

**U.S. Nuclear Regulatory Commission  
Request for Additional Information  
Powertech (USA) Inc. Dewey-Burdock Project  
Environmental Review of Application for a U.S. Nuclear Regulatory Commission Source  
Material License**

Powertech (USA) Inc. (Powertech) submitted a source material license application on August 11, 2009, to the U.S. Nuclear Regulatory Commission (NRC) for the Dewey-Burdock Uranium Project. This application, which included an environmental report (ER) (Powertech, 2009a), a technical report (TR) (Powertech, 2009b), and a supplement to the license application (Powertech, 2009c), is to allow Powertech to conduct in situ recovery (ISR) operations for uranium extraction at Burdock and Dewey (a satellite to Burdock), in Custer and Fall River Counties, South Dakota. Based on a review of the license application documents, the NRC staff offers the following request for additional information (RAI). In this RAI, staff refers to the Dewey-Burdock Project, which consists of the Dewey unit and the Burdock unit. Each information request may refer collectively to the Dewey-Burdock Project or individually to the Dewey unit or Burdock unit, and includes the basis and purpose for requesting the information. Information requests are organized by environmental resource area or review topic. Section numbers, figures, and tables refer to Powertech's ER, TR, or supplemental report to the license application (SR), unless otherwise indicated.

**Proposed Action:**

**RAI PA-1**

**Provide information on the roads leading to the proposed project area from Custer, South Dakota and Newcastle, Wyoming.**

According to ER Sections 3.10 and 7.0, the towns of Custer, South Dakota, and Newcastle, Wyoming, are within the region of influence of the proposed project and could provide workers for the proposed project. These towns are located north and northeast of the project area, and therefore, workers commuting to the site from these towns likely would not access the site from Edgemont. For example, conversations with staff from Custer County Planning and Development indicated that workers would likely use Pleasant Valley Road to access the site from the town of Custer. Please provide information on the main highways and/or county roads that workers would potentially use to access the site from the towns of Custer and Newcastle. This information is needed to complete the description of the proposed action and determine the potential environmental impacts of traffic leading to and from the site.

**RAI PA-2**

**Confirm, clarify, and provide information on land disturbance associated with the proposed project.**

Several inconsistencies and missing information were observed in descriptions of land disturbance in the ER.

Enclosure

1. ER Section 1.2.3 describes the total acreage that would be disturbed during construction, operation, and restoration activities and the additional acreage that will be disturbed if land application is used to dispose of treated wastewater. However, the ER does not provide information on the acreage disturbed by specific facilities and infrastructure (e.g., buildings, pipelines, access roads). Provide a breakdown of the acreage disturbed by construction of site facilities (buildings), pipelines, access roads, well fields, impoundments for the deep well disposal liquid waste management option, and impoundments and irrigation areas for the land application liquid waste management option.
2. ER Section 3.5.2 notes that ISR operations associated with the project are expected to disturb approximately 1,007 ha [2,488 acres]. This is inconsistent with the maximum potential land disturbance of 190 ha [463 acres] for the project described in ER Section 1.2.3. Please clarify this inconsistency.
3. ER Section 1.2.3 indicates that a total of 144 ha [355 acres] of land would potentially be affected or disturbed at the project site if the land application option is used to dispose of treated wastewater. However, Section 3.1, Appendix B, of the Supplemental Report indicates that the total irrigated area for the land application option at any given time would be 127 ha [315 acres] at the Burdock site and 127 ha [315 acres] at the Dewey site. Therefore, based on information from the SR, a total of 255 ha [630 acres] could be affected if the land application option is used to dispose of treated wastewater. Please confirm and clarify the total acres of land that would potentially be affected or disturbed if the land application option is used to dispose of treated wastewater.

This information is needed to complete the description of the proposed action and affected environment and to provide a consistent technical basis for determining the impacts of land disturbance from the proposed project.

#### **RAI PA-3**

##### **Provide information on the acreage occupied by ponds for the deep well disposal option.**

SR Section 4.4.2 provides information on the number, types, and storage capacities of ponds for the deep well disposal option. However, the acreage of the ponds is not included. Please provide the acreage of the ponds for the deep well disposal option. This information is needed to complete the description of the proposed action and affected environment and to determine the environmental impacts from the proposed project.

#### **RAI PA-4**

##### **Provide information on the acreage ponds occupy for the land application option.**

SR Section 4.4.1 provides information on the number, types, and storage capacities of ponds for the land application option for disposing of treated wastewater. However, the acreage of the ponds is not included. Please provide the acreage of the ponds for the land application option.

This information is needed to complete the description of the proposed action and affected environment and to determine the environmental impacts from the proposed project.

#### **RAI PA-5**

##### **Provide updated information on federal, state, county, and tribal licenses and permits required to construct and operate the proposed Dewey-Burdock project.**

Table 1.6-1 of the ER lists and describes the status of federal, state, county, and tribal licenses and permits that will be required to construct and operate the proposed Dewey-Burdock project. Given that the license application was submitted to NRC over 7 months ago (submittal date August 10, 2009), please provide:

1. Updated information listed in ER Table 1.6-1 on federal, state, county, and tribal licenses and permits required for the proposed Dewey-Burdock project.
2. New information on any additional federal, state, county, and tribal licenses, permits, and approvals required for the proposed Dewey-Burdock project. For example, SR Section 4.2 indicates that Powertech intends to apply for a Class V (Non Hazardous) deep injection permit for disposal of liquid wastes generated from the project through a permitting process with the U.S. Environmental Protection Agency.

The information provided in 1 and 2 above should identify the issuing agency, describe the type of license, permit, or approval needed, and provide the current status of securing the license, permit, or approval. This information is needed to complete the description of the proposed action and determine the environmental impacts of the licensing and permitting process on the proposed project.

#### **Air Quality:**

##### **RAI AQ-1**

##### **Explain how emission levels relate to compliance with ambient air standards.**

The information in SR Section 6.2 expresses emission estimates in terms of mass per year. Prevention of Significant Deterioration (PSD) and National Ambient Air Quality Standard thresholds are expressed in concentrations over various timeframes. It is unclear how to relate the provided emission estimates with impacts to air quality in terms of compliance with ambient air standards expressed in concentrations. Please explain how the emission levels relate to compliance with ambient air standards because the values are expressed in different terms, and if appropriate, provide supplemental information (such as emission estimates expressed in concentrations) (see also RAI AQ-2). This information is needed to determine impacts to air quality resulting from emission estimates at the proposed project.

**RAI AQ-2****Provide emission estimates discretely for all four ISR phases.**

The Generic Environmental Impact Statement (GEIS) (NRC, 2009) recognizes that ISR phases may occur simultaneously. However, the air quality impacts were assessed by phase discretely or individually. In contrast to the GEIS, Powertech included all aquifer restoration activities and some construction activities in the operations air emission estimates provided in SR Section 6.2. Please provide emission estimates discretely for all four ISR phases (construction, operations, aquifer restoration, and decommissioning). This information is needed to determine the impacts to air quality on the four ISR phases of the Dewey-Burdock Project lifecycle.

**RAI AQ-3****Provide greenhouse gas emission levels for the ISR phases and the basis for the emission levels.**

ER Section 3.6.4 and SR Section 6.2 do not directly mention greenhouse gases or provide an estimate expressed in terms of CO<sub>2</sub> equivalents. Emission estimates for two greenhouse gases, carbon dioxide and nitrogen dioxide, are provided in SR Section 6.2. However, these estimates do not reflect all greenhouse gases and do not incorporate indirect sources, such as electricity consumption. Please address greenhouse gas emission levels for the ISR phases by providing estimates in terms of CO<sub>2</sub> equivalents, providing the basis for the emission levels, and including other sources such as electricity consumption.

**RAI AQ-4****Discuss the applicability of any greenhouse gas regulations, and if appropriate, address compliance with these regulations.**

ER Section 3.6.4 and SR Section 6.2 do not directly mention greenhouse gases or any associated regulations. In October 2009, the U.S. Environmental Protection Agency (EPA) announced a final rule regarding mandatory reporting of greenhouse gas emissions (EPA, 2009). Please discuss the applicability of any greenhouse gas regulations, and if appropriate, address compliance with these regulations. This information is needed to complete the description of the affected environment and to determine the environmental impacts to air quality from the proposed project.

**RAI AQ-5****Provide information on the air permit, if available.**

SR Section 6.2 states that Powertech will apply for an air permit from the South Dakota Department of the Environment and Natural Resources and the application will include a fugitive dust monitoring plan. The actual permit would describe any state-imposed monitoring plans, mitigation, or restrictions. Please provide information on the status of the air permit, if available. This information is needed to complete the description of the affected environment and determine the environmental impacts to air quality from the proposed project.

**RAI AQ-6****Provide an assessment concerning compliance with Prevention of Significant Deterioration (PSD) regulations.**

Wind Cave National Park is in Custer County approximately 46.7 km [29 mi] from the proposed site. However, ER Section 3.6.4 does not identify Wind Cave National Park as a PSD Class I area. Furthermore, the ER does not discuss compliance with PSD regulations. Please provide an assessment concerning compliance with PSD regulations. This information is needed to complete the description of the affected environment and to determine the environmental impacts to air quality from the proposed project.

**RAI AQ-7****Provide the rationale or supporting documentation regarding proposed mitigation measures.**

The ER states that the proposed mitigation measures identified in Section 5.6 will reduce dust levels to those equal to or less than current conditions. However, no rationale or supporting documentation is provided to support this statement. Please provide the rationale or supporting documentation for the statement that the proposed mitigation measures will reduce dust levels to those equal to or less than current conditions. This information is needed to determine the impacts to air quality from the proposed project.

**RAI AQ-8****Provide the rationale or supporting documentation regarding cumulative impact conclusion for air quality.**

ER Section 4.8.1 states that because of the isolated location and atmospheric conditions of the area, the cumulative air quality impacts will be negligible. However, no quantitative information was provided to characterize local air quality, and no basis was provided to support the statement that atmospheric conditions would result in negligible cumulative impacts. Please provide the rationale or documentation to support your conclusion. This information is needed to provide the bases for a comprehensive cumulative impacts analysis.

**RAI AQ-9****Clarify the description of fugitive dust emission estimates.**

SR Section 6.2 includes estimates of fugitive dust emissions. In reviewing the discussion of the estimates in that section, staff could not find any information to clarify whether commuting workers were included in the fugitive dust estimates. Staff also could not locate information to clarify whether aquifer restoration activities were addressed in the estimates for the operational period.

1. Powertech should clarify whether traffic from commuting workers was included in the fugitive dust emissions estimates, and if it was not, either provide an updated estimate that includes commuting worker traffic or provide the basis for excluding the information.
2. Powertech should clarify whether the fugitive dust estimates for the operational period include activities that would be conducted for the aquifer restoration phase.

This information is needed for the staff to evaluate the potential impacts of fugitive dust emissions.

### **Land Use:**

#### **RAI Land Use-1**

##### **Clarify and provide information on the location and number of residences and residents.**

SR Exhibit 3.1-1 provides information on residences within the proposed permit boundary and the 1.6-km [1-mi] area of review outside the permit boundary. However, the ER does not describe the location and number of residences and residents within the proposed license boundary and the 1.6-km [1-mi] area of review for the proposed project. Please clarify and provide this information. This information is needed to complete the description of the proposed action and affected environment to determine the environmental impacts of the proposed project to onsite and offsite receptors.

#### **RAI Land Use-2**

##### **Provide additional information on existing, pending, and potential future land leases that overlap the proposed project area.**

ER Section 3.1 does not provide information on existing and potential future land leases that overlap the proposed project area. The U.S. Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) have provided NRC staff with some limited information on current and pending oil and gas leases that overlap the proposed project area. Please provide additional information on existing, pending, and potential future land use leases that overlap the proposed project area, if available. This information is needed to evaluate potential land use conflicts with existing and proposed activities that overlap the proposed project areas.

#### **RAI Land Use-3**

##### **Provide information on access restrictions around buildings, ponds, well fields, monitor wells, potential irrigation areas, and other structures at the proposed project.**

ER Section 4.3.2 and related technical drawings indicate that the installation of fences around well fields would restrict livestock grazing access in some areas. However, the ER does not discuss how access will be restricted to buildings, ponds, monitor wells, potential irrigation areas, and other structures associated with project activities. Please provide this information,

which is needed to complete the description of the affected environment and to determine the environmental impacts of access restrictions on the proposed project.

### **Transportation:**

#### **RAI TR-1**

##### **Provide estimate of the expected traffic generated by proposed construction activities.**

The staff's review of the applicant's license application, Powertech does not appear to provide any information on the expected magnitude of transportation activities during the construction phase. Staff can use workforce estimates provided in ER Section 4.12.1 to estimate commuter traffic; however, no information could be located on estimated trucking activity during this period (e.g., construction equipment and supplies shipments). Therefore, the applicant should provide an estimate of the daily or annual trucking activity during the construction phase or note where the information is located, if already submitted. This information can be presented as one-way vehicle trips counted at the entrance of the facility. Powertech does not need to identify all potential routes of transportation; however, if Powertech anticipates using local road networks for most trucking activity, such information should be provided. The requested information is needed to evaluate the potential transportation traffic impacts associated with the construction phase of the proposed project.

#### **RAI TR-2**

##### **Provide estimate of the expected frequency of chemical supply shipments during operations.**

ER Section 4.14.1.1 describes the chemicals that would be used for the proposed action, but staff could not locate information on the number of expected chemical supply shipments during the operations phase of the proposed project. Therefore, the applicant should provide an estimate of the daily or annual chemical supply shipments during the operations phase or note where the information is located, if already submitted. This information can be presented as one-way vehicle trips counted at the entrance of the facility. The requested information is needed so staff can evaluate the potential transportation traffic impacts associated with the operation phase of the proposed project.

### **Water Resources:**

#### **RAI WR-1**

##### **Clarify whether the Minnekahta aquifer is a major or minor aquifer in the Black Hills Area.**

On ER p. 3-50 (Section 3.4.3.1), five major aquifers are reported in the Black Hills area, but only four are listed [Inyan Kara (comprised of hydraulically connected Fall River and Lakota formations), Minnelusa, Madison, and Deadwood aquifers]. ER Figure 3.4-7 suggests that the Minnekahta aquifer could be the fifth major aquifer. However, the Minnekahta aquifer was listed as a minor aquifer on ER p. 3-56 (Section 3.4.3.1.6).

1. Please clarify whether the Minnekahta aquifer is a major or minor aquifer in the Black Hills Area.
2. If the Minnekahta is a major aquifer, provide its hydraulic properties (transmissivity, storativity and thickness).

This information is needed to complete the description of the affected environment and to determine the environmental impacts of the proposed project.

### **RAI WR-2**

#### **Provide additional information on confinement of the Lakota and Fall River aquifers across the proposed project area.**

ER Section 3.4.3.2 notes that the Fuson Shale is not an effective confining layer at some locations in the Burdock portion of the project area. At these locations, the Lakota Aquifer would be in hydraulic connection with the overlying Fall River Aquifer. Based on potentiometric surface and surface outcrop data, the Fall River Aquifer is unconfined in the northern and eastern parts of the Burdock portion of the project area (SR Exhibit 3.1-4 and TR Figure 2.7-14). Therefore, proposed production zones within the Lakota Aquifer (which would be unconfined where the Fuson Shale is not an effective confining layer) may have a direct hydraulic connection with the Fall River Aquifer and consequently with upstream surface water bodies, such as the Triangle open pit lake, present in the outcrop area of the Fall River Aquifer in the northern and eastern parts of the Burdock area (TR Plate 2.5-1). Please provide additional information on confinement of the Lakota and Fall River aquifers across the proposed project area including:

1. A map or maps, based on available borehole and hydrological data from the site, showing
  - a. depth contours to the top of the Fall River aquifer,
  - b. regions where the Fuson Shale is not an effective confining layer,
  - c. locations of all wetlands (denoted by "W" in ER Plate 6.-1) and surface impoundments (denoted by "Sub" in ER Plate 6.1-1), and
  - d. Regions where Fall River aquifer is unconfined.
2. Based on information provided in 1 above, an analysis on the potential for drawdown-induced migration from surface water bodies in the outcrop area of the Fall River aquifer toward unconfined production zones in the Lakota Aquifer in the Burdock portion of the project area.

This information is needed to complete the description of the affected environment and to determine the environmental impacts of ineffective confinement and groundwater pumping on the proposed project.

**RAI WR-3****Provide information on ISR operations in unconfined portions of the Lakota and Fall River aquifers in the Burdock portion of the project area.**

As discussed in RAI WR-2, the Fall River aquifer is unconfined in the northern and eastern portions of the Burdock area (Supplementary Exhibit 3.1-4) and the Lakota Aquifer is unconfined where the Fuson Shale is not an effective confining unit. Please provide information on ISR operations in unconfined portions of the Lakota and Fall River aquifers in the Burdock area. This information should include:

1. Whether Powertech plans to conduct ISR operations in unconfined portions of the Lakota and Fall River aquifers in the Burdock area identified during delineation drilling and aquifer pump testing.
2. If the answer is yes to 1 above, information on well field design and construction and how Powertech plans to control and monitor production fluids in unconfined production zones. This information should include:
  - a. Production and injection well patterns and spacing.
  - b. Production bleed rates.
  - c. Monitoring well ring layouts and spacing.
  - d. Well construction, development, completion, and testing methods.

This information is needed to determine the potential impacts to groundwater resulting from ISR activities conducted in unconfined aquifers at the proposed project site.

**RAI WR-4****Provide information on expected consumptive use of groundwater during construction of the proposed Dewey-Burdock Project.**

The ER does not discuss the consumptive use of groundwater for activities such as dust control, drilling support, cement mixing, and aquifer pump tests during the construction phase of the proposed project. Please provide information on expected water consumptive use during construction of the proposed Dewey-Burdock Project. This information should include the aquifers that would supply groundwater for use in construction activities, plans for discharge of the water after use, and the potential impacts to groundwater resulting from consumptive use activities. This information is required to determine the environmental impacts of construction activities on groundwater resources at the proposed project.

**RAI WR-5****Provide information on the status of obtaining water appropriation permits for use of water from the Madison aquifer.**

ER Section 4.6.2.7.2 indicates that during operations, water requirements of the central processing plant and other facilities are estimated to be a maximum of 246 L/min [65 gpm] and that most of this water will be derived from a water supply well in the Madison Formation. ER

Section 4.6.2.7.3 indicates that up to 1,893 Lpm [500 gpm] from the Madison Formation will be needed for the aquifer restoration process at the proposed project. However, if a water rights permit cannot be secured from the South Dakota Department of Environment and Natural Resources (SDDENR) for the Madison Formation, other alternatives will be needed to meet water requirements during operations and aquifer restoration.

1. Please provide information on the status of obtaining a water appropriation for use of Madison aquifer water during operations and aquifer restoration.
2. If water rights permit cannot be secured for the Madison aquifer provide information on the potential alternatives to meet water requirements during operations and aquifer restoration and how each alternative would impact groundwater levels, flow rates, and flow directions.

This information is needed to determine the environmental impacts to groundwater to meet requirements during operations and aquifer restoration.

#### **RAI WR-6**

##### **Provide information on all known exploratory wells that extend below the Lakota Formation in the proposed project area.**

TR Section 2.7.2.2.16 indicates that up to 5 percent of exploratory wells in the proposed project area were drilled below the Lakota Formation into the Morrison Shale. Please provide information on all known exploratory wells including location, depth, and current status that extend below the Lakota Formation into the Morrison Shale in the proposed project area. This information is needed to determine the potential environmental impacts of past drilling on the quality and yield of groundwater in aquifers below the Lakota Formation at the proposed project site.

#### **RAI WR-7**

##### **Provide information on deep aquifers below the Morrison Formation that could be used for deep well disposal of wastewater at the proposed project and status of UIC permit.**

ER Section 4.15.2.4 notes that deep well disposal is an option for the disposal of wastewater generated during ISR activities at the proposed Dewey-Burdock Project. Please provide information on deep aquifers below the Morrison Formation that could be used for deep well disposal of wastewater at the proposed project. This information should include the technical basis and rationale for the choice of deep aquifers for liquid waste disposal at the proposed site. This question is raised due to (i) potential impacts on water quality in Unkpapa and Sundance aquifer below the Morrison Formation at the proposed site, (ii) the occurrence of hydraulic connections among the major aquifers (ER 2009; Section 3.4.3.1.7), (iii) the prevailing upward hydraulic gradient across major aquifers below the Morrison Formation, . This information is needed to determine the impacts to groundwater quality resulting from deep well disposal of liquid wastewaters at the proposed project.

**Ecology:****RAI Ecology-1**

**Provide the basis and supporting documentation for the statement in ER Section 3.5.5.3.2, Big Game, that the South Dakota Game, Fish and Parks (SDGFP) does not recognize any crucial big game habitats or migration corridors in the permit area or surrounding 1.6-km [1-mi] perimeter.**

The ER states that SDGFP does not recognize any crucial big game habitats or migration corridors in the permit area or surrounding 1.6-km [1-mi] perimeter. However, no basis or supporting documentation is provided to support this statement. Please provide the basis or supporting documentation for the statement. This information is needed to determine the impacts to big game habitats and migration corridors from the proposed project.

**Noise:****RAI Noise-1**

**Provide information on the frequency and noise levels of freight trains passing through the project area.**

According to ER Section 3.7, traffic from U.S. Highway 18 and State Highway 89 would generate the majority of the existing ambient noise in the vicinity of the project area. However, background noise generated by freight trains passing through the project area on the Burlington Northern Santa Fe Railroad was not considered. The Burlington Northern Santa Fe Railroad, which runs from northwest to southeast through the project area, is used for shipping coal from mining operations in the Powder River Basin of Wyoming. Provide information on the frequency and noise levels of freight trains passing through the project area on the Burlington Northern Santa Fe Railroad. This information is needed to determine the potential impacts of noise within and in the vicinity of the project site and to assess the cumulative impact of the proposed action as it relates to noise.

**Cultural and Historic Resources:****RAI Cultural-1**

**Provide a single map showing the location and boundaries of documented archaeological sites and historic structures with respect to proposed facilities to be constructed within and beyond the next five years at the proposed Dewey-Burdock project.**

Historical and cultural resources within the proposed Dewey-Burdock project area are documented and described in ER Section 3.8 and ER Appendix 4.10-A, which includes two Level III cultural resource inventories (Kruse et al., 2008; Palmer and Kruse, 2008) and two cultural resource evaluative testing reports (Palmer, 2008; Palmer 2009). However, a single comprehensive map showing the location and boundaries of documented historic and cultural

sites with respect to proposed facilities to be constructed within and beyond the next 5 years at the proposed project is not provided in the ER.

1. Please provide a single map showing the location and boundaries of documented archaeological sites and historic structures with respect to proposed facilities (i.e., central processing plant, satellite plant, well fields, ponds, potential irrigation areas) to be constructed within the proposed Dewey-Burdock project area.
2. The map should include all facilities to be constructed over the proposed life of the project (i.e., within and beyond the next 5 years).
3. The map should include archeological sites and historic structures that are:
  - a. Currently listed on the National Register of Historic Places (NRHP).
  - b. Potentially eligible for listing on the NRHP.
  - c. Documented but unevaluated in terms of NRHP-eligibility.

This information is needed to complete the description of the affected environment and determine the environmental impacts of proposed project activities on cultural and historical resources over the life of the project.

#### **RAI Cultural-2**

**Provide additional information on sites 39CU3592 and 39CU560 and/or explain why these sites were included in evaluative testing but were not documented in the Level III cultural resource inventory reports.**

The results of evaluative testing of NRHP-eligible site 39CU3592 and site 39CU560 were described in reports included in ER Appendix 4.10A (Palmer, 2008; Palmer, 2009). However, these sites were not documented in either of the Level III cultural resource inventory reports included in ER Appendix 4.10A (Kruse et al., 2008; Palmer and Kruse, 2008). Please provide additional information on sites 39CU3592 and 39CU560 and/or explain why these sites were included in evaluative testing but were not documented in the Level III cultural resource inventory reports. This information is needed to complete the description of the affected environment and determine the environmental impacts of the proposed project on cultural and historical resources.

#### **RAI Cultural-3**

**Provide information or plans that describe agreements and measures to be undertaken to meet federal compliance with handling of cultural resources in the event cultural resources are encountered during construction, operation, aquifer restoration, and decommissioning activities at the proposed Dewey-Burdock project.**

ER Appendix 4.10-B documents a Memorandum of Agreement (MOA) executed between Powertech and the State of South Dakota Archeologist to ensure preservation of any historical or cultural sites within the Dewey-Burdock project area. However, this MOA does not constitute compliance with Federal laws such as the National Historic Preservation Act (NHPA). Please provide information or plans that outline agreements and measures to be undertaken to meet federal compliance with handling of cultural resources in the event cultural resources are encountered during construction, operation, aquifer restoration, and decommissioning activities at the proposed Dewey-Burdock project. This information should include a description of any discussions Powertech has had with the South Dakota State Historical Preservation Office (SHPO) concerning Section 106 of the NHPA. This information is needed to determine the environmental impacts of project activities on cultural and historical resources over the life of the project.

### **Socioeconomics:**

#### **RAI SOC-1**

**Provide additional data from the most recent source available on demographic and socioeconomic parameters for the counties and towns surrounding the proposed project location.**

1. Provide updated race characteristics (e.g., 2008 data) for Fall River and Custer Counties in South Dakota (similar to ER Table 3.10.3) and Niobrara and Weston Counties in Wyoming (similar to ER Table 3.10.4), if available.
2. Provide annual average labor, employment, and income characteristics for direct social zones within the region of interest for Wyoming, similar to data provided in ER Section 3.10.3 for South Dakota.
3. Provide school information for the direct social zones of influence for Wyoming, similar to school information for the direct social zones of influence for South Dakota provided in ER Section 3.10.2.2.
4. Provide tax information for the direct social zones of influence for Wyoming, similar to tax information for the direct social zones of influence for South Dakota provided in ER Section 3.10.3.5.
5. Provide updated housing unit statistics (e.g., 2008 data) for Fall River, Custer, Niobrara, and Weston Counties (similar to Table 3.10-16), if available. In addition, provide housing unit statistics for affected towns within the region of interest, if available.

This information is needed for the staff to evaluate the socioeconomic impacts of the proposed project.

**RAI SOC-2****Provide additional data on mining and mineral resource development in the vicinity of the proposed project area.**

ER Section 3.10.3 mentions that mining is a business sector contributing to taxable sales and use revenues in the project area. However, detailed information on mining and mineral resource development in the vicinity of the proposed project area is not provided. In addition, it is not clear whether South Dakota and Wyoming levy ad valorem taxes on mineral extraction activities. Please provide additional data on mining and mineral resource development in the vicinity of the proposed project area and information on the amount of revenue mining generates and note whether any state ad valorem taxes are levied. This information is needed for the staff to evaluate the impacts to socioeconomics associated with the proposed project.

**RAI SOC-3****Provide information on medical treatment personnel, facilities, and emergency services.**

ER Section 3.10 does not provide information on medical treatment personnel and facilities and emergency services in the vicinity of the proposed project location. ER Section 4.12.4 states that “existing emergency response and medical treatment facilities are capable of responding to any possible incident at the project site.” However, no supporting information is provided to confirm this statement. Please provide information on medical treatment personnel, facilities (e.g., doctors and hospitals), and emergency services in the vicinity of the proposed project location and their ability to provide accident response. This information is needed for the staff to evaluate the socioeconomic impacts associated with the proposed project.

**RAI SOC-4****Provide labor force and employment information for the aquifer restoration and decommissioning phases of the proposed project.**

ER Section 4.12 breaks down anticipated labor force and employment information for the construction and operation phases of the proposed project, but does not break down this information for the aquifer restoration and decommissioning phases of the project. Please provide this information as it is needed for the staff to evaluate the socioeconomic impacts associated with the proposed project.

**RAI SOC-5****Provide information on impacts to socioeconomic parameters from the proposed project.**

1. Provide information on impacts to local finance for counties and towns surrounding the proposed project location (see RAI SOC-1). ER Section 4.12 does not include expected impacts to local finance for the surrounding counties and towns.

2. Provide information on impacts to housing for counties and towns surrounding the proposed project location. ER Section 4.12.3 mentions potential housing impacts during the operational phase of the project, but no information on the expected impacts is provided. In addition, housing impacts during the construction, aquifer restoration, and decommissioning phases of the proposed project are not provided.
3. Provide information on educational impacts for counties and towns surrounding the proposed project location. ER Section 4.12.4 mentions potential educational impacts during the operational phase of the project, but no information on the expected impacts is provided. In addition, educational impacts during the construction, aquifer restoration, and decommissioning phases of the proposed project are not provided.
4. Provide information on impacts to health and social services for counties and towns surrounding the proposed project location. ER Section 4.12.4 mentions potential impacts to health and social services during the operational phase of the project, but no information on the expected impacts is provided. In addition, impacts to health and social services during the construction, aquifer restoration, and decommissioning phases of the proposed project are not provided.

This information is needed for the staff to evaluate the socioeconomic impacts of the proposed project.

### **Environmental Justice:**

#### **RAI EJ-1**

**Provide additional data from the most recent source available on low-income characteristics for counties surrounding the proposed project location.**

1. Provide updated characteristics on low-income populations (e.g., 2008 data) for Fall River and Custer Counties in South Dakota (similar to ER Table 4.13-1), if available.
2. Provide the most recent low-income characteristics for Niobrara and Weston Counties in Wyoming (similar to ER Table 4.13-1 for Fall River and Custer Counties in South Dakota), if available.

This information is needed for the staff to evaluate the environmental justice impacts of the proposed project on low-income populations.

### **Public and Occupational Health and Safety:**

#### **RAI Public-1**

**Discuss and provide references for previous public health studies (radiological or chemical) that may have been performed at and within the vicinity of the proposed project.**

Provide a summary of existing health effects studies specific to the Dewey-Burdock region for the past 5 calendar years (if available). This information is needed to establish a baseline

measure of public health in the region surrounding the proposed project. This information is also needed for the staff to assess the potential impact to occupational health from the operations taking place at the Dewey-Burdock site.

### **RAI Public-2**

#### **Provide information on occupational incident rates and lost-time incident rates for the ISR industry.**

Per NUREG-1748 (NRC, 2003b), ER Section 6.3.11 states the applicant should provide occupational worker injury rates and fatality rates and a summary of any health effects studies. Occupational health data for workers is not included in the ER (Powertech, 2009a). Please provide information (i.e., for the past 5 years) on the U.S. Department of Labor Bureau of Labor Statistics reported incident rate and lost-time incident rate for ISR facilities, including the associated North American Industry Classification System code. The U.S. Department of Labor Bureau of Labor Statistics reports incident rates for manufacturing facilities such as Dewey-Burdock, which can be used for comparing work injuries, illnesses, and accidents within an industry. This information is needed for the staff to assess the impact to occupational health from the operations taking place at the Dewey-Burdock site.

### **RAI Public-3**

#### **Provide an analysis or discussion of how the accident assumptions and scenarios presented in the ER are applicable to the Dewey-Burdock project, and discuss the particular mitigation measures employed to minimize accident impacts on occupational health.**

The applicant discussed an accident analysis of a yellowcake thickener failure and a catastrophic tank failure that are included in NUREG/CR-6733 (Mackin, et al., 2001). However, Powertech did not provide an analysis or discussion of why the NUREG/CR-6733 scenarios were bounding or applicable to the Dewey-Burdock operation. Therefore, occupational health impacts due to accidents cannot be evaluated. Provide an analysis or discussion of a yellowcake thickener failure and catastrophic tank failure based on how the accident assumptions and scenarios presented in the ER are applicable to the Dewey-Burdock project, and discuss the particular mitigation measures employed to minimize accident impacts on occupational health. This information is needed for staff to evaluate the impacts of operational accidents on public and occupational health and safety.

### **Waste Management:**

#### **RAI WM-1**

#### **Clarify the constituents and treatment methods for other waste streams.**

TR Section 4.2.1.1 indicates wastes (including laboratory chemicals, laundry water, plant washdown water, and waste brine streams from elution and precipitation circuits) will be collected, treated, and discharged to a deep disposal well. Staff could not locate in any of the submitted documents any description of the constituents in these waste streams and the

treatment methods that would be applied. Therefore, staff requests Powertech provide additional description of the treatment and disposal methods that would be applied to these waste streams before disposal. While most of the categories of wastes discussed are self-evident, staff requests clarification of the constituents expected in the laboratory waste that is referred to in Section 4.2.1.1. This information is needed for the staff to evaluate the impacts of these other waste streams for the proposed action.

#### **RAI WM-2**

##### **Describe the types and expected volume of solid wastes generated during construction.**

ER Section 4.15.3 describes radioactive and hazardous solid wastes that the proposed action would generate, but does not discuss nonradioactive, nonhazardous wastes that would be generated during the construction period. ER Appendix 6.6-A includes estimates of nonradiological, nonhazardous decommissioning solid waste volumes; however, staff could not locate estimates for such wastes for the construction period. Therefore, staff requests that Powertech describe (generally) the types of solid wastes that would be generated during construction and provide estimates of the annual volume of solid wastes expected to be generated during the construction period. This information is needed for staff to evaluate the solid waste management impacts for the construction phase.

#### **RAI WM-3**

##### **Clarify solid waste disposal plans.**

ER Section 4.4.3.4 refers to solid waste shipments to a permitted landfill but does not identify any specific facilities where Powertech would be likely to send this waste material. If known, Powertech should provide the names and locations of facilities where it plans to send its nonradioactive, nonhazardous solid wastes. If no such plans have yet been formulated, Powertech should provide a list of facilities it believes are likely candidates for receipt of this waste. The response should clarify whether Powertech is considering utilizing the landfill at Edgemont, South Dakota, which appears to the staff to be the nearest landfill to the proposed site. Staff needs this information to evaluate the magnitude of potential impacts from solid waste management from the proposed action.

#### **RAI WM-4**

##### **Describe the types and expected volume of solid wastes generated during operations.**

ER Section 4.15.3 describes radioactive and hazardous solid wastes that the proposed action would generate, but does not discuss non-radioactive non-hazardous wastes that would be generated during the operations period. ER Appendix 6.6-A includes estimates of nonradiological, nonhazardous decommissioning solid waste volumes; however, staff could not locate estimates for such wastes for the operations period. Therefore, staff requests Powertech describe (generally) the types of solid wastes that would be generated during operations and provide estimates of the annual volume of solid wastes expected to be generated during the operations period. This information is needed for staff to evaluate the solid waste management impacts for the operations phase.

**RAI WM-5****Provide additional information clarifying the characteristics of byproduct wastes generated during operations including packaging and transportation.**

ER Section 4.4.3.4 describes the proposed waste material shipments that include 11e.(2) byproduct material. TR Section 4.4.1 describes radioactive waste generation resulting from the proposed use of radium settling ponds to remove dissolved radium from liquid waste streams. That section indicates the radium settling pond bottoms would be periodically removed, stored onsite, and disposed of as 11e.(2) byproduct waste at a licensed disposal facility, but does not provide additional details about the radiological characteristics of the waste material or the proposed approach to transporting the material to an offsite disposal facility.

1. Powertech should provide an estimate of the activity concentration of radium (e.g., Ci of radium per gram of this waste material) in the settling pond bottom waste material.
2. Powertech should clarify how this waste material would be classified for transportation (e.g., low specific activity), the type of packaging that would be used, and the approximate amounts of the waste material that would be included in a typical waste shipment.

This information is needed for staff to more completely evaluate the radiological characteristics of the waste materials the proposed action will generate, describe the proposed transportation activities for this material, estimate the number of shipments, and evaluate the potential impacts associated with these activities.

**RAI WM-6****Clarify the estimated quantity of byproduct material generated during decommissioning.**

TR Appendix 6.6-A provides a spreadsheet of cost estimates. In the section of this spreadsheet titled "Stability Monitoring/Decommissioning," the estimate labeled "Transportation/Disposal of 11e(2) Waste" appears, based on information in the preceding entry labeled "Materials to Demo and Send to 11e(2) Disposal Site," to include only pond-related wastes. The staff could not locate any entries in the spreadsheet or elsewhere in submitted documentation that estimated the volume of contaminated soil (e.g., from well field leaks, spills, or excessive land application buildup of constituents) expected to be excavated and sent offsite for disposal during decommissioning.

1. Powertech should clarify whether the aforementioned estimate of byproduct material includes excavated soil and, if soil is not included in that estimate, Powertech should provide the expected amount of excavated soil from decommissioning that would need to be disposed of as 11e.(2) byproduct waste and the basis for the estimate, or explain why such an estimate cannot be reliably calculated.
2. If the estimate is zero, then Powertech should provide the basis for that conclusion.

3. If this information has already been provided, Powertech should note where the information is located as the response to this request.

This information is needed for staff to accurately assess the expected amount of 11e.(2) byproduct waste generated during decommissioning to support both the description of produced wastes and to estimate the magnitude of expected waste shipments to an offsite disposal facility.

### **Cumulative Effects:**

#### **RAI Cumulative Effects-1**

**Provide information on historical (closed or abandoned), currently active, and proposed future projects related to mineral resource (uranium, coal, coal bed methane, oil, and natural gas) or wind farm facilities and land development activities located in the vicinity of the proposed Dewey-Burdock Project area.**

ER Sections 2.10 and 4.16.1 states that Powertech has identified other potential ore bodies near the proposed Dewey-Burdock Project region that are in various stages of development. However, no information, such as location, is provided for these potential ore bodies. In addition, ER Sections 2.10 and 4.16.1 do not discuss other mining and land development activities that are currently active or may also occur in the future.

1. Please provide information on historical (closed or abandoned), currently active, and proposed future projects related to mineral resource (uranium, coal, coal bed methane, oil, and natural gas) facilities located in the vicinity of the proposed Dewey-Burdock Project area. The response should define the geographic boundaries for studying each facility. These boundaries may be airsheds, watersheds, aquifer zones, census boundaries, or habitat areas depending on the type of resource. For each facility identified, the response should include information regarding areas of disturbance, groundwater and surface water impacts, grazing range impacts, socioeconomic impacts, air quality and noise impacts, threatened and endangered species impacts, and cultural resource impacts.
2. Please provide information on wind farm facilities located in the vicinity of the proposed Dewey-Burdock project area. The response should define the geographic boundaries for studying each facility. These boundaries may be airsheds, watersheds, aquifer zones, census boundaries, or habitat areas depending on the type of resource. For each facility identified, the response should include information regarding areas of disturbance, groundwater and surface water impacts, grazing range impacts, socioeconomic impacts, air quality and noise impacts, threatened and endangered species impacts, and cultural resource impacts.
3. Please provide information on any other land development facilities located in the vicinity of the proposed Dewey-Burdock project area. The response should define the geographic boundaries for studying each facility. These boundaries may be airsheds, watersheds, aquifer zones, census boundaries, or habitat areas depending on the type of resource. For each facility identified, the response should include information

regarding areas of disturbance, groundwater and surface water impacts, grazing range impacts, socioeconomic impacts, air quality and noise impacts, threatened and endangered species impacts, and cultural resource impacts.

This information is needed to provide the bases for assessing potential indirect and cumulative impacts.

### **RAI Cumulative Effects-2**

#### **Provide information on currently active and proposed future projects related to water resource and water development activities located in the vicinity of the proposed Dewey-Burdock Project area.**

ER Sections 2.10 and 4.16.1 on cumulative impacts do not discuss currently active or reasonably foreseeable future commercial, residential, or recreational water resource and development activities in the vicinity of the proposed project. Please provide information on currently active and proposed future projects related to water resource and water development activities located in the vicinity of the proposed Dewey-Burdock Project area. The response should define the geographic boundaries for studying each water resource development activity identified. These boundaries may be watersheds, aquifer zones, census boundaries, or political boundaries. For each activity identified, the response should include information regarding areas of disturbance, groundwater and surface water impacts, grazing range impacts, socioeconomic impacts, air quality and noise impacts, threatened and endangered species impacts, and cultural resource impacts. This information is needed to provide the bases for assessing potential indirect and cumulative impacts.

### **RAI Cumulative Effects-3**

#### **Provide information on currently active and proposed future transportation development activities located in the vicinity of the proposed Dewey-Burdock Project area.**

ER Sections 2.10 and 4.16.1 on cumulative impacts do not discuss currently active or proposed future transportation development activities (e.g., construction or expansion of highways or railroad lines) in the vicinity of the proposed project. Please provide information on currently active and proposed future transportation development activities located in the vicinity of the proposed Dewey-Burdock Project area. The response should define the geographic boundaries for studying each transportation development activity identified. These boundaries may be airsheds, census boundaries, or political boundaries. For each activity identified, the response should include information regarding areas of disturbance, groundwater and surface water impacts, grazing range impacts, socioeconomic impacts, air quality and noise impacts, threatened and endangered species impacts, and cultural resource impacts. This information is needed to provide the bases for assessing potential indirect and cumulative impacts.

**Environmental Measurements and Monitoring:****RAI EMM-1****Provide information to justify excluding multiple major and trace elements from the proposed baseline and operational groundwater monitoring analyte list.**

ER Section 6.2.2.1 describes Powertech's plans for baseline groundwater quality sampling before ISR operations begin. The parameters proposed for sampling are listed in Table 6.2-1 (Powertech, 2009a), which appears to exclude several potentially important analytes of interest including, but not limited to, major cations, such as sodium and calcium, and important trace elements, such as selenium, chromium, and copper. The abbreviated list of contaminants provided in Table 6.2-1 is inconsistent with the suggested list of parameters included in the GEIS (NRC, 2009, Table 8.2-1) and is inconsistent with the applicant's list of sampled parameters included in the site characterization of groundwater provided in ER Section 2.2.2 and in other proposed monitoring activities (e.g., TR Section 4.2.2.1.5.7). The response should provide an updated list of parameters to be sampled or provide the technical bases and justification for excluding parameters not listed in Table 6.2-1. This information is needed to assess the adequacy of the proposed well field baseline sampling plan.

**References:**

Driscoll, D.G., J.M. Carter, J.E. Williamson, and L.D. Putnam. "Hydrology of the Black Hills Area, South Dakota." U.S. Geological Survey Water Resources Investigation Report 02-4094. 2002.

EPA. "Mandatory Reporting of Greenhouse Gases." 74 FR 56260. *Federal Register*: Vol. 74, No. 209. pp. 56260–56519. October 30, 2009.

Kruse, J.M., T.V. Gillen, J.R. Bozell, L. Palmer, and A.A. Buhta. "A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota." Archeological Contract Series No. 216. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. 2008.

Mackin, P.C., D. Daruwalla, J. Winterle, M. Smith, and D.A. Pickett. NUREG/CR-6733, "A Baseline Risk-Informed, Performance-Based Approach for *In-Situ* Leach Uranium Extraction Licensees." Washington, DC: NRC. September 2001.

NRC. NUREG-1910, "Generic Environmental Impact Statement for *In-Situ* Leach Uranium Milling Facilities." Final Report. Washington DC: NRC. May 2009.

NRC. "Final Standard Review Plan for *In-Situ* Leach Uranium Extraction Applications." Washington, DC: NRC. June 2003a.

NRC. NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated With NMSS Programs." Final Report. Washington, DC: NRC. August 2003b.

Palmer, L. and J.M. Kruse. "A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota." Addendum 2, Vol. I: Additional Survey Report. Archeological Contract Series No.229. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. 2008.

Palmer, L. "A Level III Cultural Resources Evaluation of Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality within the Southern Black Hills, Custer and Fall River Counties, South Dakota." Addendum 1, Vol. I: Evaluative Testing Report. Archeological Contract Series No.227. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. 2008.

Palmer, L. "Evaluative Testing of Four Sites within Powertech (USA) Incorporated's Proposed Dewey-Burdock Uranium Project Locality, Southern Black Hills, Custer and Fall River Counties, South Dakota." Archeological Contract Series No. 231. Archeology Laboratory, Augustana College, Sioux Falls, South Dakota. 2009.

Powertech. "Application for NRC Uranium Recovery License Proposed Action Fall River and Custer Counties South Dakota Environmental Report." Greenwood Village, Colorado: Powertech. February 2009a.

Powertech. "Dewey-Burdock Project Application for NRC Uranium Recovery License Fall River and Custer Counties, South Dakota Technical Report." Greenwood Village, Colorado: Powertech. February 2009b.

Powertech. "Dewey-Burdock Project Supplement to Application for NRC Uranium Recovery License Dated February 2009." Greenwood Village, Colorado: Powertech. August 2009c.