

# **WASTE ANALYSIS PLAN**

**(WAP)**

**Powertech (USA) Inc.**

**Dewey-Burdock Project**

**Custer and Fall River Counties, South Dakota**

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## **1.0 INTRODUCTION**

### **1.A. Background**

The purpose of this Waste Analysis Plan (WAP) is to characterize the non-hazardous wastewater that will be injected into the proposed new Powertech (USA) Inc. (Powertech) Dewey-Burdock Disposal Wells at the Dewey-Burdock Project, South Dakota. Powertech will be responsible for ensuring this WAP is implemented. The wells are proposed as non-hazardous, non-commercial Class V industrial disposal wells that are to be dedicated to the injection of fluids generated in association with in-situ leach (ISL) uranium mining.

Powertech will operate the wells under this Waste Analysis Plan in accordance with Title 40 of the Code of Federal Regulations (40 CFR), Section 146.13 that requires operators of Class I (and likely Class V) underground injection wells to monitor and analyze the fluids injected into the well "to yield representative data of their characteristics." This Waste Analysis Plan has been prepared to fulfill the specifications of 40 CFR 146.68 such that the plan presents parameters for which the waste will be analyzed, methods that will be used to test for these parameters, and methods that will be used to obtain representative samples of the waste to be analyzed.

### **1.B. Waste Source**

This WAP applies to wastes that are non-hazardous under the Resource Conservation and Recovery Act (RCRA). The anticipated water chemistry of the injected waste stream is presented in the table below. This table was excerpted from NUREG-0489 and represents a typical waste stream for an ISL facility. Minor concentrations of corrosion inhibitors, scale inhibitors, and/or biocides may be used as needed to maintain the wells in optimum condition.

<b>Table 2.7-3. Estimated Flow Rates and Constituents in Liquid Waste Streams for the Highland <i>In-Situ</i> Leach Facility*</b>					
	<b>Water Softener Brine</b>	<b>Resin Rinse</b>	<b>Elution Bleed</b>	<b>Yellowcake Wash Water</b>	<b>Restoration Wastes</b>
Flow Rate, gal/min	1	<3	3	7	450
As, ppm					0.1–0.3
Ca, ppm	3,000–5,000				
Cl, ppm	15,000–20,000	10,000–15,000	12,000–15,000	4,000–6,000	
CO <sub>3</sub> , ppm		500–800			300–600
HCO <sub>3</sub> , ppm		600–900			400–700
Mg, ppm	1,000–2,000				
Na, ppm	10,000–15,000	6,000–11,000	6,000–8,000	3,000–4,000	380–720
NH <sub>4</sub> , ppm			640–180		
Se, ppm					0.05–0.15
Ra-226, pCi/L	<5	100–200	100–300	20–50	50–100
SO <sub>4</sub> , ppm					100–200
Th-230, pCi/L	<5	50–100	10–30	10–20	50–150
U, ppm	<1	1–3	5–10	3–5	<1
Gross Alpha, pCi/L					2,000–3,000
Gross Beta, pCi/L					2,500–3,500

\*NRC. NUREG-0489, "Final Environmental Statement Related to Operation of Highland Uranium Solution Mining Project, Exxon Minerals Company, USA." Washington, DC: NRC. November 1978.

The wastes consist of operational and restoration bleed streams and liquid waste from plant processes from ISL uranium mining operations, including but not limited to: normal overproduction (wellfield bleed) streams, yellowcake wash water, bleed from eluant and precipitation circuits, sumps, membrane cleaning solutions, laboratory waste, reverse osmosis brine, groundwater sweep solutions and plant washdown water from the Dewey-Burdock Project. Dewey-Burdock operation wastes will be generated by operations covered under a pending South Dakota Department of Environment and Natural Resources (DENR) Permit to Mine, EPA and DENR Class III UIC Permits, a BLM Plan of Operations, and a pending U.S. Nuclear Regulatory Commission (NRC) Source Material License. These waste streams are beneficiation wastes, exempt from RCRA regulation under the Bevill Amendment found in 40 CFR 261.4(b)(7).

## **2.0 PROCEDURES**

### **2.A. Waste Collection and Volume Monitoring**

Gathering flowlines will be directed to collection tanks at the site, and on occasion, vacuum trucks or other equipment utilized for remediation activities at the site will transfer fluid into a collection tank. Transfer from trucks will only be conducted with a trained operator physically present on site.

As discussed in the main text of the Class V permit application, a recorder will be utilized to continuously monitor injection pressure, annulus pressure, flow rate and totalized cumulative volumes. A summary of recorded data will be provided to the EPA per applicable permit requirements. Records of (1) daily volume of any fluids managed at the facility will be recorded and (2) a total monthly volume of injectate calculated based on data maintained in the records will be noted in the monthly well reports made to EPA.

### **2.B. Waste Characterization**

At a minimum, the following composition parameters will be monitored once quarterly for any quarterly period that fluid is injected. These parameters shall include:

- pH
- total dissolved solids
- total suspended solids
- specific gravity
- arsenic
- barium
- bicarbonate alkalinity
- calcium
- chloride
- iron
- lead
- mercury
- radium-226
- selenium
- sodium
- sulfate
- thorium-230
- uranium
- vanadium

For the purpose of this Waste Analysis Plan, the first quarter shall be considered the first three calendar months of the year, and the remaining quarters shall be considered subsequent divisions of the year into three-month segments. If fluids are not injected into the Dewey-Burdock Disposal Wells during a calendar year, sample or analyses will be required.

## **2.C. Sampling and Analysis**

Powertech, or contracted personnel will collect necessary waste stream samples. All sampling procedures will be conducted at the direction of the selected, certified analytical laboratory and in accordance with acceptable US EPA procedures. The sampler's name, sampling point, and date sampled will be documented in chain-of-custody paperwork. Samples will be collected with the grab method.

The table included below summarizes the analytical method and sampling frequency for typical parameters that may be included in the waste sampling for a particular waste source.

## WASTE SAMPLING METHODS

Test Parameter	Test Method	Units
Total Dissolved Solids, TDS	EPA 160.1	mg/L
Total Suspended Solids, TSS	EPA 160.2	mg/L
Specific Gravity	ASTM2710F	-
Sodium	EPA 6010 B	mg/L
Calcium	EPA 6010 B	mg/L
Bicarbonate	EPA 310.1	mg/L
Sulfate	EPA 300.0	mg/L
Chloride	EPA 325.3	mg/L
Iron (Fe)	EPA 200.7	mg/L
Mercury (Hg)	EPA 7470	mg/L
Arsenic (As)	EPA 6010 B	mg/L
Corrosivity (D002)	SW-846 1110,9045	pH units
pH	EPA 150.1	pH units
Barium	EPA 6010 B	mg/L
Lead	EPA 239.2	mg/L
Radium	EPA 903.0	pCi/L
Selenium	EPA 270.2	mg/L
Thorium	ATSM D3972-90M	mg/L
Uranium	ATSM D3972-90M	µg/L
Vanadium	EPA 6010 B	mg/L

Note: Powertech reserves the right to select use of the cited method or method with equal or greater detection limit

Samples will be collected from a sample tap in the flowline downstream of final filtration or from a sample tap at the wellheads.

### **3.0 QUALITY ASSURANCE/QUALITY CONTROL**

#### **3.A. General Sampling and Analytical Information**

The sampling protocol will be followed by properly trained personnel conducting the sample collection and analysis. Powertech will adhere to guidelines set forth in "Test Methods for Evaluating Solid Waste", SW-846 and "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79/020 as appropriate. Approved sample preservation techniques from 40 CFR 136.3 will be followed as appropriate. These will include preservation in plastic or glass sample containers provided by the laboratory and storage in a sample refrigerator or cooler for shipment to the laboratory. Powertech reserves the option to choose suitable laboratories for testing provided equivalent quality assurance/quality control (QA/QC) standards are met.

Standard chain of custody protocols will be followed for waste collection, transport and analysis. Below are summaries of the minimum sampling and analysis protocols which will be followed for each characterization parameter:

##### **Labeling**

1. Sample name, date and time
2. Name of sample collector; (include sampling company name if not Powertech);
3. Sample collection method;
4. Sample collection point;

##### **Reporting**

1. Sample preservation technique, as appropriate;
2. Analytical method for parameter detection/quantification;
3. Analytical method accuracy and quantification limits; and
4. Field documentation of sampling.

The following are QA/QC parameters which will be followed to ensure the adequacy of the sampling and analytical techniques for wellhead sampling and analysis described in this plan.

#### **3.B. Sampling Controls**

1. Equipment Blanks

If possible, quarterly grab samples will be obtained directly from the sample tap or valve being used to access the tank or containment vessel and not be transferred to any secondary container or device before being stored in the sample container to be shipped to the laboratory. In this case, no equipment blanks will be required. If not, equipment blanks will be taken as deemed appropriate by Powertech for the purpose of detecting potential cross contamination due to improper decontamination of

sampling equipment. After sampling, any secondary container or sampling device used will be decontaminated according to the sampling plan protocol. The sampling device will then be rinsed with deionized water and the rinsate collected in a sample container for transport to the laboratory for analysis of, at a minimum, the same parameters chosen in the sampling plan above.

## 2. Trip Blanks

In the case of suspect analysis from any laboratory, trip blanks will be used and will be sample containers filled with Type II reagent grade water at the laboratory, sealed at the laboratory, which accompany the sample containers used throughout the sampling event. The sample containers shall be handled in the same manner as the samples. Trip blank(s) will be sent to the laboratory for analysis of, at a minimum, the same parameters chosen in the sampling plan above. A minimum of one (1) trip blank per sampling event will be utilized, if necessary.

## 3. Sample Duplicates

On advance written demand of EPA, duplicate samples will be taken to assess the QA/QC of the laboratory conducting the analysis. Such samples will be drawn from the same site from which primary samples are taken. Duplicate samples, if taken, will be split from the original sample in a manner to emphasize sample representativeness. The duplicate will be labeled with a sample number that will not conflict with the other samples, but will not be discernable to the laboratory as a duplicate sample. If requested by EPA, one duplicate sample per sampling event will be taken and analyzed for the same parameters listed in the sampling plan.

## 4. Sample Chain-of-Custody Protocol

Sample chain-of-custody will be followed at all times during the sampling and subsequent analysis. Chain-of-custody will be used to document the handling and control necessary to identify and trace a sample from collection to final analytical results.

### **3.C. Analytical Controls**

#### 1. Equipment Calibration

Selected laboratories will maintain QA/QC data in accordance with that laboratory's Q/A plan regarding the frequency and type of instrument calibration performed at the laboratory and in the field. Any calibration of thermometers, gauges, chromatographs, spectrometers and other meters will be conducted according to appropriate instrument manufacturer specifications and manufacturer recommended frequencies or as dictated by applicable laboratory Q/A plans.

## 2. Data Reduction

The process of transcription of the raw data into the reportable units will be conducted by the laboratory in accordance with that laboratory's Q/A plan. Data reduction utilized in the analysis and reporting process will be presented in the reports to the US EPA for each sampling event and parameter tested by the specific laboratory used at the time.

## 3. Data Verification

Data verification will be conducted in accordance with the selected laboratory's Q/A plan after each sampling event by assigned laboratory personnel. Typical procedures will include review of chain-of-custody forms, equipment calibration records and data completeness. Spot checks of raw data versus reported data may be performed to review math accuracy, significant numbers and reporting units. In addition, certified laboratory standard quality assurance/quality control checklists will be utilized per the selected laboratory's Q/A plan for individual test methods such as blanks, standards, and comparisons of internal lab test duplicate results. Problems with any of these items will be indicated in the report to the agency.

## 4. Internal Quality Control

Certified quality control samples may be run periodically in accordance with the selected laboratory's Q/A plan with sample batches obtained from appropriate commercial sources, or appropriate regulatory entities. Internal quality control will be addressed as required by the selected laboratory's Q/A plan and will typically include disclosure of the laboratory's use of blanks, blind standards, matrix spikes and matrix spike duplicates, preparation of reagents, and laboratory duplicate or replicate analyses.

### **3.D. Actions**

#### 1. Corrective Actions

Corrective actions will be implemented by laboratories if the analytical or sampling method does not achieve laboratory standards or Powertech objectives. Actions may entail re-sampling the waste stream and/or re-analyzing the fluid for a particular parameter, re-calibrating an analytical device, or other appropriate actions. Action levels will be taken in accordance with SW 846 or other approved EPA methods.

#### 2. Reports to US EPA, Region 8 and DENR

Reports to US EPA will contain results, data and sampling descriptions regarding the accuracy, completeness and repeatability of the reported analytical results. The report will contain a table that specifies the type of sample (blank, waste, etc.), sampling date, sampling location, analytical method, method detection limit and analytical result. The results of analyses and all accompanying data, including chain-of-custody forms, will be reported to US EPA with the next monthly operating report submitted to the agency after the receipt of the final sample analysis report from the

laboratory. This submittal to the agency will typically be within sixty (60) days of the sampling event, unless prior arrangements have been made with the agency due to conditions beyond the control of the operator that prohibit such reporting.