2.0 PLANS FOR WELL FAILURES

Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or well failures, so as to prevent migration of fluids into any USDW.

RESPONSE

The proposed Powertech Dewey–Burdock Disposal Wells will be operated from limited tank storage at common Class I well operating pressures. The following summarizes the plan to address failure of any well to protect the surface environment and prevent migration of injected fluids into any USDW:

Powertech (USA), Inc
Dewey-Burdock Project, South Dakota
Proposed Dewey-Burdock Disposal Wells Contingency Plan

1. Monitoring and periodic routine investigative procedures will be performed on the injection wells as required by applicable laws, permits and regulations. Pertinent data will be reviewed regularly by qualified operators and forwarded to the agencies as required. Monitoring and testing will be designed to assure well integrity and safe operation.

2. If a well fails required continuous monitoring or periodic testing standards, the well will be shut-in and the agency notified according to applicable regulations and permit conditions. After investigation into the cause for the failure, work plans will be prepared and reviewed with the regulators for repairing the problem.

3. If a workover is performed on a well, mechanical integrity testing will be conducted as required by applicable regulations before the well is returned to service. Copies of all work reports and logs will be forwarded to the regulatory agencies per applicable requirements.

4. During the period of time required for a well workover or for shut-ins due to MIT failure, the contingency plans of the facility will include the following:

    a. If shut-in period is sufficiently brief, the fluids accumulated during this period of time will be routed to another well or held in storage at the facility.

    b. If required due to length of shut-in and multiple well failures, mining operations will be altered to reduce wastewater disposal requirements and/or alternate offsite disposal will be arranged.

Should the mode of failure be beyond the limits of economic feasibility to repair, the guidelines for plugging and abandonment in Attachment Q will be followed.

2.P MONITORING PROGRAM

Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

RESPONSE

The monitoring program proposed for injection operations at this site focuses on the active injection wells themselves. No monitoring program specifically focused on the investigation of injectate containment via dedicated monitor wells is warranted, based on site-specific conditions nor is one proposed. A variety of data will be collected to monitor the injection well operations. This monitoring will take place through utilizing both periodic and continuous techniques.

Mechanical Integrity and Periodic Testing

Periodic monitoring is to be performed to conform to both Part I and Part II mechanical integrity requirements. Annual testing including reservoir monitoring and annulus pressure testing will be conducted once each calendar year in addition to Part II testing which will be performed once each fifth calendar year and will include one of the following logs (temperature, noise, RAT, or oxygen activation) per applicable non-hazardous well regulations. Casing inspection logs may be conducted to investigate corrosion if it is determined to be necessary due to operational or regulatory concerns when tubing is already removed from the borehole during a workover or stimulation.

Annual Part I mechanical integrity testing for the Dewey-Burdock wells will include reservoir monitoring as specified in 40 CFR 146.13 (d) in addition to static or dynamic annulus pressure testing. Although test procedures or methods may be changed based on request of the permittee and approval by Region 8 USEPA staff, the following procedure is expected to be typical for such monitoring. Powertech will provide the agency with a minimum of 30 days notice of annual testing (when practical) to allow the agency to witness testing. Such notice is to include proposed procedures for testing.

1. Conduct Well Site Safety Meeting

   A. Prior to commencement of field activities, conduct safety meeting with contractors and personnel to be involved with field services and MIT testing. Ensure that all safety procedures are understood and review days work activities.

2. Conduct Reservoir (Fall-Off or Static) Pressure Test

   A. For fall-off, record data regarding test well injection at typical operating conditions (constant rate). Rate, temperature and fluid consistency will be recorded during the injection period. Cumulative volume injected should also be recorded. Continue injection for a minimum of approximately 2- 6 hours. Note that significant rate variations may yield poor quality data or require more complicated analysis techniques.

   B. Rig-up pressure gauge and run in well to a depth approved by USEPA consistent with historical measurements.

C. For pressure transient fall-off, obtain final stabilized injection pressure for a minimum of 1 hour. Ensure that the gauge temperature readings have also stabilized.

D. After gauge recordings are stable, cease injection and monitor pressure fall-off. Continue monitoring pressure for a minimum of 6 hours or until a valid observation of fall-off curve is observed. For static survey, the well will be shut-in for a minimum of 24 hours before testing. Static data will be collected by using downhole gauges at an approved depth consistent with past measurements as approved by USEPA.

E. Stop test data acquisition, rig-down and release equipment.

3. Annulus Pressure Test

A. Stabilize well pressure and temperature.

B. As practical, arrangements will be made for a representative from the USEPA to be present to witness this testing.

C. Pressurize annulus to a minimum 100 psi with liquid and shut-in valve. Install certified gauge on "bleed" type valve. The annulus may need to be pressurized and bled off several times to ensure an absence of air. Monitor and record pressure for one hour. Pressure may not fluctuate more than 10 percent during the one-hour test. At the conclusion of the test, lower the annulus pressure to normal operating pressure.

Part II (5 year) mechanical integrity demonstration for the well will be accomplished via an approved test method(s) such as temperature log, or noise log, or oxygen activation log. Powertech (USA), Inc. will provide the agency with a notice of Part II testing to allow the agency to witness data collection activities. Although Powertech may utilize any acceptable method per USEPA Region 8 procedure approval, at this time it is proposed that temperature logging be utilized for future Part II mechanical integrity testing. Differential temperature logging to be conducted as follows:

1. Conduct Differential Temperature Log.

A. Shut-in well for stabilization (minimum of 24 hours) prior to running base temperature log.

B. Rig-up temperature log and run base log from approximately 500' above the injection zone to total depth. Pull tool to surface and shut-in master valve.

C. Rig down equipment and return the well to normal operations.

Continuous and Operational Monitoring

The proposed wells will have one long string protective casing extending into the injection interval with cement isolating all permeable intervals. As previously noted in this document, the annulus area between the protective casings and injection tubing string is to be filled with treated fresh water. The annulus pressure is to be continually monitored to detect any leaks in the tubing or casing. If leaks develop during injection, pressurized annulus fluid would be injected into the permitted injection interval, and injected fluids would not be able to contact the production string

casing above the permitted injection zone. Injectate should therefore have no potential for leakage into un-permitted formations. Details regarding the proposed system components are provided in Attachments L and M of this document.

Monitoring of physical parameters associated with injection operations will be conducted pursuant to 40.CFR.146 regulations. At a minimum the monitoring will include, injection pressure, annulus pressure, injection rate, injection volume, annulus level, and injectate characteristics. Details regarding this monitoring follow. Automatic shutdown capability as specified in Attachment K of this document will be operated to ensure that maximum pressure or minimum annulus differential requirements are not exceeded.

Annulus and Injection Pressure

Both the injection pressure and the annulus pressure are to be recorded continuously for each well. Electronic pressure transducers will be placed in pressure taps on the annulus system and injection flow lines. A signal will be sent from these transducers to a digital recorder and/or a chart recorder. The automated control system data will be visually inspected a minimum of once daily for anomalies when the well is operating. As part of the process and controls, the monitoring system will record maximum, minimum and average information. Differential pressures are to be obtained by comparison of simultaneous readings of the annulus and injection pressure transducer readings obtained for the wells.

Injection Rate and Volume

The flow rate to each well will be determined by a liquid flow meter designed for continuous monitoring. Flow rate is to be measured in the flow line to each well. The instrument will send signals to the process control system that calculates cumulative volume. Powertech reserves the right to substitute equivalent or superior equipment to fulfill these data measurement functions at any time.

Annulus Tank Levels

The annulus tank in each well system will have sufficient reservoir capacity to accommodate the anticipated volume fluctuations due to operating temperature and pressure limitations. The annulus tank is to be equipped with an armored reflex sight glass, pressure relief valve and independent liquid fill nozzle. If any annulus fluid is added, it will be recorded by the well operators on an operator log sheet. Annulus tank level is to be recorded a minimum of weekly when injection occurs.

Waste Characterization and Analysis

Injectate characteristics will be monitored by collecting samples per the approved waste analysis plan entered as part of the administrative record for this permit. The waste analysis to be conducted is intended to provide representative data regarding average injectate chemical constituents.