Record of Communication
Call with Powertech (USA) Inc.
RE: Dewey-Burdock Class V Underground Injection Control (UIC) Permit Application

On December 8, 2016, the EPA UIC Program conducted a phone conversation with Powertech (USA) Inc. (Powertech) regarding the Class V permit application submitted for deep injection wells at the proposed Dewey-Burdock uranium in-situ recovery (ISR) Project located in the southern Black Hills region of South Dakota.

Present on the call were:
Blake Steele, President, Chief Financial Officer and Corporate Secretary, Azarga Uranium Corp.
John Mays, Chief Operating Officer, Azarga Uranium Corp.
Hal Demuth, Petrotek Engineering Corporation, consultant to Azarga
Douglas Minter, UIC Unit Manager, Office of Water Protection, EPA
Valois Shea, UIC Permit Writer, UIC Program, Office of Water Protection, EPA

During the call, the EPA informed Powertech that the wells proposed in the Dewey-Burdock Class V permit application for injection into the Deadwood Formation must be classified as Class I injection wells under UIC regulation §144.6, *Classification of wells* which states:

> Injection wells are classified as follows:
> (a) *Class I.* (1) Wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within one-quarter mile of the well bore, an underground source of drinking water.
> (2) Other industrial and municipal disposal wells which inject fluids beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.
> (3) Radioactive waste disposal wells which inject fluids below the lowermost formation containing an underground source of drinking water within one quarter mile of the well bore;

and under UIC regulation §144.6(e) *Class V* wells are injection wells not included in Class I, II, III, IV, or VI.

Powertech asked for clarification on the well classification for the Bureau of Reclamation Class V Paradox injection well located in Bedrock, Colorado. The EPA referred to regulation 144.6(a)(1) that specifies that Class I wells inject either hazardous waste, other industrial and municipal waste or radioactive waste. The fluid injected into Paradox well does not fall under any of these types of fluid waste categories.

Powertech expressed concern that removing the Deadwood Formation as an option for injection of treated ISR waste fluids would greatly diminish the capacity for waste fluid disposal. The EPA discussed its review of the Critical Pressure Rise and Cone of Influence calculation for the Deadwood Formation injection zone under Section 2A of the Class V permit application. The EPA explained that different input values were used for the EPA calculations, including a different Madison aquifer potentiometric surface elevation and 12 years of injection activity, rather than 10 years used in the Class V permit application. The Cone of Influence calculations the EPA performed included a different input value for the Madison aquifer potentiometric surface elevation from the elevation the used in the calculation in the Class V permit application. The calculation in the Class V permit application placed the Madison aquifer potentiometric surface elevation 200 feet above ground elevation at the Dewey-Burdock Project Area location. The EPA placed the Madison aquifer potentiometric surface elevation 101.8 feet below the ground elevation at the Dewey-Burdock Project Area location. The 12 years of injection activity are based on Figure 10.2, *Projected Construction, Operation and Decommissioning Schedule* in the Class III

permit application and Figure 1.3 *Life of Mine Schedule* in the April 2015 *Preliminary Economic Assessment,* NI 43-101 technical report prepared by TREC, Inc.

Using these values, and the other input data provided in the Class V permit application, the maximum injection rates calculated for injection into the Deadwood is 32 gallons per minute (gpm) for the Dewey Area Deadwood injection well and 49 gpm for the Burdock Area injection well. These injection rates are the maximum values that would not result in the Deadwood aquifer pressure moving fluids through the Dewey Fault into the Madison Formation aquifer. The calculations took into account that the Dewey Fault is located approximately 9,375 feet from the Dewey Area Deadwood injection well and approximately 29,000 feet from the Burdock Area Deadwood injection well.

Powertech pointed out that the input data in the Class V permit application was provided from the references noted in the Class V permit application and were not based on site specific measurements, which would only become available once the Deadwood injection wells were drilled and tested. The EPA acknowledged that the calculations were not based on site-specific input data and that site specific data may result in different maximum injection rate calculation results.

Powertech also pointed out that the Dewey Fault has been demonstrated to be a barrier to horizontal groundwater flow, based on data collected during both the Tennessee Valley Authority and the Powertech pump tests conducted in the Dewey Area. The EPA acknowledged that the Agency agreed that data from the two pump tests demonstrated that the Dewey Fault acts a barrier to horizontal groundwater flow in the area. Both Powertech and EPA agreed that the Dewey Fault may still represent a hypothetical vertical pathway for groundwater flow between the Deadwood, Madison and Minnelusa aquifers.

In order to assure Powertech that the proposed Minnelusa injection zone appeared to provide adequate disposal capacity, the EPA discussed its review of the Critical Pressure Rise and Cone of Influence calculations under Section 2A of the Class V permit application for the Minnelusa injection zone and the Madison Formation. In addition to the different input values discussed above for the Deadwood calculation, the EPA also used a porosity input value of 10% for the Minnelusa injection zone, compared with a 21% porosity value used in the Class V permit application. The EPA explained that even with the more conservative calculation input values used by the EPA, the calculated injection rate into the Minnelusa were higher than the 75-gallon-per-minute injection rate proposed by Powertech in its application for each Minnelusa injection well. In addition, the EPA stated that based on the input values, the Minnelusa injection zone should provide adequate disposal capacity using the four Minnelusa injection wells Powertech requested in the Class V permit application.

Commented [CL1]: Did you really just launch into the calculation discussion without first explaining that our calculations indicated the Minnelusa should have enough capacity for their needs?

Powertech asked for assurance from the EPA that injection rate permit limits are not based on the calculations discussed above using input parameters that are not measured at the Dewey-Burdock Project Site. The EPA stated that the Agency cannot discuss any permit conditions prior to issuance of the draft permits, at which time the public also has access to the permit requirements for review and comment.

Powertech and EPA both affirmed these statements in the Class V permit application:

1) The input parameters used for these calculations are based on formation parameters derived from limited data as referenced in the Class V permit application and will be verified during the drilling, testing, and completion of the injection wells.

2) If the input parameters that have been used are found to yield projections that are insufficiently conservative, the calculations will be updated with the site-specific values, as stated in the Class V permit application.

Powertech stated that the reason the Deadwood was proposed as a possible injection zone is because generally injection below the lowermost USDW is considered to be more protective of USDWs.

Commented [SV2]: Is this a good approximation of Hal's statement?

Based on the above conversation, Powertech stated that it will seek approval from the Azarga Board of Directors to submit a letter to the EPA withdrawing only the portion of its Class V permit application that requests authorization for injection into the Deadwood Formation. The request for authorization to inject into the Minnelusa Formation "porosity zone" in Powertech's Class V permit application will remain intact.

The EPA confirmed that, upon receipt of the letter from Powertech, the Agency would be in a position to move forward with preparations to issue a draft UIC Class V permit for injection into the Minnelusa Formation.

Powertech asked for an estimated timeframe for issuance of the UIC draft Class V and Class III permits. The EPA replied that the timeframe was not yet determined, because the EPA Region 8 administrator still needed to brief the EPA Administrator and edits would need to be made to the existing documents that will be part of the administrative record to remove reference to the Class I wells injecting into the Deadwood Formation. The EPA replied that the earliest estimated timeframe for UIC draft permit issuance would be in January 2017.

Powertech asked about the scope of the number of existing documents that would be part of the administrative record for the UIC draft permits. The EPA responded with references to:

1) 40 CFR § 124.6(d) stating that the UIC Class III and Class V Draft Area Permits are part of the administrative record;
2) 40 CFR § 124.8, which stipulates that a fact sheet must be prepared for every draft permit, stating that the Class III and Class V fact sheets are part of the administrative record;
3) UIC regulation 40 CFR § 144.4(b) regarding the National Historic Preservation Act (NHPA), stating that documentation of how the EPA proposes to comply with the NHPA is part of the administrative record;
4) UIC regulation 40 CFR §144.33(c)(3) which stipulates the cumulative effects of drilling and operation of additional injection wells are considered by the Director during evaluation of the area permit application and are acceptable to the Director, stating that a cumulative effect analysis document was developed; and
5) Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which focuses federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities resulted in an draft Environmental Justice Analysis document that is part of the administrative record.