequately defined whether zones peripheral to the D-B ore-bearing geologic formations and bounding formations (above and below) also contain zones of high-quality, possibly potable ground water. Such zones should already have been defined as part of the Application documents.

Declaration of Dr. Robert E. Moran at ¶ 29.

Lastly, with respect to field sampling protocol and methodology, and the resulting integrity of the resulting data obtained, Dr. Moran opines:

The Application is inadequate in its attempt to demonstrate that the ground water quality data are of suitable quality, as on ER pg. 3-61, 62. Here they state that a comparison of field and lab pH and specific conductance data “are within reasonable limits.” Despite the vagueness of the language, this statement / section demonstrates a failure to understand the basics of applied water quality. Ground water chemistry routinely changes between the time a water sample is lifted from a well--where field pH and S.C. measurements should be made immediately--and much later when investigated in a laboratory. Hence, it is inappropriate to argue that, for example, the highest measured field pH was 12.67 and it “was verified by the contracting laboratory which reported a pH of 12.4 in the sample” (p. 3-62). Of course the chemistry changed as the temperature and pressure of the sample changed, the sample de-gassed, and various chemical reactions occurred. However, the authors failed to comment on the significance of the actual, reported pH of 12.67. In such a hydrogeologic setting, a site that had been previously drilled by thousands of exploration boreholes, and possibly previously mined, the logical conclusion is that such a pH represents evidence of some form of contamination---possibly from the incorrect

completion of a well with cement and / or bentonite grout, a spill of some alkaline chemicals, or from some past attempts to test the leachability of these ores using an alkaline lixiviant. The same is true for the insufficient discussion of the field versus lab specific conductance values at well 677, which were reported to be 12,220 $\mu\text{S}/\text{cm}$ versus 11,000 $\mu\text{S}/\text{cm}$ (pg. 3-62). The authors ignore the more reasonable conclusions that some form of contamination has occurred.

Declaration of Dr. Robert E. Moran at ¶ 62.

Based on this evidence, the application 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.

Contention 3: Failure to Include Adequate Hydrogeological Information to Demonstrate Ability to Contain Fluid Migration

The application fails to provide sufficient information regarding the geological setting of the area to meet the requirements of 10 C.F.R. § 40.31(f); 10 C.F.R. § 51.45; 10 C.F.R. § 51.60; 10 C.F.R. Part 40, Appendix A, Criteria 4(e) and 5G(2); the National Environmental Policy Act; and NUREG-1569 section 2.6. The application 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. § 51.45, NUREG-1569 section 2.7, and the National Environmental Policy Act.

Basis and Discussion:

This contention is supported by the Declaration of Dr. Robert E. Moran (attached as Exhibit 10) and Exhibit 6 (EPA comments).

10 C.F.R. § 40.31 and 10 C.F.R. § 51.60 require an applicant to submit an environmental report with its license application. 10 C.F.R. § 51.45 and the National Environmental Policy Act require that the environmental report include a description of the affected environment and the

impact of the proposed project on the environment, with sufficient data to enable the Commission to conduct its independent analysis. 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. As discussed in NUREG-1569 at 2.7.1(3), the application must include a description of the “effective porosity, hydraulic conductivity, and hydraulic gradient” of site hydrogeology, including any “other information relative to the control and prevention of excursions.” At minimum, the applicant must develop an acceptable conceptual model of site hydrology adequately supported by the data presented in the site characterization. NUREG-1569 section 2.7.2. 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.

In this case, the application fails to present sufficient information in a scientifically-defensible manner to adequately characterize the site and off-site hydrogeology to ensure confinement of the extraction fluids. These deficiencies include unsubstantiated assumptions as to the isolation of the aquifers in the ore-bearing zones and failure to account for natural and man-made hydraulic conductivity through natural breccias pipe formations and the historic drilling of literally thousands of drill holes in the aquifers and ore-bearing zones in question, which were not properly abandoned. As described in depth by Dr. Moran:

36. The application presents overly-optimistic conclusions about the isolation of the ore-

bearing zones, aquifers, and the lack of fluid excursions that will occur, both vertically and horizontally. Powertech's description and evaluation of possible water-related impacts [ER pg. 8-2 (Table 8.1-1)] are unreasonably optimistic. It is unlikely that the process waters can be contained within the project boundaries given the following sources of the evidence.

37. The D-B uranium deposits occur in subsurface, fluvial channel, sandstone deposits in the Lakota and Fall River formations (Smith, 2005). These sandstones inter-finger with finer-grained silts and shales, often associated with lignites and coals, which form the typical lithologic sequences often seen in classic sedimentary uranium deposits (Abitz, 2005; Gott, 1974; Henry, 1982; Galloway, 1982; Henry, 1980; Harshman, 1972).

38. Hydraulically, such sedimentary packages typically allow ground waters to flow between the inter-fingering facies, both vertically and horizontally, when the coarser-grained sediments are stressed by long-term pumping. The hydraulic inter-connections are verified by conducting long-term aquifer tests integrated with sequential water quality sampling and in-situ measurement of field parameters (Henry, 1982; Galloway, 1982; Moran, R.E.—hydrogeochemical research activities, U.S.G.S., Water Resources Div., 1973—1978).

39. Thus, ore-bearing sandstones in typical sedimentary packages associated with roll-front uranium deposits do not routinely behave as hydraulically-isolated bodies. Numerous specific lines of evidence from the D-B Application documents indicate that the project sediments possess various pathways for the migration of water and contaminants from the ore zones into neighboring sediments, both vertically and laterally. For example, thousands of exploration boreholes have been drilled since the 1950's at the D-B site (Smith, 2005; TR, ER), many of which were not correctly plugged and abandoned (TR, Pg. 2-157; Append. 2.7-B, sub-Appendix D, pg. 1484; TR, Append. 2.6-A, pg. 972-1111). In addition, several sources (Smith, 2005, pg. 9; ER, pg. 3-106) report that the area contains historic, shallow mine workings, both open pits and short tunnels that would provide additional flow pathways.

40. There are numerous old and existing water wells and old oil test wells in the D-B area, many with rusty and leaky casings, often unplugged or partially-plugged, drilled through several formations which act as potential pathways for flow between water-bearing units (ER, pg.3-40; TR, Append. 2.2-A, pg. 740-779; 2.2-B, especially pg. 864-902).

41. The TR, pg. 2-153-154, states that hydraulic connections between local D-B aquifers often result because confining units thin or are absent in many areas (ER, pg.3-56-57). In addition, Gott (1974) and others have mentioned the presence of breccia / evaporite pipes (collapse structures), which create vertical permeability pathways between aquifers. Gott (1974, pg. 27-29) and others discuss the common presence of faults and joints throughout the region, which could easily act as flow pathways.

42. Vertical and lateral hydraulic connectivity between the ore zones and the neighboring facies / formations are also indicated by the aquifer test results conducted in both 1979

and 2008 (ER, pg.3-56-57; TR, pg. 2-170 & 2-180, for example; TR Append. 2.7-B, Knight-Piesold Pumping Test Report, pg. 1290).

43. It seems obvious that the aquifer testing already performed demonstrates leakage between the various formations / facies bounding the ore zone. However, it seems equally likely that longer-duration aquifer tests conducted at even higher pumping rates would demonstrate even more clearly the leaky nature of these site sediments.

44. Repeatedly throughout the Application, Powertech states that the project will bleed 0.5 to 3% of leachate to maintain a cone of depression, which will prevent flow of leachate outwards (i.e. ER, pg. 1-14). Rather than supporting this allegation with long-term, technical data from other operating sites, Powertech has inserted a public relations statement from the mining industries' lobbying group, the National Mining Association (NMA, 2007).

45. D-B Application Supplement, pg. 5-5 describes an aquifer exemption boundary, which acts as an additional buffer zone outside the monitor well rings "to provide protection to adjacent water from the excursions that occur in the normal course of operations." Page 5-6 of the Supplement further states that the aquifer exemption boundary is proposed to be up to 1200 ft. outside the monitor well ring, and would be considered the point of regulatory compliance. Apparently simply pumping to create an inward flow direction is not adequate to control "excursions". It appears this aquifer exemption boundary is actually an expanded ground water sacrifice zone.

Potential hydrogeologic pathways to nearby wells have not been adequately investigated and documented.

46. The discussion above presents ample evidence that the D-B area sediments contain numerous possible subsurface pathways for project leach fluids to migrate vertically between water-bearing units and outside the project boundaries. Unfortunately, as noted above, Powertech has not adequately defined the baseline water levels or water quality conditions of neighboring wells within a 1 to 2 mile radius of the D-B project. In addition, the TR, pg. 2-180, states that no public data are available on the use of aquifers in Fall River or Custer counties. Such data should have been compiled by Powertech as part of the Application, and must be required before any licenses are given.

Declaration of Dr. Robert E. Moran (attached as Exhibit 10).

The concerns expressed by Dr. Moran are echoed in Exhibit 6, at 4-5, where EPA critiques the environmental review process conducted by NRC for ISL operations proposed in Wyoming. That discussion is directly applicable here, and provides evidence of the impacts associated with failure to properly assess the baseline site conditions and impacts of lixiviant injection, attempts at restoration, and excursions.

Based on this evidence, the application fails to provide an adequate site characterization of geology and hydrogeology and fails to demonstrate the ability of the applicant to determine effective porosity of the affected aquifers or to demonstrate the ability to confine the leaching fluids.

Contention 4: Inadequate Analysis of Ground Water Quantity Impacts

The application violates the National Environmental Policy Act in its failure to provide an analysis of the ground water quantity impacts of the project. Further, the application 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. § 40.32(c), 40.32(d), and 51.45.

Basis and Discussion:

This contention is supported by the Declaration of Dr. Robert E. Moran (attached as Exhibit 10).

10 CFR 40.32(c) requires the applicant's proposed equipment, facilities, and procedures to be adequate to protect health and minimize danger to life or property; 10 CFR 40.32(d) requires that the issuance of the license not be adverse to the common defense and security or to the health and safety of the public; and 10 CFR 51.45 and the National Environmental Policy Act require the applicant 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 application as submitted 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 applicant has not established that its procedures are adequate to protect, and to not be adverse to, human health or that they will minimize danger to life or property.

The Declaration of Dr. Robert E. Moran sets forth the primary concerns related to the application's lack of credible analysis of ground water quantity impacts:

12. The D-B project area is semi-arid, having an average yearly precipitation of about 12 to 13 inches. While the application documents fail to report yearly evapotranspiration (ET), estimates of ET are roughly 70 inches per year, about 5 times the yearly precipitation (ER, pg. 3-176 and 177; Fig. 3.6-27). Because the project is presently expected to operate for between 7 and 20 years, it will require the use of tremendous volumes of local ground water.

13. Unfortunately, the Application documents present conflicting estimates of the volumes of water actually needed to operate the project. The ER, pg. 4-25, section 4.6.2.7.2 Water Requirements for the Proposed Action Facilities states:

“Water requirements of the CPP and other facilities are estimated to have a maximum requirement of **65 gpm**. As this requirement is relatively large, it is expected that most of this water will be derived from a water supply well in the Madison formation. Some of this water may be withdrawn from the Inyan Kara formation, but if so, it will not occur in a fashion to affect any well field operations.”

While the last sentence is totally unclear as to specific details, the greater problem comes on reading ER pg. 8-2 (Table 8.1-1), which states that ground water consumption will be **320 gpm**. Aside from the obvious lack of consistency, both of the estimates translate into massive amounts of ground water when considered over the full life of the project.

The water usage data for the conflicting water usage numbers referenced in the Application result in total water consumption over the life of the project as follows:

65 gpm = 34.2 Million gpy (gals / yr).

After 7 yrs = 239,148,000 gallons, or 239.15 Million gals.

After 17 yrs = 580,788,000 gals or 580.8 Million gals.

320 gpm = 168.2 Million gpy (gals. / yr).

After 7 yrs = 1,177,344,000 = 1.2 Billion gallons

After 17 years = 2,859,264,000 gallons = 2.86 Billion gallons.

14. The TR, pg. 2-181, also says water requirements will be 65 gpm, but the subsequent discussion (pg. 2-181 and 2-182) indicates great uncertainty. These inconsistencies need to be rectified to enable effective public and NRC staff review. Clearly, both of these estimates indicate that vast quantities of ground water will be extracted from these aquifers over the long-term, and it seems overly-optimistic to simply state that no significant impacts will occur. At a minimum, Powertech should be required to construct a credible, project water balance and to more seriously investigate the potential that such large-volume water use might impact local / regional ground water levels. At present, I see no evidence that the Application contains a reliable compilation of baseline water level data for the surrounding domestic and agricultural wells (see discussion below). Without such reliable,

summarized data, there will be no viable method to demonstrate that ground water levels (and related pumping costs) have not been impacted by project-related activities.

Declaration of Dr. Robert E. Moran (attached as Exhibit 10).

Contention 5: Failure to Adequately Calculate Bond for Decommissioning

The application fails to provide a sufficient and acceptable financial assurance cost estimate, as required by 10 C.F.R. Part 40, Appendix A, Criterion 9, to assure the availability of sufficient funds to complete the reclamation plan and the activities in the application by an independent contractor.

Basis and Discussion:

This contention is supported by the Declaration of Dr. Robert E. Moran (attached as Exhibit 10) and the Technical Report, Appendix 6.6-A, and Section 1.0.

10 C.F.R. Part 40, Appendix A, Criterion 9 requires:

Financial surety arrangements must be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements must be based on Commission-approved cost estimates in a Commission-approved plan....This will yield a surety that is at least sufficient at all times to cover the costs of decommissioning and reclamation of the areas that are expected to be disturbed before the next license renewal.

In this case, the application states that the operation will continue for 7 to 20 years and extract approximately one million pounds of uranium each of those years. TR at 1-8. See also Figure 1.9-1 Projected Construction, Operation, Restoration and Decommissioning Schedule. The estimates of both restoration and reclamation costs, however, are based on full production only in 2011, minor production levels in 2012, and no production anticipated beyond 2012. TR, Appendix 6.6-A. The costs of decontamination and decommissioning as portrayed in the application are thus grossly underestimated and insufficient for the reclamation of all activities as

required by 10 C.F.R. Part 40, Appendix A, Criterion 9. Further, the application states that the restoration times may be longer than originally anticipated, and this fact is not incorporated into the financial surety calculation. TR at 1-8. See also Exhibit 6 at 4 (EPA stating that “Studies-cited in the GEIS concluded that, for sites that were reviewed, aquifer restoration took longer and required more aquifer pore volume flushing than originally planned.”).

Contention 6: Inadequate technical sufficiency of the application and failure to present information to enable effective public review resulting in denial of due process

The application fails to present relevant information in a clear and concise manner that is readily accessible to the public and other reviewers, as required by the National Environmental Policy Act, Regulatory Guide 3.46, and NUREG 1569.

Basis and Discussion:

This contention is supported by the Declaration of Dr. Robert E. Moran (Declaration attached as Exhibit 10).

NUREG-1569 is the NRC’s current updated standard review plan. NUREG-1569 states:

The standard review plan complements Regulatory Guide 3.46, Standard Format and Content of License Applications, Including Environmental Reports for *In Situ* Uranium Solution Mining (NRC, 1982) which is guidance to applicants and licensees on an acceptable format and contents for a license application. Sections of this standard review plan are keyed to sections in Regulatory Guide 3.46 (NRC, 1982). Applicants should use Regulatory Guide 3.46 (NRC, 1982) as guidance in preparing their applications.

NUREG-1569 at xv. Regulatory Guide 3.46 provides explicit instruction for applicants in presenting information in an application, cautioning, “[t]he applicant should strive for clear, concise presentation of the information in the license application.” Regulatory Guide 3.46 at vii. Regulatory Guide 3.46 goes on to require:

An evaluation of information or data should clearly state the conclusions of the evaluation and should present the analyses and supporting data in sufficient detail to

permit an independent reviewer to verify this result. Tables, line drawings, and photographs should be used wherever they contribute to the clarity and brevity of the application. The number of significant figures stated in numerical data should reflect the accuracy of the data. Descriptive and narrative passages should be brief and concise. In cases where test results to support conclusions are presented, the procedures, techniques, and equipment used to obtain the test data should be included.

Id.

Similarly, 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....”).

In this case, the Application has not been presented in a form acceptable under NEPA or NRC regulations. As set forth by Dr. Moran:

5. Powertech D-B Application is so disorganized and technically-deficient that it does not comply with the terms of NUREG-1569 and other relevant NRC regulations and should be revised. The various portions of the D-B Application total almost 6000 pages and are composed of:

- Technical Report (TR)-- 3103 pages;
- Environmental Report (ER)-- 2615 pages;
- Supplement to Application-- 66 pages.

The relevant information, if compiled in a direct, transparent manner using predominantly maps, tables and graphs, could easily have been summarized in 150 pages for the main volume. Instead, the Application is so duplicative and poorly-organized that it makes informed review by both the regulators and general public largely impossible. The Table of Contents for both the TR and ER provide no page numbers for the masses of information presented in the Appendices. The Appendices, in places, seem to have been thrown together with little or no logic to the organization. The authors of the main portions of the ER and TR, whoever they are, have made the review process unnecessarily convoluted, for both the NRC and the public. To that point, for numerous sections of the Application, it is not possible to discern whose opinions are being stated – Powertech’s, one of their consultants, or some other source.

6. What follows in paragraphs (6-10) are a few examples of the disorganized nature of these documents: For both the ER and TR, the tables of contents present basic titles, but no page numbers for the thousands of pages of appendices. As it is the Appendices that contain much of the corroborating data, such careless organization makes document review and substantiation of claims written in the text unnecessarily difficult. The headings of the

appendices, figures and tables often are far too vague to be useful. For example, regarding ER Append. 3.4-A, the title simply says: WELL LOCATION DATA. This is an inadequate presentation and several questions are evident. Data compiled by whom? When was the data compiled? For what types of wells (domestic? agricultural?)? Are those wells still in use? Are those wells monitored?

7. There are several other similar examples. One title says: Wells in Dewey-Burdock Database. Was this database originally compiled by Powertech? TVA?

8. Surface water sites discussed on pg. 2-192 through 2-194 of the TR have no specific names; they are simply labeled BVC01, BVC04, CHR01, CHR05. The field data for these sites are not integrated with the lab data from the same samples.

9. Application documents fail to provide summary tables and figures where they are most necessary. For example, the ER, pg. 3-39-40 provides no summary of the wells discussed, their uses, water-bearing units / formations, etc. such tables should be included in the text where the discussions are taking place.

10. Water-related discussions / data are scattered throughout the ER and present inconsistent findings. For example, a reviewer (NRC or public) of water-related issues must search through the following sections:

3.4 Affected Environment [WQ and Q discussions not integrated];

4.6 Potential WR Impacts

6.1.8 GW Sampling

6.2 Physiochemical GW Monitoring

7.4.3 Potential GW Impacts

8.1 Summary of Env. Consequences

Appendices:

3.3A, D

3.4A, B, C, D, E

3.5I

6.1B, C, D, E, F, G

Given the need for the applicant to submit supplemental information, these deficiencies should have been resolved at that time.

Declaration of Dr. Robert E. Moran (attached as Exhibit 10).

Contention 7: Failure to Include in the Application a Reviewable Plan for Disposal of 11e2 Byproduct Material

The Environmental Report indicates that Powertech intends to use some unidentified facility for disposal of the 11e2 Byproduct generated at the proposed ISL Facility. See Powertech ER at 1-7, 4-6. It is not sufficient, however, for an applicant to merely state that permanent disposal will occur in conformance with applicable laws.

The very reason for the licensing process is to ensure that the problems associated with mill tailings which UMTRCA addresses do not recur under the modern licensing regime. Nowhere do the regulations at 10 C.F.R. Part 40, Appendix A allow an applicant to merely assert that tailings will be handled in accordance with applicable law. The opposite is required by federal law: an applicant must address permanent disposal at the time it seeks a license for activities which create 11e2 Byproduct.

Basis and Discussion

The relevant regulations applicable to new uranium processing operations state in plain language:

Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required by the provisions of § 40.31(h) to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling activities.

40 C.F.R. Part 40 Appendix A (emphasis added). This regulation implements the UMTRCA amendments to the Atomic Energy Act, which require the NRC to ensure that the specific proposal for disposition of tailings and wastes involved in milling is subjected to review in the initial license application. However, it is impossible to determine, based on the application, Environmental Report, and NEPA documents, whether any specific plans exist for the

disposition of the 11(e)2 Byproduct that will be produced by Powertech and what impacts such disposition would entail.

For this reason alone, the Powertech application must be summarily denied, without conduct of further proceedings. Such result is contemplated by the regulations:

Each application must clearly demonstrate how the requirements and objectives set forth in appendix A of this part have been addressed. Failure to clearly demonstrate how the requirements and objectives in appendix A have been addressed shall be grounds for refusing to accept an application.

40 C.F.R. § 40.31(h). Even where the regulations recognize flexible implementation, specific plans for handling the tailings is a mandatory requirement:

In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis. However, in such cases the objectives, technical alternatives and concerns which must be taken into account in developing a tailings program are identified. As provided by the provisions of § 40.31(h) applications for licenses must clearly demonstrate how the criteria have been addressed.

40 C.F.R. Part 40 Appendix A.

The failure to address disposal requirements for 11e2 byproduct is not a technical deficiency that can be cured by expending NRC staff resources to cure minor defects. Where the applicant has a duty to provide specific information on this major feature of an ISL license application, and such information is omitted, the NRC staff must not expend federal resources and must instead reject the license without further inquiry or assistance to an applicant who fails to meaningfully address this critical licensing requirement. In sum, the application (including the Environmental Report) does not provide the necessary information to fulfill the applicant's burden to demonstrate that its proposal satisfies the criteria set out in Part 40 Appendix A.

Moreover, the policies set forth by NEPA prevent the NRC staff from segmenting the disposal issues from the inquiry into whether applicant will be allowed to create 11e2 Byproduct

material in the first instance. *In re Pac. Gas & Elec. Co.*, 67 N.R.C. 1, 13 (N.R.C. Jan. 15, 2008). (“There is no genuine dispute that NEPA and AEA legal requirements are not the same [. . .] and NEPA requirements must be satisfied.”). Failure to identify the permanent disposal facility avoids examination of all direct, indirect, and cumulative impacts of the proposal, as required by NEPA. *Custer County Action Ass’n v. Garvey*, 256 F.3d 1024, 1035 (10th Cir. 2001)(Where a “federal action” exists, the NEPA process must “analyze not only the direct impacts of a proposed action, but also the indirect and cumulative impacts of ‘past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.’”).

Where “federal action” triggers NEPA -- here, the applicant’s proposal to conduct ISL mining activities -- an agency cannot define “the project’s purpose in terms so unreasonably narrow as to make [NEPA] ‘a foreordained formality.’” *City of Bridgeton v. FAA*, 212 F.3d 448, 458 (8th Cir. 2000)(citations omitted). Here, NEPA mandates that the NRC consider the ISL mining activities which create tailings at the same time it considers the specific method, transportation requirements, and site for tailings disposal. This mandate of federal law attaches at such time as the need for disposal is reasonably foreseeable, which occurs before submission of an application to the NRC for a license to create $11e2$ Byproduct by processing uranium, not after the NRC rules on the admissibility of contentions submitted without benefit of NEPA documentation.

The CEQ regulations that apply to each agency’s implementation of NEPA state that the requisite site-specific environmental impact statement should be available at all stages of the decision-making process, not merely at the end of that process as a “rubber stamp” to approve the environmental impacts of the process. Because the application in this case involves

extensive, site-specific consideration -- including but not limited to, access, geology, hydrogeology, quantitative impacts upon water supplies for domestic use, livestock, agriculture, non-domesticated plants and animals, and qualitative on-going and subsequent impacts to water supplies of all the same due to releases of chemicals into the surface, groundwater and aquifers flowing through the licensed site -- failure of the site-specific environmental impact statement to inform every step of the license application decision-making process means that the final decision cannot comply with NEPA. At a minimum, without a completed, site-specific environmental impact statement as a guide, NRC staff, the public, and the Tribe have no basis to identify and access alternatives to the license application and find ways to avoid or mitigate possible adverse environmental impacts of the licensed activity.

These NEPA requirements are consistent with the requirement in Subpart 40, Appendix A's *Criteria One*, which requires that the applicant and the NRC examine "alternative tailings disposal sites" when considering a milling application. *See Natural Resources Defense Council v. Hodel*, 865 F.2d 288, 299 (D.C.Cir. 1988)(citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976)(formulation of alternatives during the NEPA disclosure and study process is at the heart of the NEPA-mandated procedures).

The history, legal requirements, and policies embodied in federal laws applicable to the present proceedings require NRC staff to refuse further analysis of an application which lacks any analysis of the specifications for a reasonable range of alternatives for final disposition of the 11e2 byproduct material. The deficiencies in the application require denial or rejection of the application without further inquiry or expenditure of scarce government resources.

Contention 8: Requiring the Tribe to Formulate Contentions before an EIS is Released Violates NEPA

The procedure used by NRC to consider the Powertech application fails to satisfy the public participation and informed decision-making mandates of NEPA. The procedural requirements of NEPA are designed to benefit those who participate in agency decision-making processes and to require that the agency take a “hard look” at the impacts, alternatives, mitigation measures, and other aspects of a federal action at the earliest stages of the decision process, in recognition that when a “decision is made without the information that NEPA seeks to put before the decisionmaker, the harm that NEPA seeks to prevent occurs.” *See: Sierra Club v. Marsh*, 872 F.2d 497, 500 (1st Cir. 1989) *quoting Commonwealth of Massachusetts v. Watt*, 716 F.2d 946 at 953 (1st Cir. 1983)

By contrast, the procedure used in the present proceedings denies the Tribe and the NRC the information that a NEPA analysis provides. Importantly, this interdisciplinary analysis and information is provided during the NEPA process by the applicant, staff, and members of the public. All of these sources of information are recognized by NEPA, but the Tribe is prejudiced here when significant sources of information are not available until the NRC has taken final action to accept or deny its contentions. It is of no consequence that the NRC provides an opportunity to seek permission to pursue new or rejected contentions later in the proceedings, based on information revealed in the NEPA analysis. *See: Id.* (“Once large bureaucracies are committed to a course of action, it is difficult to change that course - even if new, or more thorough, NEPA statements are prepared and the agency is told to ‘redecide.’”).

Basis and Discussion

NRC Staff has violated NEPA by requiring that the Tribe formulate and submit detailed contentions before the NEPA process is complete, denying the Tribe the benefit of NEPA analysis. This statutory violation is not remedied by providing a *post hoc* NEPA analysis, as is

contemplated by the NRC regulations. Failure to conform to the timing policies and requirements of NEPA wastes resources of both the NRC Staff and the Tribe. The procedural harms are demonstrated by previously aborted attempts to gain approval of plans to mine in the Dewey-Burdock area: “A Draft Environmental Statement (DES) was prepared by TVA to address the impact of a proposed underground mine in the Dewey-Burdock area, but TVA never completed the NEPA process.” Powertech Environmental Report at 1-4.

Conducting NEPA analysis early in the process is necessary to meet the requirement that NEPA analysis must precede the decision-making process, lest the agency unleash a “bureaucratic steam roller” aimed at approval, but without the public participation and informed decisionmaking requirements of NEPA.” *See Davis v. Mineta*, 302 F.3d 1104, 1115 (10th Cir. 2002). In short, the procedures the NRC used for the present application fail to satisfy NEPA’s purpose, which is to influence the decision making process “by focusing the [federal] agency’s attention on the environmental consequences of a proposed project,” so as to “ensure[] that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

Contention 9: Failure to Consider Connected Actions

The Powertech proposal to conduct ISL operations and conduct associated waste disposal activities is being considered by multiple federal agencies. However, NRC, the lead agency for purposes of NEPA - has failed engage these other agencies and therefore has failed to comply with the “action-forcing” mandate and purpose of NEPA.

Basis and Discussion:

The mandate and purpose of NEPA is to influence the decision making process “by focusing the [federal] agency’s attention on the environmental consequences of a proposed project,” so as to “ensure[] that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). The NEPA analysis must be prepared by the NRC in a manner which timely addresses, identifies, and analyzes any actions that are “connected” to the project under review. *See* 40 C.F.R. § 1508.25; *Utahns for Better Transp. v. United States Dep’t of Transp.*, 305 F.3d 1152, 1182 (10th Cir. 2002), *modified in part on other grounds*, 319 F.3d 1207 (2003).

For example, Powertech has recently filed an application with the Environmental Protection Agency (“EPA”) for a Class V deep injection well. However, there appears to have been no attempt by the NRC (or EPA) to conduct any NEPA analysis of the proposal for deep injection of hazardous materials in conjunction with the pending AEA license application. The Class V deep injection well is a “connected action” and even though EPA is the permitting agency, the deep injection proposal must be analyzed in the same NEPA analysis as the full Powertech proposal. Even if the disposal plans could somehow avoid analysis as “connected action” the deep well disposal activities must still be fully analyzed in the “cumulative impacts” analysis. See Exhibit 6, at 2-3 (providing evidence applicable here as to the requirements of NEPA with respect to analysis of waste disposal alternatives and impacts).

Here, the Tribe would be harmed should NRC continue to ignore the EPA permitting process on the basis that the “EIS has neglected to mention a serious environmental consequence, failed adequately to discuss some reasonable alternative, or otherwise swept

stubborn problems or serious criticism . . . under the rug.” *Lee v. United States Air Force*, 354 F.3d 1229, 1242 (10th Cir. 2004) *citing* *Sierra Club v. Peterson*, 228 F.3d 559 (5th Cir. 2000).

Contention 10: The Environmental Report does not Examine Impacts of a Direct Tornado Strike

The Environmental Report provides an encyclopedic recital of considerable irrelevant information, but fails to provide information on reasonably foreseeable impacts of the proposal. As one example, although tornado strikes are common occurrences in the region, there is no recognition of this reasonably foreseeable impact, even though it is coupled with catastrophic consequences. See Exhibit 11 (NOAA announcement regarding tornado preparedness in region surrounding Rapid City, South Dakota). This is but one example of the applicant’s failure to provide a complete Environmental Report and the NRC failure to comply with the NEPA requirements at the earliest stages of the proceedings.

Basis and Discussion

The CEQ has published NEPA regulations at 40 C.F.R. § 1502.22(b)(3), which are applicable to all federal agencies and which require the NRC “to consider low-probability environmental impacts with catastrophic consequences, if those impacts are reasonably foreseeable.” Here, neither the applicant’s environmental report nor any NEPA document produced by the NRC has examined the impacts which would occur if the proposed ISL facility received a direct or indirect hit from a tornado. Tornadoes are not uncommon occurrences in the region and planning for tornado impacts is a common practice among all levels of government.

http://dps.sd.gov/emergency_services/emergency_management/natural_hazard_info.aspx

The impact of a tornado strike is not only reasonably foreseeable, a tornado has impacted radioactive materials at the Fansteel Plant in Muskogee, Oklahoma (NRC License No. SMB-911) where on June 1, 1999, an F1 tornado was accompanied by a storm that also produced very

large hail. The tornado struck the Fansteel plant, and damaged numerous buildings. According to documents in NRC files, the liners of Pond Numbers 3, 8, and 9 were torn above the water line and a stored soils cover was ripped. Damage to the Sodium Reduction Building allowed bagged material to fall out of the building and tear open with approximately 500 pounds of material released to the ground surface within a 10-foot-diameter area before being recovered and bagged.

See: Docket No: 40-7580, Safety Evaluation Report For License Amendment Application To Approve Decommissioning Dated July 24, 2003.

Where it is reasonably foreseeable that a tornado could strike the proposed ISL facility and damage the control facilities, with the associated winds dispersing toxic and radioactive materials across the landscape, the NRC and the applicant have ignored an important, and foreseeable, environmental impact with potentially catastrophic consequences.

IV. CONCLUSION

For the foregoing reasons, the Tribe has demonstrated that it has standing and that its contentions are admissible. Therefore, the Tribe is entitled to a hearing on its contentions.

Respectfully Submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Petition to Intervene and Request for Hearing in the captioned proceeding were served via the Electronic Information Exchange ("EIE") on the 6th day of April 2010, which to the best of my knowledge resulted in transmittal of same to those on the EIE Service List for the captioned proceeding.

/s/ signed electronically by_____

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EXHIBIT 8



Injection Wells
The Hidden Risks of Pumping Waste Underground

On a Wyoming Ranch, Feds Sacrifice Tomorrow's Water to Mine Uranium Today



Thousands of small black boxes used for uranium mining are scattered across Christensen Ranch in Wyoming. (Abraham Lustgarten/ProPublica)

by Abraham Lustgarten
ProPublica, Dec. 26, 2012, 9:54 a.m.

GILLETTE, Wyo. — On a lonely stretch at the edge of the Great Plains, rolling grassland presses up against a crowning escarpment called the Pumpkin Buttes. The land appears bountiful, but it is stingy, straining to produce enough sustenance for the herds of cattle and sheep on its arid prairies.

"It's a tough way to make a living," said John Christensen, whose family has worked this private expanse, called Christensen Ranch, for more than a century.

Christensen has made ends meet by allowing prospectors to tap into minerals and oil and gas beneath his bucolic hills. But from the start, it has been a Faustian bargain.

As dry as this land may be, underground, vast reservoirs hold billions of gallons of water suitable for drinking, according to the U.S. Environmental Protection Agency. Yet every day injection wells pump more than 200,000 gallons of toxic and radioactive waste from uranium mining into Christensen's aquifers.

What is happening in this remote corner of Wyoming affects few people other than Christensen — at least for now.

But a roiling conflict between state and federal regulators over whether to allow more mining at Christensen Ranch — and the damage that comes with it — has pitted the feverish drive for domestic energy against the need to protect water resources for the future. The outcome could have far-reaching implications, setting a precedent for similar battles sparked by the resurgence of uranium mining in Texas, South Dakota, New Mexico and elsewhere.

Twenty-five years ago, the EPA and Wyoming officials agreed that polluting the water beneath Christensen Ranch was an acceptable price for producing energy there.

The Safe Drinking Water Act forbids injecting industrial waste into or above drinking water aquifers, but the EPA issued what are called aquifer exemptions that gave mine operators at the ranch permission to ignore the law. Over the last three decades [1], the agency has issued more than 1,500 such exemptions nationwide, allowing energy and mining companies to pollute portions of at least 100 drinking water aquifers.

When the EPA granted the exemptions for Christensen Ranch, its scientists believed that the reservoirs underlying the property were too deep to hold desirable water, and that even if they did, no one was likely to use it. They also believed the mine operators could contain and remediate pollution in the shallower rock layers where mining takes place.

Over time, shifting science and a changing climate have upended these assumptions, however. An epochal drought across the West has made water more precious and improved technology has made it economically viable to retrieve water from extraordinary depths, filter it and transport it.

"What does deep mean?" asked Mike Wireman, a hydrologist with the EPA who also works with the World Bank on global water supply issues. "There is a view out there that says if it's more than a few thousand feet deep we don't really care ... just go ahead and dump all that waste. There is an opposite view that says no, that is not sustainable water management policy."

Federal regulators also have become less certain that it is possible to clean up contamination from uranium mining. At Christensen Ranch and elsewhere, efforts to cleanse radioactive pollutants from drinking water aquifers near the surface have failed and uranium and its byproducts have sometimes migrated beyond containment zones, records show.

In 2007, when the Christensen Ranch mine operator proposed expanding its operations, bringing more injection wells online and more than tripling the amount of waste it was injecting into underground reservoirs, Wyoming officials eagerly gave their permission, but the EPA found itself at a crossroads.

If the agency did what Wyoming wanted, it could destroy water that someday could be necessary and undermine its ability to protect aquifers in other places. If it rejected the plan, the agency risked political and legal backlash from state officials and the energy industry.

The EPA declined interview requests from ProPublica for this story and did not respond to a lengthy set of questions submitted in writing. After learning that ProPublica contacted several EPA employees directly involved in the debate over Christensen Ranch, the agency instructed staffers not to discuss the matter without agency approval.

For the last five years, as regulators have vacillated over what to do, John Christensen has experienced a similar ambivalence.

His property is speckled with thousands of small, mysterious black boxes. From each dark cube, a mixture of chemicals is pumped into the ground to dissolve the ore and separate out the uranium so that it can be sucked back out and refined for nuclear fuel.

Horses graze behind a gate on a dirt road that winds across this 35,000-acre tract, 50 miles south of Gillette. Nearby, a small metal sign is strung to a cattle guard with chicken wire: "Caution. Radioactive Material."

Christensen still places a tenuous trust in the system that promises to keep his water safe and leave his ranch clean. He relies on the royalty income and believes the national pursuit of energy is important enough to warrant a few compromises.

Yet if he had it to do over again, he's not sure he would lease out the rights to put a uranium mine on Christensen Ranch.

"It's probably worthwhile for this generation," he said. "You just don't know about future generations."

* * *

John Christensen's grandfather, Fred, first allowed uranium exploration on the family's ranch in the 1950s.

Fred Christensen had come to Wyoming from Michigan as a homesteader in 1906, finding work as a ranch hand and settling on a small tract at the base of the northernmost Pumpkin Butte. The Christensens farmed sheep, selling their meat and their wool, and used the proceeds to buy up more land. Through marriage and business, the family amassed some 70,000 acres, coming to rank among the largest private landowners in the United States.

Yet droughts plagued the region, making agriculture difficult. Tapping into Wyoming's resource wealth, the Christensens staked claims on the property, selling mining and drilling rights to companies that helped transform the Powder River Basin into the energy basket of America.

Uranium was discovered underneath Christensen Ranch in 1973. In 1978, after the property had been divided between cousins, Westinghouse Electric launched the first large-scale uranium mine on John Christensen's portion.

Modern mining for the radioactive ore inevitably pollutes water.

To avoid digging big holes in the ground, operators inject a mixture of sodium bicarbonate, hydrogen peroxide and oxygen into the rock to separate out the minerals and bond to the uranium. Then, they vacuum out the uranium-laden fluids to make a fine powder called yellowcake. The process leaves a toxic mix of heavy metals and radioactive ions floating in the groundwater and generates millions of gallons of waste that need to be dumped deeper underground.

The federal Safe Drinking Water Act, implemented in the early 1980s as mining began in earnest on Christensen Ranch, posed a potential hurdle to such ventures because it prohibited disposal of waste in aquifers. But the law allowed regulators to exempt aquifers if they determined that water was too dirty to use, or buried too deep to be worth pumping to the surface, or unlikely to be needed.

In 1982, when Wyoming officials anticipated the need for an aquifer exemption at Christensen Ranch, the state's then-governor, Ed Herschler, wrote to urge EPA officials to streamline their review of such requests and not to delay energy projects or interfere with Wyoming regulators. Steven Durham, the EPA's regional administrator at the time, wrote back to assure the governor the EPA would not second guess state officials, and that he had adjusted the rules so that they "should assure a speedy finalization of any exemptions."

Wyoming environment officials issued the first permit exempting several deep groundwater aquifers on the ranch from environmental protection in 1988. It said the water was of relatively poor quality, and was too deep and too remote to be used for drinking. The permit did not address the possibility that usable aquifers could lie in even deeper rock layers beneath the site.

The EPA confirmed the state's exemptions and issued separate ones allowing the mine operator to contaminate the shallow layer of groundwater closest to the surface, where anyone who needed water — including John Christensen — was likely to go for it first.

Even as they gave their stamp of approval, EPA officials noted that the mine operator's application had not set precise boundaries for the depth or breadth of the exempted area. "The information contained in the submittal does not specifically delineate the area to be designated," the EPA's Denver chief administrator acknowledged in a letter to Wyoming regulators [2] in August 1988.

Still, Christensen, who continued to run stock on his land, saw the pollution as an inconvenience, not a threat. He was assured that the mine operator could steer contaminants toward the center of the exemption zone by manipulating pressure underground. Monitoring wells surrounded the perimeter of the mining site like sentries, checking if pollutants were seeping past the border.

Drilling new water wells beyond the mine's boundary was expensive, but Christensen took comfort from rules obliging the mine operator to restore contaminated water within the exempted area to its original condition once mining was complete.

"That was our best quality water," Christensen said. "I've been given to believe that it is not sacrificed, that they will restore the groundwater quality."

The mining proceeded in fits and starts, stalling in 1982 with a collapse of the uranium market, picking up five years later, stopping again in 1990, and then restarting in 1993. Ownership of the facilities changed hands at least five times.

By 2000, mining activity seemed to be over for good, and restoration efforts geared up under the supervision of the Nuclear Regulatory Commission.

The restoration wouldn't go entirely as planned.

* * *

In July 2004, contaminants were detected in one of the monitoring wells surrounding the mining facility at Christensen Ranch.

This wasn't that unusual, mining and regulatory officials say. Other excursions, as they are called, had occurred over the years. The monitoring wells are an early warning system, detecting benign chemicals long before more dangerous toxins can spread.

"It's sort of like a smoke detector," said Ron Linton, who oversees the licensing for Christensen Ranch for the Nuclear Regulatory Commission. "They will go back in and adjust their flow with their production practices within their ore zone to get those levels down."

But according to documents [3] from the Wyoming Department of Environmental Quality, Cogema — the company then handling the restoration effort — could not fix the problem or identify its cause. The company tested water from the area and examined their injection wells for defects, but told state officials they believed the contaminants had occurred naturally and were not from the mine.

For six years, the contaminants continued to spread, disappearing for short periods as the restoration progressed only to reappear again, records show.

"This really shouldn't happen," said Glenn Mooney, a senior state geologist who oversaw the Christensen Ranch site for Wyoming from the late 1970s until last July.

Mooney observed that the concentration of contaminants at the boundary had leveled, but "showed no hint that they may drop," and warned that some of the chemicals found posed a considerable risk.

"The increase in uranium levels, a level over 70 times above the maximum contaminate limit for uranium, in a well that is located at the edge of the aquifer exemption boundary, is a major concern to WDEQ," he wrote in a 2010 letter [3].

Christensen said he was never told about the excursions beneath his property and that, as far as he knew, several of the minefields had been fully restored. He said he expected to use the shallow aquifer polluted by the mining as a source of drinking water in the future.

Restoration is the most important backstop against the risk that contaminants will spread from the mining site after the mining is finished. Polluted water is pumped from the ground, filtered using reverse osmosis, and then re-injected underground. The worst, most concentrated waste is disposed of in deeper waste wells.

Yet the Nuclear Regulatory Commission approved Cogema's restoration of minefields associated with Christensen Ranch even as the excursion remained unresolved.

The commission deemed nine mining fields [4] there successfully "restored" even though records show that half of the contaminants in the aquifer, including the radioactive byproduct Radium 226, remained above their natural levels.

Studies by the NRC [4], the U.S. Geological Survey [5] and private consultants [6] have found that similar cleanups elsewhere have rarely been fully successful.

The Geological Survey's study of uranium restoration in Texas found that no sites had been completely restored to pre-mining levels, and the majority had elevated uranium when the restoration was finished. The 2008 NRC review concluded that each of 11 sites at three mines certified by the agency as "restored" had at least one important pollutant above baseline levels recorded before mining began. The report concluded that restoring water to baseline levels was "not attainable" for many of the most important contaminants, including uranium.

Some regulators and mining industry executives call attempts to fully restore aquifers at uranium sites idealistic. Such water was often contaminated with uranium before mining began, they contend.

"When you restore it ... you bring each individual ion down to a level that is within the levels that occurred naturally," said Richard Clement, the chief executive of Powertech Uranium, which is currently applying for permits for a new mine in South Dakota. "It depends what you mean by 100 percent successful. Are people saying it is different than what it was? Yes it is. But is it worse? No."

Efforts to restore the groundwater at Christensen Ranch had other consequences. While the water was supposed to be filtered and re-injected, millions of gallons were removed and disposed of permanently as a result of the process, lowering the ranch's water table.

Water wells outside of the mine area that had routinely produced 10 gallons a minute struggled to produce a single quart, Christensen said. The water levels in the aquifer also dropped — in some places by 100 feet.

"They have always claimed that they could restore the groundwater," Christensen said. "The main concern is there isn't much water left when they get it to that quality. It never came back."

* * *

In 2007, as uranium commodities skyrocketed and a new mining boom began, Cogema applied to the Wyoming Department of Environmental Quality and the Nuclear Regulatory Commission for permits to restart and expand its operations at Christensen Ranch.

To do it, the company would need to use two additional deep injection wells, making four total, to dispose of waste produced from ongoing restoration efforts and absorb the byproducts of drying and refining yellowcake. The plan called for more than tripling the amount of waste the company could pump into the Lance aquifer, more than 3,000 feet under Christensen Ranch.

Wyoming had permitted the additional wells years earlier, which it can do under authority delegated to states by the EPA to enact the Safe Drinking Water Act. But Cogema's request required something more — a change to past exemptions — that only the EPA had the power to grant.

Earlier exemptions issued for Christensen Ranch had only indirectly addressed the deep aquifers underlying the Lance.

In November 2010, Wyoming officials asked the EPA to exempt every layer of water below the Lance, regardless of its quality or whether it was being used by the mine, and without additional study. The water quality at those depths was "not reliably known," they wrote. The EPA should apply the exemptions to all of the deep aquifers, they said, "whether or not they meet the definitions of 'underground sources of drinking water.'"

For the EPA, Wyoming's request opened up a morass of legal and environmental concerns.

In the eight years since the agency had approved the last exemption at the ranch, its scientists had grown increasingly convinced that the deep layers of aquifers beneath the property might contain one of the state's largest reserves of good water. One layer, the Madison, is described in a state assessment as "probably the most important high-yield aquifer in Wyoming" and supplies drinking water to the city of Gillette.

Some within the EPA worried that approving Wyoming's request would create a damaging precedent, several EPA employees told ProPublica. It would write off billions of gallons of water in perpetuity, stripping them of legal protections against pollution, even though they were not necessary to the mining process.

Also, arguments that nobody would ever pay to pull water from aquifers below Christensen Ranch seemed more tenuous as scarcity made every drop of clean water more valuable and changing technology made deeper resources economically viable.

"Where do we get that water?" asked Mark Williams, a hydrologist at the University of Colorado at Boulder who has received a National Science Foundation grant to look at energy and water issues. "Right now we want to get it from the near surface because it's cheaper. The question is, is that going to change in the future?"

If the EPA rejected Wyoming's request, it opened itself to other problems, however.

The EPA had granted exemptions allowing the two injection wells already operating at Christensen Ranch based on the notion that the aquifers below them did not qualify as sources of drinking water. If the agency reversed itself on this, it could make the existing mine operations illegal.

"I don't think that you could argue very strongly that it was the intent of the law to routinely use these exemptions to get around complying with the law," Wireman said.

"The law is very clear," he added, referring to the prohibition against allowing injection wells for toxic waste above aquifers. "That was done for a reason."

The process slowed to a crawl as federal officials from Denver to Washington considered the matter.

In December 2010, the EPA sent a letter [7] to Wyoming's chief groundwater supervisor saying the agency saw no justification for granting new exemptions at Christensen Ranch and asked the state to make a stronger scientific argument.

The EPA also informed Wyoming regulators it planned to publish the exemption requests in the Federal Register, a move that would open them up for public comment and push back their potential approval date.

Infuriated, Wyoming officials approved the renewal permit on their own authority on Aug. 7, 2012, and decided the new injection wells did not need EPA permission because they were covered by past exemptions that could not be reversed.

"We were pretty disappointed with the amount of time it was taking to get a determination, and of course the operator was as well," Kevin Frederick, groundwater manager for the Wyoming Department of Environmental Quality, told ProPublica. "The delay... really kind of caused us to rethink what we were asking EPA to consider. We recognized that we were essentially issuing a permit that had already been approved."

Wyoming's top elected official punctuated the state's position on the case by complaining to EPA administrator Lisa Jackson about the agency's interference.

"Wyoming is the number one producer of uranium in the United States. The industry provides the nation with a reliable, secure source of domestic uranium," Gov. Matthew Mead wrote in a stern Aug. 29 letter. The EPA's review was having a "direct impact on operations, planning, investment and jobs. This has resulted in a standstill which has been the situation for far too long."

* * *

The problems and pressures the EPA is facing at Christensen Ranch are not unique.

With uranium mining booming, the agency has received a mounting number of requests for aquifer exemptions in recent years. So far, EPA records show, the agency has issued at least 40 exemptions for uranium mines across the country and is considering several more. Two mines are expanding operations near Christensen Ranch.

In several cases, the EPA has struggled to balance imposing water protections with accommodating the industry's needs.

In South Dakota, where Powertech Uranium is seeking permits for a new mine in the Black Hills, state regulations bar the deep injection wells typically used to dispose of mining waste. The EPA is weighing whether to allow Powertech to use what's called a Class 5 well — a virtually unregulated and unmonitored shallow dumping system normally used for non-toxic waste — instead.

Powertech officials say they will voluntarily meet the EPA's toughest construction standards for injection wells and will treat waste before burying it to alleviate concerns about groundwater.

"It's not going around the process," said Clement, the company's CEO. "It's using the laws the way they were designed to be used."

Environmental groups say the EPA should not be letting mining companies write their own rules.

"It's disturbing that such a requirement would be so easy to get around," said Jeff Parsons, a senior attorney for the Western Mining Action Project, which is representing the Oglala Sioux in a challenge to stop the Powertech mine. "There is a reason that South Dakota prohibited Class 1 wells; it's to protect the aquifers."

Similar disputes are erupting across the country.

In Goliad County, Texas, a proposal for a new uranium mine has triggered a bitter fight between [8] state officials and the EPA.

In 2010, Texas regulators gave a mining company preliminary permission to pollute a shallow aquifer even though 50 homes draw water from wells near the contamination zone.

EPA scientists were concerned by the mining area's proximity to homes and believed the natural flow of water would send contaminants toward the water wells. At first, the agency notified Texas officials it would deny an exemption for the mine unless the state did further monitoring and analysis.

Texas regulators refused [8]. "It appears the EPA may be swayed by the unsubstantiated allegations and fears of uranium mining opponents," Zak Covar, executive director of the Texas Commission on Environmental Quality, wrote in a May 2012 letter to William Honker, acting director of the EPA's local Water Protection Division.

As the case dragged on without a final determination, some within the agency worried that the EPA would go back on its initial decision and capitulate to appease Texas authorities, with whom it has clashed repeatedly.

"This aquifer exemption issue in Goliad County might become a sacrificial lamb that the federal government puts on the altar to try to repair some relations with the state," said a former government official with knowledge of the case.

On Dec. 5, the EPA approved the exemption in Goliad County.

Many disputes over aquifer exemptions focus on water people might need years in the future, but in Goliad County the risk is imminent. People already rely on drinking water drawn from areas close to those that would be polluted.

"This is a health issue as much as a water supply issue," said Art Dohmann, president of the Goliad County Groundwater Conservation District, a local agency that manages water resources.

As of now, it's unclear how the EPA will answer Wyoming's challenge to its authority at Christensen Ranch.

Meanwhile, uranium mining has resumed on the property.

Uranium One, a Canadian-based company with majority Russian ownership that bought the facility from Cogema in 2010, is moving forward with the added injection wells to expand the operation.

For Christensen, it's the same old story. "I'm going to be dead before it's turned back into grazing land," he said of the ranch. "I'm almost 63 years old... so you know, it's gone on my whole life."

1. <http://www.propublica.org/article/poisoning-the-well-how-the-feds-let-industry-pollute-the-nations-underground>
2. <http://www.propublica.org/documents/item/549659-478epaaquiferexemption-1988-letter-approving>
3. <http://www.propublica.org/documents/item/549660-2010-warning-letter-aqex-good-source-ml100840667>
4. <http://www.propublica.org/documents/item/549568-gw-impacts-detailed-report>
5. <http://www.propublica.org/documents/item/549562-usgs-aqex-remediation-of09-1143>
6. <http://www.propublica.org/documents/item/549563-texas-report-on-restoration-good-restoration>
7. <http://www.propublica.org/documents/item/549658-ac-partial-denial-letter-to-wdeq-final>
8. <http://www.propublica.org/documents/item/549557-pir-9994-dkohler>

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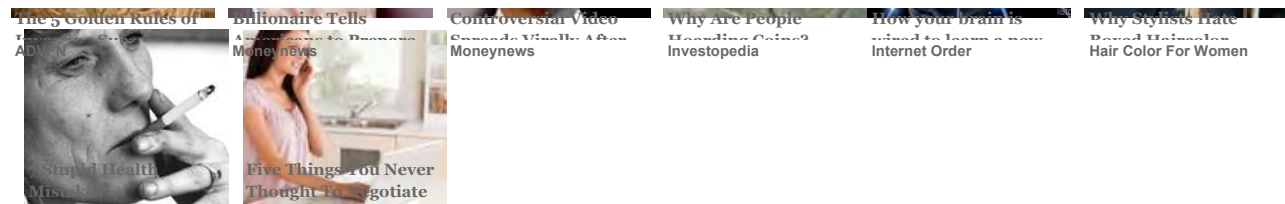
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EXHIBIT 9

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June 25, 2012

Powertech Completes NI 43-101 Report On The Aladdin Project

POWERTECH URANIUM CORP. ("Powertech" or the "Company") (Vancouver, B.C.) is pleased to announce the completion of a National Instrument 43-101 ("**NI 43-101**") compliant technical report (the "**Report**") for the Aladdin Project, located in Crook County, Wyoming. This 10,831 acre project is located along the Wyoming/South Dakota border on the northwestern flank of the Black Hills Uplift, within sandstones of the Lower Cretaceous-age Inyan Kara Group. The Report was authored by Jerry D. Bush, P.G., an independent professional geologist with uranium exploration experience in the Black Hills region. The purpose of the Report was to classify total project uranium resources through the strict application of CIM Definition Standards for Mineral Resources and Mineral Reserves, as well as to estimate the overall uranium resource potential for the project area.

The Report describes the results of the Company's confirmation drilling program and continued evaluation of historic exploration drilling data from Teton Exploration Company. The resource classification effort was based on detailed GT (Grade of mineralized intercept (%) x Thickness (ft)) contour mapping within six sandstone units of the Fall River Formation and seven individual mineralized units within the Chilson Member of the Lakota Formation. Using a 0.20 GT cut-off, Powertech has identified 1,038,023 pounds of Indicated Resources, contained in 466,232 tons averaging 0.111% U₃O₈. At the same cut-off, an additional 101,255 pounds of Inferred Resources were identified, contained in 42,611 tons averaging 0.119% U₃O₈.

The above-described classified resources are located in areas of close-spaced historic drilling. However, in over 80% of the project area, the density of exploration drilling is light. In these lightly explored areas, there is sufficient drill hole control for subsurface geochemical mapping and thirteen mineralized trends were identified. In the Report, a range of (i) mineralized trend lengths, (ii) widths of mineralization and (iii) grades of mineralization were used to obtain an estimate of additional potential pounds of uranium within the project. At a GT cut-off of 0.20, a range of this potential was determined to be 5.0 to 11.0 million pounds of uranium, averaging 0.11% - 0.12% U₃O₈. The grade and quantity of this potential is conceptual in nature. There has been insufficient exploration within the portions of the Aladdin Project that contain this potential to define a mineral resource. It is uncertain if further exploration in the areas of this potential will result in the delineation of mineral resources.

The Aladdin property is 90 miles northwest of the Company's Dewey-Burdock Project, which is in its final South Dakota state and federal ISR mine permitting phase. Uranium resources at the Aladdin Project have been developed within the same host rocks that contain the Dewey Burdock deposit.

Richard Clement, President and CEO of Powertech, stated, "We are extremely pleased with the results of the independent review of our Aladdin Project. Internally we have been aware of the high grade intercepts encountered by Teton from the data that we acquired. This is the first attempt to quantify the historical resources combined with our exploration drilling into a fully vetted report. The potential of upwards of 10 million pounds makes the Aladdin Project a favorable prospect for future ISR exploration and development. Powertech's focus has been in lower Cretaceous sediments surrounding the Black Hills of South Dakota and Wyoming. We believe that this project, in addition to our flagship Dewey Burdock Project and the Dewey Terrace Project in Weston/Niobrara Wyoming, outlines some of the most favorable areas for the development of a new uranium district."

The Report, entitled "Technical Report on the Aladdin Uranium Project, Crook County, Wyoming" and dated effective June 21, 2012, will be filed and available shortly on the SEDAR website at www.sedar.com, and on the Company's website at www.powertechuranium.com. Jerry Bush, the author of the Report, is a Qualified Person and independent of Powertech as defined in NI 43-101. Powertech holds a 100% interest in the private and state mining leases that comprise the Aladdin Project.

This news release has been reviewed and approved by Mr. Richard Clement, President and CEO of Powertech, under whose direction the Company's operations are being carried out. Mr. Clement, P.G., M.Sc. is a Qualified Person as defined by NI 43-101.

POWERTECH URANIUM CORP.

Per: "*Richard F. Clement*"

Richard F. Clement Jr.,

President& CEO

For further information, please contact:

Thomas A. Doyle, CFO, VP Finance

Phone : (604) 685-9181

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Email : info@powertechuranium.com

OST-11

www.powertechuranium.com

The TSX has not reviewed and does not accept responsibility for the adequacy or accuracy of the content of this News Release.

Disclaimer for Forward-Looking Information

Certain statements in this release, including statements with respect to potential resources and exploration plans at the Aladdin Project, are forward-looking statements, which reflect the expectations of management. Forward-looking statements consist of statements that are not purely historical, including any statements regarding beliefs, plans, expectations or intentions regarding the future. Such statements are subject to risks and uncertainties that may cause actual results, performance or developments to differ materially from those contained in the statements. No assurance can be given that any of the events anticipated by the forward-looking statements will occur or, if they do occur, what benefits the Company will obtain from them. These forward-looking statements reflect management's current views and are based on certain expectations, estimates and assumptions which may prove to be incorrect. A number of risks and uncertainties could cause the Company's actual results to differ materially from those expressed or implied by the forward-looking statements, including: (1) an extended downturn in general economic conditions in North America and internationally, (2) the inherent uncertainties and speculative nature associated with uranium exploration, including the actual results of current exploration activities, conclusions of economic evaluations, changes in project parameters as plans continue to be refined, possible variations in grade and ore densities or recovery rates, failure of plant, equipment or processes to operate as anticipated, accidents or other risks of the mining industry, (3) a decrease in the demand for and/or a decrease in the price of uranium, (4) an increase in the operating costs associated with the extraction and processing of the uranium, (5) any number of events or causes which may delay or cease exploration and development of the Company's property interests, such as environmental liabilities, weather, mechanical failures, safety concerns and labour problems, (6) the risk that the Company does not execute its business plan, (7) inability to retain key employees, (8) inability to finance operations and growth, (9) any negative change in the law, regulatory or political environment which would negatively affect the Company's ability to obtain all necessary environmental and regulatory approvals, license and permits, (9) an increase in the number of competitors with larger resources, and (10) other factors beyond the Company's control. These forward-looking statements are made as of the date of this news release and the Company assumes no obligation to update these forward-looking statements, or to update the reasons why actual results differed from those projected in the forward-looking statements. Additional information about these and other assumptions, risks and uncertainties are set out in the "Risks and Uncertainties" section in the Company's MD&A filed with Canadian security regulators at www.sedar.com.

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EXHIBIT 10



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

September 18, 2012

Dear THPO:

SUBJECT: REQUEST FOR A PROPOSAL WITH COST ESTIMATE; PROPOSED DEWEY BURDOCK IN-SITU RECOVERY PROJECT

The NRC staff wishes to thank the tribal representatives from the Crow Nation, Oglala Sioux Tribe, Northern Cheyenne Tribe, Rosebud Sioux Tribe, Sisseton-Wahpeton Oyate, Standing Rock Sioux Tribe, and Yankton Sioux Tribe who participated in a project meeting with Jean Trefethen (NRC) and Randy Withrow (NRC contractor) in Bismarck, North Dakota on September 5, 2012. This meeting was scheduled following a teleconference held on August 21, 2012, during which participating tribes requested an opportunity to revise the applicant's proposed Statement of Work (SOW) for completing a Tribal Survey for the Dewey-Burdock Project.

It was the U.S. Nuclear Regulatory Commission (NRC) staff's understanding that this meeting would include an opportunity for a working group composed of NRC and tribal representatives to develop a revised SOW for completion of a field survey in the fall of 2012. Instead, tribal representatives provided NRC with a revised SOW (Enclosure 1) on September 3, 2012, just in advance of the meeting. At the September 5th meeting, most of the discussion actually involved several other topics of concern to the tribes.

Tribes requested NRC's written comment on four principal matters of concern prior to finalizing a scope of work for a field survey limited to the area of direct effect. The tribes' first three concerns involve general matters of compliance with the National Historic Preservation Act (NHPA) or other laws. The NRC staff believes it has previously addressed these issues in meetings, teleconferences and written correspondence with tribal representatives. Nonetheless, the staff will respond to the tribal representatives' concerns below.

- Tribes are concerned that the scope of the tribal survey will be limited to the area of immediate direct effects (2,637 acres) and that tribes would have no assurance that future development outside this area would be subject to proper review prior to construction. Tribal representatives requested a Programmatic Agreement be developed for the Dewey Burdock project to address the need for phased identification of historic properties, including places of traditional religious and cultural significance to tribes.

Staff Response: The NRC staff agrees that a Programmatic Agreement will need to be developed to address the phased identification and evaluation of historic properties. The need for a phased approach to identification and the advantages of developing a Programmatic Agreement for the Dewey Burdock project has been discussed in previous meetings. For example, during the February 14–15, 2012, consultation meeting, the parties discussed the phased identification and evaluation of historic properties on the Dewey-Burdock site. See Meeting Transcripts at the Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML120590330 and ML120590341. Using a phased approach to comply with the NHPA is allowed by the regulations at 36 CFR § 800.14(b). The NRC staff will continue to consult with the tribes and other consulting parties as it develops a Programmatic Agreement.

- Tribes are concerned that potential indirect effects have not yet been fully addressed and requested that the NRC and Bureau of Land Management (BLM) continue consultation with tribes, the South Dakota State Historic Preservation Office (SD SHPO) and the Advisory Council on Historic Preservation (ACHP) to define the area of potential indirect effects and then determine what level of effort is needed to identify properties and assess effects in this area.

Staff Response: The NRC staff will continue to consult with BLM, SD SHPO, and the tribes on all issues arising under Section 106 of the NHPA, including potential indirect effects. The staff will also consult with ACHP as necessary. For approximately the past year, NRC staff has been involved in discussions with the tribes over how to identify historic properties that may be affected by the proposed Dewey-Burdock Project. The staff previously sent the tribes maps identifying the area of potential effect (APE) for the entire Dewey-Burdock Project. The staff also sent the tribes maps showing areas that may be affected during the first phase of the project. These maps identify the placement of buildings, potential wellfields, land application areas, and known archaeological sites (Enclosure 2). The tribes have therefore had the resources to provide input on what areas may be affected, either directly or indirectly, during the first phase of the Dewey-Burdock project. However, to date, tribal representatives have not provided input on specific areas that may be affected during the first phase of the project.

- Tribes expressed concern about the need for confidentiality of site information associated with completion of the tribal survey and the disposition of that information. Tribes requested that the NRC endorse the confidentiality provisions included in the SOW as revised on September 3, 2012.

Staff response: The NRC staff intends to keep survey information confidential to the fullest extent allowed by law. At the same time, the staff must have sufficient information to ensure that we can make an independent recommendation as to whether properties are eligible for inclusion on the National Register of Historic Places. The staff has discussed these issues with tribal representatives previously. See February 2012, Meeting Transcripts at ADAMS Accession Nos. ML110550535, ML120590330 and ML120590341. In the “Reporting” section of the information request (Enclosure 3), the staff proposes a method of reporting fieldwork intended to address the tribes’ confidentiality concerns, while at the same time meeting the staff’s information needs. We ask that you provide further input on confidentiality in your response to our information request.

In addition to these general NHPA-related concerns, the tribes requested the following action specific to NRC's request for a cost estimate to complete the survey:

- Tribes expressed concern that the daily coverage rates (acres per person/day) requested by NRC for cost estimating purposes might be incorrectly interpreted as a precedent for other survey efforts. Tribes requested that this be waived as a requirement for the purpose of estimating survey costs.

Staff response: Since February 2012, the staff has been trying to facilitate the development of an SOW under which the applicant would contract with the tribes for a survey of the proposed Dewey-Burdock site. The initial SOW from the applicant, which the staff sent to the tribes on May 7, 2012, included coverage rates. At the end of this letter, the staff renews our request for certain information from the tribes. If the tribes object to using coverage rates to estimate survey costs, NRC invites tribes to substitute an alternative means of estimating survey cost.

As we have stated previously, the staff's schedule for completing our NHPA review is tied to our schedule for completing our review under the National Environmental Policy Act (NEPA). Because our schedule calls for issuing our final NEPA document no later than May 2013, it is imperative that we proceed with identifying any NHPA-eligible properties before the end of the 2012 field season (*i.e.*, in the fall 2012).

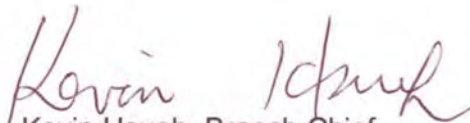
The staff respectfully requests that the participating tribes designate a preferred contractor to complete a cultural resources survey on their behalf and provide NRC with a written proposal with cost estimate based on the 2,637-acre area that may be disturbed during the first phase of the proposed Dewey Burdock project. For your convenience, the staff is enclosing a detailed request for information with this letter (Enclosure 3). This request repeats and consolidates the staff's prior requests for information from the tribes. See, *e.g.*, ADAMS Accession Nos. ML12143A185, ML12261A375, ML12261A429, and ML12261A476. The staff is also forwarding maps showing the location of the entire proposed project area and the proposed initial disturbed area (2,637-acre) to be surveyed. These maps were sent to you previously. See ADAMS Accession No. ML 12261A326.

The NRC staff requests that you submit the proposal with cost estimate stated above to Ms. Kellee Jamerson, NRC Project Manager, or Mr. Randy Withrow, NRC contractor, no later than close of business on October 1, 2012. The proposal can be submitted by email to

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Kellee.Jamerson@nrc.gov or rwithrow@louisberger.com. Following the receipt of this information or after October 1, 2012, NRC and BLM will determine the path forward for identifying any NHPA-eligible properties before the end of the 2012 field season (*i.e.*, in the fall 2012).

Sincerely,



Kevin Hsueh, Branch Chief
Environmental Review Branch
Environmental Protection and Performance
Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosures:

1. Tribes Revised SOW from
September 3, 2012
2. Powertech's Map Depicting Project
Boundary and Proposed Known
Disturbance (ML12261A326)
3. Detailed Request for Information
(Request for Proposal w/Cost Estimate)

**Request for Proposal with Cost Estimate
Tribal Survey for the Proposed Dewey Burdock Project
September 18, 2012**

The U.S. Nuclear Regulatory Commission (NRC) staff requests a written proposal with cost estimate for a survey to identify places of traditional religious and cultural significance to tribes that may be affected by the first phase of the proposed Dewey Burdock Project. This request consolidates prior requests for information that the staff has made in emails, letters, teleconferences, and meetings with tribal representatives. See, e.g., ADAMS Accession Nos. ML12143A185, ML12261A375, ML12261A429, and ML12261A476.

The tribes' proposal with cost estimate should include a brief description of the work that will be completed for both field investigations and reporting. Please include the following specific information in your written proposal.

Fieldwork:

- Describe the size and composition of the survey crew (number of individuals and their titles).
- Provide a proposed start date and estimated duration of fieldwork (number of field days).
- Cost assumptions (including, for example, the estimated number of cultural features that will be recorded).

Reporting:

- Provide a schedule for completion of the following work products or deliverables.
 1. A non-confidential summary of fieldwork including a map showing where survey work was completed (this should not include specific site locations).
 2. A confidential final eligibility report that provides the location of all identified sites, a description of where each site is located in relationship to areas that will be directly impacted by planned operations, and recommendations regarding the eligibility of each site for listing in the National Register of Historic Places. The assessment of eligibility should include references to the appropriate eligibility criteria (36 CFR 60.4) and an assessment of how the site's integrity will be affected directly or indirectly by the proposed undertaking.
 3. A confidential report for use by the applicant showing the location of any eligible sites identified within the proposed Dewey Burdock license area. This report will be prepared once final determinations of eligibility have been completed and will only be shared with the applicant after tribes receive a confidentiality agreement signed by the applicant that limits use to appropriate personnel.

Enclosure 3

- 2 -

Cost Estimate:

Please provide a line-item budget that lists costs for estimated labor and related expenses for both fieldwork and reporting. For labor estimates, please include labor categories or titles, estimated number of hours for each category, and the associated hourly rates. For related expenses such as per diem or equipment rental, please include both the number of days and associated rates used to estimate total costs.

Schedule:

NRC requests that all field investigations be completed by the end of the 2012 field season (i.e., in fall 2012), and that a confidential eligibility report be completed no later than 60 days following completion of the field survey.

Access and Safety:

The applicant, Powertech (USA), will provide access to the properties, and a representative of Powertech (USA) will coordinate with Tribal preferred contractor in terms of access to land. The Powertech (USA) representative will utilize a GPS survey unit to identify all map locations selected by the Tribal preferred contractor for ground examination and will guide the Tribal personnel to the locations they select in the field. The Powertech (USA) representative will also serve as liaison with the local landowners.

Insurance:

All Tribal representatives who will be present during field work will be required to provide proof of liability insurance in the amount of \$500,000 or more, or sign an indemnification statement that will hold harmless both the landowner and Powertech (USA) from any accidents that may occur in the field.

Contracting:

NRC will not contract directly with the preferred contractor selected by participating tribes. NRC will forward the proposal to the project applicant for their consideration and contracting.

TURTLE MOUNTAIN BAND OF CHIPPEWA INDIANS/THREE AFFILIATED TRIBES TCP STUDY FOR DEWEY-BURDOCK

The Turtle Mountain Band of Chippewa Indians and Three Affiliated Tribes of the MHA Nation, in cooperation with KLJ, will assemble a team of tribal cultural resource experts and practitioners to help with the identification of traditional cultural properties at the Dewey-Burdock Project. Along with KLJ, the Turtle Mountain Band of Chippewa and Three Affiliated Tribes have successfully completed numerous key traditional cultural property projects – including several large-scale studies along the Missouri River and across the region.

PROPOSED METHODOLOGY

The team will utilize a variety of methods to identify and evaluate potential traditional cultural properties within the proposed 2,637-acre area of potential effect (APE) of the Dewey-Burdock Project.

1. LITERATURE REVIEW OF PREVIOUSLY RECORDED SITES AND STUDIES

Researchers will review data on previously recorded archaeological sites and surveys conducted within the Dewey-Burdock Project APE. The purpose of this review will be to assess the potential of each recorded site to possess sensitive cultural features that would qualify the site as a TCP, or that would warrant additional fieldwork at a specific site location.

This review will allow project personnel to also provide additional input that could help in the eventual development of site mitigation plans, avoidance plans, or other information that can help to protect and/or mitigate adverse effects.

2. FIELD SURVEY

As outlined in the Revised Scope of Work, researchers will conduct a field survey to help in the identification of traditional cultural properties within the established 2,637-acre APE. Further, as established by the NRC through ongoing consultation with participating Indian Tribes, the team understands that the desired method for identifying places of religious and cultural significance is through an examination (survey) of the ground surface by knowledgeable representatives from the interested tribes. The team will undertake this through the following process:

Based on the results of the evaluation of the literature review, the team will revisit sites determined to have potential as TCPs to assess site features, site boundaries, and other “tells” that would be evaluated by tribal participants. The end-result of these revisits will be additional data and site interpretation that can help in the evaluation of these sites for the National Register of Historic Places, help in the eventual development of site mitigation plans, avoidance plans, or other information that can help to protect and/or mitigate adverse effects.

In addition to revisiting previously recorded sites, the team will conduct a detailed field study of other areas within the APE to identify any TCP sites and features that were not previously recorded by archaeologists as part of an established archaeological site.

This survey effort will be conducted using a combination of techniques, including such methods as:

- a. visually assessing the landscape to identify any landforms or geographic features that could indicate a focus of cultural activity;

- b. conducting a detailed pedestrian inventory of the project APE using transects less than 30 meters in spacing (as outlined in the scope of work);
- c. utilizing LIDAR to provide an overview of features that may be indistinguishable on the ground; and
- d. using other means to collect necessary data on possible TCPs.

3. REPORTING

As outlined in the scope of work, the team will provide a letter report within 14 working days after completion of fieldwork. This report will be a non-confidential written summary of the fieldwork completed and a synopsis of the number and types of properties identified. This report will be made available to the NRC, BLM, and Powertech (USA). This summary will include 7.5 minute USGS maps showing survey coverage (i.e. specific areas where ground examination took place), but will not show specific site locations of any identified properties of religious and cultural significance. It is understood that this information will be disclosed to the public through NRC's NEPA compliance process, and the information will be tailored to facilitate the preparation of the NEPA document.

It is also understood that within 40 working days after completion of fieldwork, the team will provide a detailed, professional report to the NRC. This report will contain sufficient information about identified properties of religious and cultural significance, to allow the NRC to adequately consult with the South Dakota State Historic Preservation Officer (SHPO) and interested Indian tribes about NRHP eligibility of these properties.

SCHEDULING

Upon notice to proceed, the team anticipates that it will take approximately 7 days to review literature (previously recorded sites and surveys), 21 working days to complete fieldwork, 14 days to complete the letter report, and an additional 28 days to complete the draft report for submission to NRC.

It is assumed that it will take an additional 7 working days for the draft report to be reviewed by the NRC.

Upon receipt of comments, the team will submit a revised final report to the NRC within an additional 7 days.

QUALITY ASSURANCE/QUALITY CONTROL

To ensure efficacy, project management tasks will be provided by KLJ.

KLJ is a company of engineers, surveyors, planners, and cultural resource specialists. KLJ has a history of successfully completing projects on the Northern Great Plains, Midwest, and Intermountain West. KLJ holds our employees to the highest ethical and professional standards to ensure that projects are consistently completed to the highest quality, are on time, and are under budget. KLJ is uniquely positioned to continue to supply expert services for any cultural resource project.

KLJ will handle logistics, billing, report preparation, and other tasks for the project. KLJ holds all necessary insurance and professional liability as required by the NRC and Powertech.



Kevin Hsueh, Chief
 Environmental Review Branch
 Division of Waste Management
 and Environmental Protection
 Office of Federal and State Materials
 and Environmental Management Programs

T RIBAL HISTORIC PRESERVATION OFFICE
S TANDING ROCK SIOUX TRIBE
 Administrative Service Center
 North Standing Rock Avenue
 Fort Yates, N.D. 58538
 Tel: (701) 854-2120
 Fax: (701) 854-2138

October 15, 2012

Dear Mr. Hsueh,

The Standing Rock Sioux Tribe THPO (SRST-THPO) is in receipt of the Nuclear Regulatory Commissions' (NRC) letter dated October 12, 2012 regarding the Dewey-Burdock in-situ recovery project and the request to seek alternatives to field identification. We find this new request to be disappointing by the lead federal agency especially in light of other recent letters and emails to the tribes. In particular, with the following bullying by ultimatum tactics:

The NRC staff encourages the Tribal Representatives to consider the offer provided by the applicant when revising the SOW (which should include the above requested information). If Tribal Representatives are unable to provide the requested information by the end of the September 5th and 6th, 2012 meeting to support completion of a field survey in the fall of 2012, the NRC and BLM staff will develop an alternative approach for identifying historic properties, and will move the Section 106 process forward.

(quote from email sent to tribes by
 Haimanot Yilma on Aug. 30/12).

That quote alone represents one of many fundamental misunderstandings of the Section 106 process by the NRC. The offer by the applicant in this quote included a sum of money which in no way would suffice for field identification for the 10,000 acres that this undertakings area of potential effect technically is. This paltry sum would not even be sufficient for the 2700-3700 acres of direct effects that the applicant and federal agency only want surveyed. The SRST-THPO continues to maintain its position, supported by the law by the way, that only addressing the direct effects of a proposed undertaking does not fulfill a federal agencies responsibilities for section 106 considering that the area of potential effects for an undertaking are defined as both direct and indirect effects per 36CFR800.16 (d). The applicants' proposal, which is favored by the NRC, would place unrealistic expectations on our field crews that could never be met. Yet, here we are almost two months later, after having the tribes preferred contractor submit their cost estimate and we are in the exact same spot as we were in August. The NRC, by this letter, is yet again attempting to find an alternative to on the ground field identification. The only difference between the August email and the current letter is that the NRC is making a feeble attempt to

include the tribes in their discussion to not conduct proper on the ground field identification. The SRST-THPO whole-heartedly disagrees with this attempt to circumvent the 106 process on behalf of the applicants' and federal agencies timeline and budget. The following comments outline this disagreement.

The participating tribes have made a concerted and cooperative effort to work with the Nuclear Regulatory Commission on a proposal to address our concerns about the identification of historic properties of significance to tribes for this project. Meaningful conversation pertaining to proper field identification only began in February of 2012 at the meeting in Rapid City, SD, not June of 2011. Identification under Section 106 has, and continues to be, the tribe's primary concern.

The SRST-THPO has participated in the Section 106 process up to this point steadfastly and in good faith despite the many missteps in the process by the lead federal agency and the intrusive participation by the applicant and their third party consultants. The latter, at many times during these discussions, are perceived to be running the entire process in place of the lead federal agency and this recent letter and previous letters and communications only reinforces this perception.

36CFR800.2 (c) (2) (ii) specifies that:

Section 101 (d) (6) (b) of the act requires the agency official to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property. Such Indian tribe or Native Hawaiian organization shall be a consulting party.

36CFR800.2 (c) (2) (ii) (A) further specifies that:

The agency official shall ensure that consultation in the section 106 process provides the Indian tribe or Native Hawaiian organization 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 undertakings effects on such properties, and participate in the resolution of adverse effects.

These two sections of the act specify the tribes' role as consulting parties within the process and the federal agency requirements for consultation with the tribes for every undertaking. The participating tribes have repeatedly stated that we require in field identification for historic properties of significance to tribes for this and all projects. That has been our requirement for this project ever since the informal field visits and information gathering session of June 2011. The participating tribes advised the NRC that identification efforts conducted by archaeologists were insufficient to address historic properties of significance to tribes. The tribes proved that these efforts were insufficient by visiting sites identified by the archaeologists and identifying numerous features that were missed that are significant to tribes. The tribes, applicant, NRC staff and the archaeologists were all present when these historic properties of significance were observed.

Were the tribes given a reasonable opportunity to advise, consult and identify concerns pursuant to 36CFR800.2 (c) (2) (ii) (A)? Yes in some ways the tribes were. Unfortunately, it all amounts to a check box that must be checked in the process when everything that is told to them during these consultations is being subsequently ignored. All of the information which was gathered pursuant to 36CFR800.4 (a) is

being subsequently ignored by this latest letter from the NRC to keep to federal and applicant timelines. The federal agency has stated that they intend to issue their record of decision for any EIS by May of 2013. The draft EIS is expected to be submitted for comments prior to December of 2012. This is the impetus in denying the tribes the opportunity to conduct a proper 100% survey of the entire area of potential effects. The applicant has repeatedly stated that funds would only be available for survey work up to the fall of 2012. Our historic properties of significance which will be destroyed by this project are in essence being held hostage by this process and by the applicant and federal agency. The 106 process should not be conducted to keep to an applicants and/or federal agencies timeline.

As stated in 36CFR800.1 (a):

The section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

The goal of the 106 process is not to keep to an applicants or federal agencies arbitrary external timeline. The section 106 process does not have a timeline for identification and consultation. In fact, the only reference to timing contained within the document pertaining to this issue is that the federal agency must complete the section 106 process prior to any approval for expenditure of Federal funds or prior to any issuance of any license (36CFR800.1 (c)). If the federal agency has not completed the section 106 process they cannot issue any license or commit any funds to that undertaking. Yet, the NRC continues to insist that it must be done now to keep to their external timelines for their record of decision and the applicant continues to pressure the federal agency by stating that funds are only available for work to be conducted during the fall of 2012 to keep to their timelines. This further reinforces the perception that it is the applicant who is in fact "running the show" as it were. The NRC's record of decision for an EIS should have no influence whatsoever on their completion of the 106 process. Yet, here we are as tribes reading ultimatum bullying tactics by a federal agency to ensure that an external arbitrary date is adhered to that has nothing whatsoever to do with the section 106 process. This is a classic example of what is considered to be not consultation in good faith.

36CFR800.4 (a) (3) specifies that the agency official shall:

Seek information, as appropriate, from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, and identify issues relating to the undertaking's potential effects on historic properties; and

36CCFR800.4 (a) (4) specifies that the agency official shall:

Gather information from any Indian tribe or Native Hawaiian organization identified pursuant to 800.3 (f) to assist in identifying properties, including those located off tribal lands, which may be of religious and cultural significance to them and may be eligible to the National Register, recognizing that an Indian tribe or Native Hawaiian organization may be reluctant to divulge specific information regarding the location, nature and activities associated with such sites.

It has already been established through 36CFR800.2 (c) (2) (ii) that the tribes are to be considered consulting parties for this undertaking and as such the federal agency must gather and seek information pertaining to historic properties from us and to identify issues relating to the undertakings potential effects on those historic properties. The tribe's primary concern with the effects of this undertaking to historic properties has been the insufficient identification efforts undertaken to identify historic properties of significance to tribes. In particular, if the project proceeds without field identification for our historic sites of significance; numerous sites will be impacted. The tribes have provided this information numerous times and even proven this statement in the field yet it is being ignored to stay true to an applicant's and federal agencies timeline. Our historic properties of significance should not be held hostage in this manner. It has been repeatedly stated over the past two months that the NRC will just move along with the project or that the applicant will not pay if field identification does not happen this fall. The October 12, 2012 letter also has the same bullying tactics through ultimatum contained within it by requesting a response by October 19th. If the tribes did not respond by October 19th, what were the NRC plans? Would they have just moved along with the BLM and applicant as they stated they would back in August, 2012? The SRST-THPO believes they would have. This is not good faith consultation to continue to try and bully tribes into accepting a proposal that is insufficient to even begin field identification efforts in the form of a 100% survey.

36CFR800.4 (b) requires that an agency official shall:

Based on the information gathered under paragraph [a] (*outlined above-for clarification*) of this section, and in consultation with the SHPO/THPO and any Indian Tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects, the agency official shall take the steps necessary to identify historic properties within the area of potential effects.

36CFR800.4 (b) (1) requires that the agency official shall:

The agency official shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigations and field survey....

36CFR800.4 (b) (1) is precisely what the NRC is referring to when it states in the October 12, 2012 letter that:

The NRC recognizes that there are additional methods for identifying potential properties of traditional religious and cultural importance to tribes at the proposed Dewey-Burdock site. Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethnohistorical and ethnographic information from tribal specialists in interviews at tribal headquarters.

The NRC is neglecting the requirements of 36CFR800.4 (b) that the level of effort contained within 36CFR800.4 (b) (1) is based upon the information gathered pursuant to 36CFR800.4 (a) and is to be conducted in consultation with the SHPO/THPO and Indian tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects. The SRST-THPO will, once again, for the numerous time during these consultations, state that in field identification in the form of a 100% survey of the area of potential effects for historic properties of significance to tribes by tribal personnel from the participating tribes is required for this project. The

current identification efforts have been proven to be insufficient at identifying historic properties of significance to tribes justifies our position.

It is not good faith consultation to flat out ignore what the tribes have been repeatedly stating for identification since June of 2011. The NRC is basically requesting alternatives to field identification due to an applicant's unwillingness to pay for a proper 100% survey of an undertakings area of potential effect for historic properties of significance to tribes. The applicant had no problem financially supporting other identification efforts such as the archaeologists during their Class III survey and subsequent intensive excavations at 20 sites. If the applicant is unwilling to financially support the tribes to conduct a proper survey for historic properties of significance to them; then the federal agency will not be able to complete the section 106 process and their request for a permit should be denied by the NRC. Our historic properties should not be held hostage in this process or irrevocably destroyed because an applicant is refusing to pay for a proper survey and a federal agency does not understand the section 106 process.

Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethnohistorical and ethnographic information from tribal specialists in interviews at tribal headquarters.

This statement completely ignores everything that has been discussed with the NRC by the participating tribes since June of 2011. The preferred contractor chosen by the tribes was chosen because his company could conduct a proper survey for sites of significance to tribes and could ensure that the proper protocols for these sites would be followed. What the NRC is suggesting does not accomplish that. Who would ensure that the proper protocols for these sites were respected under the NRC's proposal? Who would be recording these sites? Who would conduct the surveys and ensure that all areas within the area of potential effects received coverage? Who would download and process all this data? Who would write the reports that the SOW requires? Who would fill out the site forms required by the State Historic Preservation Office? Where would all of this information be stored? Looking at the NRC's proposal at face value, the NRC just wants the tribes to send a few people out to walk around for a while and see whatever they happen to see wherever the applicant decides to take them and that will somehow suffice? The NRC's recent proposal makes absolutely no sense and would be a complete disservice to our sites of significance if it ever gets accepted. Once again, and hopefully for the last time, the SRST-THPO requires on the ground field identification by tribal personnel from the participating tribes in the form of a 100% survey of the entire area of potential effects to address our concerns that the current level of identification does not take into account our historic properties of significance. We have proven that the current level of identification is insufficient by showing NRC staff sites of significance to tribes that were missed by current (archaeological) efforts.

The NRC's time should be invested in ensuring that proper identification efforts are conducted (100% survey of the entire area of potential effects by tribal personnel from the participating tribes) and in securing the funds necessary to ensure that the identification efforts are financially supported. It should not be wasted on efforts that do nothing to address tribal concerns with historic properties of significance that the NRC has themselves witnessed and knows will be destroyed by this proposed project. Until such time as the NRC can secure the funds from the applicant (and not the paltry sum that will not be sufficient as currently proposed by the applicant) to properly conduct a 100% survey of the entire area of potential effects for historic properties of significance to tribes; the section 106 process is not complete and therefore no license or approval for expenditure of federal funds can be given.

The request for ideas for alternative methods for identifying historic properties of significance to tribes in lieu of an actual 100% field survey of the entire area of potential effects is denied based on the reasons outlined in this letter.

The SRST-THPO maintains that the only level of effort that is sufficient for this project is on the ground 100% survey of the entire area of potential effects by tribal personnel from the participating tribes. We have stated this since June 2011 and anything less would not address our concerns for identification per 36CFR800.4.

If the NRC wishes to pursue alternative methods during their level effort they are welcome to do so as a supplement to the 100% survey. However, this alternative method will never be agreed to by the SRST-THPO as a replacement for a 100% field survey of the area of potential effects or as the sole level of effort per 36CFR800.4 (b) (1). The SRST-THPO has stated repeatedly pursuant to the information gathered under 36CFR800.4 (a) that on the ground field identification of 100% of the area of potential effects by tribal members from the participating tribes is the minimum level of effort that must be conducted for this project.

The SRST-THPO is willing and open to send Tribal Cultural Specialists and Monitors into the field to identify sites (2012) as we always have been. This assumes that our concerns with the project area of potential effects as defined by 36CFR800.16 (d) to account for both the direct and indirect effects, issues pertaining to confidentiality of the resources and any other additional concerns which may come up in the interim are addressed.

Sincerely,
STANDING ROCK SIOUX TRIBE



Terry Clouthier
Tribal Archaeologist



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
WASHINGTON, D.C. 20555-0001

October 12, 2012

Dear Tribal Historic Preservation Officer:

SUBJECT: TRANSMITTAL OF TRIBES' PROPOSAL WITH COST ESTIMATE FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

On September 27, 2012, the U.S. Nuclear Regulatory Commission (NRC) received a "Proposal with Cost Estimate for Traditional Cultural Properties Survey for the Proposed Dewey Burdock Project" from Makoche Wowapi/Mentz-Wilson Consultants, LLP.

The NRC is aware of significant differences in the proposal submitted by Makoche Wowapi/Mentz-Wilson Consultants, LLP and the proposal¹ submitted by Powertech. The NRC anticipates that resolving these differences will not support completion of a field survey in the fall of 2012 for the Dewey-Burdock In-Situ Recovery (ISR) Project and for this reason it seeks alternatives.

The NRC recognizes that there are additional methods for identifying potential properties of traditional religious and cultural importance to tribes at the proposed Dewey-Burdock site. Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethnohistorical and ethnographic information from tribal specialists in interviews at tribal headquarters.

The NRC requests that you provide us with your ideas on alternative methods for identifying potential properties by close of business Friday, October 19, 2012.

Also, enclosed is Powertech's "Reply to October 4, 2012 Letter and Statement of Work (SOW)," dated October 9, 2012.

Please note that the cost estimate and breakdown of field crew wages in the Tribes' proposal (pages 3 and 4) has been identified by the consultants as proprietary information and will not be shared with all the consulting parties. In addition, the proposal with cost estimate in its entirety are being withheld from public disclosure under 10 CFR 2.390.

Sincerely,

Kevin Hsueh, Chief
Environmental Review Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosures:

1. Proposal with Cost Estimate
2. Powertech letter dated 10/9/12 (ML12285A425)

¹ On August 7, 2012, the NRC forwarded Powertech's revised statement of work (SOW) dated July 30, 2012 (ML12261A333). The NRC received a letter dated August 29, 2012 from Powertech in response to an August 12, 2011 request concerning information needed to complete Section 106 (ML12243A156).



RICHARD E. BLUBAUGH
Vice President – Health, Safety
& Environmental Resources

POWERTECH (USA) INC.

October 9, 2012

Kevin Hsueh, Chief
Environmental Review Branch
Environmental Protection and Performance
Assessment Directorate
Office of Federal and State Materials and Environmental
Management Programs
US Nuclear Regulatory Commission
Mailstop T8H09
Washington, DC 20555-0001

VIA Email and USPS

Re: Reply to October 4, 2012 Letter and SOW

Dear Mr. Hsueh:

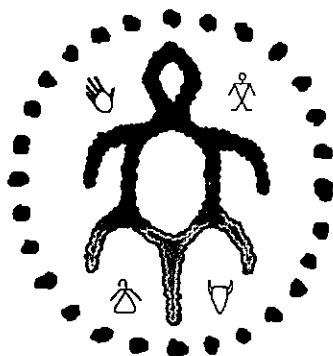
As we noted in our letter to you dated August 29, 2012, despite substantial efforts on our part over the past year, Powertech (USA) Inc. (Powertech) has been unable to secure information about properties of religious and cultural significance to federally recognized Indian tribes that may be affected by the proposed Dewey-Burdock Project. Powertech is willing to make every effort to avoid adversely affecting National Register-eligible properties of religious and cultural significance within the areas of disturbance for the Dewey-Burdock license boundary if NRC is able to identify such properties through the agency's government-to-government consultations with the interested Indian tribes.

As we also noted in the August 29 letter, Powertech is willing to support financially NRC's efforts to complete the agency's responsibilities under Section 106 of the National Historic Preservation Act up to the amount of \$100,000. We will take responsibility for disbursing these funds as NRC staff may direct to pay for field or ethnohistoric studies, tribal site visits, ethnographic interviews, or other efforts determined to be necessary by NRC.

Sincerely,

Richard E. Blubaugh

cc: R. F. Clement, President and CEO
Thompson & Pugsley, PLLC
Lynne Sebastian, SRI Foundation



Tribal Historic Preservation Office

P.O. Box 907
205 Oak St. East, Suite 121
Sisseton, SD 57262

(605) 698-3584 phone

(605) 698-4283 fax

October 18, 2012

Kevin Hsueh, Chief
Environmental Review Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

RE: Dewey Burdock in-situ Recovery Project

Dear Mr. Hsueh,

The Sisseton Wahpeton Oyate THPO would like to state as a matter of record that we fully endorse the Standing Rock Sioux Tribal Historic Preservation Office letter submitted by Terry Cloutier, Standing Rock THPO archeologist, dated October 15, 2012. (See attached).

According to the DENR notice of -Large Scale Mining Permit Application/ Powertech states *"The total acreage within the proposed permit boundary is 10,580 acres. Powertech proposes to affect 2,528 to 3,792 acres depending upon whether deep well injection or the land application is used for wastewater disposal."* Sisseton Wahpeton Oyate along with Standing Rock Sioux Tribe and other tribes have been actively participating in the Section 106 process and have been clear in our needs to address the issues surrounding identification and a proper survey of the 10,580 acres since June of 2011. NRC and Powertech have continually made efforts to accelerate the process to meet their timeline, although meeting a timeline is not the goal of Section 106. In a recent teleconference the ACHP representatives reviewed the issues the tribes are having with Powertech and NCR and noted it as a case of *"an agency that is allowing an unproductive and potentially inappropriate dialog or negotiation to occur without inserting or conveying its own interests or commitments to do the work or to achieve an outcome regardless of the cost"*. This is not good faith consultation and we object to their wishes to force the tribes into accepting a proposal for an insufficient survey of only

the directly affected areas instead of the licensed 10,580 acres which is the permitted area which is our concern with NRC and a proper scope of work.

We assert along with other tribes that the Black Hills are an area of great significance to the Indigenous Nations and that there are irreplaceable historic properties of significance that exist in the proposed area that require protection. This is something that is clearly acknowledged in the 2008 submittal of a "Request for Determination of Special Exceptional, Critical, or Unique Lands and Intent to Operate" to the State of South Dakota. On Page 10 of this submittal, it states that a *Level III Cultural Resources Evaluation Powertech (USA) Incorporated's Proposed Dewey Burdock Uranium Project Locality within the Southern Black Hills. Custer and Fall River Counties, South Dakota by Kruse et al.* was conducted by the Archaeology Laboratory, Augustana College, Sioux Falls, SD. The report refers to the following:

"The small number of Euro American sites documented was not unanticipated given the peripheral nature of the project area in relation to the Black Hills proper. The disparity existing between the number of Historic and prehistoric sites observed in the project area is also not unexpected; however, the sheer volume of sited documented in the area is noteworthy. The land evaluated as a part of the Level III cultural resources , evaluation has an average site density of approximately 1 site per 8.1 acres. Even greater site densities were reported in 2000 during the investigation of immediately adjacent land parcels for the Dacotah Cement/Land exchange [Winham et al., 2001]."

The importance of this issue and the knowledge of the existence of such historic properties in the area of concern have been made clear to the NRC when tribal representatives visited the sites previously identified by their archeologist. The tribal representatives identified numerous additional sites in that area that had been overlooked. These are issues that NRC must address under not only Section 106 of the NHPA, but also with the requirements under NEPA. Both obligations must be met before issuing a permit.

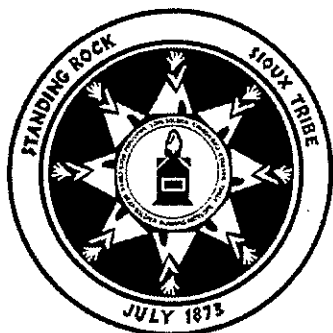
Sisseton Wahpeton Oyate-THPO also rejects the request for alternative methods for fulfilling 36CFR800.4(b) (1) and maintains that the only sufficient level of effort for this project is an on the ground 100% survey of the entire area of potential effects by tribal personnel from participating tribes.

Sincerely,



Dianne Desrosiers

Sisseton Wahpeton Oyate
Tribal Historic Preservation Officer



Kevin Hsueh, Chief
 Environmental Review Branch
 Division of Waste Management
 and Environmental Protection
 Office of Federal and State Materials
 and Environmental Management Programs

T RIBAL HISTORIC PRESERVATION OFFICE
S TANDING ROCK SIOUX TRIBE
 Administrative Service Center
 North Standing Rock Avenue
 Fort Yates, N.D. 58538
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October 15, 2012

Dear Mr. Hsueh,

The Standing Rock Sioux Tribe THPO (SRST-THPO) is in receipt of the Nuclear Regulatory Commissions' (NRC) letter dated October 12, 2012 regarding the Dewey-Burdock in-situ recovery project and the request to seek alternatives to field identification. We find this new request to be disappointing by the lead federal agency especially in light of other recent letters and emails to the tribes. In particular, with the following bullying by ultimatum tactics:

The NRC staff encourages the Tribal Representatives to consider the offer provided by the applicant when revising the SOW (which should include the above requested information). If Tribal Representatives are unable to provide the requested information by the end of the September 5th and 6th, 2012 meeting to support completion of a field survey in the fall of 2012, the NRC and BLM staff will develop an alternative approach for identifying historic properties, and will move the Section 106 process forward.

(quote from email sent to tribes by
 Haimanot Yilma on Aug. 30/12).

That quote alone represents one of many fundamental misunderstandings of the Section 106 process by the NRC. The offer by the applicant in this quote included a sum of money which in no way would suffice for field identification for the 10,000 acres that this undertakings area of potential effect technically is. This paltry sum would not even be sufficient for the 2700-3700 acres of direct effects that the applicant and federal agency only want surveyed. The SRST-THPO continues to maintain its position, supported by the law by the way, that only addressing the direct effects of a proposed undertaking does not fulfill a federal agencies responsibilities for section 106 considering that the area of potential effects for an undertaking are defined as both direct and indirect effects per 36CFR800.16 (d). The applicants' proposal, which is favored by the NRC, would place unrealistic expectations on our field crews that could never be met. Yet, here we are almost two months later, after having the tribes preferred contractor submit their cost estimate and we are in the exact same spot as we were in August. The NRC, by this letter, is yet again attempting to find an alternative to on the ground field identification. The only difference between the August email and the current letter is that the NRC is making a feeble attempt to

include the tribes in their discussion to not conduct proper on the ground field identification. The SRST-THPO whole-heartedly disagrees with this attempt to circumvent the 106 process on behalf of the applicants' and federal agencies timeline and budget. The following comments outline this disagreement.

The participating tribes have made a concerted and cooperative effort to work with the Nuclear Regulatory Commission on a proposal to address our concerns about the identification of historic properties of significance to tribes for this project. Meaningful conversation pertaining to proper field identification only began in February of 2012 at the meeting in Rapid City, SD, not June of 2011. Identification under Section 106 has, and continues to be, the tribe's primary concern.

The SRST-THPO has participated in the Section 106 process up to this point steadfastly and in good faith despite the many missteps in the process by the lead federal agency and the intrusive participation by the applicant and their third party consultants. The latter, at many times during these discussions, are perceived to be running the entire process in place of the lead federal agency and this recent letter and previous letters and communications only reinforces this perception.

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Were the tribes given a reasonable opportunity to advise, consult and identify concerns pursuant to 36CFR800.2 (c) (2) (ii) (A)? Yes in some ways the tribes were. Unfortunately, it all amounts to a check box that must be checked in the process when everything that is told to them during these consultations is being subsequently ignored. All of the information which was gathered pursuant to 36CFR800.4 (a) is

being subsequently ignored by this latest letter from the NRC to keep to federal and applicant timelines. The federal agency has stated that they intend to issue their record of decision for any EIS by May of 2013. The draft EIS is expected to be submitted for comments prior to December of 2012. This is the impetus in denying the tribes the opportunity to conduct a proper 100% survey of the entire area of potential effects. The applicant has repeatedly stated that funds would only be available for survey work up to the fall of 2012. Our historic properties of significance which will be destroyed by this project are in essence being held hostage by this process and by the applicant and federal agency. The 106 process should not be conducted to keep to an applicants and/or federal agencies timeline.

As stated in 36CFR800.1 (a):

The section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

The goal of the 106 process is not to keep to an applicants or federal agencies arbitrary external timeline. The section 106 process does not have a timeline for identification and consultation. In fact, the only reference to timing contained within the document pertaining to this issue is that the federal agency must complete the section 106 process prior to any approval for expenditure of Federal funds or prior to any issuance of any license (36CFR800.1 (c)). If the federal agency has not completed the section 106 process they cannot issue any license or commit any funds to that undertaking. Yet, the NRC continues to insist that it must be done now to keep to their external timelines for their record of decision and the applicant continues to pressure the federal agency by stating that funds are only available for work to be conducted during the fall of 2012 to keep to their timelines. This further reinforces the perception that it is the applicant who is in fact "running the show" as it were. The NRC's record of decision for an EIS should have no influence whatsoever on their completion of the 106 process. Yet, here we are as tribes reading ultimatum bullying tactics by a federal agency to ensure that an external arbitrary date is adhered to that has nothing whatsoever to do with the section 106 process. This is a classic example of what is considered to be not consultation in good faith.

36CFR800.4 (a) (3) specifies that the agency official shall:

Seek information, as appropriate, from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, and identify issues relating to the undertaking's potential effects on historic properties; and

36CFR800.4 (a) (4) specifies that the agency official shall:

Gather information from any Indian tribe or Native Hawaiian organization identified pursuant to 800.3 (f) to assist in identifying properties, including those located off tribal lands, which may be of religious and cultural significance to them and may be eligible to the National Register, recognizing that an Indian tribe or Native Hawaiian organization may be reluctant to divulge specific information regarding the location, nature and activities associated with such sites.

It has already been established through 36CFR800.2 (c) (2) (ii) that the tribes are to be considered consulting parties for this undertaking and as such the federal agency must gather and seek information pertaining to historic properties from us and to identify issues relating to the undertakings potential effects on those historic properties. The tribe's primary concern with the effects of this undertaking to historic properties has been the insufficient identification efforts undertaken to identify historic properties of significance to tribes. In particular, if the project proceeds without field identification for our historic sites of significance; numerous sites will be impacted. The tribes have provided this information numerous times and even proven this statement in the field yet it is being ignored to stay true to an applicant's and federal agencies timeline. Our historic properties of significance should not be held hostage in this manner. It has been repeatedly stated over the past two months that the NRC will just move along with the project or that the applicant will not pay if field identification does not happen this fall. The October 12, 2012 letter also has the same bullying tactics through ultimatum contained within it by requesting a response by October 19th. If the tribes did not respond by October 19th, what were the NRC plans? Would they have just moved along with the BLM and applicant as they stated they would back in August, 2012? The SRST-THPO believes they would have. This is not good faith consultation to continue to try and bully tribes into accepting a proposal that is insufficient to even begin field identification efforts in the form of a 100% survey.

36CFR800.4 (b) requires that an agency official shall:

Based on the information gathered under paragraph [a] (*outlined above-for clarification*) of this section, and in consultation with the SHPO/THPO and any Indian Tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects, the agency official shall take the steps necessary to identify historic properties within the area of potential effects.

36CFR800.4 (b) (1) requires that the agency official shall:

The agency official shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigations and field survey....

36CFR800.4 (b) (1) is precisely what the NRC is referring to when it states in the October 12, 2012 letter that:

The NRC recognizes that there are additional methods for identifying potential properties of traditional religious and cultural importance to tribes at the proposed Dewey-Burdock site. Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethnohistorical and ethnographic information from tribal specialists in interviews at tribal headquarters.

The NRC is neglecting the requirements of 36CFR800.4 (b) that the level of effort contained within 36CFR800.4 (b) (1) is based upon the information gathered pursuant to 36CFR800.4 (a) and is to be conducted in consultation with the SHPO/THPO and Indian tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects. The SRST-THPO will, once again, for the numerous time during these consultations, state that in field identification in the form of a 100% survey of the area of potential effects for historic properties of significance to tribes by tribal personnel from the participating tribes is required for this project. The

current identification efforts have been proven to be insufficient at identifying historic properties of significance to tribes justifies our position.

It is not good faith consultation to flat out ignore what the tribes have been repeatedly stating for identification since June of 2011. The NRC is basically requesting alternatives to field identification due to an applicant's unwillingness to pay for a proper 100% survey of an undertakings area of potential effect for historic properties of significance to tribes. The applicant had no problem financially supporting other identification efforts such as the archaeologists during their Class III survey and subsequent intensive excavations at 20 sites. If the applicant is unwilling to financially support the tribes to conduct a proper survey for historic properties of significance to them; then the federal agency will not be able to complete the section 106 process and their request for a permit should be denied by the NRC. Our historic properties should not be held hostage in this process or irrevocably destroyed because an applicant is refusing to pay for a proper survey and a federal agency does not understand the section 106 process.

Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethnohistorical and ethnographic information from tribal specialists in interviews at tribal headquarters.

This statement completely ignores everything that has been discussed with the NRC by the participating tribes since June of 2011. The preferred contractor chosen by the tribes was chosen because his company could conduct a proper survey for sites of significance to tribes and could ensure that the proper protocols for these sites would be followed. What the NRC is suggesting does not accomplish that. Who would ensure that the proper protocols for these sites were respected under the NRC's proposal? Who would be recording these sites? Who would conduct the surveys and ensure that all areas within the area of potential effects received coverage? Who would download and process all this data? Who would write the reports that the SOW requires? Who would fill out the site forms required by the State Historic Preservation Office? Where would all of this information be stored? Looking at the NRC's proposal at face value, the NRC just wants the tribes to send a few people out to walk around for a while and see whatever they happen to see wherever the applicant decides to take them and that will somehow suffice? The NRC's recent proposal makes absolutely no sense and would be a complete disservice to our sites of significance if it ever gets accepted. Once again, and hopefully for the last time, the SRST-THPO requires on the ground field identification by tribal personnel from the participating tribes in the form of a 100% survey of the entire area of potential effects to address our concerns that the current level of identification does not take into account our historic properties of significance. We have proven that the current level of identification is insufficient by showing NRC staff sites of significance to tribes that were missed by current (archaeological) efforts.

The NRC's time should be invested in ensuring that proper identification efforts are conducted (100% survey of the entire area of potential effects by tribal personnel from the participating tribes) and in securing the funds necessary to ensure that the identification efforts are financially supported. It should not be wasted on efforts that do nothing to address tribal concerns with historic properties of significance that the NRC has themselves witnessed and knows will be destroyed by this proposed project. Until such time as the NRC can secure the funds from the applicant (and not the paltry sum that will not be sufficient as currently proposed by the applicant) to properly conduct a 100% survey of the entire area of potential effects for historic properties of significance to tribes; the section 106 process is not complete and therefore no license or approval for expenditure of federal funds can be given.

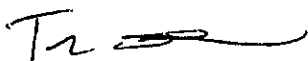
The request for ideas for alternative methods for identifying historic properties of significance to tribes in lieu of an actual 100% field survey of the entire area of potential effects is denied based on the reasons outlined in this letter.

The SRST-THPO maintains that the only level of effort that is sufficient for this project is on the ground 100% survey of the entire area of potential effects by tribal personnel from the participating tribes. We have stated this since June 2011 and anything less would not address our concerns for identification per 36CFR800.4.

If the NRC wishes to pursue alternative methods during their level effort they are welcome to do so as a supplement to the 100% survey. However, this alternative method will never be agreed to by the SRST-THPO as a replacement for a 100% field survey of the area of potential effects or as the sole level of effort per 36CFR800.4 (b) (1). The SRST-THPO has stated repeatedly pursuant to the information gathered under 36CFR800.4 (a) that on the ground field identification of 100% of the area of potential effects by tribal members from the participating tribes is the minimum level of effort that must be conducted for this project.

The SRST-THPO is willing and open to send Tribal Cultural Specialists and Monitors into the field to identify sites (2012) as we always have been. This assumes that our concerns with the project area of potential effects as defined by 36CFR800.16 (d) to account for both the direct and indirect effects, issues pertaining to confidentiality of the resources and any other additional concerns which may come up in the interim are addressed.

Sincerely,
STANDING ROCK SIOUX TRIBE



Terry Clouthier
Tribal Archaeologist



Protecting the Land, Cultural,
Heritage and Tradition for
the Future Generation

Tribal Historic Preservation Office

*P.O. Box 809
Rosebud, South Dakota
Telephone: (605) 747-4255
Fax: (605) 747-4211
Email: rstthpo@yahoo.com*



Russell Eagle Bear
Officer

Kathy Arcoren
Administrative Assistant

Kevin Hsueh, Chief
Environmental Review Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

October 19, 2012

Dear Mr. Hsueh,

The Rosebud Sioux Tribe THPO (RST-THPO) is in receipt of the Nuclear Regulatory Commissions' (NRC) letter dated October 12, 2012 regarding the Dewey-Burdock in-situ recovery project and the request to seek alternatives to field identification. We find this new request to be disappointing by the lead federal agency especially in light of other recent letters and emails to the tribes. In particular, with the following bullying by ultimatum tactics:

The NRC staff encourages the Tribal Representatives to consider the offer provided by the applicant when revising the SOW (which should include the above requested information). If Tribal Representatives are unable to provide the requested information by the end of the September 5th and 6th, 2012 meeting to support completion of a field survey in the fall of 2012, the NRC and BLM staff will develop an alternative approach for identifying historic properties, and will move the Section 106 process forward.

(quote from email sent to tribes by
Haimanot Yilma on Aug. 30/12).

That quote alone represents one of many fundamental misunderstandings of the Section 106 process by the NRC. The offer by the applicant in this quote included a sum of money which in no way would suffice for field identification for the 10,000 acres that this undertakings area of potential effect technically is. This paltry sum would not even be sufficient for the 2700-3700 acres of direct effects that the applicant and federal agency only want surveyed. The RST-THPO continues to maintain its position, supported by the law by the way, that only addressing the direct effects of a proposed undertaking does not fulfill a federal agencies responsibilities for section 106 considering that the area of potential effects for an undertaking are defined as both direct and indirect effects per 36CFR800.16 (d). The applicants' proposal, which is favored by the NRC, would place unrealistic expectations on our field crews that could never be met. Yet, here we are almost two months later, after having the tribes preferred contractor submit their cost estimate and we are in the exact same spot as we were in August. The NRC, by this letter, is yet again attempting to find an alternative to on the ground field identification. The only difference between the August email and the current letter is that the NRC is making a feeble attempt to include the tribes in their discussion to not conduct proper on the ground field identification.

The SRST-THPO whole-heartedly disagrees with this attempt to circumvent the 106 process on behalf of the applicants' and federal agencies timeline and budget. The following comments outline this disagreement.

The participating tribes have made a concerted and cooperative effort to work with the Nuclear Regulatory Commission on a proposal to address our concerns about the identification of historic properties of significance to tribes for this project. Meaningful conversation pertaining to proper field identification only began in February of 2012 at the meeting in Rapid City, SD, not June of 2011. Identification under Section 106 has, and continues to be, the tribe's primary concern.

The RST-THPO has participated in the Section 106 process up to this point steadfastly and in good faith despite the many missteps in the process by the lead federal agency and the intrusive participation by the applicant and their third party consultants. The latter, at many times during these discussions, are perceived to be running the entire process in place of the lead federal agency and this recent letter and previous letters and communications only re-inforces this perception.

36CFR800.2 (c) (2) (ii) specifies that:

Section 101 (d) (6) (b) of the act requires the agency official to consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property. Such Indian tribe or Native Hawaiian organization shall be a consulting party.

36CFR800.2 (c) (2) (ii) (A) further specifies that:

The agency official shall ensure that consultation in the section 106 process provides the Indian tribe or Native Hawaiian organization 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 undertakings effects on such properties, and participate in the resolution of adverse effects.

These two sections of the act specify the tribes' role as consulting parties within the process and the federal agency requirements for consultation with the tribes for every undertaking. The participating tribes have repeatedly stated that we require in field identification for historic properties of significance to tribes for this and all projects. That has been our requirement for this project ever since the informal field visits and information gathering session of June 2011. The participating tribes advised the NRC that identification efforts conducted by archaeologists were insufficient to address historic properties of significance to tribes. The tribes proved that these efforts were insufficient by visiting sites identified by the archaeologists and identifying numerous features that were missed that are significant to tribes. The tribes, applicant, NRC staff and the archaeologists were all present when these historic properties of significance were observed.

Were the tribes given a reasonable opportunity to advise, consult and identify concerns pursuant to 36CFR800.2 (c) (2) (ii) (A)? Yes in some ways the tribes were. Unfortunately, it all amounts to a check box that must be checked in the process when everything that is told to them during these consultations is being subsequently ignored. All of the information which was gathered pursuant to 36CFR800.4 (a) is being subsequently ignored by this latest letter from the NRC to keep to federal and applicant timelines.

The federal agency has stated that they intend to issue their record of decision for any EIS by May of 2013. The draft EIS is expected to be submitted for comments prior to December of 2012. This is the impetus in denying the tribes the opportunity to conduct a proper 100% survey of the entire area of potential effects. The applicant has repeatedly stated that funds would only be available for survey work up to the fall of 2012. Our historic properties of significance which will be destroyed by this project are in essence being held hostage by this process and by the applicant and federal agency. The 106 process should not be conducted to keep to an applicants and/or federal agencies timeline.

As stated in 36CFR800.1 (a):

The section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

The goal of the 106 process is not to keep to an applicants or federal agencies arbitrary external timeline. The section 106 process does not have a timeline for identification and consultation. In fact, the only reference to timing contained within the document pertaining to this issue is that the federal agency must complete the section 106 process prior to any approval for expenditure of Federal funds or prior to any issuance of any license (36CFR800.1 (c)). If the federal agency has not completed the section 106 process they cannot issue any license or commit any funds to that undertaking. Yet, the NRC continues to insist that it must be done now to keep to their external timelines for their record of decision and the applicant continues to pressure the federal agency by stating that funds are only available for work to be conducted during the fall of 2012 to keep to their timelines. This further reinforces the perception that it is the applicant who is in fact “running the show” as it were. The NRC’s record of decision for an EIS should have no influence whatsoever on their completion of the 106 process. Yet, here we are as tribes reading ultimatum bullying tactics by a federal agency to ensure that an external arbitrary date is adhered to that has nothing whatsoever to do with the section 106 process. This is a classic example of what is considered to be not consultation in good faith.

36CFR800.4 (a) (3) specifies that the agency official shall:

Seek information, as appropriate, from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, and identify issues relating to the undertaking’s potential effects on historic properties; and

36CFR800.4 (a) (4) specifies that the agency official shall:

Gather information from any Indian tribe or Native Hawaiian organization identified pursuant to 800.3 (f) to assist in identifying properties, including those located off tribal lands, which may be of religious and cultural significance to them and may be eligible to the National Register, recognizing that an Indian tribe or Native Hawaiian organization may be reluctant to divulge specific information regarding the location, nature and activities associated with such sites.

It has already been established through 36CFR800.2 (c) (2) (ii) that the tribes are to be considered consulting parties for this undertaking and as such the federal agency must gather and seek information

pertaining to historic properties from us and to identify issues relating to the undertakings potential effects on those historic properties. The tribe's primary concern with the effects of this undertaking to historic properties has been the insufficient identification efforts undertaken to identify historic properties of significance to tribes. In particular, if the project proceeds without field identification for our historic sites of significance; numerous sites will be impacted. The tribes have provided this information numerous times and even proven this statement in the field yet it is being ignored to stay true to an applicant's and federal agencies timeline. Our historic properties of significance should not be held hostage in this manner. It has been repeatedly stated over the past two months that the NRC will just move along with the project or that the applicant will not pay if field identification does not happen this fall. The October 12, 2012 letter also has the same bullying tactics through ultimatum contained within it by requesting a response by October 19th. If the tribes did not respond by October 19th, what were the NRC plans? Would they have just moved along with the BLM and applicant as they stated they would back in August, 2012? The RST-THPO believes they would have. This is not good faith consultation to continue to try and bully tribes into accepting a proposal that is insufficient to even begin field identification efforts in the form of a 100% survey.

36CFR800.4 (b) requires that an agency official shall:

Based on the information gathered under paragraph [a] (*outlined above-for clarification*) of this section, and in consultation with the SHPO/THPO and any Indian Tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects, the agency official shall take the steps necessary to identify historic properties within the area of potential effects.

36CFR800.4 (b) (1) requires that the agency official shall:

The agency official shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigations and field survey....

36CFR800.4 (b) (1) is precisely what the NRC is referring to when it states in the October 12, 2012 letter that:

The NRC recognizes that there are additional methods for identifying potential properties of traditional religious and cultural importance to tribes at the proposed Dewey-Burdock site. Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethno-historical and ethnographic information from tribal specialists in interviews at tribal headquarters.

The NRC is neglecting the requirements of 36CFR800.4 (b) that the level of effort contained within 36CFR800.4 (b) (1) is based upon the information gathered pursuant to 36CFR800.4 (a) and is to be conducted in consultation with the SHPO/THPO and Indian tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects. The RST-THPO will, once again, for the numerous time during these consultations, state that in field identification in the form of a 100% survey of the area of potential effects for historic properties of significance to tribes by tribal personnel from the participating tribes is required for this project. The current identification efforts have been proven to be insufficient at identifying historic properties of significance to tribes justifies our position.

It is not good faith consultation to flat out ignore what the tribes have been repeatedly stating for identification since June of 2011. The NRC is basically requesting alternatives to field identification due to an applicant's unwillingness to pay for a proper 100% survey of an undertakings area of potential effect for historic properties of significance to tribes. The applicant had no problem financially supporting other identification efforts such as the archaeologists during their Class III survey and subsequent intensive excavations at 20 sites. If the applicant is unwilling to financially support the tribes to conduct a proper survey for historic properties of significance to them; then the federal agency will not be able to complete the section 106 process and their request for a permit should be denied by the NRC. Our historic properties should not be held hostage in this process or irrevocably destroyed because an applicant is refusing to pay for a proper survey and a federal agency does not understand the section 106 process.

Alternatives include opening the site to interested tribal specialists over a period of several weeks with payments to be made to individual tribes, or seeking ethno-historical and ethnographic information from tribal specialists in interviews at tribal headquarters.

This statement completely ignores everything that has been discussed with the NRC by the participating tribes since June of 2011. The preferred contractor chosen by the tribes was chosen because his company could conduct a proper survey for sites of significance to tribes and could ensure that the proper protocols for these sites would be followed. What the NRC is suggesting does not accomplish that. Who would ensure that the proper protocols for these sites were respected under the NRC's proposal? Who would be recording these sites? Who would conduct the surveys and ensure that all areas within the area of potential effects received coverage? Who would download and process all this data? Who would write the reports that the SOW requires? Who would fill out the site forms required by the State Historic Preservation Office? Where would all of this information be stored? Looking at the NRC's proposal at face value, the NRC just wants the tribes to send a few people out to walk around for a while and see whatever they happen to see wherever the applicant decides to take them and that will somehow suffice? The NRC's recent proposal makes absolutely no sense and would be a complete disservice to our sites of significance if it ever gets accepted. Once again, and hopefully for the last time, the SRST-THPO requires on the ground field identification by tribal personnel from the participating tribes in the form of a 100% survey of the entire area of potential effects to address our concerns that the current level of identification does not take into account our historic properties of significance. We have proven that the current level of identification is insufficient by showing NRC staff sites of significance to tribes that were missed by current (archaeological) efforts.

The NRC's time should be invested in ensuring that proper identification efforts are conducted (100% survey of the entire area of potential effects by tribal personnel from the participating tribes) and in securing the funds necessary to ensure that the identification efforts are financially supported. It should not be wasted on efforts that do nothing to address tribal concerns with historic properties of significance that the NRC has themselves witnessed and knows will be destroyed by this proposed project. Until such time as the NRC can secure the funds from the applicant (and not the paltry sum that will not be sufficient as currently proposed by the applicant) to properly conduct a 100% survey of the entire area of potential effects for historic properties of significance to tribes; the section 106 process is not complete and therefore no license or approval for expenditure of federal funds can be given.

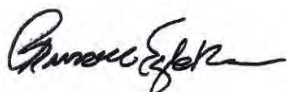
The request for ideas for alternative methods for identifying historic properties of significance to tribes in lieu of an actual 100% field survey of the entire area of potential effects is denied based on the reasons outlined in this letter.

The RST-THPO maintains that the only level of effort that is sufficient for this project is on the ground 100% survey of the entire area of potential effects by tribal personnel from the participating tribes. We have stated this since June 2011 and anything less would not address our concerns for identification per 36CFR800.4.

If the NRC wishes to pursue alternative methods during their level effort they are welcome to do so as a supplement to the 100% survey. However, this alternative method will never be agreed to by the RST-THPO as a replacement for a 100% field survey of the area of potential effects or as the sole level of effort per 36CFR800.4 (b) (1). The RST-THPO has stated repeatedly pursuant to the information gathered under 36CFR800.4 (a) that on the ground field identification of 100% of the area of potential effects by tribal members from the participating tribes is the minimum level of effort that must be conducted for this project.

The RST-THPO is willing and open to send Tribal Cultural Specialists and Monitors into the field to identify sites (2012) as we always have been. This assumes that our concerns with the project area of potential effects as defined by 36CFR800.16 (d) to account for both the direct and indirect effects, issues pertaining to confidentiality of the resources and any other additional concerns which may come up in the interim are addressed.

Sincerely,
Rosebud Sioux Tribe



Mr. Russell Eagle Bear
Rosebud Sioux Tribe
Tribal Historic Preservation Officer
PO Box 809
Rosebud, SD 57570
Ph. (605) 747-4255
Email: rstthpo@yahoo.com

From: [Lana Gravatt](#)
To: [Yilma, Haimanot](#)
Subject: Response to NRC letter dated october 12,2012
Date: Saturday, October 20, 2012 5:03:23 AM

Haimanot:

It is the determination of the Yankton Sioux Tribe Historic Preservation Office that the Nuclear Regulatory Commission (NRC) is in violation of Section 106 of the National Historic Preservation Act of 1966 (NHPA). NRC has not addressed the direct and indirect effects of the Dewey-Burdock in situ recovery project to date. The Yankton Sioux Tribe beleives this area to be an identified area within our history and culture as significant to our identity and spritual way of life. The identification efforts proposed by NRC have not been reasonable. In addition, the process has been rushed by your agency making it unrealistic for the tribes to acheive proper identification and evaluation...Further the Yantkon Sioux Tribe agrees and supports the Standing Rock Sioux Tribe Archeologist, Terry Clouthier in his response letter dated October 15,2012 addressed to Kevin Hsueh, Cheif Enviromental Review Branch Division of Waste Mangement and Enviromental Protection Office of Federal and State Materials and Environmental Management Programs.

This letter is in response to the NRC letter Dated October 12, 2012 requesting to seek alternatives to feild identification.

thank you

Lana M. Gravatt
Tribal Historic Preservation officer
Yankton Sioux Tribe S.D.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 31, 2012

Dear Tribal Historic Preservation Officer:

**SUBJECT: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED
DEWEY-BURDOCK *IN-SITU* RECOVERY PROJECT**

On October 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) sent a letter to all consulting parties requesting suggested alternatives for identifying potential historic and cultural properties at the proposed Dewey-Burdock site that may be of interest to Tribes. This request was prompted by NRC's concern that Powertech and Makoche Wowapi/Mentz-Wilson Consultants, LLP would not be able to reach an agreement regarding an appropriate level of effort for completion of a tribal survey for the proposed Dewey-Burdock *In-Situ* Recovery (ISR) project.

The NRC would like to thank the Standing Rock Sioux Tribe, Sisseton-Wahpeton Oyate, Rosebud Sioux Tribe, Yankton Sioux Tribe, Three Affiliated Tribes of the MHA Nation, Cheyenne River Sioux Tribe, and the Turtle Mountain Band of Chippewa Indians for responding to this request.

On October 19, 2012, an alternative survey approach was submitted by the Turtle Mountain Band of Chippewa Indians in collaboration with the Three Affiliated Tribes and the consulting firm of Kadrmas, Lee & Jackson. A copy of the proposal is enclosed for your review. The NRC believes the level of effort represented by the Kadrmas, Lee & Jackson proposal is commensurate with the survey needs of the 2,637-acre area identified for potential direct effects. The NRC has decided to move forward with this proposal.

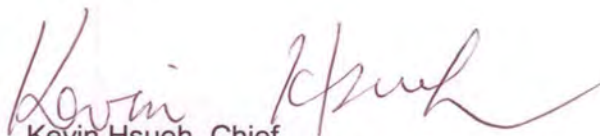
The NRC recognizes the importance of providing all interested Tribes with an opportunity to participate in this survey effort. Therefore, the NRC hereby invites each interested Tribe to provide a qualified representative to join the survey team. Powertech has agreed to provide financial support for one representative from each participating Tribe. This includes an honorarium of \$5,000 per Tribe, plus travel reimbursement and per diem for meals and lodging to be distributed at the Tribe's discretion to an individual participating in the fieldwork. Based on the enclosed proposal, the field survey is estimated to require three weeks.

Due to the lateness of the season, it is imperative that this work begin as soon as possible. Therefore, the NRC asks those Tribes who wish to participate in the survey to respond no later than November 7, 2012. Please respond by sending an email to Haimanot Yilma (Haimanot.Yilma@nrc.gov) and/or the NRC's contractor, Randy Withrow (rwithrow@louisberger.com). If you have any questions or additional comments for the NRC, please forward them to either Haimanot or Randy.

2

Please note that the enclosed revised proposal does not contain any proprietary information. The original proposal with cost estimate is being withheld from public disclosure under 10 CFR 2.390.

Sincerely,

A handwritten signature in dark ink, appearing to read "Kevin Hsueh", with a stylized flourish extending to the right.

Kevin Hsueh, Chief
Environmental Review Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure: Revised Proposal

From: [Terence Clouthier](#)
To: [Yilma, Haimanot](#); [Bruce Nadeau](#); [Hsueh, Kevin](#); ["Withrow, Randy"](#); [Jamerson, Kellee](#)
Cc: [Waste"Win Young](#); [dianned@swo-nsn.gov](#); [Russell Eagle Bear \(reaglebear@yahoo.com\)](#); [Ben Rhodd \(brhodd1@yahoo.com\)](#); [Conrad Fisher \(conrad.fisher@cheyennation.com\)](#); [Wanda Wells \(wandawells@midstatesd.net\)](#); [Lana Gravatt \(gravattlana@yahoo.com\)](#); [Clair Green \(clairsgreen@yahoo.com\)](#); [jb.weston@fsst.org](#); [Elgin Crows Breast \(redhawk@mhanation.com\)](#); [Dennis Yellow Thunder \(ostnrrafd@gwtc.net\)](#); [Fred Mousseau \(ostnrrathpo@gwtc.net\)](#); [Curly Youpee \(cultres@nemontel.net\)](#); [James Whitted \(jmswhitted@yahoo.com\)](#); [Steve Vance \(steve.vance@crst-nsn.gov\)](#); [Valerie Hauser](#); [John Eddins](#)
Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT
Date: Friday, November 02, 2012 3:32:29 PM

Haimanot and Kevin,

This latest proposal does absolutely nothing to address the concerns that all of the participating tribes (well the tribes that were participating from June 2011 until this latest failure anyway) have with this project. From all appearances, your agency accepted the proposal because it went along with the applicants financial constraints. That is the only reason it was accepted as it is just another predictive model which we have repeatedly told you are insufficient to address our concerns. Yet, here you are, ignoring the information gathered pursuant to 36CFR800.4 (a) and accepting a predictive model. I will have a letter for you on Monday morning on THPO letterhead to explain to you for the millionth time how your agency has done nothing but fail the 106 process.

As I mentioned in my voice mail. If you issue your SEIS based off the work done on this latest proposal without addressing all of the concerns that have been brought up since June of 2011 - i will fight you every step of the way.

This is an utter failure on your agencies part to accept a proposal from a tribe at the 11th hour that does nothing to address the concerns that were brought up through information gathered pursuant 36CFR800.4 (a) and expect this proposal to show that a good faith effort was met per 36CFR800.4 (b) (1). Especially, considering that your own agency purposely kept them out of the consultation process based on their granting of a no historic properties affected determination back in 2010. They should have been at the table the entire time and not used to pit one tribe against the other as you are doing now. The fact that a federal agency is encouraging this kind of strife between tribes is alarming. Bringing them back in as the accepted proposal in concert with the letters that you have issued where you have been trying to ignore the tribes requests and "move the 106" process forward without all of the tribes who have actually consulted since 2011 is nothing but a slap in the face to every one of us. This just further enforces the opinion that your agency has no intention of negotiating in good faith for this project. All your agency is apparently concerned with is making sure a timeline is kept so you can issue your permit and that you don't anger your applicant.

I encourage your agency to reconsider its current position based on the letter of October 31, 2012 before this escalates further.

Have a good weekend

Terry

From: Yilma, Haimanot [Haimanot.Yilma@nrc.gov]
Sent: Thursday, November 01, 2012 2:10 PM
To: Bruce Nadeau; Terence Clouthier; Hsueh, Kevin; 'Withrow, Randy'; Jamerson, Kellee
Cc: Waste"Win Young; rwithrow@louisberger.com; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com); jb.weston@fsst.org; Elgin Crows Breast (redhawk@mhanation.com); Dennis Yellow Thunder (ostnrrafd@gwtc.net); Fred Mousseau (ostnrrathpo@gwtc.net); Curly Youpee (cultres@nemontel.net); James Whitted (jmswhitted@yahoo.com); Steve Vance (steve.vance@crst-nsn.gov)
Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Good Afternoon,

NRC staff welcomes all comments from tribes regarding the Dewey-Burdock project. We've received several important responses to yesterday's letter announcing our intent to move forward with a tribal survey proposal initiated by the Turtle Mountain Band of Chippewa Indians and Three Affiliated Tribes of the MHA Nation in collaboration with the consulting firm Kadrmas, Lee & Jackson (KLJ).

NRC shares the concern expressed by the Standing Rock Sioux Tribe regarding individuals who show disrespect for tribes, tribal members and resources important to tribes. We have asked KLJ to provide us with the names of all individuals scheduled to participate in the survey effort and we will provide this information to all parties for review as soon as we have it. It is our understanding that the survey team will be led and conducted by tribal members affiliated with the Turtle Mountain Band of Chippewa Indians and Three Affiliated Tribes of the MHA Nation. As presented in yesterday's letter we are also extending an invitation for all consulting tribes to participate in the field survey.

In response to other concerns expressed about NRC's compliance with Section 106 requirements for tribal consultation regarding the Dewey-Burdock project, NRC recognizes that the consultation process is ongoing. On September 18, 2012 NRC directly addressed several outstanding concerns including plans to develop a Programmatic Agreement and address indirect effects. The September 18, 2012 letter is attached to this email for your reference. It is NRC's intent to continue consultation with all interested tribes on these and other concerns.

Thanks you,

Sincerely,

Haimanot Yilma
Project Manager
FSME/DWMEP/EPPAD/ERB
U.S Nuclear Regulatory Commission
Phone: 301-415-8029
email: haimanot.yilma@nrc.gov
Mail Stop : T8F05

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Subject: Re: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Thanks for the information Terry.

At present we are concerned only with the land/area of potential effect with which we have been contracted to provide inventory for. Any other issues outside of this discrete area is something that would require additional scrutiny beyond the current proposed scope.

Respectfully,

Bruce Nadeau

On Thu, Nov 1, 2012 at 11:28 AM, Terence Clouthier
 <tclouthier@standingrock.org<<mailto:tclouthier@standingrock.org>>> wrote:
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In particular, the consulting tribes that have been in consultation with the NRC and applicants for the past year and a half have issues with the following:

- Sites of significance to tribes cannot be identified by archaeologists. This was proven to them in the field during the meetings in June of 2011 when the consulting tribes visited the project area and showed the NRC sites that were missed by their archaeological consultants. The consulting tribes have requested a 100% survey of the entire area of potential effects (indirect and direct)- we have never waived on this. Yet, the current proposal will not conduct a 100% survey of the entire project area. A project area that constantly changes numbers from the entire license boundary (10000+acres) to 2673 acres to 3000+ acres depending on which disposal method is used.
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Unfortunately , I could spend all day illustrating to you exactly how this federal agency is apparently trying to circumvent the 106 process but I will just stop here. I have attached the Standing Rock Sioux Tribes response to the October 12 letter which illustrates the points above. The ACHP is well aware of the issues involved in this project and unfortunately, the latest proposal by your office with the Three Affiliated Tribe and KLJ does absolutely nothing to address these issues besides create another avenue for the federal agency to try and avoid the consulting tribes concerns. I truly wish that your office and the THPO office of the Three Affiliated Tribes had been involved in this process from the beginning of consultation back in June of 2011 so that these backdoor attempts by the federal agency to apparently drive the tribes apart could have been avoided.

As an aside, I urge your office to reconsider its current proposal and sit at the table with the tribes that have been consulting on this project since 2011 so that proper 106 procedures can be followed and not the feeble attempt at 106 compliance that is currently being conducted. The NRC specifically did not include the Three Affiliated Tribe or your office in the meeting of June 2011 due to the 2010 letters granting a no historic properties affected determination. Your offices have every right under the law to reenter the consultation process at any time, unfortunately, the way the NRC is conducting it – it is pitting your offices against the tribes who have been consulting for the past 1.5 years. This adversarial relationship that is apparently being encouraged by the NRC is not consultation in good faith by them. We should be united in our voice and opinions for this and all projects and not pitted against one another to circumvent the requirements for a federal law that they must follow.

If you have any questions about any of this – I would be more than happy to respond to them. 701 854 8510<tel:701%20854%208510> although email is probably better as I will not be in the office later today

Terry Clouthier
Standing Rock Sioux Tribe
Tribal Archaeologist

From: Bruce Nadeau [<mailto:brucefnadeau@gmail.com> <<mailto:brucefnadeau@gmail.com>>]
Sent: Thursday, November 01, 2012 9:02 AM
To: Waste'Win Young
Cc: Haimanot.Yilma@nrc.gov<<mailto:Haimanot.Yilma@nrc.gov>>;
rwithrow@louisberger.com<<mailto:rwithrow@louisberger.com>>; Terence Clouthier; dianned@swo-
nsn.gov<<mailto:dianned@swo-nsn.gov>>; Russell Eagle Bear
(reaglebear@yahoo.com<<mailto:reaglebear@yahoo.com>>); Ben Rhodd
(brhodd1@yahoo.com<<mailto:brhodd1@yahoo.com>>); Conrad Fisher
(conrad.fisher@cheyennenation.com<<mailto:conrad.fisher@cheyennenation.com>>); Wanda Wells
(wandawells@midstatesd.net<<mailto:wandawells@midstatesd.net>>); Lana Gravatt
(gravattlana@yahoo.com<<mailto:gravattlana@yahoo.com>>); Clair Green
(clairsgreen@yahoo.com<<mailto:clairsgreen@yahoo.com>>);
jb.weston@fsst.org<<mailto:jb.weston@fsst.org>>; Elgin Crows Breast
(redhawk@mhanation.com<<mailto:redhawk@mhanation.com>>); Dennis Yellow Thunder
(ostnrrafd@gwtc.net<<mailto:ostnrrafd@gwtc.net>>); Fred Mousseau
(ostnrrathpo@gwtc.net<<mailto:ostnrrathpo@gwtc.net>>); Curly Youpee
(cultres@nemontel.net<<mailto:cultres@nemontel.net>>); James Whitted
(jmswhitted@yahoo.com<<mailto:jmswhitted@yahoo.com>>); Steve Vance (steve.vance@crst-
nsn.gov<<mailto:steve.vance@crst-nsn.gov>>)
Subject: Re: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR
PROJECT

Just a point of order.

The fact that the project area is part of Sioux Territory (Ft. Laramie Treaty) is a moot point. It seems to me just recently that Makoche Wowapi conducted a few TCP surveys in northwestern North Dakota on lands that are Chippewa and Three Affiliated Tribes territory under the 1904 Davis Agreement and Fort Laramie Treaty (MHA portion). Obviously respecting treaty boundaries wasn't a consideration then.

Sincerely,

Turtle Mountain Tribe THPO

On Wed, Oct 31, 2012 at 3:54 PM, Waste'Win Young

<wyoung@standingrock.org<<mailto:wyoung@standingrock.org>>> wrote:

Just for the record. The Standing Rock Sioux Tribal Council passed a resolution in 2010 against working with KLJ because of comments made by a KLJ archeologist Brian O'Danacha in 2009 that "they should just bulldoze all this Indian shit." This is a documented incident.

In addition to this, Turtle Mountain and Three Affiliated Tribes have sites of significance that are different from the Dakota, Lakota and Nakota.

This area was classified as Sioux Territory under the Fort Laramie Treaties of 1851 and 1868.

Please forward this to Kevin.

Wašté Win Young

Standing Rock Sioux Tribe

Tribal Historic Preservation Officer

(701)-854-8645<tel:%28701%29-854-8645> work

(701)-854-2138<tel:%28701%29-854-2138> fax

From: Yilma, Haimanot [<mailto:Haimanot.Yilma@nrc.gov><<mailto:Haimanot.Yilma@nrc.gov>>]

Sent: Wednesday, October 31, 2012 2:37 PM

To: Yilma, Haimanot

Cc: Jamerson, Kellee

Subject: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Dear Tribal Historic Preservation Officers:

Please find attached a letter enclosing a survey proposal for the proposed Dewey-Burdock In-Situ Recovery Project. The NRC staff will also mail this letter to each Tribal President or Chair with a cc to the THPOs.

If you have any questions regarding this email or its contents, please contact Randy Withrow or myself.

Thank you,

Haimanot Yilma

Project Manager

FSME/DWMEP/EPPAD/ERB

U.S Nuclear Regulatory Commission

Phone: 301-415-8029<tel:301-415-8029>

email: haimanot.yilma@nrc.gov<<mailto:haimanot.yilma@nrc.gov>>

Mail Stop : T8F05

Randy Withrow

Sr. Program Manager | Cultural Resources

The Louis Berger Group, Inc.

900 50th Street | Marion, IA 52302

Office: 319.373.3043, ext. 3035<tel:319.373.3043%2C%20ext.%203035>

Cell: 515.441.6497<tel:515.441.6497>

DeweyBurdPubEm Resource

From: Richard Iron Cloud [ostnrranrd@gwtc.net]
Sent: Friday, November 02, 2012 2:45 PM
To: Yilma, Haimanot
Cc: Jamerson, Kellee; 'dianne desrosiers'; 'Steve Vance'; 'Lana Gravatt'; 'Waste Win Young'; 'Conrad Fisher'
Subject: RE: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

The Oglala Sioux Tribe participated in a teleconference on Thursday, November 1st, 2012, with the Tribal Historic Preservation Officers from the following tribes; Cheyenne River Sioux Tribe, Lower Brule Sioux Tribe, Sisseton Sioux Tribe, Northern Cheyenne, Rosebud Sioux Tribe, Standing Rock Sioux and the Yankton Sioux Tribe. It was the consensus of the Tribes present that the November 07, 2012 deadline was not sufficient time to make a decision on the proposed contract, so therefore we are requesting an extension.

Wilmer Mesteth; Oglala Sioux Tribal Historic Preservation Officer

Respectfully,

Richard Iron Cloud

Natural & Cultural Resources Director
 Natural Resources Regulatory Agency
 Oglala Sioux Tribe
 (605) 867-5624 office
 (605) 867-2818 facsimilie



Please consider the environment before printing this e-mail

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Sent: Wednesday, October 31, 2012 1:37 PM
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If you have any questions regarding this email or its contents, please contact Randy Withrow or myself.

Thank you,

Haimanot Yilma

Project Manager
 FSME/DWMEP/EPPAD/ERB
 U.S Nuclear Regulatory Commission
 Phone: 301-415-8029
 email: haimanot.yilma@nrc.gov
 Mail Stop : T8F05

Randy Withrow

Sr. Program Manager | Cultural Resources

The Louis Berger Group, Inc.

900 50th Street | Marion, IA 52302

Office: 319.373.3043, ext. 3035

Cell: 515.441.6497

Hearing Identifier: Powertech_Uranium_Dewey_Burdock_LA_Public
Email Number: 234

Mail Envelope Properties (000001cdb92a\$2525ed60\$6f71c820\$)

Subject: RE: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED
 DEWEY-BURDOCK ISR PROJECT
Sent Date: 11/2/2012 2:44:48 PM
Received Date: 11/2/2012 2:48:52 PM
From: Richard Iron Cloud

Created By: ostonrranrd@gwtc.net

Recipients:

"Jamerson, Kellee" <Kellee.Jamerson@nrc.gov>
 Tracking Status: None
 "dianne desrosiers" <dyandancer@yahoo.com>
 Tracking Status: None
 "Steve Vance" <steve.vance@crst-nsn.gov>
 Tracking Status: None
 "Lana Gravatt" <gravattlana@yahoo.com>
 Tracking Status: None
 "Waste Win Young" <wyoung@standingrock.org>
 Tracking Status: None
 "Conrad Fisher" <conrad.fisher@cheyennation.com>
 Tracking Status: None
 "Yilma, Haimanot" <Haimanot.Yilma@nrc.gov>
 Tracking Status: None

Post Office: net

Files	Size	Date & Time
MESSAGE	1935	11/2/2012 2:48:52 PM

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

DeweyBurdPubEm Resource

From: Yilma, Haimanot
Sent: Friday, November 02, 2012 5:40 PM
To: Bruce Nadeau; Terence Clouthier; Hsueh, Kevin; Jamerson, Kellee
Cc: Waste'Win Young; rwithrow@louisberger.com; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennenation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com); jb.weston@fsst.org; Elgin Crows Breast (redhawk@mhanation.com); Dennis Yellow Thunder (ostnrrafd@gwtc.net); Fred Mousseau (ostnrrathpo@gwtc.net); Curly Youpee (cultres@nemontel.net); James Whitted (jmswhitted@yahoo.com); Steve Vance (steve.vance@crst-nsn.gov); Kade Ferris
Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT
Attachments: CORE FIELD TEAM D-B IN-SITU.pdf.pdf

All,

As stated in our email yesterday, attached please find the names of individuals scheduled to participate in the survey effort.

Sincerely,

Haimanot Yilma

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Terry Clouthier

Standing Rock Sioux Tribe

Tribal Archaeologist

From: Bruce Nadeau [mailto:brucefnadeau@gmail.com]

Sent: Thursday, November 01, 2012 9:02 AM

To: Waste'Win Young

Cc: Haimanot.Yilma@nrc.gov; rwithrow@louisberger.com; Terence Clouthier; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com); jb.weston@fsst.org; Elgin Crows Breast

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Wašté Win Young

Standing Rock Sioux Tribe

Tribal Historic Preservation Officer

[\(701\)-854-8645](tel:(701)-854-8645) work

[\(701\)-854-2138](tel:(701)-854-2138) fax

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Haimanot Yilma

Project Manager

FSME/DWMEP/EPPAD/ERB

U.S Nuclear Regulatory Commission

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Hearing Identifier: Powertech_Uranium_Dewey_Burdock_LA_Public
Email Number: 233

Mail Envelope Properties (980B7CA25C4BC14B938BA946F668D71006DBFE7714)

Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT
Sent Date: 11/2/2012 5:39:51 PM
Received Date: 11/2/2012 5:39:00 PM
From: Yilma, Haimanot

Created By: Haimanot.Yilma@nrc.gov

Recipients:

"Waste'Win Young" <wyoung@standingrock.org>
Tracking Status: None
"rwithrow@louisberger.com" <rwithrow@louisberger.com>
Tracking Status: None
"dianned@swo-nsn.gov" <dianned@swo-nsn.gov>
Tracking Status: None
"Russell Eagle Bear (reaglebear@yahoo.com)" <reaglebear@yahoo.com>
Tracking Status: None
"Ben Rhodd (brhodd1@yahoo.com)" <brhodd1@yahoo.com>
Tracking Status: None
"Conrad Fisher (conrad.fisher@cheyennenation.com)" <conrad.fisher@cheyennenation.com>
Tracking Status: None
"Wanda Wells (wandawells@midstatesd.net)" <wandawells@midstatesd.net>
Tracking Status: None
"Lana Gravatt (gravattlana@yahoo.com)" <gravattlana@yahoo.com>
Tracking Status: None
"Clair Green (clairsgreen@yahoo.com)" <clairsgreen@yahoo.com>
Tracking Status: None
"jb.weston@fsst.org" <jb.weston@fsst.org>
Tracking Status: None
"Elgin Crows Breast (redhawk@mhanation.com)" <redhawk@mhanation.com>
Tracking Status: None
"Dennis Yellow Thunder (ostnrrafd@gwtc.net)" <ostnrrafd@gwtc.net>
Tracking Status: None
"Fred Mousseau (ostnrrathpo@gwtc.net)" <ostnrrathpo@gwtc.net>
Tracking Status: None
"Curly Youpee (cultres@nemontel.net)" <cultres@nemontel.net>
Tracking Status: None
"James Whitted (jmswhitted@yahoo.com)" <jmswhitted@yahoo.com>
Tracking Status: None
"Steve Vance (steve.vance@crst-nsn.gov)" <steve.vance@crst-nsn.gov>
Tracking Status: None
"Kade Ferris" <Kade.Ferris@kljeng.com>
Tracking Status: None
"Bruce Nadeau" <brucefnadeau@gmail.com>
Tracking Status: None
"Terence Clouthier" <tclouthier@standingrock.org>
Tracking Status: None
"Hsueh, Kevin" <Kevin.Hsueh@nrc.gov>
Tracking Status: None

"Jamerson, Kellee" <Kellee.Jamerson@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	11999	11/2/2012 5:39:00 PM
CORE FIELD TEAM D-B IN-SITU.pdf.pdf		47862

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

CORE FIELD SURVEY TEAM COMPOSITION

TURTLE MOUNTAIN BAND OF CHIPPEWA THPO

Bruce F. Nadeau Sr., Tribal Field Coordinator

Russell Davis, THPO Technician

THREE AFFILIATED TRIBES OF THE MHA NATION THPO

Elgin Crows Breast, Tribal Field Coordinator

Calvin Grinnell, Tribal Historian

KLJ

Jennifer Harty, Project Manager

Kade Ferris, Principal Investigator

Christopher Tinti, Archaeologist

Chad Kalbfleisch, Archaeologist

DeweyBurdPubEm Resource

From: Yilma, Haimanot
Sent: Friday, November 02, 2012 5:41 PM
To: Richard Iron Cloud; Hsueh, Kevin; Withrow, Randy
Cc: Jamerson, Kellee; 'dianne desrosiers'; 'Steve Vance'; 'Lana Gravatt'; 'Waste Win Young'; 'Conrad Fisher'
Subject: RE: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Richard,

Thank you for getting back to us regarding the offer to have interested tribes participate in the field survey along with Turtle Mountain Tribe, Three Affiliated Tribes and KLJ. We understand that some of the interested THPOs want more time to make a decision. Considering the lateness of the season, we propose an extension from Nov 7, 2012 to Nov 13, 2012. We hope this extension gives you enough time to reach your decision.

Sincerely,

Haimanot Yilma

From: Richard Iron Cloud [<mailto:ostnrranrd@gwtc.net>]
Sent: Friday, November 02, 2012 2:45 PM
To: Yilma, Haimanot
Cc: Jamerson, Kellee; 'dianne desrosiers'; 'Steve Vance'; 'Lana Gravatt'; 'Waste Win Young'; 'Conrad Fisher'
Subject: RE: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

The Oglala Sioux Tribe participated in a teleconference on Thursday, November 1st, 2012, with the Tribal Historic Preservation Officers from the following tribes; Cheyenne River Sioux Tribe, Lower Brule Sioux Tribe, Sisseton Sioux Tribe, Northern Cheyenne, Rosebud Sioux Tribe, Standing Rock Sioux and the Yankton Sioux Tribe. It was the consensus of the Tribes present that the November 07, 2012 deadline was not sufficient time to make a decision on the proposed contract, so therefore we are requesting an extension.

Wilmer Mesteth; Oglala Sioux Tribal Historic Preservation Officer

Respectfully,

Richard Iron Cloud

Natural & Cultural Resources Director
 Natural Resources Regulatory Agency
 Oglala Sioux Tribe
 (605) 867-5624 office
 (605) 867-2818 facsimilie



Please consider the environment before printing this e-mail

From: Yilma, Haimanot [<mailto:Haimanot.Yilma@nrc.gov>]
Sent: Wednesday, October 31, 2012 1:37 PM
To: Yilma, Haimanot
Cc: Jamerson, Kellee
Subject: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Dear Tribal Historic Preservation Officers:

Please find attached a letter enclosing a survey proposal for the proposed Dewey-Burdock *In-Situ* Recovery Project. The NRC staff will also mail this letter to each Tribal President or Chair with a cc to the THPOs.

If you have any questions regarding this email or its contents, please contact Randy Withrow or myself.

Thank you,

Haimanot Yilma

Project Manager

FSME/DWMEP/EPPAD/ERB

U.S Nuclear Regulatory Commission

Phone: 301-415-8029

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Mail Stop : T8F05

Randy Withrow

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Cell: 515.441.6497

Hearing Identifier: Powertech_Uranium_Dewey_Burdock_LA_Public
Email Number: 232

Mail Envelope Properties (980B7CA25C4BC14B938BA946F668D71006DBFE7715)

Subject: RE: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED
 DEWEY-BURDOCK ISR PROJECT
Sent Date: 11/2/2012 5:40:37 PM
Received Date: 11/2/2012 5:40:00 PM
From: Yilma, Haimanot

Created By: Haimanot.Yilma@nrc.gov

Recipients:

"Jamerson, Kellee" <Kellee.Jamerson@nrc.gov>
 Tracking Status: None
 "dianne desrosiers" <dyandancer@yahoo.com>
 Tracking Status: None
 "Steve Vance" <steve.vance@crst-nsn.gov>
 Tracking Status: None
 "Lana Gravatt" <gravattlana@yahoo.com>
 Tracking Status: None
 "Waste Win Young" <wyoung@standingrock.org>
 Tracking Status: None
 "Conrad Fisher" <conrad.fisher@cheyennation.com>
 Tracking Status: None
 "Richard Iron Cloud" <ostnrranrd@gwtc.net>
 Tracking Status: None
 "Hsueh, Kevin" <Kevin.Hsueh@nrc.gov>
 Tracking Status: None
 "Withrow, Randy" <rwithrow@louisberger.com>
 Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE	2766	11/2/2012 5:40:00 PM

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

DeweyBurdPubEm Resource

From: Steve Vance [steve.vance@crst-nsn.gov]
Sent: Friday, November 02, 2012 6:44 PM
To: Yilma, Haimanot
Cc: Bob Walters; beneeagle2@hotmail.com; brhodd1@yahoo.com; Conrad Fisher (esevone1@yahoo.com); dyandancer@yahoo.com; Dana.Dupris; Lana Gravatt; Halley.Maynard; Bryce In The Woods; James Weston (jb.weston@fsst.org); James Whitted (jmswhitted@yahoo.com); Wilmer Mesteth (ostnrrathpo@gwtc.net); Michael Catches Enemy; Richard Iron Cloud (ostnrrapro@gwtc.net); Robin.LeBeau; Ryman.LeBeau; Rosebud Sioux Tribe (rstthpo@yahoo.com); 'steve_emery1989@hotmail.com'; Ted "Buddy" Knife Jr; 'Terence Clouthier (tclouthier@standingrock.org)'; Tamara St John (tamara_stjohn@yahoo.com); Waste'Win Young (wyoung@standingrock.org); Wanda Wells (wandawells@midstatesd.net)
Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Greetings Nuclear Regulatory Commission (NRC),

The Cheyenne River Sioux Tribe THPO is requesting an extension of thirty (30) days for further review. The NRCs Proposed Dewey/Burdock Project is not the only project for review by the Lakota (Sioux) Government. NRC has also submitted the Proposed Crow Butte/North Trend on the same day October 31, 2012. The review of these need to be brought to CRST Council, who I feel do have questions and comments as to who NRC has selected for proper identification, evaluation and nomination eligibility. I am sure our Council has never heard of these names listed for the proposed survey.

NRC knows the position of the CRST Tribal Council's Resolution to any new or expansion of uranium mining in Treaty Territory (Black Hills) and ancestral territories of origin.

This is not just a push of time and money by applicants, companies, and the US Government but destruction of our Natural L.A.W. (land, air, water) as was stated in the CRST Resolution submitted to NRC.

NRC is supposed to represent the United States, with respect to the trust responsibility of Treaties agreed upon for PEACE, not just "with the best interest of Tribes" and "in good faith effort".

The seven (7) days for review is not sufficient.

Respectfully

Steve Vance

Tribal Historic Preservation Officer
 Cheyenne River Sioux Tribe
 Cultural Preservation Office
 P.O. Box 590
 98 S. Willow St.
 Eagle Butte, SD 57625
 (605) 964-7553
 (605) 964-7554
 (605) 964-7552 FAX
 (605) 200-0651
steve.vance@crst-nsn.gov
cpthpo@lakotanetwork.com

From: Yilma, Haimanot [mailto:Haimanot.Yilma@nrc.gov]
Sent: Friday, November 02, 2012 3:40 PM
To: Bruce Nadeau; Terence Clouthier; Hsueh, Kevin; Jamerson, Kellee
Cc: Waste'Win Young; rwithrow@louisberger.com; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennenation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com);

jb.weston@fsst.org; Elgin Crows Breast (redhawk@mhanation.com); Dennis Yellow Thunder (ostnrrafd@gwtc.net); Fred Mousseau (ostnrrathpo@gwtc.net); Curly Youpee (cultres@nemontel.net); James Whitted (jmswhitted@yahoo.com); Steve Vance; Kade Ferris

Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

All,

As stated in our email yesterday, attached please find the names of individuals scheduled to participate in the survey effort.

Sincerely,

Haimanot Yilma

From: Bruce Nadeau [<mailto:brucefnadeau@gmail.com>]

Sent: Thursday, November 01, 2012 1:15 PM

To: Terence Clouthier

Cc: Waste'Win Young; Yilma, Haimanot; rwithrow@louisberger.com; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennenation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com); jb.weston@fsst.org; Elgin Crows Breast (redhawk@mhanation.com); Dennis Yellow Thunder (ostnrrafd@gwtc.net); Fred Mousseau (ostnrrathpo@gwtc.net); Curly Youpee (cultres@nemontel.net); James Whitted (jmswhitted@yahoo.com); Steve Vance (steve.vance@crst-nsn.gov)

Subject: Re: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Thanks for the information Terry.

At present we are concerned only with the land/area of potential effect with which we have been contracted to provide inventory for. Any other issues outside of this discrete area is something that would require additional scrutiny beyond the current proposed scope.

Respectfully,

Bruce Nadeau

On Thu, Nov 1, 2012 at 11:28 AM, Terence Clouthier <tclouthier@standingrock.org> wrote:

Hi Bruce,

I'm not sure if you are up to date on the current status of this project and the attempts by the federal agency to apparently ignore the Section 106 process. It wouldn't surprise me if you were not given the lack of good faith consultation that this project exemplifies. In particular, there has been a concentrated effort by the federal agency to move this project along without addressing the pressing concerns that all of the consulting tribes currently have. Your office issued a no historic properties determination back in 2010 for this project and stated that you had no concerns at all with this project and that it would not affect any sites of significance for your tribe (stamped on a letter from March 19th, 2010). The fact that the NRC is now going with a proposal from your office at basically the 11th hour and ignoring all of the information that has been provided since 2011 further illustrates the lengths this federal agency will apparently go to not complete the Section 106 process in a good faith manner.

In particular, the consulting tribes that have been in consultation with the NRC and applicants for the past year and a half have issues with the following:

- Sites of significance to tribes cannot be identified by archaeologists. This was proven to them in the field during the meetings in June of 2011 when the consulting tribes visited the project area and showed the NRC sites that were missed by their archaeological consultants. The consulting tribes have requested a 100% survey of the entire area of potential effects (indirect and direct)- we have never waived on this. Yet, the current proposal will not conduct a 100% survey of the entire project area. A project area that constantly changes numbers from the entire license boundary (10000+acres) to 2673 acres to 3000+ acres depending on which disposal method is used.

- Information was given at a meeting in February 2012 illustrating that a predictive model cannot address the sites of concerns for the consulting tribes. This information was given directly to the Federal agencies involved in this project only and not to the applicant or any third party consultants. The current proposal that your office is involved in is a predictive model without actually naming it that. The NRC is ignoring the information they gained during the February 2012 meeting to keep to their and the applicants timeline for the EIS to be issued.

- The current proposal only addresses the direct area of potential effect of the project. I'm not sure how familiar you are with the Section 106 process Bruce as I understand you are just recently appointed into your position and I apologize in advance if you are very familiar with the 106 process. 36CFR800.16 (d) defines the area of potential effects as both the indirect and direct effects that an undertaking may have on historic properties. This has been a sticking point for the consulting tribes. The applicant and the NRC only want to complete a survey for the direct effects. They are ignoring the law. The Scope of work submitted by the tribes addressed this concern and a PA was supposed to be developed to address the other 8000 acres that would need to be surveyed. They are continuing to ignore this and your current proposal allows them to do this.

- The NRC basically tried to move the 106 process forward without doing any identification efforts that are required by 36CFR800.4 per their letter of August 30, 2012. The only reason the letter from Oct 12 even came out was because the NRC was informed by the consulting tribes and by the ACHP that what they were trying to do was essentially illegal. There is no provision within 36CFR800.4 that allows them to stop consulting with the tribes for the identification efforts. The only place where they can terminate consultation is 36CFR800.7 for the resolution of adverse effects not during the identification phase. Once again, the NRC is apparently trying to find a way out of their Section 106 responsibilities.

Unfortunately, I could spend all day illustrating to you exactly how this federal agency is apparently trying to circumvent the 106 process but I will just stop here. I have attached the Standing Rock Sioux Tribes response to the October 12 letter which illustrates the points above. The ACHP is well aware of the issues involved in this project and unfortunately, the latest proposal by your office with the Three Affiliated Tribe and KLJ does absolutely nothing to address these issues

besides create another avenue for the federal agency to try and avoid the consulting tribes concerns. I truly wish that your office and the THPO office of the Three Affiliated Tribes had been involved in this process from the beginning of consultation back in June of 2011 so that these backdoor attempts by the federal agency to apparently drive the tribes apart could have been avoided.

As an aside, I urge your office to reconsider its current proposal and sit at the table with the tribes that have been consulting on this project since 2011 so that proper 106 procedures can be followed and not the feeble attempt at 106 compliance that is currently being conducted. The NRC specifically did not include the Three Affiliated Tribe or your office in the meeting of June 2011 due to the 2010 letters granting a no historic properties affected determination. Your offices have every right under the law to reenter the consultation process at any time, unfortunately, the way the NRC is conducting it – it is pitting your offices against the tribes who have been consulting for the past 1.5 years. This adversarial relationship that is apparently being encouraged by the NRC is not consultation in good faith by them. We should be united in our voice and opinions for this and all projects and not pitted against one another to circumvent the requirements for a federal law that they must follow.

If you have any questions about any of this – I would be more than happy to respond to them. [701 854 8510](tel:7018548510) although email is probably better as I will not be in the office later today

Terry Clouthier

Standing Rock Sioux Tribe

Tribal Archaeologist

From: Bruce Nadeau [mailto:brucefnadeau@gmail.com]

Sent: Thursday, November 01, 2012 9:02 AM

To: Waste'Win Young

Cc: Haimanot.Yilma@nrc.gov; rwithrow@louisberger.com; Terence Clouthier; dianned@swo-nsn.gov; Russell Eagle Bear (reaglebear@yahoo.com); Ben Rhodd (brhodd1@yahoo.com); Conrad Fisher (conrad.fisher@cheyennenation.com); Wanda Wells (wandawells@midstatesd.net); Lana Gravatt (gravattlana@yahoo.com); Clair Green (clairsgreen@yahoo.com); jb.weston@fsst.org; Elgin Crows Breast (redhawk@mhanation.com); Dennis Yellow Thunder (ostnrrafd@gwtc.net); Fred Mousseau (ostnrrathpo@gwtc.net); Curly Youpee (cultres@nemontel.net); James Whitted (jmswhitted@yahoo.com); Steve Vance (steve.vance@crst-nsn.gov)

Subject: Re: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Just a point of order.

The fact that the project area is part of Sioux Territory (Ft. Laramie Treaty) is a moot point. It seems to me just

recently that Makoche Wowapi conducted a few TCP surveys in northwestern North Dakota on lands that are Chippewa and Three Affiliated Tribes territory under the 1904 Davis Agreement and Fort Laramie Treaty (MHA portion). Obviously respecting treaty boundaries wasn't a consideration then.

Sincerely,

Turtle Mountain Tribe THPO

On Wed, Oct 31, 2012 at 3:54 PM, Waste'Win Young <wyoung@standingrock.org> wrote:

Just for the record. The Standing Rock Sioux Tribal Council passed a resolution in 2010 against working with KLJ because of comments made by a KLJ archeologist Brian O'Danacha in 2009 that "they should just bulldoze all this Indian shit." This is a documented incident.

In addition to this, Turtle Mountain and Three Affiliated Tribes have sites of significance that are different from the Dakota, Lakota and Nakota.

This area was classified as Sioux Territory under the Fort Laramie Treaties of 1851 and 1868.

Please forward this to Kevin.

Wašté Win Young

Standing Rock Sioux Tribe

Tribal Historic Preservation Officer

(701)-854-8645 work

(701)-854-2138 fax

From: Yilma, Haimanot [mailto:Haimanot.Yilma@nrc.gov]

Sent: Wednesday, October 31, 2012 2:37 PM

To: Yilma, Haimanot

Cc: Jamerson, Kellee

Subject: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED DEWEY-BURDOCK ISR PROJECT

Dear Tribal Historic Preservation Officers:

Please find attached a letter enclosing a survey proposal for the proposed Dewey-Burdock *In-Situ* Recovery Project. The NRC staff will also mail this letter to each Tribal President or Chair with a cc to the THPOs.

If you have any questions regarding this email or its contents, please contact Randy Withrow or myself.

Thank you,

Haimanot Yilma

Project Manager

FSME/DWMEP/EPPAD/ERB

U.S Nuclear Regulatory Commission

Phone: [301-415-8029](tel:301-415-8029)

email: haimanot.yilma@nrc.gov

Mail Stop : T8F05

Randy Withrow

Sr. Program Manager | Cultural Resources

The Louis Berger Group, Inc.

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Office: [319.373.3043](tel:319.373.3043), ext. 3035

Hearing Identifier: Powertech_Uranium_Dewey_Burdock_LA_Public
Email Number: 235

Mail Envelope Properties (1D3F520392587F43B9890A1093D0A093B6C93C019A)

Subject: RE: FW: TRANSMITTAL OF SURVEY PROPOSAL FOR THE PROPOSED
 DEWEY-BURDOCK ISR PROJECT
Sent Date: 11/2/2012 6:44:21 PM
Received Date: 11/2/2012 6:41:12 PM
From: Steve Vance

Created By: steve.vance@crst-nsn.gov

Recipients:

"Bob Walters" <b_walters40@yahoo.com>
 Tracking Status: None
 "beneeeagle2@hotmail.com" <beneeeagle2@hotmail.com>
 Tracking Status: None
 "brhodd1@yahoo.com" <brhodd1@yahoo.com>
 Tracking Status: None
 "Conrad Fisher (esevone1@yahoo.com)" <esevone1@yahoo.com>
 Tracking Status: None
 "dyandancer@yahoo.com" <dyandancer@yahoo.com>
 Tracking Status: None
 "Dana.Dupris" <dana.dupris@crst-nsn.gov>
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 "Lana Gravatt" <gravattlana@yahoo.com>
 Tracking Status: None
 "Halley.Maynard" <halley.maynard@crst-nsn.gov>
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 "Bryce In The Woods" <inthewoods@lakotanetwork.com>
 Tracking Status: None
 "James Weston (jb.weston@fsst.org)" <jb.weston@fsst.org>
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 "James Whitted (jmswhitted@yahoo.com)" <jmswhitted@yahoo.com>
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 "Wilmer Mesteth (ostnrrathpo@gwtc.net)" <ostnrrathpo@gwtc.net>
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 "Michael Catches Enemy" <ostnrranrd@gwtc.net>
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 "Robin.LeBeau" <robin.lebeau@crst-nsn.gov>
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 "Ryman.LeBeau" <ryman.lebeau@crst-nsn.gov>
 Tracking Status: None
 "Rosebud Sioux Tribe (rstthpo@yahoo.com)" <rstthpo@yahoo.com>
 Tracking Status: None
 "steve_emery1989@hotmail.com" <steve_emery1989@hotmail.com>
 Tracking Status: None
 "Ted "Buddy" Knife Jr" <t_knifejr@hotmail.com>
 Tracking Status: None
 "Terence Clouthier (tclouthier@standingrock.org)" <tclouthier@standingrock.org>
 Tracking Status: None

"Tamara St John (tamara_stjohn@yahoo.com)" <tamara_stjohn@yahoo.com>

Tracking Status: None

"Waste'Win Young (wyoung@standingrock.org)" <wyoung@standingrock.org>

Tracking Status: None

"Wanda Wells (wandawells@midstatesd.net)" <wandawells@midstatesd.net>

Tracking Status: None

"Yilma, Haimanot" <Haimanot.Yilma@nrc.gov>

Tracking Status: None

Post Office: Exchange

Files	Size	Date & Time
MESSAGE	15113	11/2/2012 6:41:12 PM

Options

Priority: Standard

Return Notification: Yes

Reply Requested: Yes

Sensitivity: Normal

Expiration Date:

Recipients Received:

EXHIBIT 11

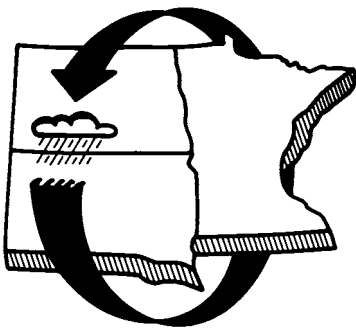
Treatment Systems for Household Water Supplies

Reverse Osmosis

Fred Bergsrud
Water Quality Coordinator
Minnesota Extension Service

Bruce Seelig
Water Quality Specialist
North Dakota Extension Service

Russell Derickson
Extension Associate in Water and Natural Resources
South Dakota Extension Service



What impurities will reverse osmosis remove?

Reverse osmosis (RO) has become a common method for the treatment of household drinking water supplies. Effectiveness of RO units depends on initial levels of contamination and water pressure. RO treatment may be used to reduce the levels of:

1. Naturally occurring substances that cause water supplies to be unhealthy or unappealing (foul tastes, smells or colors).
2. Substances that have contaminated the water supply resulting in possible adverse health effects or decreased desirability.

RO systems are typically used to reduce the levels of total dissolved solids and suspended matter. The principal uses of reverse osmosis in Minnesota and the Dakotas are for the reduction of high levels of nitrate, sulfate, sodium and total dissolved solids.

RO units with carbon filters may also reduce the level of some SOC (soluble organic compounds) like pesticides, dioxins and VOCs (volatile organic compounds like chloroform and petrochemicals). An RO unit alone may not be the best solution for these

types of contaminants, but installing a properly designed RO unit to reduce the levels of other contaminants may provide a reduction in SOC and VOCs.

How to test your water

Before installing any water treatment system be sure to have the water tested. The test will identify the bacteria and level of minerals that are present. Interpretation of the test results will help determine whether treatment is needed and what type of system or systems to consider. The intended use of the water (drinking only, drinking and cooking, laundry, or all household uses) will also help determine the extent of treatment needed and the type of system to select.

Note: RO systems are normally used to treat only drinking and cooking water supplies so may not be preferred where larger supplies are being treated. RO systems are not appropriate for treating water supplies that are contaminated by coliform bacteria.

The water test analysis and interpretation will provide information about both naturally-occurring substances and those resulting from human activity. Treatment of

NDSU
Extension Service
North Dakota State University
Fargo, North Dakota 58105

FEBRUARY 1992
Reviewed January 2008

contaminated water supplies should be considered only as a temporary solution. The best solution is to remove the source(s) of contamination and/or obtain a new water supply.

How reverse osmosis works

Reverse osmosis is sometimes referred to as ultrafiltration because it involves the movement of water through a membrane as shown in Figure 1. The membrane has microscopic openings that allow water molecules, but not larger compounds, to pass through. Some RO membranes also have an electrical charge that helps in rejecting some chemicals at the membrane surface. Proper maintenance is essential to retain effectiveness over time. Some units are equipped with automatic membrane flushing systems to clean the membrane.

How is effectiveness measured?

The effectiveness of RO units is characterized by the rejection rate or rejection percentage. The rejection rate is the percent of a contaminant that does not move through, or is rejected by, the membrane. Some typical rejection rates for common contaminants are shown in Table 1. These rejection rates are for single contaminants under design conditions.

Where water contains more than one contaminant, the rejection rate for each contaminant may be reduced or one of the contaminants may be reduced in preference to the other contaminant. For example, cases have been reported where water supplies containing either high TDS levels or high sulfates in combination with nitrates show no decrease in nitrates after treatment.

Figure 1. Dynamic Cross-Section of a Reverse Osmosis Unit

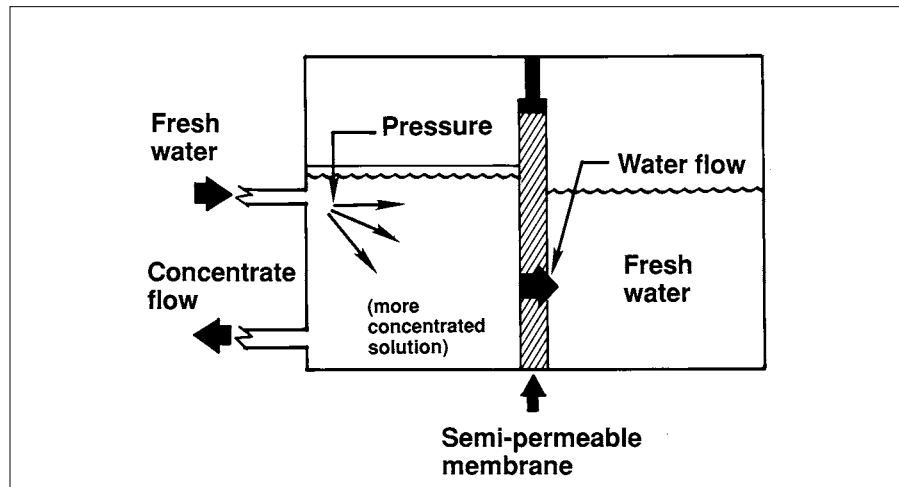


Table 1. Typical Rejection Rates for Common Contaminants

Contaminant	Rejection Rate Range*	
	Laboratory Tests	Field Tests
Nitrates	83 - 92 %	** - 92%
Total Dissolved Solids	95 - 99 %	60% - 99%
Sulfates	90 - 98 %	60% - 98%
Sodium	87 - 93 %	60% - 93%

*These values are for properly maintained units. Poorly maintained units will not be as effective at removing contaminants and, in the worst case, may not be removing any contaminants.

(Nitrates as used in this publication refers to nitrate-nitrogen or $\text{NO}_3\text{-N}$.)

Rejection rates need to be high enough to reduce the contaminant level in the untreated water to a safe level. To determine the needed rejection rate, it is necessary to consider the initial concentration. For example, if a water supply contains nitrates at a concentration of 20 milligrams per liter (mg/l), an RO unit rejecting at a rate of 85 percent, which means 15 percent re-remaining, would reduce the level to 3 mg/l (20 times 0.15 = 3).

Water with very high levels of nitrates (such as 100 mg/l) would re-main near or above health standard levels even after treatment. Nitrate levels this high are not expected in this region and indicate unusual problems that require special investigation and handling. The National Sanitation Foundation (NSF) recommends that special designs be used for RO units where the $\text{NO}_3\text{-N}$ level exceeds 40 mg/l.

Disadvantages of reverse osmosis units

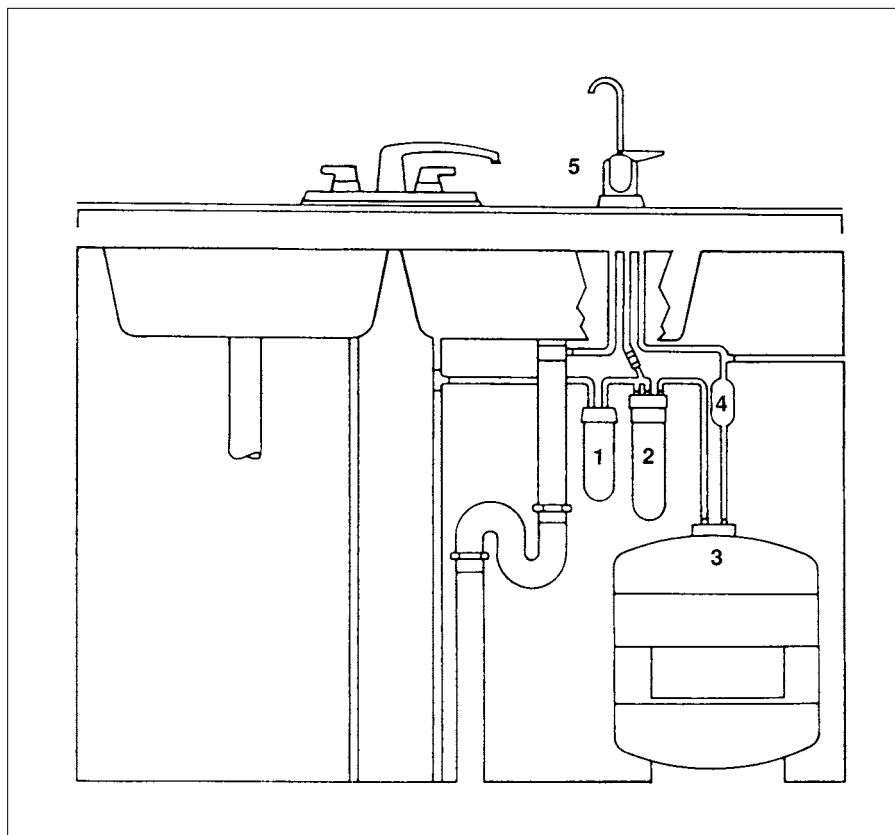
RO units use a lot of water. They recover only 5 to 15 percent of the water entering the system. The remainder is discharged as waste water. Because waste water carries with it the rejected contaminants, methods to recover this water are not practical for household systems. Waste water is typically connected to the house drains and will add to the load on the household septic system. An RO unit delivering 5 gallons of treated water per day may discharge 40 to 90 gallons of waste water per day to the septic system.

What types of equipment make up an RO System?

A typical home reverse osmosis treatment system is shown in Figure 2. The system is normally located beneath the kitchen sink since it is used to treat water for drinking and cooking purposes. RO systems consist of the pre-filter, RO membrane unit, a pressurized storage tank for the treated water, a post-filter and a separate delivery tap for the treated water supply.

The water supply entering the RO unit should be bacteriologically safe. RO units will remove virtually all microorganisms but they are not recommended for that use because of the possibility of contamination through pinhole leaks or deterioration due to bacterial growth. Water softeners are commonly used in Minnesota and the Dakotas in advance of the RO system.

Figure 2. A Typical Home RO System Includes: (1) particle filter, (2) reverse osmosis membrane unit, (3) pressurized treated-water storage container, (4) carbon adsorption post-filter, and (5) separate treated-water tap.



1. **Prefilter:** The prefilter is sometimes referred to as a sediment filter. It removes small suspended particles to extend the life of the membrane. Some membrane units are damaged by chlorine and others by bacterial growth. Where chlorine is present, a carbon prefilter may also be recommended.
2. **RO Membrane:** Several kinds of reverse osmosis membranes are available. The most common materials are cellulose acetate or polyamide resins. Mixtures or variations of these materials are also used. Each product has certain advantages and limitations and these need to be considered carefully.

Some of the factors that should be investigated are:

- The contaminant(s) involved and their initial concentration(s).
- The water supply rate, or whether the system will deliver enough water

to meet normal daily drinking and cooking requirements.

- The rejection rate, or the percentage of contaminants to be removed by the membrane.
- The water pressure required to meet the supply and rejection rates. That is, can this unit be operated on the normal operating pressure of a home water system or will a booster pump be required?
- How can the system's performance be monitored? That is, how can leaks or other problems be detected or how is the time for servicing or replacement determined? Some systems have built-in monitors, but many do not. Conductivity meters, pressure gauges and other devices can be used to detect problems where monitors are not included. Where coliform bacteria or other special contaminants are a known or

suspected problem, periodic testing is recommended.

3. **Storage Tank:** Most RO units supply treated water at very low rates so a storage tank of 2 to 5 gallons is used to provide a suitable supply. These units are pressurized to produce an adequate flow when the tap is open. Under sink storage requires minimum pressure to deliver water. Other locations may require increased delivery pressure which may reduce membrane performance.
4. **Post-Filter:** The main reason for postfiltration is to remove any undesirable taste and any residual organics from the treated water. Usually a carbon filter is used for this purpose. Where a carbon filter is used as a part of the prefiltration step, postfiltration is normally eliminated.

5. **Delivery Tap:** A separate delivery tap for the treated water is used so that both treated and untreated water are available.
6. **Other:** No special controls are required on most systems since they operate by the use of pressure-sensitive switches, check valves, or flexible bladders. Shut-off valves are important to conserve water during low use periods. Monitoring gauges or servicing lights are becoming increasingly common and assist greatly in knowing whether the system is or isn't working.

What does an RO System cost?

When deciding on a water treatment system be sure to investigate all options and all costs. To compare purchase to lease or rent options consider the following:

1. **Initial Costs of the System:** Be sure that all parts are included, especially when comparisons are being made. RO units range in cost from \$300 to \$3000 and vary in quality and effectiveness. Replacement membranes cost \$100 to \$200 and filter cartridges around \$50.
2. **Installation Costs:** These costs are generally the responsibility of the purchaser, but who pays installation fees when renting or leasing? Is there enough space to accommodate the system being considered or will some modifications of space be needed?
3. **Operating and Maintenance Costs:** Electricity to pump the water is the only significant operating cost.

Filter cleaning and/or replacement (both pre- and post-filters) and RO membrane replacement need to be estimated. Whether routine maintenance can be done by the owner or requires special service is important information when purchasing a system. When renting or leasing, how and when servicing is to be done and who pays for the supplies and service needs to be clearly stated. For example, is the service done on a schedule or an "as needed" basis?

Summary

Reverse osmosis is a proven technology that has been used successfully on a commercial basis. One of the better known uses of RO is the removal of salt from seawater. Household RO units typically deliver small amounts (2 to 10 gallons per day) of treated water and waste 3 to 20 times the amount of water treated. Reverse osmosis units remove many inorganic contaminants from household drinking water supplies. The removal effectiveness depends on the contaminant and its concentration, the membrane selected, the water pressure and proper installation. RO units require regular maintenance and monitoring to perform satisfactorily over an extended period of time. Before purchasing an RO unit or any other water treatment equipment, purchasers should test their water to be certain that treatment is needed and that the equipment being selected is appropriate to the problem requiring treatment. All costs need to be considered when comparing competitive systems and when making purchase or rental decisions.

Further Information

For further information contact your local county extension office or state health department. Additional information can be found in other publications in this series:

Treatment Systems For Household Water Supplies:

1. Activated Carbon Filtration
2. Chlorination
3. Distillation
4. Iron and Manganese Removal
5. Reverse Osmosis
6. Softening

References

MF-884 *Reverse Osmosis*,
Cooperative Extension Service,
Kansas State University,
Manhattan

Fact Sheet 4 *Water Treatment Notes: Reverse Osmosis Treatment of Drinking Water*, Cornell Cooperative Extension, New York State College of Human Ecology

Vol. 9, No. 2, 1991 *Water Review: Residential Reverse Osmosis*,
Water Quality Research Council

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EXHIBIT 12

OST-11

From: <Christina_Maes@fws.gov>
To: <nrcprep@nrc.gov>
Date: Wed, Sep 5, 2007 3:35 PM
Subject: ER_07_0604_NOI uranium Milling response

(See attached file: ER_07_0604.pdf)

Thank You,
Christina M. Maes
Region 6 RO Fisheries/Ecological Services
Administrative Assistant
303-236-4516 Direct Line
303-236-0027 Fax
Christina_Maes@fws.gov

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Add = J. Park (JRP)
W. Vontell (RWV)

OST-11

Mail Envelope Properties (46DF04FD.9A6 : 2 : 27046)**Subject:** ER_07_0604_NOI uranium Miling response**Creation Date** Wed, Sep 5, 2007 3:34 PM**From:** <Christina_Maes@fws.gov>**Created By:** Christina_Maes@fws.gov**Recipients**

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IN REPLY REFER TO

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FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

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Denver, Colorado 80225-0486

STREET LOCATION:

134 Union Blvd.
Lakewood, Colorado 80228-1807



OST-11

SEP 05 2007

Patrice Bubar, Deputy Director
Division of Intergovernmental Liaison and Rulemaking
U.S. Nuclear Regulatory Commission
Mail Stop T-6D59
Washington, D.C. 20555-0001

Dear Ms. Bubar:

The U.S. Fish and Wildlife Service, Region 6 (Service) has reviewed the Notice of Intent to prepare a Generic Environmental Impact Statement for Uranium Milling Facilities (GEIS). We offer the following comments and recommend the Nuclear Regulatory Commission incorporate safeguards or management actions to prevent or minimize adverse impacts to our trust resources addressed below.

Contaminants Associated with In-situ Uranium Mining

High selenium concentrations can occur in wastewater from in-situ mining of uranium ore as uranium-bearing formations are usually associated with seleniferous strata (Boon 1989). Boon (1989) reported that uranium deposits in the southern Powder River Basin in Converse County, Wyoming can contain up to 4,500 µg/g (ppm) of selenium. The leaching solution dissolves selenium present in the formation. The disposal of this wastewater can expose migratory birds to selenium which is known to cause impaired reproduction and mortality in sensitive species of birds such as waterfowl.

The in-situ mining wastewater is typically disposed of through deep-well injection or discharge into large evaporation ponds. However, we do not recommend land application using center pivot irrigation for the disposal of in-situ mining wastewater. In 1998, the Service conducted a study of a grassland irrigated with wastewater from an in-situ uranium mine and found that selenium was mobilized into the food chain and bioaccumulated by grasshoppers and songbirds (Ramirez and Rogers 2002). Disposal of the in-situ wastewater through irrigation is not recommended because selenium bioaccumulation in the food chain can cause adverse effects to migratory birds. Additionally, land application may result in the contamination of groundwater which may reach surface waters. 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 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). Additionally, water with more than 20 µg/L is considered hazardous to aquatic birds (Skorupa and Ohlendorf 1991). Selenium toxicity also will cause embryonic deformities and mortality (see et al. 1992,

Skorupa and Ohlendorf 1991, Ohlendorf 2002). Chronic effects of selenium manifest themselves in immune suppression to birds (Fairbrother et al. 1994) which can make affected birds more susceptible to disease and predation.

If submerged aquatic vegetation and/or aquatic invertebrates are present in evaporation ponds with elevated waterborne selenium concentrations, extremely high dietary levels may be present in vegetation and insects and thus become available to aquatic migratory birds. Ramirez and Rogers (2000) documented selenium concentrations ranging from 434 to 508 $\mu\text{g/g}$ in pondweed (*Potamogeton vaginatus*) collected from a uranium mine wastewater storage reservoir that had waterborne selenium concentrations ranging from 260 to 350 $\mu\text{g/L}$.

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.

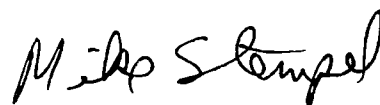
Contaminants Associated with the Conventional Uranium Milling Process

Our primary concern with the conventional uranium milling process is the management of milling wastes. Milling wastes should not be stored in the 100-year floodplain and these wastes should be contained in facilities with impermeable liners to prevent contamination of groundwater or surface waters. We recommend the draft GEIS identify other constituents found in the ores, or added during the milling/processing phase, and that the document address possible impacts of those constituents on the environment. We also recommend that location and stability of any leach piles, disposal piles, or any other disposal units be identified.

Conclusion

Thank you for the opportunity to review and comment on this Notice of Intent. If you have any questions, please contact Larry Gamble, Environmental Contaminants Coordinator, at (303) 236-4260.

Sincerely,



Assistant Regional Director
Fisheries - Ecological Services

References Cited:

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EXHIBIT 13

Contaminant Report Number: R6/715C /00



**U.S. FISH & WILDLIFE SERVICE
REGION 6**

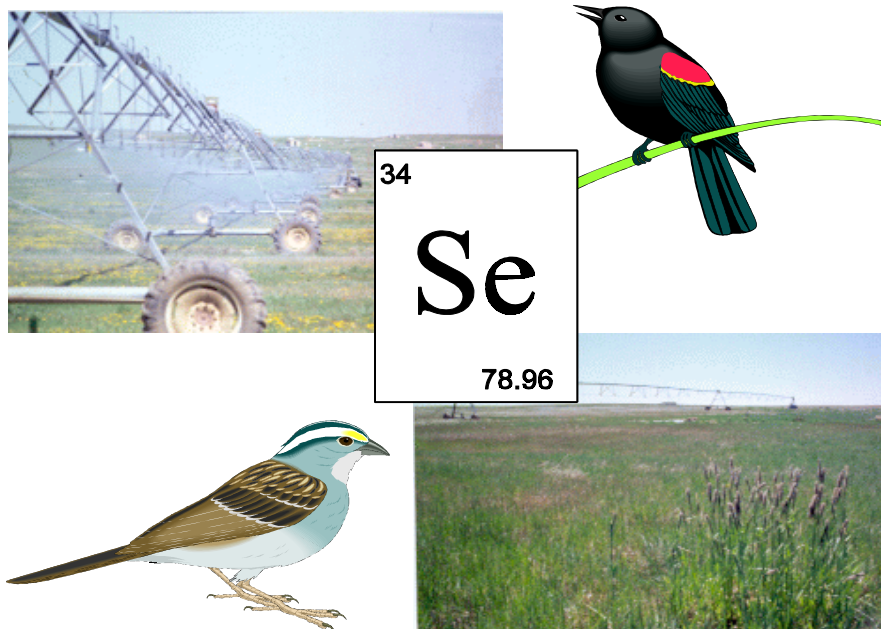


CONTAMINANTS PROGRAM

**Selenium in a Wyoming Grassland
Community Receiving Wastewater from
an In Situ Uranium Mine**

By
Pedro Ramirez, Jr.
Environmental Contaminants Specialist
and
Brad Rogers
Biological Technician

Project #: 98-6-6F37-FC



U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Wyoming Field Office
4000 Airport Parkway
Cheyenne, Wyoming 82001
September 2000

ABSTRACT

Water, soil, vegetation, grasshoppers (Family Acrididae), bird eggs and bird livers collected at a 23.5 hectare (58 acres) grassland irrigated with wastewater from an in situ uranium mine (Study Area) and a reference site in 1998 were analyzed for selenium and other trace elements. Bird surveys were conducted at the irrigated grassland at the in situ uranium mine to determine species use, relative abundance and behavior. We observed 23 species of birds using the Study Area. Western meadowlarks (*Sturnella neglecta*), red-winged blackbirds (*Agelaius phoeniceus*), lark buntings (*Calamospiza melanocorys*) and horned larks (*Eremophila alpestris*) were the most common avian species using the Study Area and were observed feeding and drinking at this site. Meadowlarks, red-winged blackbirds and lark buntings were observed nesting at the Study Area. Selenium concentrations in the uranium mine wastewater applied onto the grassland ranged from 340 to 450 µg/L. Selenium in the upper 15 cm (6 in) of soil from the irrigated grassland at the mine ranged from 2.6 to 4.2 µg/g dry weight (dw). Mean selenium concentrations in soil and water were 5 and 15 times higher at the Study Area than at the reference site. Selenium concentrations in grasses and grasshoppers ranged from 6.8 to 24 µg/g and 11 to 20 µg/g dw, respectively. Selenium in red-winged blackbird eggs and livers collected from the Study Area ranged from 13.2 to 22 µg/g and 33 to 53 µg/g dw, respectively, and concentrations were well in excess of toxic thresholds. Two composite samples of gizzard contents taken from red-winged blackbirds collected at the Study Area had selenium concentrations of 12 and 83 µg/g dw. Mean selenium concentrations in grasses, grasshoppers, and bird eggs and livers were 5.8 to 30 times higher at the Study Area than at the reference site. Elevated selenium concentrations in water, soil, grasshoppers, and red-winged blackbird eggs and livers collected from the Study Area demonstrate that selenium is being mobilized and is bioaccumulating in the food chain.

Acknowledgments - Thanks are extended to Bill Kearney, Environmental Superintendent, Power Resources Highland Uranium Project and the staff at the mine for their assistance and for allowing access to the mine to conduct the study. We appreciate the help of April Lafferty and Paula Cutillo, formerly with the Wyoming Department of Environmental Quality. Thanks also go to the reviewers of this manuscript for their helpful comments and suggestions: Joseph Skorupa, Kirke King, Stanley Wiemeyer, Bill Olsen, Brent Esmoil, and Karen Nelson of the U.S. Fish and Wildlife Service; Bill Kearney; and Anna K. Waitkus and Lowell Spackman of the Wyoming Department of Environmental Quality.

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INTRODUCTION

High concentrations of waterborne selenium can be produced with in situ mining of uranium ore as uranium-bearing formations are usually associated with seleniferous strata (Boon 1989). Boon (1989) reported that uranium deposits in Converse County, Wyoming can contain up to 4,500 µg/g (ppm) of selenium. In situ mining of uranium is done by injecting a leaching solution of native ground water containing dissolved oxygen and carbon dioxide into the uranium-bearing formation through injection wells. The leaching solution oxidizes the uranium and allows it to dissolve in the ground water. Production wells intercept the pregnant leaching solution and pump it to the surface. The leaching solution also dissolves selenium present in the formation. The uranium is extracted from the pregnant leaching solution and the water is reinjected into the ore-bearing formation. Water is recycled through the mining process several times and then is disposed of through deep-well injection, evaporation ponds or land application through irrigation after treatment for removal of uranium and radium.

The Highland Uranium Project near Douglas, Wyoming has reported waterborne selenium concentrations from 1,000 to 2,000 µg/L (ppb) in their in situ mining wastewater (information from permit filed at the Wyoming Department of Environmental Quality, Land Quality Division, Cheyenne, WY). The Wyoming Department of Environmental Quality (WDEQ) has permitted the mine to dispose of wastewater through land application. Wastewater is stored in holding ponds and is applied onto a grassland with center pivot irrigation systems. At full capacity the holding ponds are 2 to 13 hectares (ha) (5 to 32 acres) in size. The larger of the two ponds has never reached full capacity (Bill Kearney, Environmental Superintendent, Power Resources, Glenrock, WY, Personal communications, March 1, 2000). Currently, the mine has two center pivots in operation. The center pivots have been operational since 1989 and 1995, respectively.

The effects of selenium on fish and aquatic migratory birds have been well documented (Eisler 1985, Ohlendorf et al. 1986, Hamilton et al. 1990, Ohlendorf et al. 1988, Skorupa and Ohlendorf 1991, Lemly 1993, Saiki and Ogle 1995). Selenium concentrations >2 µg/L in water are known to impair waterbird reproduction and survival due to the high potential for dietary toxicity through food chain bioaccumulation (Lemly 1993). To protect waterfowl, shorebirds, and other wildlife from adverse effects, waterborne selenium concentrations should be <2 µg/L (Skorupa and Ohlendorf 1991; Lemly 1993). Waterborne selenium concentrations >3 µg/L exceed the bioaccumulation threshold for wildlife. Food organisms can bioaccumulate selenium from the water and supply a toxic dose of selenium to wildlife; however, the selenium concentration may not affect the health of the food organism (Lemly 1993).

Selenium enters the food chain almost entirely through vegetation and dietary plant selenium is readily absorbed by animals (up to 100%). This fact pertains to not only macrophytic vegetation but microscopic algae and phytoplankton, both of which serve as a principal food source for invertebrates (Ohlendorf et al 1993). Aquatic invertebrates also bioaccumulate selenium and can contain concentrations 2 to 6 times those found in aquatic plants. Selenium can concentrate in the food chain more than 300,000 times the concentration in the water (Besser et al. 1993). For example, the Kendrick irrigation project, located west of Casper, Wyoming has documented

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deformities and poor reproductive success in American avocets (*Recurvirostra americana*) and eared grebes (*Podiceps nigricollis*) resulting from elevated selenium concentrations. The median concentration of dissolved selenium in water samples from two closed basin ponds were 38 and 54 µg/L (See et al. 1992). Due to the bioaccumulation of selenium in food items from these ponds, aquatic birds suffered from impaired reproduction (See et al. 1992).

Impacts to waterfowl feeding on selenium contaminated food sources can occur in seven days (Heinz et al. 1990). Ingestion of water containing selenium concentrations as low as 2.2 mg/L can cause immune suppression in waterfowl (Fairbrother and Fowles 1990). During migration, birds are very stressed and become much more susceptible to the effects of environmental contaminants (Peterle 1991). Fairbrother and Fowles (1990) found selenium concentrations >10 µg/g in the livers of mallards (*Anas platyrhynchos*) given water with 2.2 mg/L selenium in the form of selenomethionine. Biological effects thresholds (dry weight) for sensitive aquatic birds such as waterfowl are 10 µg/g for liver tissue and 3 µg/g for eggs (Lemly 1993 and Heinz 1996). Selenium concentrations above these thresholds can cause impaired reproduction or mortality.

Little information is available on selenium bioaccumulation and toxicity in grassland species of passerine birds. Ohlendorf and Hothem (1995) and Santolo G.M. Santolo (G.M. Santolo, CH2M Hill, Sacramento, CA. Personal Communications, August 1999) report data on grassland species of passerine birds collected at Kesterson National Wildlife Refuge. Research on selenium mobilization and bioaccumulation in terrestrial communities has focused primarily on vegetation and ungulates. Forage species such as grasses can accumulate elevated levels of selenium in high selenium soils associated with uranium mining (Hossner et al. 1992). Raisbeck et al. (1996) found immune suppression in pronghorn (*Antilocapra americana*) fed an alfalfa-grass hay diet containing 15 µg/g of selenium. Acute poisoning has been documented in sheep (*Ovis aries*) fed plant material containing 3.2 to 12.8 µg/g of selenium (Eisler 1985).

This study was designed to: determine selenium concentrations in water, soil, terrestrial invertebrates, vegetation, birds and bird eggs; determine pathways of selenium in the food chain; and document potential adverse effects to migratory birds resulting from selenium bioaccumulation.

STUDY AREA

The Highland Uranium in situ mine is located in Converse County, Wyoming and is operated by Power Resources, Inc. (PRI). The mine is located approximately 40 km (25 miles) north of Douglas and 38 km (24 miles) northeast of Glenrock (Figure 1). The Satellite # 1 purge storage reservoir is approximately 2 ha (5 acres) in size with a maximum depth of 3.05 m (10 feet). The reservoir holds

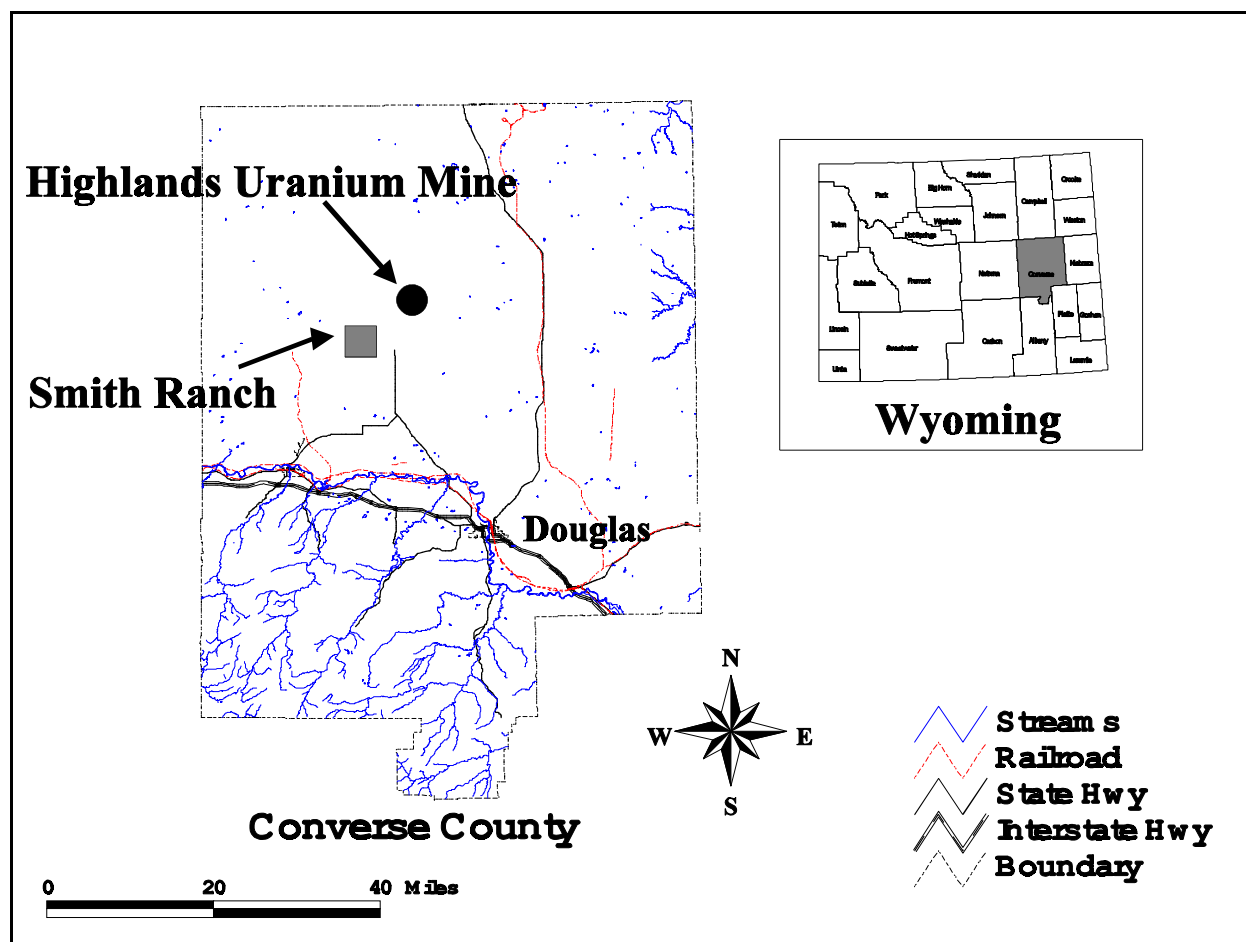


Figure 1. Location of the Highland in-situ uranium mine (Study Area) and the Smith Ranch (Reference Site), Converse County, Wyoming.

approximately 61,675 m³ (50 acre-feet) of wastewater. The center pivot irrigates 23.5 ha (58 acres) of grassland. The irrigator is a low profile system with 106.68 cm (42-inch) drop pipes and is 263.8 m (865 feet) in length. The irrigator completes a rotation every 21.8 hours and applies approximately 0.68 cm (0.27 inches) of wastewater on the grassland per revolution. A small berm from 15 to 30 cm (six to 12 inches) high encircles the irrigated area to ensure that the wastewater remains on site. The irrigated area is nearly flat and is dominated by grasses such as brome (*Bromus tectorum*); foxtail barley (*Hordeum jubatum*); blue grama (*Bouteloua gracilis*); common buffalo grass (*Buchloe dactyloides*); western wheatgrass (*Agropyron smithii*); and needle and thread (*Stipa*

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comata). Soils in the irrigated area consist of clay and clayey-loam Bidman and Ulm soils. These soils are slowly to moderately permeable.

The area receives an average of 30 cm (12 inches) of precipitation per year of which 45 percent falls during the months of May, June and July. The evaporation rate is 159.7 cm (62.9 inches) per year. Temperatures range from -40 °F in the winter to 100 °F in the summer. The prevailing winds are from the west and southwest with predominant speeds ranging from 17 to 33 km (11 to 21 miles) per hour.

Satellite # 1 purge storage reservoir and irrigation area 1 at the Highlands uranium mine (Study Area) were selected for this study. Satellite # 1 has operated since 1989. A center pivot irrigated area located at the Smith Ranch, approximately 16 kilometers (km) (10 miles) southwest of the Highlands uranium mine, was selected as the reference site (Reference Site). Alfalfa (*Medicago sativa*) is irrigated at the Reference Site. The radius of the irrigated area is 274.5 meters (m) (900 feet).

METHODS

Bird Surveys

Surveys were conducted once a week between 0800 and 1200 (MST), between May 5 and September 3, 1998. Stations were placed 200 m (658 ft) apart and 200 m out from the center pivot. Stations were marked with easily visible stake wire flags to avoid creating perch sites for birds which could influence results. Surveys were performed by one of two observers or both observers together. Counts lasted 5 minutes, ten minutes if abundance was low at each station. All birds observed (seen or heard) within 75 m (246 ft) of a count station were identified by species. Additionally birds beyond 75 m were identified by species and noted on the data sheets as outside the area. Birds observed using the purge storage reservoir were also recorded.

Nesting Study

Twenty songbird nest boxes each were set up at the Study Area and the Reference Site. Nest boxes were checked weekly, recording nest condition, number of eggs, live young, dead young and presence/absence of adults. Nestlings were visually examined for anomalies. Songbird nests were located using random passes with a hand-held drag-line and through incidental flushes of females from nests. Each nest located was flagged ten m (32.8 ft) out from the nest in alignment with the center pivot of the irrigation system. Nest locations were flagged 10 m away to avoid detection of nests by predators. For each nest located, clutch size was recorded and one egg was randomly collected. Eggs were dissected and embryos aged and examined for deformities. The egg contents were submitted for trace elements analysis.

Trace Element Study

Vegetation, soil, water and terrestrial invertebrate samples were collected from the Study Area and the Reference Site. All equipment used to collect water, sediment, and soil samples was rinsed with deionized water and acetone prior to collection of each sample. Eight water samples were collected from the purge storage reservoir, the center pivot and from standing water within the irrigated grassland of the Study Area during June and August 1998 (Table 3). Two water samples were collected from the center pivot at the Reference Site in July and August 1998. Water samples were collected using 1-liter chemically-clean polyethylene jars with teflon-lined lids. The pH of the water samples collected for chemical analysis was lowered to approximately 2.0 with laboratory-grade nitric acid. Five soil samples were collected at each site in June 30 and July 1, 1998 to a depth of 15 cm (6 in) with a stainless steel spoon and placed in whirl-pak bags and frozen as soon as possible. Vegetation samples were clipped using chemically-cleaned scissors and placed in whirl-pak bags. Five grass samples (foxtail barley, and brome) and one dandelion (*Taraxacum officinale*) sample were collected from the Study Area. Four grass samples (brome and Kentucky bluegrass (*Poa pratensis*)) and one alfalfa sample were collected from the Reference Site. Pondweed (*Potamogeton* spp.) from the purge storage reservoir was collected by gloved hand and placed in whirl-pak bags. Five sediment samples were collected at the purge storage reservoir to a depth of 15 cm (6 in) with a stainless steel spoon and placed in whirl-pak bags and frozen within an hour after collection. Terrestrial invertebrates were collected using a sweep net, sorted to family and placed in chemically-

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clean 40 milliliter glass jars with teflon-lined lids. All samples were frozen within an hour after collection. Six composite samples of grasshoppers (Family Acrididae) from the Study Area and five from the Reference Site were submitted for trace element analyses.

Six red-winged blackbirds each were collected from the Study Area and the Reference Site, using a 20-gauge shotgun and steel shot. Bird livers and gizzards were dissected from the carcasses. The gizzard contents were removed and placed in chemically-clean glass vials and the livers in whirl-pak bags and frozen within an hour after collection. Six liver samples each from the Study Site and the Reference Site were submitted for trace element analysis. Two samples of red-winged blackbird gizzard contents were submitted to the laboratory for trace element analysis.

Water, sediment and biota samples were submitted to the Environmental Trace Substances Laboratory (ETSL) at Columbia, Missouri, under contract with the Service's Patuxent Analytical Control Facility (PACF) at Laurel, Maryland, for trace element analyses. Trace element analysis included scans for: arsenic, mercury, and selenium using atomic absorption spectroscopy. Inductively Coupled Plasma Emission Spectroscopy was used to scan a variety of elements including boron, barium, copper, lead, vanadium and zinc. Mercury samples were digested under reflux in nitric acid. Other samples were digested under reflux in nitric and perchloric acids. PACF conducted Quality Assurance/Quality Control on all samples analyzed by ETSL. Seven samples were lost in preparation at ETSL and included: two red-winged blackbird (*Agelaius phoeniceus*) livers and two European starling (*Sturnus vulgaris*) eggs from the Study Area, and three red-winged blackbird livers from the Reference Site. All analytical data for soil, sediment, and biota are reported in dry weight.

Statistics

Statistical analysis was performed using Systat statistical software. The Kruskal-Wallis One-Way Analysis of Variance test was used to compare selenium concentrations between the Study Area and the Reference Site. The probability level determining significance was $P < 0.05$.

RESULTS

Bird Surveys

Field work was completed between May 28 and September 3, 1998. We observed 626 birds during point count surveys at the Study Area. During 90 point/count/days we observed 385 individuals comprising 14 species within the 75 m (246 feet) fixed point count radius. Western meadowlarks (*Sturnella neglecta*) were the most numerous species followed by the red-winged blackbird, lark bunting (*Calamospiza melanocorys*) and horned lark (*Eremophila alpestris*), respectively (Figure 2).

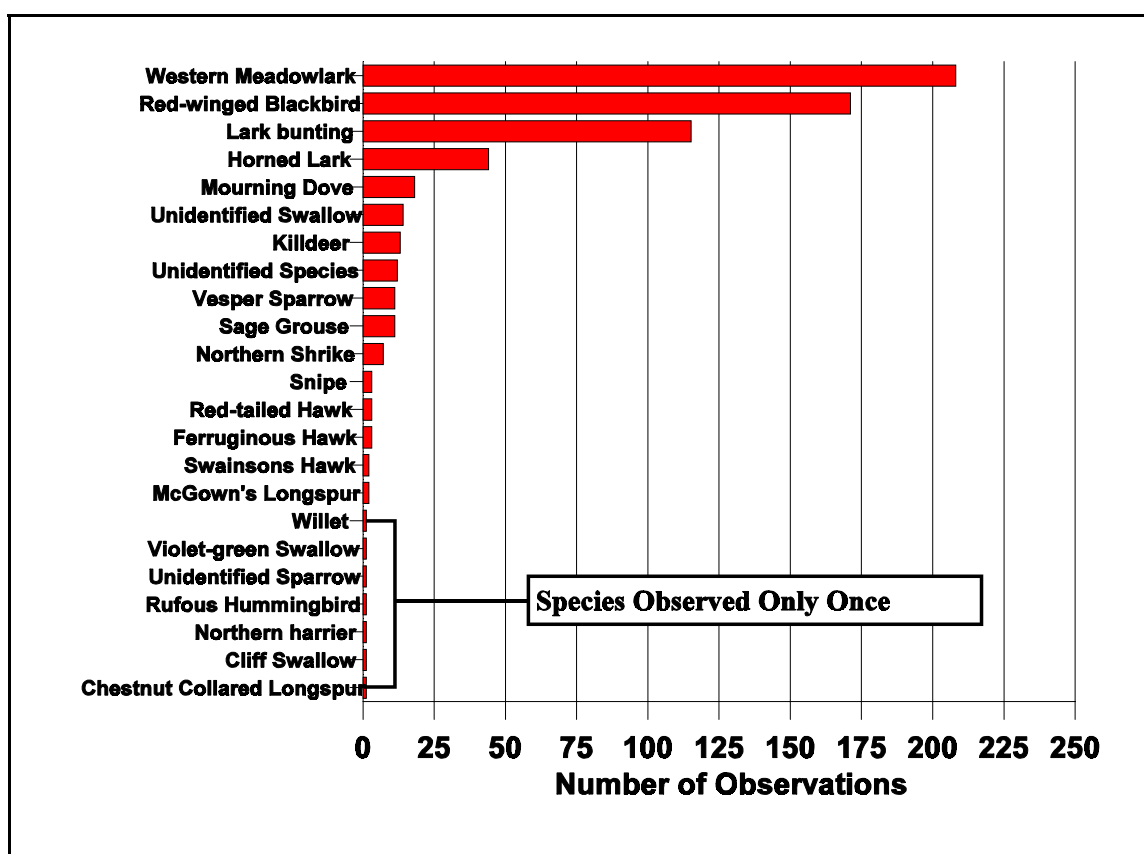


Figure 2. Species observed at the uranium mine irrigated area and the number of observations for each species.

The remaining 10 species accounted for only 17 percent of the observations. Of the 241 birds observed beyond the 75 m point count radius, only 9 individuals comprising six new species were observed. Peak observations for red-winged blackbirds, and lark buntings were in June; whereas, horned lark and western meadowlark numbers remained consistent throughout the survey period (Figure 3). Birds flying over and landing at the Study Area were the most frequent behaviors observed during the surveys followed by perching (Figure 4). Birds were also observed feeding and

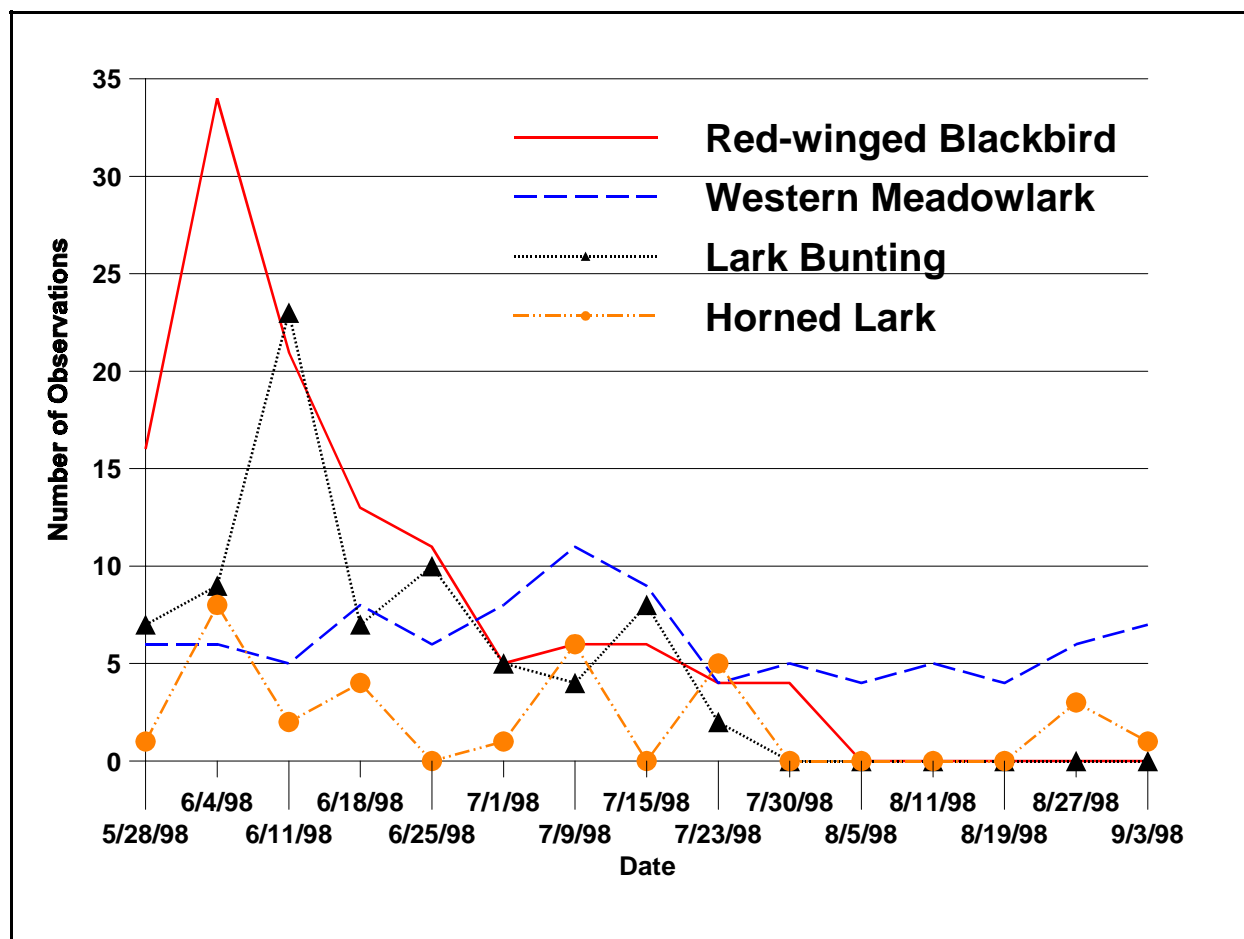


Figure 3. Daily counts of the four most common bird species observed at the uranium mine irrigated area, May 28, 1998 to September 3, 1998.

drinking at the Study Area. Nine birds were observed using the purge storage reservoir between May and September and included: two eared grebes; two gadwalls (*Anas strepera*); one hooded merganser (*Lophodytes cucullatus*); one sandpiper (Family Scolopacidae); two black terns (*Chlidonias niger*); and one mallard.

Nesting Data

Searches for ground-nesting native species at the Study Area revealed nesting by red-winged blackbirds as well as western meadowlarks and lark buntings. The nest boxes had little to no use by European starlings; therefore, the study focused on collecting eggs and livers from red-winged blackbirds at both the Study Area and the Reference Site since their nests were the most numerous.

Nine red-winged blackbird nests were monitored at the Study Area and 13 were monitored at the Reference Site. Red-winged blackbird nests at the Study Area were located in tall bunch grass as well as in a small stand of cattails (*Typha* sp.) growing in ponded water. The nests at the Reference Site were located in a cattail marsh immediately adjacent to the irrigated alfalfa field. Of the nine

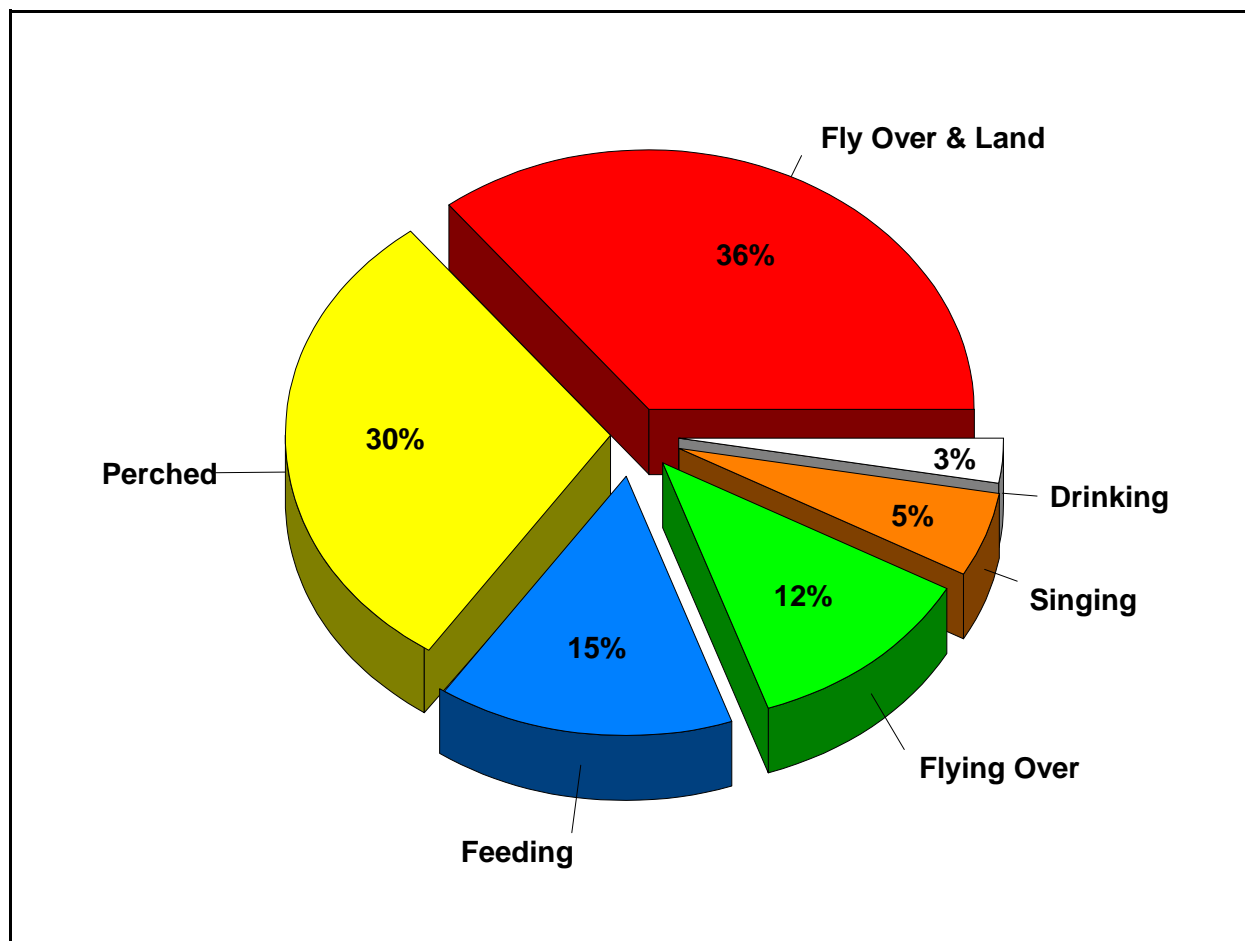


Figure 4. Behaviors observed during the bird surveys at the uranium mine irrigated site.

nests at the Study Area, six were abandoned and the fate of three was unknown. A late snowstorm on June 4 probably caused the abandonment of three nests. The cause of abandonment in two nests was unknown and one nest failed due to disturbance by the investigators. At the Reference Site five nests successfully hatched and six were presumed to have hatched. One nest was abandoned and the fate of four eggs in one nest was unknown. One of six red-winged blackbird eggs collected from the Study Area was infertile. The remaining five red-winged blackbird eggs collected at the Study Area were in the early stages of incubation (1 to 4 days). Incubation stages in red-winged blackbird eggs collected at the Reference Site ranged from 1 to 11 days; all eggs except one were fertile. Two western meadowlark nests were monitored at the Study Area; however, the fate of the eggs was unknown. The eggs at these nests could have been taken by a predator. One egg collected from one of the two meadowlark nests was fertile, the embryo appeared normal and was in the mid-stages of incubation (7 days). Of the two starling eggs collected at the Study Area, one was fertile and the other infertile. Both embryos were one day old. The one starling egg collected at the Reference Site was fertile. No abnormalities were observed in embryos collected from the Study Area and the Reference Site; however, it should be noted that all eggs were in early to mid-stages of incubation making it difficult to determine if the embryos were malformed (Table 1).

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Table 1. Selenium concentrations (in µg/g dry weight) in songbird eggs collected from the in-situ uranium mine grassland (Study Site) receiving wastewater via irrigation and from a Reference Site.

<i>Study Site - Red-winged Blackbird</i>					
Sample #	Fertile	Incubation Stage ¹	Viable Embryo	Malformation Observed	Se (µg/g)
PRIRBE01	Yes	Early	Yes	No	15
PRIRBE02	Yes	Early	Yes	No	20
PRIRBE03	Yes	Early	Yes	No	15
PRIRBE04	No	Early	Unknown	No	13
PRIRBE05	Yes	Early	Yes	No	22
PRIRBE06	Yes	Early	Yes	No	19
<i>Reference Site - Red-winged Blackbird</i>					
REFRBE01	Yes	Early	Yes	No	3
REFRBE02	Yes	Early	Yes	No	3
REFRBE03	Yes	Early	Yes	No	3
REFRBE04	Yes	Early	Yes	No	3
REFRBE05	Yes	Early	Yes	No	3
REFRBE06	Yes	Early	Yes	No	3
REFRBE07	Yes	Early	Yes	No	2
REFRBE08	Yes	Early	Yes	No	3
REFRBE09	Yes	Early	Yes	No	3
REFRBE12	Unknown	Early	Unknown	No	4
<i>Study Site - European Starling</i>					
PRISTE03	Yes	Early	No	No	7
PRISTE05	No	Early	No	No	8
<i>Reference Site - European Starling</i>					
REFSTE01	Yes	Early	Yes	No	3
<i>Study Site - Western Meadowlark</i>					
PRIWME01	Yes	Early	Yes	No	18

¹Early = 1 - 4 days; Mid = 5 - 8 days; Late = > 8 days

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Trace Elements

Arsenic and boron were elevated in pondweed samples collected from the purge storage reservoir. Arsenic concentrations ranged from 1.7 to 3.7 $\mu\text{g/g}$. Boron concentrations in pondweed ranged from 26 to 236 $\mu\text{g/g}$ dry weight. A water sample collected from pooled water in the irrigated field at the Study Area had an elevated zinc concentration of 7,410 $\mu\text{g/L}$. No analytical anomalies were reported by PACF. The source of the zinc is unknown.

Selenium concentrations in soil, grasses, grasshoppers, and red-winged blackbird eggs and livers collected from the Study Area were significantly higher than the concentrations found at the Reference Site ($P < 0.05$) (Figure 5 and Table 2). Mean selenium concentrations in water from the Study Area were 19 times higher than those from the Reference Site.

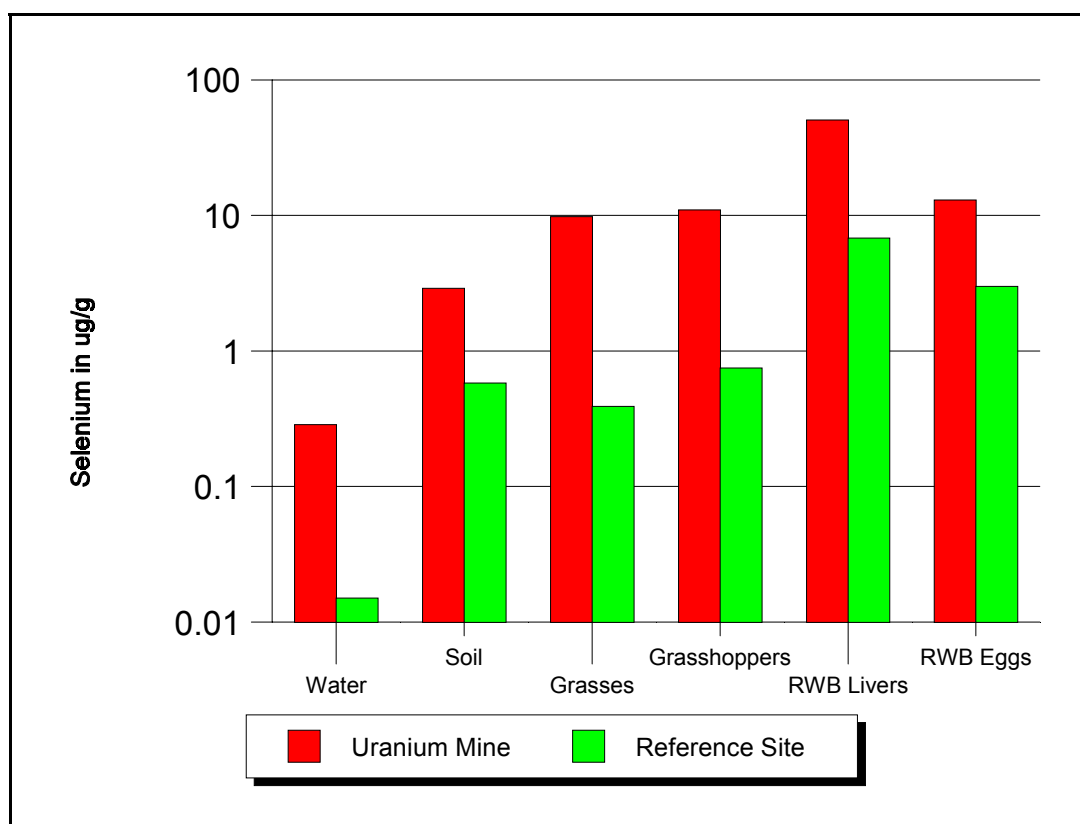


Figure 5. Mean selenium concentrations in water, soil and biota from the PRI in-situ uranium mine and Reference Site irrigated areas, Converse County, Wyoming. Concentrations are in $\mu\text{g/g}$ dry weight except for water which are reported in $\mu\text{g/L}$. [RWB = Red-winged blackbird]

Table 2. Selenium concentrations in water, soil and biota from the in-situ uranium mine grassland receiving wastewater via irrigation and from a Reference Site. Concentrations are in $\mu\text{g/g}$ dry weight except for water which are reported in $\mu\text{g/L}$.

Matrix	Study Area				Reference Site				Comparisons	
	n	Mean	Range	Variance	n	Mean	Range	Variance	Δ	Kruskal - Wallis p Value*
Water (in $\mu\text{g/L}$)	8	285	32 - 450	0.026	2	15	1 - 28	NC	270	NC
Soil	5	3.1	2.6 - 4.2	0.40	5	0.63	0.55 - 0.81	0.01	2.51	0.009
Grasses	5	12.7	6.8 - 24	50.05	4	0.43	0.3 - 0.62	0.02	12.26	0.014
Grasshoppers	6	12.8	11 - 20	12.97	5	0.73	0.6 - 0.87	0.01	12.10	0.005
Red-winged blackbird gizzard contents	2	47.5	12 - 83	NC	2	0.7	0.6 - 0.8	NC	46.8	NC
Red-winged blackbird livers	4	46.8	33 - 53	85.8	3	6.8	3.7 - 10	9.92	39.94	0.034
Red-winged blackbird eggs	6	17.4	13.2 - 22	11.93	13	3	2.4 - 3.6	0.10	14.34	0.001

n = number of samples

Δ = Difference in Study Area and Reference Site means

NC = Not Calculated

* Significant Difference ($P < 0.05$)

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Selenium concentrations in water samples collected from the pooled water in the irrigated field at the Study Area were lower than those from samples collected from the center pivot irrigator, and the purge storage reservoir (Table 3).

Table 3. Selenium concentrations ($\mu\text{g/L}$) in water collected from the the in-situ uranium mine grassland (Study Site) receiving wastewater via irrigation.

Site	n	Mean	Range
Center Pivot Irrigator	2	395	340 - 450
Purge Storage Reservoir	3	307	260 - 350
Pooled Water at Irrigated Area	3	46	32 - 69

n = number of samples

Five sediment samples collected from the purge storage reservoir at the uranium mine had selenium concentrations ranging from 7.8 to 38.8 $\mu\text{g/g}$ with a mean of 18.5 $\mu\text{g/g}$. Selenium concentrations >4 $\mu\text{g/g}$ in sediments are considered a high hazard for the aquatic bird food chain (Lemly 1995). Pondweed samples collected from the purge storage reservoir at the uranium mine had selenium concentrations ranging from 434 to 508 $\mu\text{g/g}$ with a mean of 459 $\mu\text{g/g}$. These concentrations are 144 to 169 times higher than the 3 $\mu\text{g/g}$ dietary threshold for potential toxic effects in aquatic migratory birds.

A dandelion sample collected at the Study Area had a selenium concentration of 28 $\mu\text{g/g}$. An alfalfa sample from the Reference Site had 0.41 $\mu\text{g/g}$ of selenium. Selenium concentrations in livers from three lark bunting nestlings collected from one nest in the Study Area had selenium concentrations ranging from 7.8 to 8.8 $\mu\text{g/g}$. A composite sample of the gizzard contents from these three nestlings had 1.6 $\mu\text{g/g}$ of selenium. Selenium concentrations in two composite samples of gizzard contents from red-winged blackbirds were 12 and 83 $\mu\text{g/g}$ at the Study Area and 0.6 and 0.8 at the Reference Site. Three starling eggs (one from each of three nests) collected from the nest boxes placed at the Study Area had a mean selenium concentration of 7 $\mu\text{g/g}$ with a range of 6.2 to 7.9 $\mu\text{g/g}$. One starling egg collected from a nest box at the Reference Site had a selenium concentration of 2.7 $\mu\text{g/g}$. Two western meadowlark eggs (each from two nests) from the Study Area had selenium concentrations of 18 and 28 $\mu\text{g/g}$.

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DISCUSSION

Elevated selenium concentrations in water, soil, grasshoppers, and red-winged blackbird eggs and livers collected from the Study Area demonstrate that selenium is being mobilized and bioaccumulated in the food chain. Mean selenium concentrations in soil and water were 5 and 19 times higher, respectively, in the Study Area than at the Reference Site. Mean selenium concentrations in biota were 5.8 to 30 times higher in the Study Area than at the Reference Site.

It is unclear why selenium concentrations in pooled water at the Study Area were significantly lower than waterborne concentrations in the purge storage reservoir and the irrigator. Selenium could be removed from solution and bound to the wet soil/sediments in the pools (Lemly and Smith 1987). Additionally, cattails growing in the pooled water could be removing the selenium from the water as cattails are strong selenium accumulators (Schuler et al. 1990).

Sediment collected from the purge storage reservoir at the uranium mine had selenium concentrations ranging from 7.8 to 38.8 µg/g with a mean of 18.5 µg/g. Selenium concentrations >4 µg/g in sediments are considered a high hazard for the aquatic bird food chain (Lemly 1995). The selenium concentrations in the sediment were of the same magnitude as sediment from Goose Lake, a closed basin, at the Kendrick irrigation project near Casper, Wyoming (See et al. 1992) where reproduction in aquatic migratory birds was adversely affected.

Selenium concentrations in pondweed collected from the purge storage reservoir were extremely elevated (434 to 508 µg/g). These concentrations were four to five times higher than the maximum concentration of 104 µg/g reported for pondweed from several irrigation projects in the western United States by the Department of Interior's National Irrigation Water Quality Program (NIWQP). The NIWQP investigated irrigation-induced selenium contamination in the western United States. Selenium concentrations in pondweed were also almost twice as high as those reported by Schuler et al. (1990) for widgeon grass (*Ruppia maritima*) at Kesterson Reservoir in California. Heinz et al. (1987 and 1989) found that selenomethionine concentrations of 15 to 20 µg/g in the diet of mallards resulted in mortality. It is unknown if waterfowl have a taste aversion to the pondweed at the purge storage reservoir due to the extremely high concentrations of selenium or if they are consuming enough of this pondweed to suffer mortality or other chronic effects. The limited amount of bird use observed at this reservoir suggests that a low number of waterfowl would be exposed if they feed on the pondweed. Observations on bird use at the purge storage reservoir by mine personnel also show that waterfowl do not use the pond for any substantial amount of time (Bill Kearney, Environmental Superintendent, Power Resources, Glenrock, WY, personal communications, February 28, 2000).

Arsenic concentrations in pondweed also were at the level of concern of 2 to 5 µg/g (U.S. Dept. Interior 1998). Boron concentrations in pondweed ranged from 26 to 236 µg/g dry weight with a mean concentration of 134 µg/g. Dietary levels as low as 30 µg/g and fed to adult mallards adversely affected the growth rate of their ducklings (Smith and Anders 1989). Hoffman et al. (1990) reported reduced growth in female mallard ducklings fed diets containing 100 µg/g of boron.

The mean total soil selenium at both the Study Area and the Reference Site (3.1 and 0.63 µg/g, respectively) exceeded the mean concentration for soils in the western United States (0.23 µg/g);

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however, the selenium concentration ranges were within those reported for western U.S. soils (Shacklette and Boerngen 1984). The mean total soil selenium at the Study Area was comparable to soil from several sites from the Kendrick irrigation project near Casper, Wyoming that had total selenium $> 2 \mu\text{g/g}$ (See et al. 1992). Soils with total selenium concentrations $> 2 \mu\text{g/g}$ are usually associated with selenosis in livestock (Thorton 1981).

Mean selenium concentrations in grasses from the Study Area were 30 times higher than at the Reference Site and were four times higher than the concentrations in the soil. Grasses are selenium nonaccumulators and generally contain $< 25 \mu\text{g/g}$ of selenium (Wu 1998). Selenium in the soil is usually available as selenate and selenite, both of which are absorbed by grasses and transformed into organic selenium compounds such as selenomethionine (Wu 1998) which is highly available and toxic to birds (Heinz 1996, Heinz et al. 1989).

Selenium concentrations in grasshoppers from the Study Area were 18 times higher than the Reference Site and were equivalent to the concentrations found in the grasses. Mean selenium concentrations in grasshoppers from the Study Area were twice as high as the concentrations reported by Santolo and Yamamoto (1999) from grasshoppers at selenium-contaminated grasslands at Kesterson Reservoir in California; however, the maximum selenium concentration at the mine did not exceed that reported at Kesterson. Grasshoppers bioaccumulate the selenium from the vegetation at the Study Area. The grasshoppers in turn are consumed by birds inhabiting the Study Area. Two composite samples of gizzard contents from several red-winged blackbirds collected from the Study Area had selenium concentrations of 12 and $83 \mu\text{g/g}$ which shows that the birds are ingesting elevated selenium. Excess selenium consumed by female birds is usually incorporated into their eggs (O'Toole and Raisbeck 1998). Elevated selenium substitutes sulfur in proteins formed in the cells which disrupts the normal development of the embryo and leads to terata and mortality (Ohlendorf and Hothem 1995, O'Toole and Raisbeck 1998).

The range of selenium concentrations in red-winged blackbird eggs from the uranium mine (13.2 to $22 \mu\text{g/g}$) was similar to or slightly higher than those reported for the same species and matrix from several irrigation projects in the western United States by the NIWQP. Selenium concentrations in red-winged blackbird eggs reported by the NIWQP ranged from 2 to $18 \mu\text{g/g}$. Red-winged blackbird eggs collected from the Uncompahgre Irrigation Project in western Colorado, an area with elevated selenium, had selenium concentrations ranging from 4 to $18 \mu\text{g/g}$. Selenium at these irrigation projects was mobilized by irrigation of seleniferous soils with resultant bioaccumulation by fish and wildlife (Seiler 1996). The mean selenium concentration in red-winged blackbird eggs from the uranium mine ($17.4 \mu\text{g/g}$) was also higher than the $11.1 \mu\text{g/g}$ mean value reported for red-winged blackbird eggs reported at Martin Reservoir in Texas (King 1988 and Skorupa 1998). Reduced egg hatchability was reported in the red-winged blackbird eggs at Martin Reservoir; however, it is unclear if it was associated with the elevated selenium concentrations (J. Skorupa, U.S. Fish and Wildlife Service, Sacramento, CA. Personal Communications, February 23, 2000). We were unable to determine egg hatchability in red-winged blackbird eggs at the uranium mine site due to the low number of nests, the confounding effects of a late-season snow storm and possibly nest predation and/or observer disturbance. Nests at the reference site were successful as this site did not receive as much snow during the June 4th storm. Additionally, the blackbird nests were located on a small marsh and received greater protection from predators. All red-winged blackbird eggs collected from

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the uranium mine contained concentrations of selenium (13.2 to 22 µg/g) well above the threshold (>8 µg/g) known to be reproductively toxic to sensitive bird species (Lemly 1993, Ohlendorf et al. 1993, Heinz 1996). It should be noted that the reproductive toxicity threshold for red-winged blackbirds is unknown.

Selenium concentrations in western meadowlark eggs were slightly higher than the range reported for the same species at selenium-contaminated grasslands at Kesterson Reservoir in California by G.M. Santolo (G.M. Santolo, CH2M Hill, Sacramento, CA. Personal Communications, August 1999) (3.9 to 17 µg/g) and by Ohlendorf and Hothem (1995) (9.7 to 24 µg/g). Selenium concentrations in western meadowlark eggs (18 and 28 µg/g, n=2) also exceeded the toxic threshold of 8 µg/g for sensitive species of birds; however, the sensitivity of meadowlarks to selenium is unknown.

Selenium concentrations in livers from red-winged blackbirds collected from the Study Area were nearly seven times higher than the Reference Site and higher than those reported by the NIWQP for livers from blackbirds collected from the Los Pinos River in southwestern Colorado (4.2 to 6.8 µg/g) and from red-winged blackbirds collected from the lower Gila River in Arizona in 1994 and 1995 (8 to 14 µg/g) (Kirke King, U.S. Fish and Wildlife Service, personal communications, Nov. 1999).

MANAGEMENT IMPLICATIONS

Mobilization and bioaccumulation of selenium and its potential adverse effects on fish and migratory birds have been intensively documented in irrigation projects throughout the western United States as well as in reservoirs and wetlands receiving selenium contaminated water from industrial sites such as coal-fired power plants and oil refineries (Skorupa 1998). Our study shows that application of in situ uranium mine wastewater containing elevated selenium on a grassland can lead to bioaccumulation of this element in the food chain. Although we were unable to determine if the elevated selenium concentrations were causing impaired reproduction or other effects on the resident songbirds inhabiting the irrigated grassland at the mine, we did document elevated selenium concentrations in red-winged blackbird eggs comparable to those associated with reduced hatchability in the same species at Martin Reservoir, Texas (Skorupa 1998). A controlled egg hatchability study using an incubator and eggs from birds nesting at the Study Area and the Reference Site may help in determining if the elevated selenium concentrations are causing impaired reproduction in red-winged blackbirds as well as lark buntings and meadowlarks.

Based on the results of this study efforts should be made to discourage red-winged blackbirds from nesting at the area irrigated with in situ uranium mine wastewater. Selenium concentrations in red-winged blackbird eggs were at levels suspected of causing reduced hatchability in this species. Red-winged blackbirds can be discouraged from nesting at the irrigated area by preventing the ponding of water and the growth of cattails. Although bioaccumulation of selenium was documented in lark buntings and western meadowlarks, the effects of this trace element on these grassland bird species are unknown. Additional study is needed to determine the sensitivity of these species to selenium.

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Appendix

Analytical Results

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Appendix A. Trace elements (in µg/L) in water collected from the Highland Uranium In Situ Mine irrigated area and a reference site, Smith Ranch, Converse County, Wyoming.

Sample ID	Study Area								Reference Site	
	PRIWATR1	PRIWATR2	PRIWATR3	PRIWATR4	PRIWATR5	PRIWATR6	PRIWATR7	PRIWATR8	REFWATR2	REFWATR6
Date Collected	30 June 1998	30 June 1998	30 June 1998	30 June 1998	30 June 1998	30 June 1998	11 August 1998	11 August 1998	14 July 1998	11 August 1998
Element	PRI-Pool	PRI-Pivot	PRI-Pond	PRI-Pivot	PRI-Pool	PRI-Pond	PRI-Pond	PRI-Pool	Smith Ranch	Smith Ranch
Al	310	85	730	3150	330	720	90	330	<30.0	<50
As	1	2.5	2.2	5.5	1.9	2.2	2.6	3.5	0.9	1
B	180	130	140	160	190	150	130	170	81	75
Ba	118	124	131	320	136	128	223	149	20	21
Be	<0.2	0.3	<0.2	0.3	0.3	0.3	<0.2	<0.2	<0.2	0.4
Cd	0.91	<0.1	0.2	1.1	0.4	0.38	<0.1	<0.1	<0.1	<0.1
Cr	<0.9	<0.9	<0.9	3.1	<0.9	0.001	1	1	<0.9	<0.9
Cu	11	4	3	268	8.3	3	<2	3	<2.00	<2
Fe	1210	58	350	8960	483	410	53	910	110	130
Hg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.4
Mg	97900	82100	84300	85000	111000	83200	87700	162000	18400	17800
Mn	356	118	160	757	385	175	107	1430	47	43
Mo	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ni	16	20	21	55	27	21	22	28	1.1	<3
Pb	1.5	<0.09	0.2	157	1.1	0.52	0.41	0.79	3.5	<0.09
Se	32	340	350	450	69	310	260	37	28	1
Sr	4110	3590	3690	3890	4780	3640	3950	6230	690	679
V	6	5	5	22	8.8	6.2	8	13	<2	6
Zn	24	4.6	8.7	7410	15	23	<6	<6	12	<6

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Appendix B. Trace elements (in µg/g dry weight) in soil collected from the Highland Uranium In Situ Mine irrigated area and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area					Reference Site				
	PRISOIL1	PRISOIL2	PRISOIL3	PRISOIL4	PRISOIL5	REFSOIL1	REFSOIL2	REFSOIL3	REFSOIL4	REFSOIL5
Al	13700	9900	18800	19500	17000	11600	11500	11400	10100	11900
As	4.1	3.4	5.1	3.8	3.6	3.7	3.4	3.3	3.7	3.8
B	1.9	2.2	2.4	3	2	3.9	5.5	3	3.8	4.2
Ba	110	81.1	113	128	148	75.8	76.1	84.5	73.5	75.5
Be	1.1	0.91	1.4	1.1	1.3	0.99	0.92	1.2	0.93	1.2
Cd	<.200	<.100	<.200	<.200	<.200	0.3	0.3	0.3	0.3	<.100
Cr	27	19	32	28	35	19	17	20	17	16
Cu	15	12	17	16	18	15	14	17	15	16
Fe	17300	12300	21600	18400	21200	13100	12500	14800	12600	13200
Hg	0.017	0.012	0.019	0.018	0.022	0.012	0.012	0.016	0.015	0.015
Mg	3910	2430	4570	4350	5190	4000	4040	4670	3910	4110
Mn	220	217	222	216	191	229	223	228	227	224
Mo	<.500	<.500	<.500	<.500	<.500	<.500	<.500	<.500	<.500	<.500
Ni	15	11	18	16	18	13	13	17	14	15
Pb	11	12	13	13	12	13	12	15	13	13
Se	2.6	2.8	4.2	3.2	2.9	0.81	0.55	0.58	0.64	0.56
Sr	53.5	32.2	68.1	55.9	75.7	49.1	46.3	45.8	45.1	49
V	32.8	23	38.9	32	39.6	23	21	21	19	20
Zn	49.8	38	58.6	55.6	56.5	58	57.3	66.8	55.1	60

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Appendix C. Trace elements (in µg/g dry weight) in vegetation collected from the Highland Uranium In Situ Mine irrigated area and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area						Reference Site				
	PRIVEG01	PRIVEG02	PRIVEG03	PRIVEG04	PRIVEG05	PRIVEG06	REFVEG01	REFVEG02	REFVEG03	REFVEG04	REFVEG05
	Foxtail Barley	Dandelion	Brome	Foxtail Barley	Foxtail Barley	Brome	Brome Grass	Brome Grass	Kentucky Bluegrass	Brome Grass	Alfalfa
Al	10	20	20	20	8	10	20	40	44	42	200
As	<.0900	0.2	<.0900	<.0900	<.0900	<.0900	<.0900	0.1	<.0900	0.1	0.1
B	6	30	9.9	5.1	5.2	11	11	13	12	19	53
Ba	12	4.4	13	6.7	5.9	9	33.4	34.4	14	25	8.5
Be	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200
Cd	<.0200	0.34	0.082	<.0200	<.0200	0.04	0.081	0.15	0.09	0.11	0.18
Cr	4.5	<.200	2.3	3.8	4	3.2	3.2	3.2	1.6	1.9	0.5
Cu	4.9	13	6.2	7.4	8.9	4.7	12	34	9.9	20	7.3
Fe	45	61	53	48	42	51	64	72	82	73	165
Hg	0.01	0.02	0.01	0.01	<.00900	0.01	0.01	<.00900	0.01	0.01	<.00900
Mg	1270	3750	2220	747	986	1580	1740	2040	2630	2170	4180
Mn	74.4	135	100	78.3	65.4	155	60.6	48.7	69.9	48	39.4
Mo	0.7	<.500	<.500	0.5	<.500	<.500	2	1	1	3	4.5
Ni	2.1	1	0.8	1.4	1.4	1.2	1.4	1	1.4	0.6	2.3
Pb	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	0.09	<.0700
Se	7.8	25	9.8	15	24	6.8	0.31	0.62	0.3	0.47	0.41
Sr	38.7	111	79.8	32.6	25.4	53.8	36.3	40.6	31	33.4	93.4
V	<.800	<.800	<.800	<.800	<.800	<.800	<.800	<.800	<.800	<.800	<.800
Zn	15	17	22	18	19	17	25	28	28	25	32.8

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Appendix D. Trace elements (in µg/g dry weight) in grasshoppers collected from the Highland Uranium In Situ Mine irrigated area and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area					Reference Site				
	PRIINV01	PRIINV02	PRIINV03	PRIINV04	PRIINV05	REFINV01	REFINV02	REFINV05	REFINV06	REFINV07
Al	52	36	38	31	40	230	98	440	520	250
As	<.0900	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1
B	15	14	16	13	13	19	17	13	14	15
Ba	2.6	1.9	2	1.9	2.2	3.1	2.1	3.5	4.1	2.9
Be	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	0.02	0.03	<.0200
Cd	0.44	0.44	0.45	0.36	0.31	0.28	0.32	0.28	0.24	0.31
Cr	0.2	0.2	<.200	<.200	<.200	0.3	<.200	0.5	0.5	0.5
Cu	36	36	39	36	39	28	31	30	28	28
Fe	71	63	69	63	71	169	110	261	360	174
Hg	<.0500	<.0500	<.0500	<.0500	<.0400	<.0400	<.0500	<.0400	<.0500	<.0400
Mg	1290	1250	1180	1220	1230	1240	1150	1140	1230	1130
Mn	36.3	31	29.8	31.8	33.6	12	10	12	13	10
Mo	0.6	0.5	<.500	0.7	<.500	1.6	2	1	1	1.8
Ni	<.400	<.400	1	0.9	1	1	0.9	1	1	1
Pb	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	0.1	0.1	<.0700
Se	11	20	13	11	11	0.78	0.75	0.6	0.87	0.65
Sr	25.7	31.6	25.9	24.9	25.8	17.7	18.1	16.6	16.1	16.8
V	<.800	<.800	<.800	<.800	<.800	<.800	<.800	1	1	<.800
Zn	136	134	146	140	144	140	131	142	147	143

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Appendix E. Trace elements (in µg/g dry weight) in livers from Red-winged Blackbird collected from the Highland Uranium In Situ Mine irrigated area and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area				Reference Site		
	PRIRWB02	PRIRWB04	PRIRWB05	PRIRWB06	REFRWB01	REFRWB05	REFRWB06
Al	<9.00	<10.0	<9.00	<10.0	<10.0	<9.00	<20.0
As	<.100	<.100	<.100	<.100	<.100	<.100	<.200
B	13	18	20	25	24	21	48
Ba	<.200	<.200	<.200	<.200	<.200	<.200	<.300
Be	<.0200	<.0300	<.0200	<.0200	<.0300	<.0200	<.0400
Cd	0.51	1.2	0.98	0.943	0.04	0.82	0.45
Cr	0.3	<.200	<.200	0.1	0.4	<.200	0.4
Cu	19	25	18	18	27	18	18
Fe	303	989	1150	571	1320	784	1200
Hg	0.22	0.27	0.093	0.07	0.04	0.36	0.34
Mg	845	745	765	807	815	826	741
Mn	4.6	4.9	5.1	6.8	2.8	3.4	4.1
Mo	3.8	4.3	3.5	3.8	2.7	3.8	3
Ni	<.400	<.500	<.400	<.100	<.500	<.400	<.200
Pb	<.0800	<.0900	<.0800	<.0900	<.100	<.0800	<.200
Se	51	33	53	50.1	3.7	6.8	10
Sr	0.35	0.42	0.3	0.2	0.78	0.2	<.200
V	<.800	<1.00	<.900	<.900	<1.00	<.900	<2.00
Zn	77.2	85.1	81	88.4	72.8	76.5	73.3

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Appendix F. Trace elements (in µg/g dry weight) in livers from Lark Buntings collected from the Highland Uranium In Situ Mine irrigated area, Converse County, Wyoming.

Element	PRILBNL1	PRILBNL2	PRILBNL3
Al	<20.0	<20.0	<20.0
As	<.200	<.200	<.200
B	72	33	34
Ba	<.400	<.400	<.400
Be	<.0500	<.0600	<.0600
Cd	<.0400	<.0500	<.0500
Cr	<.400	<.500	<.500
Cu	24	25	33
Fe	1250	929	809
Hg	0.06	<.0400	<.0400
Mg	813	821	805
Mn	4.8	4.2	5.3
Mo	4	3	3
Ni	<.900	<1.00	<1.00
Pb	<.200	<.200	<.200
Se	7.8	8.8	8.6
Sr	1.5	0.4	0.4
V	<2.00	<2.00	<2.00
Zn	94.5	77.6	96

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Appendix G. Trace elements (in $\mu\text{g/g}$ dry weight) in the gizzard contents from Lark Buntings and Red-winged Blackbirds collected from the Highland Uranium In Situ Mine irrigated area, and a reference site, Smith Ranch, Converse County, Wyoming.

	PRILBNC1	PRIRWBC1	PRIRWBC2	REFRWBC1	REFRWBC2
Element	Lark Bunting	Red-Winged Blackbird	Red-Winged Blackbird	Red-Winged Blackbird	Red-Winged Blackbird
Al	4150	130	430	890	670
As	1.5	0.3	0.57	0.3	3.2
B	9.4	61.3	42	62	62
Ba	176	5.4	29.1	12	7.1
Be	0.99	<.0200	0.04	<.0300	0.21
Cd	0.31	0.77	0.61	0.51	0.84
Cr	4	0.63	1	1.9	1.3
Cu	18	37	26	23	25
Fe	2510	181	354	618	4560
Hg	<.0500	<.0500	<.0700	<.0700	<.0800
Mg	1700	1850	2640	1690	1390
Mn	181	82.5	179	54	85.8
Mo	0.8	1	2	2	2
Ni	1.5	<.400	6.6	<.600	<.600
Pb	2.6	0.1	0.2	1	1.4
Se	1.6	12	83	0.6	0.8
Sr	235	42.1	146	46.3	145
V	5.9	<.800	<1.00	3	4.3
Zn	120	265	176	210	178

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Appendix H. Trace elements (in µg/g dry weight) in Red-winged Blackbird eggs collected from the Highland Uranium In Situ Mine irrigated area, and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area						Reference Site								
	PRIRBE01	PRIRBE02	PRIRBE03	PRIRBE04	PRIRBE05	PRIRBE06	REFRBE01	REFRBE02	REFRBE03	REFRBE04	REFRBE05	REFRBE06	REFRBE07	REFRBE08	REFRBE09
Al	<4.00	<3.00	<4.00	<5.00	<10.0	<10.0	35	<3.00	<3.00	<3.00	<3.00	<3.00	<10.0	<9.00	<9.00
As	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<.0900
B	<2.00	<1.00	<2.00	<2.00	0.9	<.700	2	2	2	2	<1.00	2	1	1	1
Ba	1.3	1.6	3.6	3.5	6.9	3.4	1.3	0.58	0.96	2.1	0.44	1.9	2.1	3.3	2.5
Be	<.0200	<.0200	<.0300	<.0300	<.0200	0.02	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200	<.0300	<.0200	<.0200
Cd	0.02	<.0200	<.0200	<.0200	0.13	<.00900	<.0200	<.0200	<.0200	<.0200	<.0200	0.02	<.0200	0.04	<.0200
Cr	0.59	0.4	0.4	0.5	0.4	0.3	0.5	0.5	0.63	0.69	0.59	0.7	<.200	0.5	0.4
Cu	3.7	2.9	3.3	2.6	3.1	1	3.2	3.4	3.7	3.3	2.7	3.5	3.3	3.8	3.3
Fe	77	121	119	188	180	211	142	132	135	122	104	111	167	146	168
Hg	0.04	0.06	0.063	<.0200	0.08	0.07	0.081	0.13	0.04	0.05	0.18	0.16	0.06	0.062	0.06
Mg	377	435	423	426	344	443	505	591	360	511	405	519	399	478	498
Mn	5.3	4.5	3.1	5.2	4	6.1	4.2	3.4	5.4	3.8	3.2	4.6	3.9	2.4	3
Mo	<1.00	<.900	<1.00	<1.00	<.800	<.700	<1.00	<.900	<.900	<.900	1	<.900	<.600	<.600	<.600
Ni	<.400	<.400	<.400	<.500	<.100	<.100	<.400	<.400	<.400	<.400	<.400	<.400	<.500	<.400	<.400
Pb	0.67	<.0700	<.0800	<.100	<.100	<.100	<.0700	<.0700	<.0700	<.0700	<.0700	<.0700	<.0900	<.0800	<.0800
Se	15	20	15	13.2	22	19	3	3.1	2.7	2.7	3.3	3	2.4	3.1	3.2
Sr	9.29	10.7	10.2	9.84	9.2	17.4	16.3	24.5	8.07	16.9	5.84	19.6	8	10.6	16.8
V	<.400	0.7	<.500	<.600	<1.00	<1.00	<.400	<.400	<.400	<.400	<.400	0.5	<.900	<.800	<.800
Zn	52	55.6	61.2	81	62.3	75.2	76.3	70.8	71.7	72.9	60.4	77.1	66.3	73.3	66.1

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Appendix I. Trace elements (in µg/g dry weight) in Western meadowlark and European starling eggs collected from the Highland Uranium In Situ Mine irrigated area, and a reference site, Smith Ranch, Converse County, Wyoming.

Element	Study Area					Reference Site
	PRIWME01	PRIMLE02	PRISTE01	PRISTE03	PRISTE05	REFSTE01
	Western Meadowlark	Western Meadowlark	European Starling	European Starling	European Starling	European Starling
Al	<3.00	<3.00	<4.00	<3.00	14	<9.00
As	<.100	<.100	<.100	<.100	<.100	<.100
B	<1.00	2	<2.00	<1.00	2	<.600
Ba	9.89	8.45	16.7	14.1	8.9	2
Be	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200
Cd	<.0200	<.0200	<.0200	<.0200	<.0200	<.0200
Cr	<.200	0.66	0.3	0.4	<.200	0.5
Cu	4.2	5.1	3.1	3.1	2.5	3.1
Fe	83.1	77	114	106	152	110
Hg	0.03	0.05	0.1	0.11	0.087	0.072
Mg	505	858	411	456	458	429
Mn	2.7	2.3	4.7	4.1	3.9	4
Mo	<.900	<.900	<1.00	<.900	<.900	0.8
Ni	<.400	<.400	<.400	<.400	<.400	<.400
Pb	<.0700	<.0700	<.0800	<.0700	<.0700	0.2
Se	18	28	6.2	7.1	7.9	2.7
Sr	14.7	49.6	14.8	16.6	13.3	9.1
V	<.400	0.5	<.500	0.6	<.400	<.800
Zn	65.9	54.1	59.8	50.7	53	48

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Appendix J. Trace elements (in µg/g dry weight) in sediment collected from the Purge Storage Reservoir # 1, Highland Uranium In Situ Mine, Converse County, Wyoming.

Element	PRISOIL1	PRISED02	PRISED03	PRISED04	PRISED05
Al	11800	14000	14200	12900	18600
As	<0.02	<0.02	<0.02	<0.02	<0.02
B	<0.4	<0.4	<0.4	<0.4	<0.4
Ba	114	329	87.8	87	66.6
Be	<0.08	<0.08	<0.08	<0.08	<0.08
Cd	<0.3	<0.3	<0.3	<0.3	<0.3
Cr	59.4	37.8	96.9	82.3	<0.8
Cu	12.6	15.8	13.3	9.75	21.5
Fe	16700	20600	14800	15200	21900
Hg	<0.02	<0.02	<0.02	<0.02	<0.02
Mg	2700	3730	2780	3140	3840
Mn	178	350	161	127	195
Mo	<0.5	<0.5	<0.5	<0.5	<0.5
Ni	14.1	3.43	5.57	15	13.1
Pb	<2	<2	<2	<2	<2
Se	16	38.8	7.81	11.5	18.2
Sr	104	226	75.4	74.5	76.7
V	14.8	20.9	22.1	21.5	14.4
Zn	49.8	56.5	47.3	47	57.7

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Appendix K. Trace elements (in µg/g dry weight) in pondweed collected from the Purge Storage Reservoir # 1, Highland Uranium In Situ Mine, Converse County, Wyoming.

Element	PRIAVEG1	PRIAVEG2	PRIAVEG3	PRIAVEG4	PRIAVEG5	PRIAVEG6	PRIAVEG7	PRIAVEG8
Al	4190	3490	5630	3310	8280	2370	4080	4140
As	2.7	2	2.4	1.7	3.4	3.7	3	3
B	72.8	133	96	218	26	191	236	99.4
Ba	226	198	203	215	293	206	194	236
Be	0.08	0.1	0.1	0.09	0.27	0.09	0.1	0.1
Cd	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cr	3	3.4	4.7	3	10.1	2.9	6.3	6.2
Cu	2.9	3.2	4	5	5.5	3.3	5	4.4
Fe	2020	1630	2510	2020	4280	1120	1620	2270
Hg	0.013	0.014	0.014	0.016	0.027	0.008	0.016	0.018
Mg	4740	5170	5330	5500	4580	6110	5650	5100
Mn	2200	1930	2300	1820	2020	2560	3060	2470
Mo	1	2	1	4	<.900	2	2	1
Ni	17.7	14.7	18.9	17.3	19.9	25.6	30.6	20.1
Pb	1.69	1.91	2.18	1.87	4.82	1.14	1.68	2.29
Se	466	434	438	452	450	508	473	503
Sr	891	784	805	680	783	939	819	919
V	9.3	8.2	11	10	11	9.3	12	9.6
Zn	26.8	29.3	32	34.8	28.6	32.8	41.9	29.6

EXHIBIT 14

From: [Yilma, Haimanot](#)
To: [wmap@igc.org](#); [Jehle, Patricia](#); [Clark, Michael](#)
Cc: [Travis Stills](#); [cindy@mariogonzalezlaw.com](#); [davidcoryfrankel@gmail.com](#); [belli4law@aol.com](#); [Tom Ballanco](#); [Chris Pugsley](#); [Anthony J. Thompson](#); [Hsueh, Kevin](#); [Cohen, Stephen](#)
Subject: RE: Dewey-Burdock DSEIS comment deadline and New draft license
Date: Tuesday, January 08, 2013 4:47:07 PM

Mr. Parsons,

The NRC staff issued a second draft license to Powertech last Friday, January 4, 2012. This draft license is a revision of the draft license the staff initially issued to Powertech on July 31, 2012. A draft license serves to inform an applicant of potential license conditions, highlighting certain issues that the applicant must address prior to and during operations. Issuing a draft license to Powertech is consistent with the staff's practice in other uranium recovery licensing proceedings.

The staff is committed to following the NRC's tribal government communication protocols, and we are equally committed to fulfilling our NEPA duties. Since the staff began reviewing the Dewey-Burdock application, we have made every effort to keep tribes informed of the progress of our review. Over the last year we have sent the tribes numerous letters and emails explaining the progress of our review and seeking information from tribes. We have also explained that documents relevant to our review of Powertech's application may be found in the NRC's electronic database, the Agencywide Documents Access Management System (ADAMS). Because the second draft license was released just last Friday, we have not yet had the opportunity to mail this document to the tribes.

The second draft license documents information that Powertech has submitted since the staff issued the first draft license in July 2012. The revisions to the draft license are based on information that has been publicly available through ADAMS for some time now, including Powertech's "Supplemental Preconstruction and Preoperational Sampling Plan" (ADAMS Accession No. ML12305A056) (October 19, 2012). The changes to the draft license do not affect the conclusions in the draft supplemental environmental impact statement (DSEIS). To the contrary, the analysis in certain sections of the DSEIS presumes that Powertech will later submit information to address outstanding issues, and the changes to the draft license reflect information that Powertech has submitted over the last five months.

Because the revisions to the draft license do not change the staff's analyses of environmental impacts, the staff finds no reason to extend the comment period on the DSEIS past January 10, 2013. As stated in the *Federal Register* notice of availability for the DSEIS, however, the staff will consider comments on the DSEIS received after January 10, 2013 to the extent it is practical to do so.

The staff would further note that, as with other uranium recovery proceedings at the NRC, there is no public comment period on the revised draft license. At the same time, members of the public should always feel free to contact the NRC staff regarding documents we issue. We value this input, and we will take it into account to the extent practicable.

Sincerely,

Haimanot Yilma
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 FSME/DWMEP/EPPAD/ERB
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From: Jeffrey C. Parsons [mailto:wmap@igc.org]
Sent: Monday, January 07, 2013 1:37 PM
To: Yilma, Haimanot; Jehle, Patricia; Clark, Michael
Cc: Travis Stills; cindy@mariogonzalezlaw.com; davidcoryfrankel@gmail.com; belli4law@aol.com; Tom Ballanco; Chris Pugsley; Anthony J. Thompson
Subject: Dewey-Burdock DSEIS comment deadline and New draft license

Ms. Yilma, it has come to attention this morning through a Powertech press release provided to us by a third-party that NRC staff has issued a second draft license for the Dewey-Burdock project. The timing of this release is disappointing and deeply concerning, given that it comes mere days before the deadline for comment on the Draft SEIS in this matter. To date, no party has provided any notice of the existence or the substance of any revised draft license. This unfortunate timing and the lack of any communication regarding the issuance of a new draft license appears contrary to the NRC's tribal government communication protocols and NEPA duties. From the Powertech press release, it appears the newly-issued draft license encompasses some substantive changes in the proposed action regarding an environmental monitoring program and proposed mitigation measures.

<http://www.marketwire.com/press-release/powertech-receives-second-draft-uranium-recovery-license-from-nrc-tsx-pwe-1742886.htm>

From the press release, it appears that Powertech has 30 days to comment. The public and the parties, including the Tribe and consolidated intervenors, should be allowed a corresponding amount of time to review the changes and to incorporate them into their comments on the Draft SEIS. As such, the public comment period should be extended. Indeed, because it appears that the DSEIS was released prematurely, re-publication of the DSEIS should be required.

As you are aware, necessary field surveys have not yet been conducted, and now apparently will not be conducted until Spring 2013 – substantially mitigating any perceived prejudice such a modest extension would cause.

We look forward to your response.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
POWERTECH (USA) INC.,)	Docket No. 40-9075-MLA
)	ASLBP No. 10-898-02-MLA-BD01
(Dewey-Burdock In Situ Uranium Recovery)	
Facility))	

SUPPLEMENTAL DECLARATION OF DR. ROBERT E. MORAN

I, Dr. Robert E. Moran, do hereby swear that the following is true to the best of my knowledge:

Professional Qualifications and Introduction

Robert E. Moran, Ph.D.

Michael-Moran Assoc., LLC
Water Quality/Hydrogeology/Geochemistry
Golden, Colorado, U.S.A.
remwater@gmail.com

1. I am a hydrogeologist and geochemist with more than 40 years of domestic and international experience in conducting and managing water quality, geochemical and hydrogeologic work for private investors, industrial clients, tribal and citizens groups, NGO's, law firms, and governmental agencies at all levels. Much of his technical expertise involves the quality and geochemistry of natural and contaminated waters and sediments as related to mining, nuclear fuel cycle sites, industrial development, geothermal resources, hazardous wastes, and water supply development. In addition, I have significant experience in the application of remote sensing to natural resource issues, development of resource policy, and litigation support. I have often taught courses to technical and general audiences, and has given expert testimony on numerous occasions. Countries worked in include: Australia, Greece, Bulgaria, Mali, Senegal, Guinea, Gambia, Ghana, South Africa, Iraqi Kurdistan, Oman, Pakistan, Kazakhstan, Kyrgyzstan, Mongolia, Romania, Russia (Buryatia), Papua New Guinea, Argentina, Bolivia, Chile, Colombia, Guatemala, Honduras, Mexico, Peru, El Salvador, Belgium, France, Canada, Great Britain, United States.

Literature Reviewed

2. In addition to my professional experience, the opinions and comments that follow are based on review of all, or significant portions of the following documents:

Powertech Application for NRC Uranium Recovery License, Dewey-Burdock Project, Feb. 2009:

- ☐ Technical Report (TR)
- ☐ Environmental report (ER)
- ☐ Supplement to Application, Aug. 2009
- ☐ Powertech submittals (2010, 2011, 2012)

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Summary Comments

3. These opinions focus predominantly on the water resources and related impacts within the proposed Dewey-Burdock (D-B) area. These waters are natural resources presently used collectively by numerous parties (ranchers, municipalities, tribal groups, fish and wildlife, mineral and oil and gas developers, etc.). However, the DSEIS must realistically anticipate what will be the true *long-term* uses of these waters---especially when many generations must be considered. Thus, *truly conservative assumptions* should be employed—which is not the case in this DSEIS.

4. Some of these waters are already contaminated by past uranium exploration and mining, with little or no remediation required by any regulatory agency, which suggests a great deal about the future oversight. The D-B site contains numerous old uranium workings (shallow open-pit and underground), accumulations of various contaminated waste materials, 1000s of unplugged

boreholes, which likely provide hydraulic connections between various water-bearing units. To allow for a meaningful review, all available borehole information needs to be assembled and presented in a comprehensive manner.

5. Past exploration and mining activities have exposed the mineralized rocks to reactive surface waters and ground waters and bacteria, increasing the concentrations of numerous contaminating chemical constituents in local waters, soils, etc. *Nevertheless, some of the water-bearing units within and around the DB area will still contain high or relatively-uncontaminated waters, suitable for numerous other uses.* This pattern is the norm at typical metal mine locations worldwide, including uranium sites. The proposed D-B activities will increase the concentrations of such contaminants in some local ground waters, as a minimum. Thus, it is imperative that the specific locations and characteristics of these contaminated and uncontaminated waters be defined in a DSEIS available for public review and comment prior to publication of a FEIS and project approval.

6. The DSEIS gives the impression that all of the D-B-area waters (surface and ground) are already contaminated. However the DSEIS fails to supply the detailed data necessary to support that contention. Experience at similar sedimentary uranium sites indicates that significant quantities of uncontaminated ground water likely exist, and could be used for other livestock, agricultural, domestic, etc. uses. The NRC has failed to require Powertech to provide statistically-adequate, reliable, *preoperational* baseline data, either within the D-B project area, or in surrounding regions. Without adequate baseline data, the presently-uncontaminated waters could become contaminated through ISL-related activities, but the public would have no way of discovering this impact.

7. The DSEIS fails to provide basic information necessary to reliably evaluate future, LONGTERM impacts. If the D-B-area resources had been evaluated in a truly detailed, interdisciplinary, scientific manner, the DSEIS would have collected and summarized the most fundamental technical information relating to water resources, such as:

- a detailed inventory of all present water users within a radius of at least 2 miles of the proposed D-B boundaries. Such an inventory would include statistically-valid, preoperational data on well yields, water levels, detailed water quality;
- a detailed, statistically-valid summary of BASELINE data for water quality and quantity from the relevant water-bearing units, *based on pre-operational data*. These would already include evaluation of hydrogeologic characteristics for all of the relevant water-bearing units based on actual, long-term aquifer / pump testing data. Such baseline data would also incorporate all relevant data collected prior to Powertech's involvement, including data collected during the 1950s to the present (including, for example, TVA data).

- detailed data on the presence and condition of all subsurface borings (exploration holes, oil and gas holes, etc.)
- a detailed spring and seep survey, which would have included statistically-reliable (and seasonally-meaningful) measurement of field parameters and yields, detailed water quality---all based on preoperational data.
- all such actual data / information could easily be summarized in the form of maps, tables, and graphs, without resorting to thousands of pages of disorganized text, which has been the approach taken by Powertech and the NRC.

8. In addition, a technically-reliable study of the D-B area would have summarized the detailed data and long-term impacts from the numerous actual, operating and closed ISL sites (throughout the USA and other countries), to gain insight on actual results and impacts obtained from a *population* of sites. It is technically-meaningless to make deterministic predictions about such impacts at a *single* site, especially a site to be operated by a company that has never operated another ISL mine.

9. Impact evaluation (by NRC, PT and consultants) in this DSEIS fails to follow accepted approaches used in the wider scientific community. The DSEIS fails to use reliable scientific investigation to assess or compare known impacts at *populations* of other operating and closed ISL sites. Most importantly, it is not possible to reliably-rank future D-B impacts [SMALL, MODERATE, LARGE] when the NRC and public lack reliable baseline data to use as a measure of change. Such approaches would not be acceptable in most technical, scientific (academic-research) publications.

10. The data and information described above are required for an analysis in a DSEIS prior to FEIS or license approval. Otherwise reliable evaluations of future impacts cannot be made. In addition, without such data, it will be largely impossible to hold the operators responsible for future, unremediated impacts.

Specific Comments

The DSEIS has been publicly-released at a period specifically inconvenient for public review.

11. By releasing the DSEIS over the winter holiday season, NRC has obviously made review and commenting on these documents more difficult and precluded the public from making a useful site visit to verify data and claims made in the DSEIS.

The DSEIS comprises thousands of pages of convoluted, poorly-organized and inadequately-summarized material.

12. The various D-B documents submitted to the NRC encompass more than **14,512 pages**, yet fail to adequately present the most basic data (see below).

For example:

--the 2009 Application was almost 6000 pages;

□ [Technical Report (TR)-- 3103 pages; Environmental Report (ER)-- 2615 pages;

Supplement to Application-- 66 pages.]

--the 2011 Powertech submittal totaled roughly 5000 pages;

--the present DEIS (Vols. 1 & 2) comprises 858 pg., which is only part of the GEIS;

--the GEIS, to which much of the DSEIS refers comprises 3512 pages.

13. The relevant D-B information, if compiled in a direct, transparent manner using predominantly maps, tables and graphs, could easily have been summarized in 150 pages for the DSEIS. Instead, the DSEIS is so duplicative and poorly-organized that it makes informed review by both the regulators and general public unnecessarily convoluted.

The DSEIS fails to adequately respond to the weaknesses and written criticisms of the Powertech Application.

14. The Powertech Application submittals (2009, 2011) were prepared by Powertech and its consultants, based largely on data collected by these same parties. While the DSEIS states that it was prepared by the NRC [and the CNWRA (Center for Nuclear Waste Regulatory Analyses)], it appears that it is based entirely on these same Powertech data, with no new water-related data added since the application. Clearly most of the DSEIS opinions are also based on the technical opinions of Powertech and their consultants.

15. Also, the DSEIS fails to adequately respond or address most of my written Opinions made regarding the D-B Application, which were submitted to the NRC in April 2010 (Moran Declaration, April 2010).

The DSEIS is Technically-deficient, lacking fundamental data that are needed to reliably evaluate likely impacts to the D-B-area water resources and related environment.

16. The DSEIS admits that important water quality data collection and aquifer testing will only be conducted after license issuance (e.g. DSEIS p. 2-16, 7-8, 7-14, 7-17).

17. Such data are needed *now*, as part of any useful EIS and certainly prior to issuance of an operating permit. These data include: reliable preoperational

baseline data on water quality and quantity / yields of all relevant surface and ground waters; specific data on the total water volumes to be used by all D-B operations; detailed data on hydrogeologic characteristics of all relevant geologic units; detailed evaluations of the hydraulic interconnections between the uranium production zones and the other relevant water-bearing and confining units; data on the detailed chemical compositions of barren and pregnant solutions, evaporation pond waters, etc.; a detailed inventory of all water users within at least a 2 mile distance of the D-B project boundaries.

Details on these categories are discussed below.

Concerns Expressed by Other Federal and State Agencies not Addressed

18. The DSEIS mentions on p. 1-15 and 16 that several other Federal and State agencies have expressed concerns regarding impacts to Water Resources, etc. from the proposed D-B project, but fails to discuss or address in any detail these criticisms. This omission gives the false impression that the present comments (for the Oglala Sioux) are made in isolation from those of these other regulatory agencies.

19. A brief review of the coordination conducted with other agencies reveals the following points of concern with respect to these agencies:

- Coordination with BLM: South Dakota BLM field office: provided NRC staff with information on **oil and gas leases** in the proposed project area. DSEIS, P1-16. Additionally, BLM staff expressed **concerns related to water quality and hydrology, land use, and cumulative effects**.

- Coordination with U.S. Army Corps of Engineers: USACE documented the presence of 20 wetlands within the project area and determined that 4 were jurisdictional waters; these are Beaver Creek, an unnamed tributary to Beaver Creek, Pass Creek, and an unnamed tributary to Pass Creek (Powertech, 2009b, Appendix 3.5–H).

- Coordination with USFS: it expressed concerns that construction and operational activities could impact the nearby Black Hills National Forest and Buffalo Gap National Grasslands. USFS staff noted a concern about the cumulative groundwater effects of the project on the USFS-managed aquatic recreation areas of Cascade Springs and Keith Park Springs. USFS also expressed concerns about potential effects the project could have on Craven Canyon, known to have traditional cultural significance to Native American tribes.

- Coordination with USGS: With respect to the proposed Dewey-Burdock ISR Project, USGS staff expressed a concern that **contaminated groundwater** may travel from the project area and discharge into Beaver Creek within the proposed

project area and the Cheyenne River south of the proposed project area [via groundwater or surface water].

-Coordination With South Dakota Department of Environment and Natural Resources expressed concerns regarding:

(i) the adequacy of subsurface characterization, (ii) groundwater flow rates within and in the vicinity of the project area, (iii) potential complications in hydrology caused by past exploratory drill holes, (iv) potential hydrologic connection of production zones and abandoned onsite surface mines, and (v) the effectiveness of confining layers in isolating ore-bearing aquifers. NRC and SDDENR staffs also discussed the applicant's Class III UIC permit application (Powertech, 2010) and the water appropriation and waste management permitting processes for the proposed project. Potential risks to wildlife from wastewater surface impoundments associated with the proposed project were also discussed. SDDENR would coordinate with SDGFP to mitigate the potential effects of surface impoundments on wildlife; mitigation measures discussed included the use of netting and fencing to protect wildlife and implementing protocols to assess the effects of wastewater constituents on wildlife.

-Coordination with S.D. Game, Fish and Parks:

focused primarily on threatened or potentially threatened and endangered species (e.g., the plains topminnow, sage-grouse, and black-footed ferret) and species of local concern (e.g., raptors). SDGFP expressed a **major concern: the potential effects on birds flying through the proposed project area and drinking at exposed wastewater evaporation ponds**. SDGFP suggested two measures to mitigate effects on bird populations: (i) **testing** to determine the **toxicity of constituents in the evaporation ponds** and (ii) using **netting and fencing to restrict wildlife access to exposed ponds**. SDGFP also noted the **need for testing and monitoring of soils** at the proposed site to **identify any buildup of salts and metals** that could result from proposed land application of **treated wastewater**.

Water Use: The D-B Project will use and contaminate tremendous volumes of ground water. How much water will be used throughout the life of the proposed DB operation?

20. The D-B project area is semi-arid, having an average yearly precipitation of about 12.4 inches, and the range of evaporation for the So. Dakota-WY-Nebraska uranium region is between 40 and 50 inches (NRC GEIS 2009). Thus evaporation is roughly 3 to 4 times the yearly precipitation (ER, pg. 3-176 and 177; Fig. 3.6-27). Because the project is presently expected to operate for between 7 and 20 years, it will require the use of tremendous volumes of local ground water, and will result in losses of significantly greater quantities of water via evaporation.

21. Unfortunately, the DSEIS fails to provide reliable estimates for the volumes and sources of water to be used (consumptive and non-consumptive uses) during all stages of the proposed operation. Actual, detailed data on amounts of water required for operations are not presented (e.g. ISL operations, human consumption, dust suppression, evaporation from disposal ponds, waste disposal, etc.). In mining hydrogeologic studies, such data would routinely be included in a detailed Water Balance.
22. No detailed Water Balance is provided in the DSEIS. Instead the DSEIS provides imprecise, conflicting information on the volumes of water to be used throughout the various sections of the DSEIS (e.g. p.2-15, 2-34, 4-57-59, etc.).
23. Powertech calculates that the sustainable pumping rate from the Inyan Kara Group / Aquifer is about 40 gpm for the life of the project (DSEIS p. 4-59). However, the NRC / Powertech state that the operational requirements for the Burdock CPP alone would require a sustained pumping rate of 65 gpm (at DSEIS p. 4-59). Powertech has applied to the SDDENR for permits to extract water from the Madison Aquifer. Thus, it is presently unclear which aquifer will be the source for long-term, operational phase water. If the permits for using Madison Aquifer waters are denied, additional sources (besides Inyan Kara) would be required.
24. The applicant estimates the wellfield production bleed would be approximately **0.5 to 3.0 percent** of the **production flow rate**, yielding a wellfield production bleed rate between 20 gpm and 120 gpm (DSEIS, P. 2-34).
25. Powertech estimates that approximately 52.6 million gallons of ground water would be required for the Construction phase alone (DSEIS p.5-30). **No data are provided for the volumes of ground water required for the other phases, throughout the life of the project.**
26. Clearly, the DSEIS fails to reveal reliable long-term water use data for all phases of the entire project. Greater uncertainty is shown when one reads the water use data originally presented in the 2009 Powertech Application, ER pg. 8-2 (Table 8.1-1), which states that **ground water consumption will be 320 gpm.**
27. Because no Water Balance is presented, it is unclear how much of this volume is recycled, re-injected as waste in other formations, etc. In addition, one must assume that quality of much of the recycled and re-injected water would be degraded as compared to any reliable preoperational baseline data.
28. Aside from the obvious lack of consistency, the estimates (above) translate into massive amounts of ground water when considered over the full life of the project. Using two of the estimated ground water use rates stated above, total water consumption over the life of the project can be estimated as follows:

65 gpm = 34.2 Million gpy (gals / yr).

After 7 yrs = 239,148,000 gallons, or 239.15 Million gallons.

After 17 yrs = 580,788,000 gals or 580.8 Million gallons.

320 gpm = 168.2 Million gpy (gals. / yr).

After 7 yrs = 1,177,344,000 = 1.2 Billion gallons

After 17 years = 2,859,264,000 gallons = 2.86 Billion gallons.

29. Clearly, this range of estimates indicates that vast quantities of ground water will be extracted from these aquifers over the long-term. At a minimum, Powertech should be required to construct a credible project water balance and to more seriously investigate the potential that such large-volume water use might impact local / regional ground water levels and well yields.

30. At present, I see no evidence that the Application contains a reliable compilation of *baseline water level and pumping-rate data for the surrounding domestic and stock wells (see discussion below)*. Without such reliable, summarized data, there will be no viable method to demonstrate that ground water levels (and related pumping costs) have not been impacted by project-related activities.

31. The public must assume that Powertech will pay no cost for the actual water (the commodity) used during operations---while numerous other users do. The specifics of this issue should be addressed by Powertech in writing.

32. Despite the central role of water in the operation of the project, water use, availability, depletion, and consumption are not seriously analyzed through a water balance investigation, or other similar technique. This analysis is critical to understanding the anticipated impacts during project review and for monitoring actual water impacts should this project actually begin using and consuming groundwater.

Hydrogeologic Performance of the Water-bearing and Other Geologic Units.

33. The DSEIS fails to provide detailed, site-specific information / data on the hydrogeologic characteristics of the relevant D-B water-bearing and other bounding geologic units, including the mineralized zones. Such data must be obtained by performing and interpreting *long-term*, aquifer test data. The DSEIS admits that such long-term, detailed testing will not be performed until after the NRC license is issued (e.g. DSEIS at 2-17, 7-11).

34. The hydrogeologic data presented in the DSEIS are **inadequate** to reliably portray and predict the following:
-the baseline, detailed directions of ground water flow in the relevant water-bearing units;

- the extent of long-term hydraulic connections between the various geologic units, both within the project area and outside;
- the horizontal / regional extent of water level declines (and impacts on pumping rates) outside the project boundaries;
- the degree to which ground water withdrawals may impact local surface waters;
- the operator's ability to contain the migration of contaminants;
- the operator's ability to restore aquifer water quality to baseline / acceptable conditions.

35. Such inadequate hydrogeologic data also mean that any ground water flow simulations based on these data are likely to provide highly imprecise and unreliable predictions (e.g. SEIS, P.2-16, L 30-37).

36. In addition, such inadequate hydrogeologic data, coupled with the lack of reliable baseline water quality data (see below), render the NRC staff predictions about impacts (both incremental and Cumulative) to water resources *largely meaningless* (e.g. the Executive Summary and Section 5.0). For example, despite failing to define the extent (areal, vertical) and specific, detailed chemical compositions of past contamination, the NRC staff predicts that Cumulative Impacts to *Surface Waters and Wetlands* will be MODERATE TO LARGE (p.5-17), but that the D-B project will have a SMALL incremental impact on surface waters and wetlands when added to all other past and present impacts (p. 5-30). *Given the lack of detailed baseline data (hydrogeologic and water quality) such conclusions sound more like public relations statements than science.*

Impacts from Long-term Pumping of Ground Waters.

Radius of Impacts / Influence. (modified from Moran Declaration, 2010)

37. The DSEIS presents no specific hydrogeologic information on the anticipated declines in water levels at domestic and stock wells outside the D-B project. Despite lacking adequate, long-term aquifer test data, the Powertech ER (2009) presented *predictions* of **water level declines** after 8 years of continuous pumping:

- - **9.9 to 42.8 feet** at the nearest domestic well in the Fall River Aquifer, located 15,075 feet [**about 2.9 mi.**] from the approximate center of pumping (ER pg 4-23);
- - **4.9 to 12.6 feet** at the nearest domestic well in the **Lakota Aquifer**, located 10,915 feet [**about 2.07 mi.**] from the approximate center of pumping.

38. With such uncertainty, it is quite possible that some neighboring wells will be negatively impacted (water level declines / reduced pumping rates). These data interpretations indicate that domestic and stock, etc. wells should be inventoried and monitored out to at least 2 miles from the D-B boundary.

The D-B water-bearing units are hydrogeologically interconnected.

39. The DSEIS avoids discussing definitively the likely hydraulic interconnections between the various D-B water-bearing units. The 2009 Powertech Application does discuss these issues, but presents overly-optimistic conclusions about the isolation of the ore-bearing zones, aquifers, and the lack of fluid excursions that will occur, both vertically and horizontally. Powertech's description and evaluation of possible water-related impacts [2009 Application, ER pg. 8-2 (Table 8.1-1)] are unreasonably optimistic. It is unlikely that the process waters can be contained within the project boundaries given the following pathways that connect the project area with surrounding aquifers: 1) sedimentary formations; 2) geologic fractures, 3) exploration boreholes, 4) mine workings, 5), other anthropogenic fractures and borings.

40. The D-B uranium deposits occur in subsurface, fluvial channel, sandstone deposits in the Lakota and Fall River formations (Smith, 2005). These sandstones *inter-finger* with finer-grained silts and shales, often associated with lignites and coals, which form the typical lithologic sequences often seen in classic sedimentary uranium deposits (Abitz, 2005; Gott, 1974; Henry, 1982; Galloway, 1982; Henry, 1980; Harshman, 1972).

41. Hydraulically, such sedimentary packages typically allow ground waters to flow between the inter-fingering facies, both vertically and horizontally, when the coarser-grained sediments are *stressed by long-term pumping*. The hydraulic inter-connections are verified by conducting ***long-term aquifer tests integrated with sequential water quality sampling and in-situ measurement of field parameters*** (Henry, 1982; Galloway, 1982; Moran, R.E.—hydrogeochemical research activities, U.S.G.S., Water Resources Div., 1973—1978). *The hydraulic interconnections of such inter-fingering facies has been well known for decades within the petroleum industry research groups (e.g. Fisher, et. al., 1969).*

42. Thus, ore-bearing sandstones in typical sedimentary packages associated with roll-front uranium deposits do *not routinely behave as hydraulically-isolated bodies*. Numerous specific lines of evidence from the 2009 D-B Application documents indicate that the project sediments possess various pathways for the migration of water and contaminants from the ore zones into neighboring sediments, both vertically and laterally. For example, thousands of exploration boreholes have been drilled since the 1950's at the D-B site (Smith, 2005; TR, ER), many of which were not correctly plugged and abandoned (TR, Pg. 2-157; Append. 2.7-B, sub-Appendix D, pg. 1484; TR, Append. 2.6- A, pg. 972-1111). In addition, several sources (Smith, 2005, pg. 9; ER, pg. 3-106) report that the area contains historic shallow mine workings, both open pits and short tunnels that would provide additional flow pathways.

43. There are numerous old and existing water wells and old oil test wells in the D-B area, many with rusty and leaky casings, often unplugged or partially-plugged, drilled through several formations which act as potential pathways for

flow between water-bearing units (ER, pg.3-40; TR, Append. 2.2-A, pg. 740-779; 2.2-B, especially pg. 864- 902).

44. The 2009 Application, TR, pg. 2-153-154, states that hydraulic connections between local D-B aquifers often result because confining units are thin or are absent in many areas (ER, pg.3-56-57). In addition, Gott (1974) and others have mentioned the presence of breccia / evaporite pipes (collapse structures), which create vertical permeability pathways between aquifers. Gott (1974, pg. 27-29) and others discuss the common presence of faults and joints throughout the region, which could easily act as flow pathways. The DSEIS states that detailed geologic mapping conducted by Powertech found no indication of such breccia pipes (p. 3-32), but the document fails to state that a detailed examination of all the subsurface data was searched for the presence of such breccia pipes.

45. Vertical and lateral hydraulic connectivity between the ore zones and the neighboring facies / formations are also indicated by the aquifer test results conducted in both 1979 and 2008 (ER, pg.3-56-57; TR, pg. 2-170 & 2-180, for example; TR Append. 2.7-B, Knight-Piesold Pumping Test Report, pg. 1290).

46. The DSEIS fails to assess the forgoing conditions, or likely impacts associated with these conditions in any scientifically meaningful way, nor does it consider that geologic materials with geologic / hydraulic characteristics similar to the D-B target formations frequently yield both water and oil and gas from **geologic fractures**. A classic example is the Florence oil field in Colorado, which has been producing continuously from fractures in the Cretaceous Pierre Formation since 1862, making it the second oldest producing field in the U.S. [<http://ghostdepot.com/rg/library/magazine/florence%20oil.htm>].

47. The Pierre Formation exists in the Black Hills region and lies stratigraphically above the Inyan Kara Group, the target formations at D-B (Tourtelot, 1962; DSEIS p.3-14). Thus, it is likely that several of the geologic units in the D-B area can also transmit fluids via fracture pathways. This indicates that future computer simulations of D-B ground water flow and leach field performance should be capable of modeling fracture flow characteristics.

48. The aquifer testing already performed *demonstrates leakage between the various formations / facies bounding the ore zone. However, it seems equally likely that longer-duration aquifer tests conducted at even higher pumping rates would demonstrate even more clearly the leaky nature of these site sediments.*

Potential hydrogeologic pathways to nearby wells have not been adequately investigated and documented.

49. The discussion above presents ample evidence that the D-B area sediments contain numerous possible subsurface pathways for project leach fluids to migrate vertically between water-bearing units and outside the project

boundaries. Unfortunately, as noted above, Powertech has not adequately defined the baseline water levels or water quality conditions of neighboring wells within a 2-mile radius of the D-B project. In addition, the 2009 Application, TR pg. 2-180, states that no public data are available on the use of aquifers in Fall River or Custer counties. Such data should have been compiled by Powertech as part of the DSEIS and Application, and should be required before any licenses are given.

Toxic and Hazardous Substances to be Used at D-B.

50. The following chemicals are proposed to be used / stored at D-B (DSEIS, p.4-19):

“The applicant proposes to store, use, and receive shipments of the following chemicals: sodium chloride (NaCl), sodium carbonate (NaHCO₃), sodium hydroxide (NaOH), hydrochloric acid (HCl), hydrogen peroxide (H₂O₂), carbon dioxide (CO₂), oxygen (O₂), anhydrous ammonia (NH₃), diesel fuel, gasoline, and bottled gases (Powertech, 2009b).”

51. All these chemicals are likely stored / used in concentrations that would qualify them as toxic or hazardous substances. Releases of such chemicals can contaminate local soils and waters. Despite the proposed use of these chemicals, the proposed water quality (surface and ground waters) and soils monitoring does include constituents adequate to demonstrate the presence of several of these chemicals, especially the fuels / organic compounds (see below).

Chemical Analyses (Detailed) of Ores, Pregnant Leach Solutions, Liquid Wastes are not presented in the DSEIS.

52. The DSEIS fails to provide actual, detailed chemical analyses (numerous) of representative pregnant leach solutions (ore reacted with lixiviant), both before and after undergoing ion exchange treatment. Such data would routinely include both in-situ measurements of fluid temperature, pH, specific conductance, possibly D.O. (dissolved oxygen) and Eh (redox). Similar representative, detailed data should also have been included for the detailed chemical composition of liquid wastes to be disposed of via deep-well injection, land application and evaporation.

53. Because most mining projects at a similar stage of advancement have already conducted extensive laboratory testing and prepared Feasibility Studies to present to potential investors, such detailed chemical composition data would be available. It is not sufficient to present theoretical / expected chemical compositions, as has been done in the 2009 Powertech ER, pg. 4-83. Smith & Assoc. (2005), pg. 5, reports that TVA, one of the previous mineral right holders, had a “pre-mine feasibility study” prepared, probably in the late 1970’s or 1980’s. If TVA had obtained such detailed data in earlier decades, certainly Powertech would have obtained the older Feasibility information and contracted to have an

updated Feasibility Study performed. Clearly some information in Feasibility Studies is considered proprietary, but detailed chemical composition data on the pregnant solutions and liquids / wastes described above should be analyzed and available to the public and included in any complete DSEIS.

Characterization of Water Resources: Inadequately Described and Characterized.

54. The DSEIS fails to clearly distinguish site surface waters, ground waters (including springs and seeps), wetlands, and waters flowing from boreholes. As all of these waters are ultimately interconnected, hydraulically, this prevents a clear understanding of future impacts to water resources. In several sections, the DSEIS actually confusingly describes ground waters as surface waters. For example, on p. 3-23, it discusses ground waters in abandoned mine pits as though they are surface waters. Page 3-23 states that there are *no known natural springs* within the proposed Dewey-Burdock ISR Project area, which does not mean that a detailed attempt to locate and characterize such springs was ever conducted. On p. 3-27-28, the DSEIS confusingly describes water flowing from an old well as the source of a wetland, when it is obviously not a natural wetland.

55. DSEIS page 3-20 contains a section disingenuously entitled “Artificial Penetrations”, but which is strangely not included in the discussions pertaining to either Surface or Ground Waters. It states: “According to the environmental report, there are 4,000 exploration drill holes representing historic exploration activities (Powertech, 2009a). The applicant has drilled approximately 115 exploration holes, including 20 monitoring wells in the project area. While the applicant cannot confirm that all historic borings were properly plugged and abandoned, the applicant has made commitments to ensure that unplugged drill holes will not impact human health or the environment during operations (Powertech, 2009b, 2011). In the technical report (Powertech, 2009b), the applicant stated that little evidence of unplugged boreholes has been observed given infrared photography data. However, an infrared map of a portion of the Burdock area shows an alkali pond area (Powertech, 2011). The applicant states unplugged borings appear to explain the presence of this pond area. No other pond areas or springs appear in infrared photography data of the Dewey-Burdock site. There is no other evidence indicating that previously unplugged borings are current groundwater flow pathways (Powertech, 2011).”

56. This section makes several half-explained statements as though they are proven facts, and diverts from the likely hydraulic interconnections these boreholes have created between the site surface and ground waters. It implies that a careful study of the site using infra-red photography has been performed, when it is clear that a map of only a portion of the site was available. Despite this tortured language, there is no reason to dismiss the likelihood that many of the old boreholes are acting as conduits between the various water-bearing units, at least below the land surface. Strangely, the DSEIS describes the presence of

several water-filled mine pits (p. 3-23), yet they are not mentioned as being visible on the “infrared photography data of the Dewey-Burdock site”. Clearly a more thorough investigation using infra-red photography and satellite imagery is called for.

Baseline Water Quality

57. The D-B project area has been historically mined and thousands of exploration holes have been drilled within the properties. Hence, it is imperative that high-quality baseline data be supplied to evaluate the actual extent of past impacts to water resources, and the success of future containment or aquifer restoration.

58. The DSEIS, like the Powertech Application, fails to define pre-operational baseline water quality and quantity—both in the ore zones and peripheral zones, both vertically and horizontally. Without adequate baseline water quality data (both ground water and surface water), there is no reasonable method for either the public or the NRC to evaluate the success or failure of either fluid containment or aquifer restoration. The DSEIS and Powertech Application documents repeatedly attempt to convey the impression that the D-B ground water quality is already degraded, rather than compile statistically-defensible data from both the ore zones and non-mineralized zones.

59. This approach contradicts NRC guidance, which requires that pre-mining baseline conditions be defined *before licensing* (NRC, 2003, pg. 2-24). Failing to define specific baseline conditions prior to license approval also contradicts NEPA regulations (Parsons, 2013, p.2).

60. Failing to define and quantify preoperational baseline is also scientifically unsupportable as it allows Powertech and the DSEIS to avoid discussing which specific water sources are contaminated by past uranium mining activities and which represent naturally-contaminated waters.

61. The DSEIS, Table 3.5-4 misleadingly presents what is entitled: Baseline Groundwater Samples with Values Exceeding the MCLs(p. 3-38). Firstly, this table and related discussion fail to make clear that many of these sites are contaminated by past, un-remediated uranium mining and processing. Secondly, the table leaves out most of the important baseline constituents a competent evaluation would have included. Thirdly, the table leaves out any values below the MCLs. Thus, this table does not represent baseline ground water quality. *Most importantly, the DSEIS does not contain tables of any of the detailed water quality data, baseline or otherwise.* Further, there is no data or analysis of the hydrogeological mechanisms by which the previous contamination occurred, spread, or was contained.

62. Clearly the DSEIS / Powertech ground water baseline data should include, as a *minimum*, the chemical constituents listed in Table 2.7.3.1 of the NRC's Standard Review Plan (NRC, 2003, pg. 2-25), and Table 7.3-1 of the DSEIS. In addition, baseline water quality monitoring (both ground and surface water) should be expanded to include nitrate, ammonia, aluminum, antimony, strontium, lithium, thallium, turbidity, scans for organic compounds, and / or total organic carbon, and be integrated with *in-situ* field measurements (temperature, pH, S.C. turbidity), water levels and well yields and / or flows.

63. It is only logical that the actual list of baseline constituents should be based on analyses of pregnant solutions resulting from leach testing of the D-B ores and lixiviants—not on theoretical assumptions about what might be the chemical compositions. Such pregnant solution analyses should be made public in the DSEIS prior to Application approval.

64. Frequently, uranium roll-front ores will also mobilize significant concentrations of additional constituents, such as antimony, lithium, and strontium (Moran, 1976). In addition, it is common to detect elevated concentrations of aluminum, sometimes as the result of well-drilling and completion techniques. Thus, it is recommended that these constituents be included in routine determinations of baseline water quality. In fact, standard lab analytical scans, such as ICP (inductively-coupled plasma spectroscopy) routinely report all (or most) of these metals and metalloids at the same cost. It should be noted that almost all of these constituents were included in the data in Appendix 3.4-C of the Powertech ER.

65. I suggest that nitrate and ammonia determinations be included to allow future analysis and determinations regarding impacts from agricultural or industrial sources (ammonia may enter the aquifer via numerous agricultural or industrial activities).

66. Section 2.7 of NRC (2003) is unclear whether applicants shall provide water quality data from unfiltered (Total concentrations) or 0.45-micrometer-filtered ("dissolved") samples. Table 7.3-1 of the DSEIS states that only dissolved constituents will be reported. Much of the D-B data in the Powertech Application Appendices includes both dissolved and Total determinations. It is recommended that unfiltered samples be collected and analyzed, as a minimum, for baseline ground water evaluation. These provide more *conservative* characterization of the ground waters, and waters used in rural areas (human and livestock consumption from wells; other agricultural uses; irrigation; fisheries) are not filtered. Furthermore, contaminants carried in particulate form are ingested by humans and other organisms when consuming unfiltered waters. These particles / colloids are dissolved by the extreme biochemical conditions found in the guts of such organisms, mobilizing the contaminants into the blood and other tissues. In addition, many trace constituents are mobile in ground waters as colloidal

particles (McCarthy, 1989; Ramsey, 2000), which would be removed by filtration, generating unreasonably-low concentrations.

67. Determination of “suspended” fractions is of little utility as there are no regulatory criteria or standards for suspended forms, and such data are subject to much greater error (from the combination of sampling and analytical errors) than are either simple filtered (Dissolved) or unfiltered (Total) determinations.

68. To ensure data quality, the D-B baseline data should include:

- statistical comparisons of the field and lab determinations of pH, and S.C. for the same samples;
- comparisons of Dissolved versus Total determinations from the same samples;
- ion balances, to assist in evaluating the reliability of the analytical data, with comparisons of TDS and S.C. (Hem, 1985).

69. No coordinated, statistically-sound data set for all Baseline Water Quality data (both surface and ground water) is presented in these documents—as is required in NUREG-- 1569. The DSEIS makes clear that baseline water quality will actually be established after operations begin (e.g. DSEIS p.7-13, 14: Projectwide GW monitoring). The DSEIS fails to include reliable baseline water quality data for any of the categories of ground water or surface water.

70. The 2009 Powertech Application, carried forward in the DSEIS, include what it incorrectly calls baseline. For example, on pg. 2-14 and 2-15 of the Technical Report (TR), Sect. 2.2.3.2.2, Powertech states: “At the project site, baseline groundwater sampling was conducted in general (sic) accordance with NRC Regulatory Guide 4.14 (NRC, 1980). ... A summary of the results and methods for the groundwater quality monitoring program, as well as the historical TVA data, is presented in Section 2.7.” However, when the reader goes to TR Section 2.7, there are no tables that actually statistically summarize complete baseline field and lab water quality data for the complete data sets—both historic and recent. Instead, for ground waters, Powertech presents statistics for field data from individual wells or selected aquifers, but fails to statistically-summarize the laboratory data and leaves out the historic TVA data. Powertech then states (TR, pg. 2-203): “Complete groundwater quality data results are available in Appendix 2.7-G.” However, on TR, pg. 2-205 (Sect. 2.7.3.2.2.2, Results for Laboratory Parameters) Powertech then states: “Summary statistics for baseline monitoring program laboratory samples are contained in Appendices 2.7-H and 2.7-I. Appendix 2.7-H gives statistics for all groundwater constituents detected at or above PQL by constituent.” Thus, it appears that Powertech has not included “qualified values,” that is data reported as “less than” some concentration. By deleting the “less than” values, Powertech has severely biased the data set, rendering it useless as a reliable source for evaluating baseline conditions.

71. Furthermore, Powertech states (TR, pg. 2-217-218) that they have arbitrarily selected some analyses from the voluminous historic TVA data, but the reviewer is never allowed to see a statistical summary of the total original data set. This error is carried forward in the DSEIS. Portions of the relevant data are scattered throughout the Appendices of the various documents, and disingenuously organized to leave out all baseline data that had concentrations reported below the detection limits (i.e. “less than” values). Obviously, this approach biases the data. The NRC must require Powertech to statistically summarize all historic water quality data and all recently collected data in separate tables, including all “less than values.” Both historic and recent baseline data should be segregated by water-bearing unit. Even should averaging of water quality data over a portion of the aquifer be acceptable, the methodology employed in the Application and DSEIS of discounting relevant data points is untenable.

72. To further confuse the baseline issues, Powertech’s Supplement to the Application (August 2009) states on pg. 3-3: “A minimum of eight baseline water quality wells will be installed in the ore zone in the planned well field area.” Thus it appears that the Applicant intends that the massive amounts of water quality data (historic and recent) presented in both the TR and ER (Environmental Report) will not actually be used to determine baseline. More importantly, it is unclear whether Powertech has true baseline (pre- operational) ground water quality data that describe the **non-ore zone regions of the relevant aquifers**. It is imperative that baseline data for the non-ore zone ground waters be collected and summarized separate from those of the ore zones – a review the DSEIS fails to conduct.

73. Any revision of the DSEIS should incorporate the comments made in Abitz (2009) regarding baseline characterization and data interpretation.

74. Lastly, the DSEIS should already contain a statistically-reliable database of baseline ground water quality data from all known wells within at least 2 miles of the DB boundary

Confusion of Baseline and Background

75. Table 7.3-1 of the DSEIS (p. 7-8 to 7-11), and the accompanying text confusingly and incorrectly use the terms “Background” and “Baseline” as having the same meaning. For many decades, “background” in geochemical / water quality literature has been defined as: “The normal abundance of an element in unmineralized earth materials is commonly referred to as background.” (Rose, Hawkes & Webb, 1979, p. 30). Baseline in environmental studies has routinely been used to define a starting criterion, or yardstick, against which subsequent data are to be compared. Baseline has been used in this sense for many decades. In mining-related studies, the most common “baseline” is either pre-mining or preoperational conditions.

The DSEIS fails to clearly and adequately describe the detailed methods employed for collecting water quality and water quantity data, for both surface and ground waters.

76. Because the specific sampling and handling procedures can drastically change the results obtained when collecting water quality samples (both surface and ground water), it is imperative that the DSEIS include detailed descriptions of the various sampling, sample handling, preservation and shipment methods employed. Likewise, the DSEIS contains inadequate detail concerning the specific methods employed in collecting field water quality measurements and measurements of well yield, stream flow, etc.

77. For example, such details should provide information similar to those contained in the U.S.G.S. methods documents cited below:

[USGS] United States Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9, available online at: <http://pubs.water.usgs.gov/twri9A>.

Surface Water Quality Baseline Data: The DSEIS fails to adequately characterize these resources, or to include statistically- reliable summaries of detailed surface water data.

78. Tables 3.5-1 and 3.5-2 (p.3-25-26) present totally incomplete and inadequate summaries of surface water quality. Most hydrogeologically-important chemical constituents are missing from these tables and they contain no indication of whether samples were field-filtered, or if the data are Total concentrations. (unfiltered samples).

79. The DSEIS contains no substantive discussion of the interactions between ground and surface waters, especially when the hydrogeologic system would be under pumping stress---as would be expected during the operating life of the D-B project. The DSEIS contains no detailed analysis or discussion of potential impacts to site surface waters due to ground water pumping, or potential spills and permitted discharges to surface waters. All such operations generate short-term impacts to surface waters, as a minimum.

80. The DSEIS no longer contains the questionable statements included in the 2009 application at ER pg. 4-16, which state: "Most ISL operations extract slightly more groundwater than they re-inject into the uranium bearing formation. ***The groundwater extracted from the formation could result in a depletion of flow in nearby streams and springs if the ore-bearing aquifer is hydraulically connected to such features.*** However, because most, if not all ISL operations are expected to occur where the ore- bearing aquifers are

confined, local depletion of streams and springs is unlikely, and potential impacts would be anticipated to be SMALL (NUREG-1910, 2008).” However, the DSEIS provides no detailed technical analysis to support the contention that surface waters will not be impacted because water-bearing units having confined aquifer conditions underlie much of the D-B site.

81. More importantly, the DSEIS and Application fail to provide a summarized, statistically-reliable surface water quality baseline database. As such, there will be no defensible method for verifying whether impacts to surface water quality have or have not occurred.

A Baseline Spring and Seep Survey is not presented in the DSEIS.

82. Disingenuously the DSEIS states that: “There are **no known natural springs** within the proposed Dewey-Burdock ISR Project area (Powertech, 2011). There is one area in the southwest corner of the Burdock area, known as the “alkali flats” or the “alkali area,” where **groundwater is discharging** to the ground surface from the Fall River aquifer and Chilson aquifer (Chilson Member of the Lakota Formation) **through improperly plugged exploratory boreholes** (Powertech, 2011). Two springs are present along the Dewey Fault near the town of Dewey approximately 2 km [1.2 mi] northwest of the proposed project boundary (DSEIS p. 3-23).”

83. The DSEIS presents no information to indicate that either the NRC or Powertech have conducted an actual spring and seep survey. Such a survey would have included and characterized the springs along the Dewey Fault, and any others located within the D-B area and a reasonable perimeter, which should be at least 2-miles from the project boundary—given the results of the short-term pump test data in the 2009 Application.

84. The region surrounding the D-B project contains numerous springs in both the Madison and Minnelusa formations (DEIS p.3-32; Driscoll, et al., 2002). Baseline surveys of springs and seeps are crucial in studies where large volumes of ground water are to be extracted. The flows of such seeps and springs often decline or stop after large-scale, long-term ground water extraction begins, especially in arid or semi-arid regions, such as the D-B area. If such impacts begin to occur, disputes will arise as to the possible roles of the project water extraction and overall climate change, for example. Hence, it is imperative that such a survey be performed prior to issuance of any licenses, and such a survey should include, as a minimum:

- locate and survey all springs and seeps within some reasonable radius of the project boundary;
- measure and record flow / discharge quarterly for at least one year prior to issuance of any licenses;
- during all field episodes, make field measurements of in-situ pH, water temperature,

and S.C.(specific conductance) and collect samples for laboratory analysis.

Samples should be analyzed for the same list of constituents noted in the Baseline water Quality comments above. Spring and seep water quality data should be interpreted as representative of local ground water quality (Freeze and Cherry, 1979; Hem, 1985).

The presence of high quality ground waters within the D-B Project boundary have not been adequately defined.

85. Much of the DSEIS discussion concerning ground water quality seems focused on showing that the site waters are already contaminated. This would not be surprising given the presence of the uranium mineralization and the past mining and exploration activities---all of which would have caused increased concentrations of numerous chemical constituents above true pre-mining baseline. However, based on statements and data presented in the DSEIS, Powertech has not adequately defined whether zones peripheral to the D-B ore-bearing geologic formations and bounding formations (above and below) also contain zones of high-quality, possibly potable ground water. Such zones should already have been defined as part of the DSEIS and Application documents.

Potential impacts to ground waters have been unrealistically minimized and inadequately characterized.

86. The DSEIS fails to provide adequate baseline data to demonstrate that portions of the ore-bearing zones do not contain high quality ground water. In fact, it is clear that the NRC has relied on Powertech data that clearly are biased against revealing the extent of high quality ground waters. For example, Table 3.5-4 includes only water quality concentrations that exceed the MCLs (maximum contaminant levels), and discards all data having lower concentrations (p. 3-38). The discussion on p. 3-37 also is clearly intended to convey the message that most of the D-B area waters are already contaminated. A similar bias is presented in the DSEIS discussions of D-B area surface water quality (p.3-23, 25, 26, 27).

87. The DSEIS continues the unbalanced discussion of contaminated “baseline” that was presented in the 2009 Application. The ER (pg. 4-18) states that all D-B ore zone ground water quality is degraded by natural mineralization processes, but there are no data provided to support this allegation and in many similar situations it is simply not true. Furthermore, many ground water- bearing zones in mineralized areas do not contain elevated concentrations of metals, non- metals, etc. until they have been exposed to air and bacteria---often as the result of previous mining or exploration drilling—as has occurred here. Even following exploration and mining activities, some portions of ore-bearing formations continue to contain high-quality ground water.

88. Hence, it is not defensible for NRC and Powertech to state, as the company does in ER Sect. 4.6.2.2 (Potential Impacts of Production on Ore Zone Groundwater Quality) that: “Potential environmental impacts to groundwater are changes to water quality in well fields within the exempted aquifer. The impact, in and of itself, is of limited significance, due to the fact that the groundwater quality is very poor prior to ISL operations; due to the presence naturally occurring radionuclides, heavy metals, and other constituents that exceed EPA and/or state drinking water limits. Accordingly, the exempted aquifer is not and can never serve as a USDW (HRI, 1997; NMA, 2007).” The citations provided here by Powertech do not pertain to the specific D-B situation and one, the NMA citation, is simply a routine public relations statement made by the industry’s lobbying group. The DSEIS inadequately addresses these issues.

89. The public relations statements continue on ER, pg 4-18, where they state: “Powertech (USA) has proposed to use gaseous oxygen and carbon dioxide lixiviant. The interaction of the lixiviant with the mineral constituents of the exempted ore zone results in a slight increase in trace elements and primary constituents of sulfate, chloride, cations and TDS above pre production levels. There is no introduction of non-naturally occurring constituents from the leach fluids into the ore body.”

90. To support these unsubstantiated statements, Powertech needs to supply actual, detailed chemical analyses of the pregnant leach solutions (multiple analyses)--solutions resulting from the chemical interaction of the proposed lixiviant and the ore zone rocks. It is a basic purpose of an ISL operation to introduce these lixiviants to drastically change 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, etc. It is a total “red-herring” to claim that: “There is no introduction of non- naturally occurring constituents.....”

91. *In addition, there is ample evidence in the technical and regulatory literature to show that the leached aquifers at most, if not all ISL operations, have never truly been restored to their pre-operational, baseline water quality.*

Ground Water Monitoring Methods are Inadequate to Reliably Define Past or Future Impacts. Domestic and Stock Wells.

92. DSEIS p.7-13 and 14 (Project-wide GW monitoring), states that all domestic and stock wells within **2km** (1.2 mi.) of the project area will be sampled quarterly for a year to establish baseline water quality after operations begin [based on NRC, 1980, Regulatory Guide 4.14]. “All the preoperational groundwater samples will be analyzed for the constituents listed in Table 7.3-1.”

93. The stated approach presents several *serious flaws*:

- if the samples are collected after operations begin, they cannot be considered true baseline;
- the list of constituents to be monitored is inadequate;
- The NRC Guidance Document cited is inappropriate: it refers only to uranium mills, not ISL operations, and deals only with radiological effluent.
- This Guidance Document does not define the radius to which domestic and stock, etc. wells should be monitored, for any type of uranium operation--ISL or mill. The authors have incorrectly applied the 2-Km distance as the Guidance speaks only with regard to tailings impoundments at conventional mills (section 2.13; p. 4.14-4).
- sampling of these wells *during operations* is proposed to be done *once per year*, which is totally inadequate to note changes in water quality or water level.

94. The definition of the area containing domestic and stock wells to be monitored needs to be expanded and defined more precisely. Because the DSEIS fails to show that Powertech has ever performed a detailed well inventory of all wells outside the proposed DB boundary, such an inventory is needed to evaluate present and future impacts as part of any acceptable EIS. A preliminary inventory should investigate and summarize the characteristics of all wells within at least 2 miles of the DB boundary. The inventory should plot the locations of all such wells on appropriate maps and summarize their uses; date drilled; completion characteristics, including depths; well yields; availability of water quality data. Once such an inventory is completed, all of these wells should be monitored for detailed water quality and water levels quarterly for a year, with all data summarized in a revised EIS.

Baseline Water Quality Within Proposed Operation Areas.

95. The DSEIS states (p. 7-8) that selected wells completed within the mineralized zones will be used to evaluate “baseline” water quality and they will then be converted into injection or production wells. Clearly the water quality in many of these zones is no longer true baseline due to all of the historical drilling / mining in many of these areas. These activities would have altered the original geochemical and bacteriological conditions, leading to significant changes in the water quality. In addition, if the “baseline” wells are converted to injection or production uses, these wells must be maintained, post-closure, to allow for long-term monitoring to evaluate the success or failure of aquifer restoration.

Land application is not an approved method of radioactive liquid waste disposal.

96. The DSEIS proposes that various liquid wastes may be disposed via land application. However, US EPA (2008) guidance states that land application is not an approved method for disposal of such wastes. Equally importantly, the DSEIS has failed to supply detailed chemical analyses of these proposed wastes (see discussion below) to clarify the chemical nature of the materials being disposed.

97. Such detailed chemical composition data should be included in the DSEIS available for public comment and technical review prior to FEIS and license approval.

98. It is ironic that the Supplement to the 2009 Application erroneously states on pg. 4-7 that irrigation pivots have been used to dispose of non-hazardous wastes via surface application “with no deleterious effect on the environment” at Hobson, Mount Lucas, and Highland. In 2008, the operators of the Highland and Smith ISL mines in Wyoming were forced into a settlement agreement with the WY Dept. of Environ. Quality, because land application of liquid wastes containing elevated concentrations of selenium had contaminated soils. Part of the settlement agreement required the operators of Highland to immediately pay \$8 million to accelerate reclamation activities and to increase their financial assurance bonds for these two sites to \$80 million (WY DEQ, 2008). Furthermore, Faillace and others (1997) report that release of such waters will contaminate the soil at the land application areas. Radionuclides adsorbed by the soil will become a source term for radioactive release through wind erosion processes.

Deep Well Injection of Liquid Wastes. The DSEIS fails to provide necessary details on the chemical composition of the wastes and water treatment specifics.

99. At present, the public has not been told what specific measures will be used to dispose of D-B liquid wastes. One option mentioned is to dispose of such wastes via deep wells completed into the Minnelusa and / or Deadwood Formations (DSEIS p. 2-22). However, the public has no idea of the detailed chemical compositions of these liquid wastes. Detailed chemical analyses of these liquids should have been included in the DSEIS, including, as a minimum, all chemical constituents for which any category of environmental standard or criterion exists. These should include determinations of S.C., TDS, pH, all commonly-reported inorganics, trace elements, radiochemicals, and a detailed organic-constituent scan. Such data should be provided in the EIS for both treated and untreated liquid wastes.

100. While both the Minnelusa and Deadwood Formations are deep below the land surface, it is quite short-sighted to assume that these waters, once contaminated by the process wastes, could never generate negative impacts—especially if one considers the cumulative impact of the other industrial wastes that are or will be injected into these formations, long-term. Long-term scenarios should consider timeframes of at least 100s to 1000s of years in the future, when these deep waters may be required for other foreseeable domestic, agricultural, or industrial uses, and the economics of water are likely to be quite different than has been assumed in the GEIS (DSEIS p. 5-31). Thus, detailed water quality

analyses should be performed on these deep aquifer waters, both pre-injection and at various periods after injection is initiated.

The technical and regulatory literature amply documents the numerous failures to restore aquifer water quality at other ISL sites. Thus, it is reasonable to assume that portions of the D-B ground water surrounding the leached zones will have degraded water quality and may be unfit for future uses.

101. GEIS Section 2.5 described aquifer restoration activities within wellfields that *ensure water quality in surrounding aquifers would not be adversely affected by the uranium recovery operations* (DSEIS p. 2-35; NRC, 2009a). However, neither the DSEIS or the GEIS contain detailed discussions to demonstrate that the population of other in-situ operations have been able to do so. Indeed, the historical reality from other operating or closed ISL sites demonstrates an inability to restore to pre-operational or baseline WQ conditions for all constituents. (Otton, 2009; Hall, 2009).

The public has no detailed information concerning the specific aquifer restoration standards / criteria that will actually be employed. The DSEIS presents no such specific aquifer clean-up standards / criteria.

102. Because the DSEIS does not contain actual baseline data for D-B water resources, the DSEIS does not contain any such specific aquifer restoration standards / criteria. Instead, the DSEIS has the following convoluted, bureaucratic language (p.2-35):

“The primary goal of aquifer restoration is to return groundwater quality within the production zone of wellfields to the preoperational water quality conditions or to standards consistent with NRC requirements at 10 CFR Part 40, Appendix A, Criterion 5B(5) (Powertech, 2009b, 2011).”

103. The subsequent language makes clear to the reader that the public will not be told what the specific aquifer clean-up criteria will be until long after aquifer restoration has begun, and that the criteria are totally flexible.

“10 CFR Part 40, Appendix A, Criterion 5B(5) requires that groundwater quality in the exempted ore-bearing aquifer be restored to (i) a Commission-approved background (CAB) concentration; (ii) the maximum contaminant levels (MCLs) listed in 10 CFR Part 40, Appendix A, Table 5C, for constituents listed in Table 5C and if the background level of the constituents fall below the listed value; or (iii) an alternate concentration limit (ACL) established by the Commission, if the constituent background level and the values listed in Table 5C are not reasonably achievable. The ACL development is described in SEIS Appendix B. These groundwater quality standards would be implemented, as part of the aquifer restoration phase, to ensure public health and safety.”

Target Restoration Goals and UCL Parameters and standards should all be selected by the NRC and presented publicly in the EIS, prior to license approval.

104. The DSEIS uses unnecessarily convoluted and inconsistent terms to describe aquifer restoration standards / criteria. Various parts of the DSEIS use the following terms (DSEIS p. 2-35):

Commission-approved background (CAB)

Maximum contaminant levels (MCLs)

Alternate concentration limit (ACL)

target restoration goals

lixiviant migration indicators (DSEIS p. 7-11)

105. It is impossible to discern whether or not the target restoration goals are the same as lixiviant migration indicators.

106. DSEIS p. 7-11 states: “The constituents and parameters selected as lixiviant migration indicators and for which UCLs will be set at the proposed Dewey-Burdock ISR Project are **chloride, conductivity, and total alkalinity** (Powertech, 2011).”

107. The 2009 Powertech Application Supplement, pg. 5-6, Sect. 5.2.7, states: “Powertech management has always used **Chlorides, Sulfate, and Uranium** as Upper Control Limit (UCL) Parameters. **Sometimes Total dissolved Solids** is used.” This statement fails to provide necessary clarity, as Powertech has never operated an ISL mine.

108. The descriptions of proposed water quality monitoring (surface and ground waters) on pages DSEIS 7-4 through 7-15 are unclear and unnecessarily convoluted. Instead of the pages of unclear wording presented here, these details should have been summarized using tables to show: the specific sites / wells to be sampled; specific constituents & parameters; sampling frequency, reporting protocol and frequency.

109. The procedures describing how UCLs will be determined are inconsistent (p. 7-11, L 24-38). The UCLs named in the 2009 Application supplement and the DSEIS (2012) are different. How could the procedures used in both cases comply with NUREG-1569 (NRC 2003)? Furthermore, setting the UCLs at the mean concentration plus 5 standard deviations is excessively lax. It would be much more meaningful to present means plus the 95 percent confidence intervals.

110. Apparently only water level and UCL data (chloride, conductivity, and total alkalinity) will be reported to EPA, and only quarterly (DSEIS p. 7-11). Such reporting is totally inadequate in both frequency and constituents. In essence it

prevents the public and the EPA from understanding what is happening at the site.

111. The NRC has considerable experience with numerous operating and closed ISL / ISR operations. Clearly NRC, not the operator, should select the appropriate “target restoration goals”. Yet, the DSEIS p. 2-35, L 37-38, states: “The applicant would establish target restoration goals [CAB concentrations per.....].” Selection of such target restoration goals and UCL parameters and standards should be done by the regulatory agency in the DSEIS to avoid possible conflicts of interest and reveal these foreseeable impacts at the earliest possible stages of project analysis.

112. *Such specific restoration goals and standards should be presented in the DSEIS for public review and comment prior to FEIS or license approval.*

The SDEIS does not clearly define the various zones that are contemplated to contain, monitor, and control migration of lixiviant-mobilized groundwater and chemical constituents.

113. D-B Application Supplement, pg. 5-5 describes an aquifer exemption boundary, which acts as an additional buffer zone outside the monitor well rings **“to provide protection to adjacent water from the excursions that occur in the normal course of operations.”** Page 5-6 of the Supplement further states that the aquifer exemption boundary is proposed to be up to 1200 ft. outside the monitor well ring, and **would be considered the point of regulatory compliance. Apparently simply pumping to create an inward flow direction is not adequate to control “excursions.”** It appears this aquifer exemption boundary is actually an expanded ground water sacrifice zone.

Mitigation is Not Detailed In a Manner That Allows Any Meaningful Review

114. The DSEIS portrays mitigation to account for impacts, but the mitigation consists only of proposals to make plans to restore groundwater in the future. There is no detail as to the effectiveness of these proposed mitigation measures, nor any analysis of whether any such plans have succeeded in the past.

115. The DSEIS provides for monitoring of restored groundwater aquifers for only 12 months. DSEIS, P. 2-37. However, there is no assessment as to whether 12 months is adequate. Aquifer restoration activities at numerous other ISL sites have failed to return aquifer water quality to baseline conditions following years of attempts at clean-up. Hence, at minimum, the NRC should conduct these effectiveness reviews and require that post-operational monitoring of D-B aquifer water quality continue until baseline conditions are attained.

Financial Assurance

116. DSEIS, p. 2-35 states that: “The applicant would also be required to provide financial sureties to cover the costs of both planned and delayed restoration programs, in accordance with 10 CFR Part 40, Appendix A, Criterion 9. NRC reviews financial sureties annually.” Although a final decision on surety amounts will come at a later date, the revelation and analysis of the likely amount of surety must be revealed and analyzed in the DSEIS.

117. The NRC and the public know several general facts about the usefulness of most company-generated financial assurance estimates:

1-They generally are based on overly-optimistic assumptions about future water quality, thereby under-estimating costs. Kuipers (2000) conducted a survey of bonding practices at metal mines throughout the western U.S. and found that the bond amounts available were hundreds of millions of dollars below that necessary to conduct actual clean-ups. Many of the “problem” sites have been foreign-owned entities, especially those with their corporate headquarters and assets based in Canada.

2-Aquifer restoration at most, if not all previously-licensed and operated ISL sites has failed to actually return ground water quality to baseline conditions [Hall (2009); Otton and Hall (2009);

3-Predictions of future aquifer restoration success made by the project proponents seldom use truly conservative assumptions. Calculation of financial assurance amounts made by representatives of the party that stands to profit from project licensing represents an extreme conflict of interest.

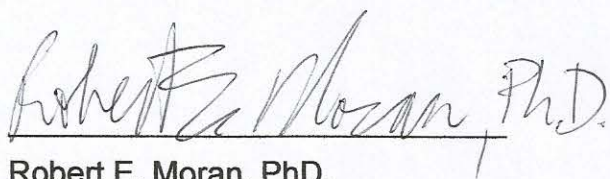
4-The technical literature is filled with documentation that quantitative predictions of future water quality at *specific* sites cannot be done reliably [Sarewitz, et. al. (2000); Moran (2000); Pilkey & Pilkey-Jarvis(2007); Kuipers & Maest (2006)], and the general failure to restore aquifers back to pre-operational baseline concentrations supports this. This approach must be totally rejected because it assumes one can make accurate and precise *deterministic* predictions.

118. For these reasons, at least preliminary financial assurance calculations should be included in the DSEIS, preferably made by some independent party, not paid or directed by the project proponents. These calculations should also consider the actual reclamation and restoration costs incurred, long-term, from a statistical sampling of the previously-licensed ISL sites. Furthermore, these financial assurance amounts and mechanisms should be made public prior to award of any licenses.

119. To ensure protection of the general public, such financial assurance agreements (bonds, etc.) should be made with the parent corporation, not simply the local operating entity.

Pursuant to 10 C.R.F. § 2.304(d) and 28 U.S.C. § 1746, I declare under penalty of perjury, that the foregoing is true and correct to the best of my knowledge and belief.

Signed on the 24th day of January, 2013,

A handwritten signature in cursive script that reads "Robert E. Moran, PhD." The signature is written in dark ink and is positioned above a horizontal line.

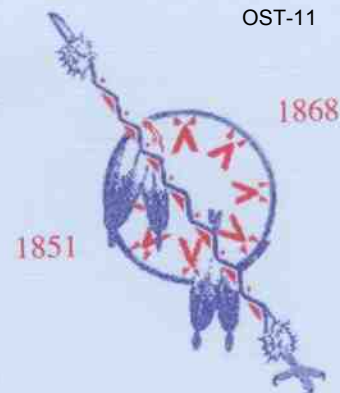
Robert E. Moran, PhD.



Oglala Sioux Tribe

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November 5, 2012

Kevin Hsueh, Chief
Environmental Review Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Re: *Refusal to Accept Dewey-Burdock In Situ Recovery Project Proposal*

Dear Mr. Hsueh:

On behalf of the Oglala Sioux Tribe, I am writing to express our deep dismay with, and strong objection to, the Nuclear Regulatory Commission's ("NRC" or "Commission") October 31, 2012, survey proposal for the Dewey-Burdock *In Situ* Recovery Project ("Project"). The proposal threatens to avoid required consultation with the tribes who have Traditional Cultural Property ("TCP") in the Project Area by working instead with other Indian tribes who have no interest or knowledge of Sioux TCP. The Commission's sole justification for such measures are self-imposed timelines and cost restraints. The Oglala Sioux Tribe objects to the terms of the proposal and to the tactics of the NRC and respectfully suggests that the Commission obey the requirements of federal law when creating its Environmental Impact Statement ("EIS").

The Sioux tribes have dedicated over a year and a half to informal discussions, and over half a year to formal consultations with the NRC over the scope of work, including the extent of the survey area, survey methodology, costs and basic cultural sensitivity and awareness. Despite our attempts to implement the policies and objectives of the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 *et seq.*, and the National Historic Preservation Act ("NHPA"), 16 U.S.C. § 470 *et seq.*, and their implementing regulations, the Commission appears determined to violate both the letter and the intent of these laws.

I would like to remind the NRC of the reason for which NEPA was implemented. NEPA was enacted to assist federal agencies in ensuring that significant environmental impacts are considered in the federal decision-making process and are communicated to the public along with mitigation decisions, thus guaranteeing that relevant information is available to the public who may then provide input into the decision-making process and the implementation of the agency decision. 42 U.S.C. § 4332; *Baltimore Gas & Elec. Co. v. Natural Resources Defense Council*, 462 U.S. 87, 97 (1983); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989). It is impossible for the Commission to consider significant environmental impacts of which the Commission has purposely made itself unaware. Moreover, federal agencies are to comply with NEPA "to the fullest extent possible" according 42 U.S.C. § 4332. Your proposal, which rejects all input from the Oglala Sioux Tribe and her sister Sioux tribes and refuses to identify or consider indirect impacts, attempts to evade the requirements of NEPA.

The Commission began gathering information from the Oglala Sioux and other Sioux tribes in 2011. Why? Because the NRC was well aware that the Project site, of approximately 10,000 acres, fell within Sioux territory according to the terms of the Treaties of Fort Laramie of 1851 and 1868, as well as within aboriginal Sioux territory from time immemorial. The Oglala Sioux Tribe continues to assert its sovereignty and right to dominion over the stolen treaty lands and demands true government-to-government consultations over the existence of TCP on these lands. Seven-day ultimatums, threats to use persons with no expertise in Siouan matters to identify signs of our sacred sites and cultural property and violation of federal treaties and statutes does not constitute good faith consultation.

1. The NRC's Preferred Agency Timeline Is Irrelevant

We have heard, over and over again, from the NRC that it cannot conduct a true scope of work or a full survey because of a self-imposed agency timeframe. An agency is only excused from NEPA compliance when there is a conflicting, shorter statutory deadline in which the agency must make its decision. See H.R. Conf. Rep. No. 91-765, 91st Cong., 1st Sess. (1969), reprinted in 1969 U.S.C.C.A.N. 2767, 2770; see also *Flint Ridge Dev. Co. v. Scenic Rivers Ass'n*, 426 U.S. 776, 788 (1976).

We understand that the Commission has a timeframe that it would like to keep. However, although breaking a deadline may be very inconvenient, it does not provide the NRC authority to ignore federal law. Many tribal projects have dragged on for years because the federal government has taken its own sweet time to complete the NEPA process, costing tribes millions of dollars and lost economic opportunities. If NRC's Environmental Impact Statement ("EIS") does not comply with NEPA, far greater litigation delays will result for your Project.

2. The NRC's Proposal is Not Designed to Identify Sioux TCP

The Commission is well aware that the Project site is within Sioux lands. Yet, because it cannot agree with the Sioux tribes on the scope of work, the NRC has reached an agreement with the Turtle Mountain Band of Chippewa and the Three Affiliated Tribes of the Mandan, Hidatsa and Arikara Nation to conduct the survey. Surely you are aware that there are 565 federally recognized Indian tribes and that each has its unique history, culture and traditional land base. The Turtle Mountain Band provided you a letter on March 19, 2010 stating that it had no historic properties in the Project area. It is ridiculous to assume that these two non-Sioux tribes, and non-Indian contractors, are expected to be able to identify Sioux sites despite their lack of knowledge on the topic.

In June of 2011, the Sioux tribes visited the Project area and showed the NRC sites that had been missed by your archeological consultants. This merely serves to demonstrate why the NRHP regulations require that federal agencies consult with Indian tribes: "The agency official **shall acknowledge** that Indian tribes and Native Hawaiian organizations possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them." 36 C.F.R. § 800.4(c)(1) (emphasis added). It is self-evident that each tribe will have expertise in recognizing its own sacred sites. *The Oglala Sioux Tribe strongly objects to the use of persons without any expertise in Sioux TCP to identify Sioux TCP.*

3. The NRC's Scope of Work is Insufficient to Adequately Identify both Direct and Indirect Impacts

The entire area of direct and indirect Project impacts is approximately 10,000 acres. The Commission is determined to limit the survey to a much smaller area that covers only immediate direct effects. In its letter of September 18, 2012, the NRC argues for a phased approach to identification and that a programmatic agreement regarding indirect effects can be reached at a later time. This is unacceptable, especially considering the bad

faith shown by the Commission thus far in its repeated statements that only survey approaches meeting its time deadlines for the EIS will be acceptable to it. The Oglala Sioux Tribe stands firm that the scope of work must include both direct and indirect effects.

Both the regulations of the Council on Environmental Quality and those of the Advisory Council on Historic Places require consideration of indirect effects. 40 C.F.R. § 1502.16(b); 36 C.F.R. § 800.5(a)(1). In fact, NHPA regulation 36 C.F.R. § 800.16(d) defines "area of potential effects" to mean "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." This is the definition that NRC must use and it clearly includes all 10,000 acres.

In addition, any survey undertaken must involve actual on-the-ground field investigation of one hundred percent (100%) of the 10,000 acre area that may suffer direct or indirect effects. No sampling, predictive model or other alternative is acceptable. Furthermore, the survey must be conducted within protocols agreed to by the Sioux tribes. While we sympathize with your efforts to contain costs, the law requires adequate attempts to identify TCP and contains no provisions regarding cost control. Be assured that the federal government's requirements for Indian tribal projects often require us to incur costs not felt by state governments or private commercial enterprises.

Because indirect effects must be considered, the scope of work cannot be limited to the 2,637 acres proposed by the NRC. Instead, all of the 10,000 acre area must be surveyed so that proper alternatives and mitigation may be considered as part of the EIS. Such a massive survey must be conducted by persons with actual knowledge of Sioux sacred sites and TCP and certainly cannot be conducted within the twenty-one (21) days proposed by the Commission in its October 31, 2012 letter. Please recall that the President of the United States has ordered federal agencies to defer to Indian tribes to set standards, where possible, when creating agency policy. E.O. 13175. Although the NRC, as an independent agency, is not subject the Executive Order, it should strive to comply here because sacred sites and TCP are involved.

4. NRC's Privacy Protections for its Proposed Survey Information are Nonexistent

The Oglala Sioux Tribe is further concerned by the description of privacy protections to be given to information on TCP in the final survey report. The letter report due within fourteen (14) days of the survey "will not show specific site locations of any identified properties of religious and cultural significance. It is understood that this information will be disclosed to the public through NRC's NEPA compliance process, and the information will be tailored to facilitate the preparation of the NEPA document." *Turtle Mountain Band Of Chippewa Indians/Three Affiliated Tribes Tcp Study For Dewey-Burdock* at 2. Shockingly, the proposal does not contain any language indicating that the final report, which will of necessity contain specific site information, will not be shown to the public or that it will be offered any privacy protections. These are sacred sites and there is a very real concern that looters and grave robbers would desecrate them. This is especially disturbing because the Tribe's consulting information might end up being disclosed to the public under the doctrine set out by the Supreme Court in *Dep't of the Interior v. Klamath Water Users*, 532 U.S. 1 (2001). Privacy protections must be carefully negotiated, not created through ultimatums.

5. The October 31, 2012 Proposal Is Not a Good Faith Consultation Effort


The NHPA regulations require federal agencies to make a good faith effort to identify and consult with Indian tribes that might attach religious and cultural significance to historic properties in the area of potential effects.

36 C.F.R. § 800.3(f)(2). Your failure to take into account the united concerns of the Sioux tribes regarding project scope, your attempts to seek the compliance of other tribes in order to evade Sioux concerns regarding Sioux sacred sites and TCP and your issuance of an ultimatum show a lack of good faith on the part of the Commission. The Oglala Sioux Tribe officially protests that the good faith consultation requirements of the NRHP regulations have not been met by the NRC.

6. Conclusion

For the above reasons, the Oglala Sioux Tribe will not bow to the October 31, 2012 ultimatum of the NRC that it join in the survey proposal. The Tribe issues a continuing objection to NRC's conduct of any survey without written agreement from all seven Sioux tribes on the scope of work, including survey methodology, survey area, consideration of direct and indirect effects, costs, use of Sioux experts in identifying TCP, and privacy concerns. If the Commission fails to stop and consider the many laws which it will break in its haste to meet its self-imposed Project time and cost deadlines, the entire EIS will be inadequate and far more time and money will be needed to correct the problems.

Sincerely,


JOHN YELLOW BIRD STEELE
President
Oglala Sioux Tribe