DeweyBurdPubEm Resource

From: Cohen, Stephen
Sent: Wednesday, September 08, 2010 7:23 AM
To: DeweyBurdHrgFile Resource
Attachments: SD DENR comments.pdf; Black Footed Ferret Recovery.pdf; BLM Oil and Gas map.pdf; Land_Application_Letter_(11-2-2009).pdf; Powertech_Class_III_UIC_Permit_Application_Comments.pdf

Stephen J. Cohen
Team Leader - New Facility Licensing
Office of Federal and State Materials
and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Mailstop T8F5
Washington, DC 20555
301-415-7182
410-206-8717 (cell)
stephen.cohen@nrc.gov

Hearing Identifier: Powertech_Uranium_Dewey_Burdock_LA_Public
Email Number: 141

Mail Envelope Properties (377CB97DD54F0F4FAAC7E9FD88BCA6D026005A4FD8)

Subject:
Sent Date: 9/8/2010 7:22:54 AM
Received Date: 9/8/2010 7:26:24 AM
From: Cohen, Stephen

Created By: Stephen.Cohen@nrc.gov

Recipients:
"DeweyBurdHrgFile Resource" <DeweyBurdHrgFile.Resource@nrc.gov>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	Size	Date & Time
MESSAGE	302	9/8/2010 7:26:24 AM
SD DENR comments.pdf	106845	
Black Footed Ferret Recovery.pdf	277863	
BLM Oil and Gas map.pdf	148676	
Land_Application_Letter_(11-2-2009).pdf	96551	
Powertech_Class_III_UIC_Permit_Application_Comments.pdf	2798632	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

DENR Comments

Other Potential Items:

-Derric's Cursory Review of Plates from NRC Supplemental Info Packet
-Communicate why we want more detailed geologic and hydrogeologic information:
1) RE: "Entire Vertical Section of the Inyan Kara Group vs. individual stratigraphic ore horizon" dilemma--we need more aquifer characterization to determine what Inyan Kara strata can or can not be isolated from target ore horizons--if underlying and/or overlying strata can be isolated from ISL ore horizons, then those strata should not be included within aquifer exemption.
2) We need more geologic, hydrogeologic, and geochemical detail to determine how the complex ISR environment will impact monitoring and restoration.
3) How will geochemistry affect ISR operations and restoration?
4) [Add your favorite reason to the list...]
5)?
-Discussion of the dreaded breccia pipes, tritium concentrations as related to ground water flow velocity, and other pertinent issues raised in the 1974 Gott report.
-Discussion of proposed Burdock mine units along eastern fringe of project area (i.e., areas where Skull Creek is absent)

Mark:

Mike Cepak asked me to respond to your September 17, 2009 phone call to him regarding discussion topics for the 9-30-09 hydrology meeting.

Gary Haag's comment letter (8-6-09) outlined a large number of specific information items the department needs in order to consider Powertech's UIC application complete. Our expectation for the upcoming (9-30-09) meeting is to provide you and your consultants the opportunity to ask questions regarding the 40 or so pages of specific "completeness issues" identified by Ground Water Quality, Minerals and Mining, and Geological Survey reviewers. Our intent for this "technical meeting" is to work through Gary Haag's completeness review letter, providing clarification on specific technical issues as needed. Having said all that, our "big questions" are summarized in the three main points listed within the cover letter Gary sent (8-6-09). In addition to these three main issues, here's a list of some specific requests or questions we plan to bring up at the meeting:

1. Please provide a map delineating the regional oxidation-reduction fronts for ore-bearing strata within the Inyan Kara.

2. Please provide cross sections or well logs depicting the screened interval of each monitoring well used to procure the baseline water quality information outlined in the permit application. Please include the detailed stratigraphic context of each well.

3. Please provide water quality data for all non ore-bearing sand units within the Inyan Kara (i.e., in addition to the water quality data you've provided from wells screened within ore bearing units, we need information from overlying and underlying sand units that may or may not be in communication with ore bearing units.) Please provide water quality data for each mapable sand unit within the Inyan Kara's stratigraphic column. Please gather two sets of such data--one from within each of the initial well field areas (Dewey and Burdock.) Please analyze the same suite of constituents as analyzed for other baseline samples. At this time we anticipate requiring only one sample set from each sand unit (i.e., you should be able to sample just once as opposed to quarterly or periodic sampling.) Please see #2 above--we need the same information for the wells used to take these non ore-unit water quality samples.

4. Throughout the 8-6-09 comment letter, we requested more detailed information regarding the geology and hydrogeology of the Dewey and Burdock project areas. Many of these requests would be best addressed by providing the department a copy of the MVS model developed by RESPEC.

5. Discussion Item: Establishing aquifer exemption boundaries (vertically and laterally) that would exclude water resources that should not be affected by the mining operation.

6. Discussion Item: Control and monitoring of solutions in a complex formation of discontinuous beds of sandstones and shales. Locating and screening of monitor wells in a such a complex system.

MEETING DATE: Mike also mentioned that the September 30th meeting may be postponed until sometime in October. Please let us know as soon as possible if the meeting will be postponed. We have a few staff members that are making travel arrangements.

Thanks.

Mike Lees
Hydrologist
Minerals and Mining Program

11/3/09 → Game & Fish meeting
Stan

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

RECEIVED
MAY 22 2003

IN REPLY REFER TO:
U.S. FISH & WILDLIFE SERVICE

FWS/ES

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

MAY 16 2003

ROUTE _____ FILE _____
REPLY _____ THROW _____
DG _____ ccJG _____ WS _____
WM _____ JD _____ GJ _____
ccSL _____ SE _____ _____
NG _____ ccCB _____ JW _____

John L. Cooper, Secretary
South Dakota Department of
Game, Fish and Parks
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

Dear Mr. Cooper:

I am writing in response to your transmitted draft document, "An Evaluation of the Block Clearance Process in South Dakota" and associated request to effectively "block clear" the entire State of South Dakota to obviate the need for further Endangered Species Act, section 7 surveys for black-footed ferrets. The U.S. Fish and Wildlife Service's staff reviewed the subject collaborative evaluation between the Service's Pierre Field Office and the South Dakota Departments of Agriculture and Game, Fish and Parks. And, while we note that this document is still in draft form, we find that the conclusions presented are sound and that your request for statewide block clearance is both warranted and timely.

We agree with the conclusions presented that the best ferret habitats remaining in South Dakota were previously surveyed, either for development of nonessential, experimental population determinations (to support ferret reintroduction projects), or to clear areas for control (e.g., the Pine Ridge Reservation). We also find that information presented on the level of prairie dog control in the 1960s and 1970s, and the resultant decline and eventual disappearance of wild ferret observations, is compelling evidence of a statewide bottleneck in which remaining, fragmented populations of ferrets likely succumbed. Habitat conversion and the extensive poisoning campaigns of the last century almost certainly led to the effective demise of this species. Parallel habitat and population bottlenecks probably occurred in most Western States, particularly over the range of the black-tailed prairie dog where massive prairie dog poisoning occurred.

The Service is engaged in resolution of section 7 ferret consultation issues raised through the Western Association of Fish and Wildlife Agencies (Association) in 2000, as referenced in the subject analysis. We believe that the collaborative block-clearing process undertaken by the State of South Dakota and the Service is a good example of how issues regarding future consultation needs can be addressed on a State-by-State basis. The Service does not wish to impose unreasonable burdens on otherwise legitimate actions and agrees that the section 7 consultation process has not been consistently applied and is not an appropriate vehicle to promote prairie dog and ferret conservation/recovery activities. We must make an informed and reasonable determination on the likelihood of continued persistence of wild ferret populations within each State, and focus any further surveys for ferrets only on those areas with a reasonable possibility of continued occupancy. Such assessments should weigh available information on past poisoning history, presence of sylvatic plague, and other sustainable habitat attributes as was addressed in the South Dakota exercise. It has been over 20 years since the last wild population of ferrets was discovered in Wyoming; and, given the extent of habitat conversion, past prairie dog poisoning, and expanding effects of plague over much of the West, the chances of a small fragmented ferret population persisting appears very low indeed. It should be noted that no section 7 ferret survey has ever yielded definitive evidence of extant ferrets outside of reintroduction areas.

The Service also agrees that section 7 consultation requirements alone have not effectively promoted the conservation of prairie dog habitats in order to support further ferret recovery, and that the relaxation of section 7 consultation requirements will not diminish the responsibilities or efforts of Federal and State agencies, tribes, or other involved entities to address ongoing ferret recovery needs. In fact, we are hopeful that more attention may be focused on identification and management of suitable habitats to support long-range recovery goals instead of using limited resources to conduct questionable section 7 surveys. Continued development of prairie dog management plans by the States and tribes should promote greater conservation of prairie dog complexes, many of which we hope will support sustainable ferret populations in the future.

The Service is continuing to address the concerns raised by the Association and is working through the Black-footed Ferret Recovery Implementation Team to evaluate the need for section 7 ferret surveys in other Western States. As such, I would like to distribute your evaluation and this response to Service offices in Regions 2 and 6 and to the Black-footed Ferret Recovery Implementation Team membership. This information will be highly useful in similar evaluations in other States.

In conclusion, the Service supports a statewide block clearance finding on the basis of the evaluation prepared by the State of South Dakota and the Service's South Dakota Field Office.

We appreciate your efforts to complete this challenging task and for your interest in, and support of, ferret recovery activities in South Dakota. If you have any other questions or need additional assistance, please contact Mike Lockhart, Black-footed Ferret Recovery Coordinator, at 307-721-8805.

Sincerely,

Deputy Regional Director

Enclosure (Distribution List)

cc: Black-footed Ferret Recovery
Implementation Team
Executive Committee and
Conservation Subcommittee
FWS/ES Region 2
FWS/ES Region 6

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

GREAT FACES. GREAT PLACES.

RECEIVED
APR 17 2003
U.S. FISH & WILDLIFE SERVICE

April 15, 2003

ROUTE _____ FILE _____
REPLY _____ THROW _____
DG 4-17 JG _____ WS _____
WM _____ JD _____ GJ _____
SD _____ SE _____ _____
NG _____ PB _____ JW _____

Ralph Morgenweck
US Fish and Wildlife Service
PO Box 25486
Denver, CO 80225-0286

Dear Ralph:

I am writing to you about a draft document titled "An evaluation of the block clearance process in South Dakota," a cooperative effort between our agency, the South Dakota Department of Agriculture, and the U.S. Fish and Wildlife Service (enclosed). The document summarizes our past experience with the block clearance process, which dates to 1991. Using an agreed-upon procedure, we were able to block clear a number of South Dakota counties that either had much reduced prairie dog acreage or that did not contain black-footed ferret recovery potential. This action relieved landowners, tribes, and other land management agencies of the need to conduct repeated, unnecessary black-footed ferret surveys. In the process, we were also able to demonstrate management flexibility associated with an endangered species to our important cooperators, the private landowners.

In the draft document, the cooperating agencies have made a joint request that the Service formally relieve South Dakota of additional black-footed ferret surveys. The draft document describes the justification for this proposed action, including the fact that, even with an assertive block clearance program, the State of South Dakota hosts the two most successful black-footed ferret reintroduction/recovery sites to date. The Conata Basin/Badlands site no longer requires reintroduced ferrets and, in fact, this site has been supplying ferrets for other sites. The reintroduction site on Cheyenne River Sioux Reservation appears to have the same potential for reaching a self-sustaining black-footed ferret population.

We recommend that the Service implement the recommendation of our three cooperating agencies and remove the unnecessary and expensive requirement for repeated black-footed ferret surveys.

I would be happy to visit with you or your staff on this issue. Thank you for your consideration of our request.

Sincerely,

John L. Cooper
Department Secretary

Enclosure

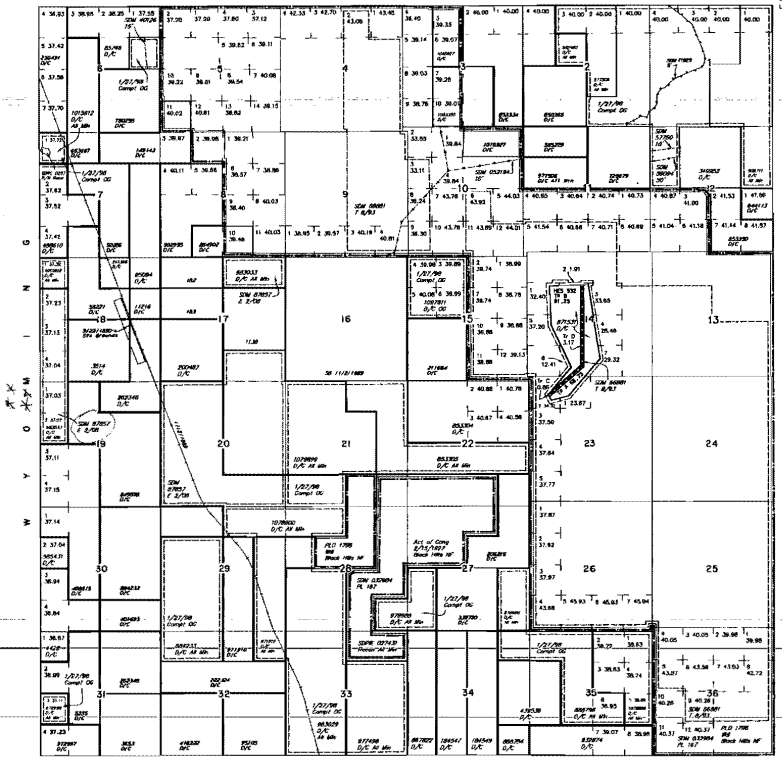
cc: Pete Gober
SD Dept. of Agriculture

12/1/09
BLM info
Oil & Gas lease area
(dotted line)

TOWNSHIP 6 SOUTH RANGE 1 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA

CUSTER COUNTY 033

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES



OG PLAT

FOR ORDERS AFFECTING DISPOSAL OR USE OF UNIDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES, REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

R/W 1/12/1889, 9/22/1890, subject to all prior existing rights or claims

SDM 032984 Del PL 167 complete 5/16/1961
All NF surface management by USFS

SDM 29275 (99.0) Acreage Info
Secs 7, 20, 29, 32, 33

CURRENT TO	BHM	
8-4-2009	PV	JB

T 6 S
R 1 E

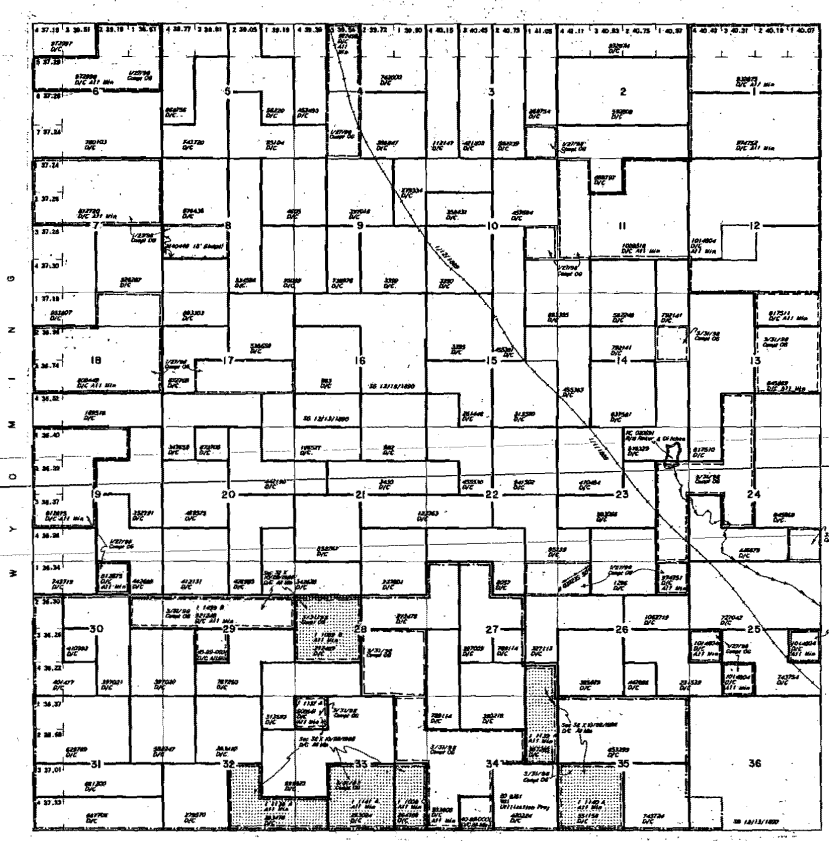
12/1/09
BLM
Info
Oil & Gas [illegible]
(Used [illegible])

TOWNSHIP 7 SOUTH RANGE 1 EAST OF THE BLACK HILLS MERIDIAN, SOUTH DAKOTA

FALL RIVER COUNTY 047

STATUS OF PUBLIC DOMAIN LAND AND MINERAL TITLES AND ACQUIRED LANDS

OG PLAT



INDEX TO SEGREGATED TRACTS				
RESURVEY	ORIGINAL SURVEY			
TRACT NO	T	R	SEC	SUBDIVISION

FOR ORDERS EFFECTING DISPOSAL OR USE OF UNIDENTIFIED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

R/W RR 1/1/1889, 1/12/1889 subject to all prior existing rights or claims

All Bankhead Jones Acq surface in Ip under Adm Juris of Dept of Agri, USFS

AC 020691 Serial page noted

SDM 29275 (99 G) Acreage info
Sec 4, 23

CURRENT TO	BY
S.X	

BH Mer
T. 7 S
R. 1 E

File Copy

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

November 2, 2009

Mr. Mark Hollenbeck, Project Manager
Powertech (USA), Inc.
P.O. Box 812
Edgemont, SD 57735

Re: Powertech Dewey-Burdock Project, Land Application of Wastewater,
Custer & Fall River Counties, South Dakota

Dear Mr. Hollenbeck:

In follow-up to our conference call of September 24, 2009, concerning land application of wastewater, the South Dakota Department of Environment and Natural Resources (Department) has the following comments:

1. If Powertech decides to dispose of its wastewater via land application a ground water discharge permit will be required. ARSD 74:54:02:06 (see enclosure) outlines the information required for a complete ground water discharge permit application. In addition, the requirements in the Mined Land Reclamation Rules, ARSD 74:29:05:14 through 74:29:05:20 (see enclosure), must be addressed in the state mine permit application and also be submitted as part of the ground water discharge permit application. The application form for a ground water discharge permit can be found on the Department's website at the following location:

   http://denr.sd.gov/des/gw/GWDischarge/GW_Discharge_Permit.aspx

2. In accordance with 74:29:05:14(4) land application areas are prohibited from discharging into water of the state.

3. As discussed during the conference call, there will be a series of ponds where wastewater will be stored prior to land application. The Department does not require a surface water permit for these types of ponds if there will not be a discharge from these ponds. However, the Department does recommend that Powertech apply for a "No Discharge" permit. A no discharge permit does not allow routine surface water discharges, however it does include provisions for an emergency discharge. This ensures Powertech would have a mechanism for discharging in case of flooding or dike failure. For further information concerning a surface water permit, please contact Kelli Buscher of the Surface Water Quality Program at 605-773-3351.

If you have any additional questions concerning this letter, please contact Gary Haag of my staff at 605-773-3296.

Sincerely,

Bill Markley

Bill Markley, Administrator
Ground Water Quality Program

Enclosures

c: (w/o enclosures)
Kelli Buscher, DENR, Surface Water Quality Program, Pierre, SD
Jim Wendte, DENR, Waste Management Program, Pierre, SD
Mike Cepak, DENR, Minerals and Mining Program, Pierre, SD

DEPARTMENT of ENVIRONMENT and NATURAL RESOURCES

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

August 6, 2009

Mr. Richard E. Blubaugh, Vice President
Environmental, Health & Safety
Powertech (USA), Inc.
5575 DTC Parkway, Suite 140
Greenwood Village, CO 80111

Re: Underground Injection Control Permit Application, Dewey-Burdock Project, Fall River and Custer Counties, South Dakota

Dear Mr. Blubaugh:

This letter is in response to Powertech (USA), Inc.'s application for a South Dakota Class III Underground Injection Control Permit (UIC), submitted on April 22, 2009. The Department of Environment and Natural Resources (Department) has reviewed the application for completeness, according to ARSD 74:55:01:03 and determined the application is incomplete. In general terms, the application lacks sufficient detail to address fundamental questions related to whether the project can be conducted in a controlled manner to protect ground water resources. Three primary issues of concern are discussed below with additional completeness issues discussed in the enclosure.

1. Powertech is requesting an aquifer exemption for the entire vertical section of the Inyan Kara Aquifer (Group) within the proposed permit boundary. Based on the information contained in the application, it is unclear whether it is appropriate to exempt the entire aquifer or only a portion of the aquifer. There are portions of the Inyan Kara that will not be mined and may be suitable as sources of drinking water. Additional information concerning the suitability of the water in the non-mined areas for use as drinking water is required before the Department can make a determination about the extent of the aquifer exemption.

2. The aquifer characteristics of the Lakota Formation and Fall River Sandstone are only generally described in the application. However, the ore bodies occur in specific sandstone units within the Lakota Formation and Fall River Sandstone. As these units will be mined individually, the aquifer characteristics (based on pump tests) for each receiving unit and the other sandstone units that may be affected by the mining process must be described in detail (thickness, ground water movement, transmissivity or hydraulic conductivity, etc.). This information must be submitted for at least the first two mining units before the application is considered complete.

3. The proposed method(s) for restoration of ground water was not specifically addressed in the UIC application. Although the application briefly mentions that a ground water sweep is a commonly used method of restoration; it does not say this will be the method used at Dewey-Burdock. The Department requires a detailed description of the restoration method(s) that

will be used at Dewey-Burdock and the technical basis for the methods proposed including unit specific geochemical information demonstrating the method(s) will achieve restoration requirements.

The technical comments (see enclosure) included in this letter are preliminary and are based on issues noted during the completeness review. They do not represent a completed technical review. The Department has included these comments to give Powertech the opportunity to address these issues prior to the Department completing the technical review. A detailed technical review cannot be completed until after the noted completeness deficiencies have been adequately addressed and corrected. In addition, the Department has also reviewed the application for typographical errors (see enclosure).

A theme throughout the entire application is the frequent use of the word "probably". Powertech must make use of definite statements such as, "We propose this specific action", as opposed to statements such as, "We will *probably* do this or that …".

In order to expedite the Department's continued review of the application, it would be helpful if the specific statute or rule being addressed in each section of the application is listed. It would also be helpful if the application could be organized in the same order as is listed in the application form.

The submission of the additionally requested information does not automatically constitute that the application will be deemed complete. Further review of the additionally submitted information will determine completeness of the application. As our technical review continues additional comments may be forthcoming. If you have any further questions concerning this letter, please contact me at 605-773-5855.

Sincerely,

Bill Mawby
Administrator

for

Gary H. Haag, Hydrologist
Ground Water Quality Program

Enclosures (completeness issues, technical and other issues, typographical errors, application form, certification of applicant form, and consent to inspect form)

cc: (w/enclosures; completeness issues, technical and other issues, typographical errors)
Valois Shea, USEPA Region VIII, Denver, CO
Ronald Burrows, NRC, Washington, D.C.
Mike Cepak, SD DENR, Minerals and Mining Program, Pierre, SD

Completeness Issues - Powertech Class III UIC Permit Application by SD DENR (8-4-09)

1. **74:55:01:03. Permit required for well injection-Plans and specifications required. Application for a permit shall be submitted on forms provided by the secretary.**

   The application was not submitted on the required form. The Department's form (see enclosed) must be included as part of your submittal. A link to the form can be found at the following website: http://denr.sd.gov/des/gw/UIC/UICClassIII.aspx. Those items that can not be directly completed on the form must be referenced on the form as to where they can be found in the body of the document. In addition, the application form has the requirement that the authorized representative's signature be notarized. The signature page included with the April 2009 application was not notarized.

2. **74:55:01:24. Designation of exempted aquifers. The board may exempt an aquifer or a portion of an aquifer and designate it as an exempted aquifer if it meets the following criteria:**

   (1) It does not currently serve as a source of drinking water; and

   (2) It cannot now and will not in the future serve as an underground source of drinking water ...

   Referring to Section 17.2 Aquifer Exemption Basis, and Figure 17.1, Aquifer Exemption Boundary, there are portions of the Inyan Kara Group that will not be mined and may be suitable as sources of drinking water. The portions of the Inyan Kara Group that are separated hydraulically from the mining zones must not be included within the aquifer exemption. The aquifer exemption must only cover sandstone units that could be potentially mined in the Lakota Formation and Fall River Sandstone and the units that are hydraulically connected to these mining zones.

3. **74:55:01:25 Information considered for permit issuance. Prior to issuance of a permit for the construction of a new well the secretary shall require the following:**

   (6) Certification of applicant form.

   The applicant must submit a certification of applicant form (see enclosed). In addition, while not specifically mentioned in the regulations, the Department also requires the applicant to submit a consent to inspect form (see enclosed).

4. **74:55:01:26 Information required in permit application. The permit application shall include, but not be limited to, a technical report which includes the following:**

   (1) A physical description and analysis of the region and site, contour (topographic) maps that accurately locate and identify the permit area and show the location of any public highways, tribal reservation boundaries, dwellings, utilities, and easements within the permit area and adjacent lands in relation to all proposed affected lands and proposed activities associated with the in situ leach operation, including all processing facilities, chemical storage areas, production areas, and

roads. The map shall also clearly illustrate the location of monitoring wells.

Plate 3.1 and Figure 3.1 cover most of the requirements of this rule. However, the maps did not show easements within the permit area and adjacent lands in relation to all proposed affected lands. Also the maps did not show proposed activities associated with the in situ leach mine, including **all** processing facilities, chemical storage areas, production areas, and roads.

(7) A list and map of all known existing water wells, producing wells, injection wells, abandoned wells, and exploration holes, giving location, depth, producing intervals, type of use, condition of casing, plugging procedures and date of completion for each well or drill hole within the permit area and on adjacent lands to the extent such information is available in public records and from a reasonable inspection of the property.

Plugging procedures and dates of completion were not listed or addressed for these wells or holes. In many cases, the depths of holes or condition of casing were not listed or addressed for these wells or holes.

(8) Current land use and zoning within a one-mile radius of the mine permit boundary.

The current land use was given for an area measured from the center of the Proposed Action Area (PAA). The current land use must be given for all land within one mile of the proposed mine boundary. The land uses must be shown on a map and must be listed section by section.

(9) A list of occupied dwellings within a one-mile radius of the mine permit boundary.

The list of occupied dwellings is given for a 10 kilometer radius measured from the approximate center of the Proposed Action Area (PAA) and located by a compass direction. The occupied dwellings must be given for all land within one mile of the proposed mine boundary, not the center of the PAA. The location of the occupied dwellings for this area must be shown on a map and must be listed section by section.

(10) A site monitoring plan to include:
(a) Ground water quality for both production zones and nonproduction zones.

With the expansion of the proposed mine area in September 2008, two additional, upgradient baseline wells were required for the Dewey area (Township 6, Range 1, Section 17 or 18). These wells have not been drilled, but they must be included in the state required ground water baseline plan.

(11) A description of the proposed method of operation, including;
(b) A description of the proposed mining solution and the chemical reactions that may occur during in situ leach mining operations as a result of injection of the mining solution.

The results of leaching tests done on representative samples of the ore body must be submitted. The results must include water quality analyses to check what parameters are liberated by chemical reactions.

(12) Discussion and illustration of the estimated injection schedule, including:

(a) A map showing the wellfields and proposed sequence for injection into the wellfields.

Only two wellfields are depicted, the application needs to show all the other proposed wellfields. Note: ore bodies in separate sandstone units that overlie or underlie each other may need to be shown as separate wellfields.

No sequence for mining wellfields was included (Section 17.3 Project Schedule and Figure 17.6 were not detailed enough). Note: ore bodies in separate sandstone units that overlie or underlie each other will need to be added to the mining sequence separately. Also note: the department understands that the plans for wellfields and the sequence of mining would be conceptual and subject to change based new drilling information and on real world mining and ground water restoration experience.

(b) An estimated time schedule for injection into each wellfield.

No time schedule for mining each wellfield was included (Section 17.3 Project Schedule and Figure 17.6 were not detailed enough). Note: the department understands that the schedule for mining each wellfield would be conceptual and subject to change based on real world mining and ground water restoration experience.

(c) Expected changes in pressure, native ground water displacement, and direction of movement of mining solution.

These items are not specifically addressed in the UIC application; please address the requirements in this section.

(d) The procedures to ensure that the installation of recovery, injection, and monitor wells will not result in hydraulic communication between the production zone and overlying or underlying stratigraphic horizons.

The procedures to ensure installation of wells will not result in hydraulic communication between stratigraphic horizons were not specifically addressed in the UIC application; please address the requirements in this section.

(e) The procedures used to verify that the injection and production wells are in communication with monitor wells completed in the receiving strata and employed for the purpose of detecting excursions.

The procedures to verify that the injection and production wells are in communication with monitor wells were not specifically addressed in the UIC application; please address the requirements in this section.

(f) A subsidence analysis, using established geotechnical principles, that estimates, based upon the proposed in situ leach operation, the effect of subsidence upon overlying aquifers.

A subsidence analysis was not addressed in the UIC application; please address the requirements in this section.

(g) A spill contingency plan to include reporting, response, assessment, and remedial actions. (Reference 74:55:01:26(12)(g)).

A spill contingency plan was not included in the UIC application; please address the requirements in this section.

(13) For uranium in situ leach mines, site-specific background radiological data including the results of measurements of radioactive materials occurring in important species, soil, air, and in surface and ground waters that could be affected by the proposed operations.

The preoperational radiological monitoring plan was not approved by the department. (Also, reference the department's February 11, 2008 comment letter to Dan Hoyer, RESPEC, regarding the Baseline Sampling Plan for Dewey-Burdock In Situ Uranium Project (January 28, 2008). The issue of the department approving the preoperational radiological monitoring plan was discussed in item no. 1 under 4.0 Radiological Sampling Plan in the letter.) Did the NRC approve of the preoperational radiological monitoring plan, or comment on the data submitted to it?

(15) An assessment of impacts that may reasonably be expected as a result of the mining operation to water resources and water rights inside the permit area and on adjacent lands, and the steps that will be taken to mitigate these impacts.

An assessment of impacts to water resources and water rights was not included in the UIC application; please address the requirements in this section.

(16) A well maintenance plan to ensure:

(a) Wells are sufficiently covered to protect against entrance of undesirable material into the well.

Referring to Section 11.2, Well Completion, well covers were not specifically addressed in the UIC application; please address the requirements in this section.

(b) The wells are marked and can be clearly seen.

Referring to Section 11.2, Well Completion, well marking was not specifically addressed in the UIC application; please address the requirements in this section.

(17) To the extent that existing information or data is available, a determination of whether existing water wells, former producing wells, former injection wells,

former monitor wells, abandoned wells, and exploration holes in the proposed production area have been appropriately plugged, and if not, a plan for re-plugging these wells.

Although corrective actions are discussed in Section 4.3, it is a requirement for the application that a determination whether existing and former wells have been properly plugged. The department realizes that a determination may not be possible for all holes until additional pump tests are done, however, based on field work to date, a determination of identified wells can be made as to whether they need replugging or not.

(18) The proposed methods to restore ground water quality, based on the geochemistry of the production zone and the chemistry of the injection solutions, to include:

(a) A proposed restoration table for all ground water quality restoration values.

A restoration table was not specifically addressed in the application. Table 17.2, Crow Butte Post Mining Water Quality Data Summary, was included as Powertech expects a similar baseline and post-production water quality results. Although the water quality may be similar between Crow Butte and Dewey – Burdock, the geologic formations are different. The restoration table must be based on Dewey – Burdock baseline ground water quality data for the Lakota Formation and Fall River Sandstone. Variations in local baseline water quality must be addressed on the restoration values table (i.e. differences in water quality between the Dewey and the Burdock areas, and differences between the Lakota Formation and Fall River Sandstone).

(b) An estimated time schedule for achieving ground water restoration, to be carried to completion within five years in accordance with applicable restoration tables.

The schedule presented in Figure 17.4, Proposed Groundwater Reclamation Schedule, is general in nature. An estimated time schedule for the restoration of each wellfield is required.

(19) A plan for the disposal of drill cuttings.

Referring to Section 11.1, Well Construction Materials, first paragraph, it states that drill cuttings will be returned to mud pits as TENORM (Technologically-Enhanced, Naturally-Occurring Radioactive Materials). A plan for disposal of drill cuttings must be submitted, and must include the appropriate TENORM guidelines.

(20) The estimated costs for:

(a) Ground water reclamation as computed in accordance with established engineering principles, including:

(i) Facilities, materials, and chemicals used for ground water restoration.

(ii) Ground water restoration in the production zone.

(iii) Water treatment.

(iv) Capping, plugging, and sealing of all wells.

(v) Personnel working on reclamation-related activities.

(vi) Collecting and analyzing samples from surface and ground water monitoring sites.

The cost estimated in Section 17.4, Financial Assurance, is general in nature. Detailed costs must be included. Note: there is a reference to detailed costs in Appendix I, however, no Appendix I was included with the application.

(21) Contingency plans to cope with all shut-ins or well failures so as to prevent the migration of mining solutions into underground sources of drinking water.

Contingency plans to cope with shut-ins or well failures were not specifically addressed in the UIC application; please address the requirements in this section.

5. **74:55:01:31. Well construction requirements. Injection and production wells shall be generally constructed as follows:**

(2) ... The casing shall be of sufficient strength and diameter to prevent casing collapse during installation, convey liquid at a specified injection/recovery rate and pressure, and allow for sampling. ...

No specifications on the PVC pipe are given.

6. **74:55:01:34 Determining information on the water-bearing injection zone. The following information concerning the production zone shall be determined:**

(1) Fluid pressure.

Fluid pressure of the receiving strata was not specifically addressed in the UIC application; please address the requirements in this section.

(4) Other physical and chemical characteristics of the injection zone rock and formation fluids including: geochemistry of the production zone and the aquifer up-gradient and down-gradient of the production zone, to include oxidation-reduction conditions and common ions, and the direction and velocity of ground water movement through the producing zone.

Physical characteristics of the receiving strata fluids were not specifically addressed in the UIC application; please address the requirements in this section.

(5) Compatibility of injected fluids with formation fluids.

Compatibility of injected fluids with formation fluids was not specifically addressed in the UIC application; please address the requirements in this section.

7. **74:55:01:35. Establishment of baseline water quality in new mining areas. Before mining a new area or section in a production zone, the operator shall submit a baseline ground water quality sampling plan to include an adequate number of wells and samples to characterize baseline water quality in production and nonproduction zones in and adjacent to the new mining area. The plan shall provide geochemical, lithologic, and mineralogical descriptions of the receiving strata and any aquifers that may be affected by the injection of mining solution.**

The mineralogical description in Section 17.2.3.2, Mineralogy of the Uranium Ore, includes only uranium minerals. The mineralogical description must, for the receiving strata, provide a list of the major minerals of the strata, the ore minerals, and notable minor minerals that may be affected by the leaching solution. As the ore bodies occur in different sandstone units within the Lakota Formation and Fall River Sandstone, and as these units will be mined individually, each receiving unit and the other sandstone units that may be affected by the mining process must have geochemical, lithological and mineralogical descriptions. This must be done for each mining unit.

Powertech also needs to provide more geochemical information, including the potential of acid rock drainage (ARD) during in situ leaching.

8. **74:55:01:35. Establishment of baseline water quality in new mining areas. The plan shall address aquifer characteristics for the water saturated portions of the receiving strata and aquifers that may be affected by the mining process. Characteristics may include aquifer thickness, velocity and direction of ground water movement, storage coefficients or specific yields, transmissivity or hydraulic conductivity, and the directions of preferred flow under hydraulic stress in saturated zones of the receiving strata. The plan shall include potentiometric maps of the ground water surface in the receiving strata and overlying and underlying aquifers. The extent of hydraulic connection between the receiving strata and overlying and underlying aquifers and the hydraulic characteristics of any influencing boundaries in or near the proposed production areas shall be determined and described.**

The general aquifer characteristics of the Lakota Formation and Fall River Sandstone are generally described in Section 8 (Attachment I). However, the ore bodies occur in different sandstone units within the Lakota Formation and Fall River Sandstone. As these units will be mined individually, the aquifer characteristics for each receiving unit and the other sandstone units that may be affected by the mining process must have aquifer characteristics described (thickness, ground water movement, transmissivity or hydraulic conductivity, etc. The hydraulic connection between these sandstone units must be determined and described.

9. **74:55:01:45.01. Ground water restoration table.**

Referring to Section 17.2.6, Groundwater Restoration Method, Powertech must develop a proposed restoration table based on Dewey – Burdock ground water baseline data. As the Dewey – Burdock area is quite large; Powertech must also develop different restoration tables for specific areas or aquifers (i.e., the Dewey area, Burdock area, Lakota Formation, Fall River Sandstone, etc.).

10. **74:55:01:46. Production area operational monitoring requirements. The monitoring plan included in the permit shall describe the procedures for operational monitoring of the quantity and quality of mining solution and ground water in the production area and shall, at a minimum, include provisions for:**

(2) Monitoring injection pressure and either flow rate or volume twice a month, or metering and recording daily injected and produced fluid volumes.

Section 14.5.2, Wellhead Pressure, does not list a monitoring frequency for flow or volume; please address the requirements in this section.

(3) Monitoring the fluid level in the injection zone twice a month.

Fluid level monitoring was not addressed in the application; please address the requirements in this section.

(6) A minimum of quarterly monitoring of Department specified wells within one-quarter mile of the production site to detect migration of recovery fluids from the production zone.

Quarterly monitoring of wells within one-quarter mile of the production site was not addressed in the application; please address the requirements in this section.

11. **74:55:01:59 Requirements for plugging wells, drill holes and the repair and conversion of wells. The requirements for plugging drill holes and repair, conversion, and plugging of wells are as follows:**

(1) A plan for drill hole plugging and well repair, plugging, and conversion shall be included in the permit application and constitutes a condition of the permit.

Referring to Section 11, Construction Details, well conversion was not specifically addressed in the application; please address the requirements in this section.

12. **74:55:01:59.03 Corrective actions for improperly sealed wells.**

The procedures to ensure installation of wells will not result in hydraulic communication between strata were not specifically addressed in the UIC application; please address the requirements in this section.

Technical & Other Issues - Powertech Class III UIC Permit Application by SD DENR (8-4-09)

General Comments: The technical comments included in this letter are preliminary and are based on issues noted during the completeness review. They do not represent a completed technical review. The Department has included these comments to give Powertech the opportunity to address these issues prior to the Department completing the technical review. A detailed technical review cannot be completed until after the noted completeness deficiencies have been addressed and corrected.

It appears there are missing attachments in the permit application. Attachments E, G, L, and T are missing; please clarify. The application and appendices need to utilize a common format with section, table and figure designations used only once. There are a number of instances where the same designation was used more than once.

List of Abbreviations and Acronyms:

- Need to include TENORM on list.

Glossary:

- Need to define "Flare"
- Need to define "Fuson Siltstone-Shale" to distinguish this Sub-Member from the entire Fuson Member of the Lakota Formation.
- Need to define "Mine unit"
- Need to define "Production zone"
- Need to define "TENORM"
- Need to define "Wellfield"

1.0 Introduction

1.1 Project Description:

The third paragraph (Pg 1-4) of this section describes the Fall River and Lakota as "Two groundwater aquifers separated by the Fuson Shale Aquitard." Elsewhere in the application, the Inyan Kara Group is described as one aquifer. Powertech needs to provide a consistent description of the complex hydrogeologic setting that takes into account factors such as; the 40' difference between the potentiometric surfaces of the Fall River and Lakota as measured in Dewey area versus the nearly identical potentiometric surfaces of the Fall River and Lakota in other project areas, and the varied effectiveness of the Fuson as a ground water flow barrier.

1.3 Health Safety, and Environmental Responsibilities

In this section (Pg. 1-8), Powertech needs to provide more detail on how it plans to implement its health and safety program. Also, Powertech must list its principles of Compliance, Prevention, Communication, and Continuous Improvement.

2.0 Attachment A - Area of Review Methods

This attachment must include a discussion of the zoning laws or zoning requirements in both Fall River and Custer counties.

2.2.1 Population and Land Use

The first paragraph (Pg. 2-2) in this section states that occupied dwellings within a 10-kilometer radius measured from the approximate center of the Proposed Action Area (PAA) were determined. The occupied dwellings must be given for all land within one mile of the proposed mine boundary, not the center of the PAA. This paragraph also states that three people reside within the area of review (AOR) on a permanent basis. However, according to Figure 3.1 there area actually three (3) fulltime and two (2) part time residences within the permit boundary; with eleven (11) residences total within the AOR. The figure that shows the locations of occupied dwellings (residences) needs to be referenced. It may be helpful to have a separate figure dedicated to depicting population, occupied dwellings and land use. In addition, the occupied dwellings within this area must be listed section by section.

The last paragraph (Pg. 2-4) mentions that the Burlington Northern Santa Fe is a major railroad that crosses the center of the permit area. What will be minimum distance from the well heads to the railroad? In addition, this paragraph states that Powertech is aware of the DM&E rail plans in the area. There must be more detail added concerning the plans; and the impact on Powertech's mining plans.

3.0 Attachment B - Maps of Area and Area of Review

3.1 Area of Review

The bullets at the beginning of this section (Pg. 3-1) list the items included on Plate 3.1. After a review of Plate 3.1 the following items appear to be missing:

- Project area (i.e., proposed wellfield locations)
- Proposed facilities
- All producing wells
- Residences (it does not appear that all residences (full or part time)) are shown on the plate
- Surface water bodies

The second paragraph (Pg. 3-1) in this section discusses the replacement of the Daniel's well. It states that the original Daniel's well was not plugged or abandoned as the owner may utilize this water for cattle. The Department has concerns about this well being used while actively mining in this area. Does Powertech have an agreement with the landowner concerning use of the well during active mining? Regarding the Daniel's replacement well into the Unkpapa, what is the production rate and what is water quality of this well?

The third paragraph (Pgs. 3-1 & 3-2) in this section references a map and table in Appendix B that lists adjudicated ground and surface water rights. A review of the map shows numerous water rights in Wyoming, however, the table does not identify which are located in Wyoming. Please modify the table so it identifies which rights are located in Wyoming and which are in South Dakota.

In the fourth paragraph of this section (Pg. 3-2), Powertech states since springs were not found during field investigations, it suggests that springs are no longer present. For the past several years, the area has been in a severe drought and the springs could have dried up because of the drought. During the recent wet conditions, these springs could reappear. The fact that the springs were not found does not mean the historic springs are not potential conduits from the Inyan Kara Group to overlying alluvial aquifers. If the locations of historic springs are within the area of review and they begin to flow, Powertech will need to sample each spring and determine the source of water to each spring. In addition, a map of these springs needs to be provided.

3.2 Abandoned Drill Holes

In the first paragraph of this section (Pg. 3-2); a reference must be made that historic drill hole data can be found in Appendix D.

4.0 Attachment C – Corrective Action Plan and Well Data

The first paragraph (Pg. 4-1) of this section states, "Powertech Class III wells that penetrate the injection zone within the proposed permit area and one – quarter mile outside the property boundary...", define property boundary. Is the property boundary the same as the permit boundary? If so, does Powertech plan to have Class III wells outside of the proposed permit boundary at some time in the future?

In this Section 4.0 (Pg. 4-1), Powertech needs to provide more detail on corrective actions instead of referring to 40 CFR Part 144.55. If this federal regulation is to be used in the corrective action plan, it must be included in the application. Since this a state application, Powertech must also make reference to any state laws or regulations that will need to be complied with in the corrective action plan.

4.1 Well Data

On Figure 4-1 (Pg. 4-2), wells 654 and 655 area labeled as Inyan Kara Group wells, however, the depth of these wells is unknown (according to Appendix C/Table A-2). In addition, there is no supporting documentation included in Table A-2 as to the aquifer these wells penetrate. Please supply the documentation that supports the aquifer information in Table A-2.

In comparing the list of items in this section (Pg. 4-1), with the well tables in Appendix C, the following deficiencies were noted:

a. No well ownership information could be found on the tables in Appendix C.

b. Location data in the tables in Appendix C was in northing/easting format instead of latitude/longitude format.
c. Condition of casing was listed in the tables in Appendix C, while the text in Section 4.1 listed condition of cementing; and
d. Did not see any additional comments other than the condition of the casing in the tables in Appendix C. In Section 4.1, the table was supposed to include information on tendencies or characteristics that may cause or prevent a breach in the confining unit.

The second paragraph (Pg. 4-3) in this section discusses the self sealing nature of abandoned test holes. Powertech must provide sufficiently detailed data to support this assertion.

4.2 Wells Requiring Corrective Action

This section (Pg. 4-6) discusses free-flowing wells and possible corrective action. Free flowing wells near (especially those immediately downgradient from) the leach zone could serve as conduits between the Inyan Kara Group and surface waters or shallow alluvial aquifers. Under what circumstances would Powertech decide corrective action is necessary? Would corrective action be triggered by determination of communication between an old well and the production zone, by an excursion, by the location of a wellfield, or by something else? Please provide more specific scenarios or information.

This section must also discuss other artesian features (i.e., springs or ponds) that may impact mining operations and indicate what protective measures will be taken. In addition, this section must also address corrective action for any improperly plugged exploration holes.

In reference to Figure 4.2 (Pg. 4-7), all artesian wells must be included in the figure. At least one flowing stock well immediately inside the entrance to the Burdock Area was missing from the figure.

4.3 Correction Action Plan

A plan must be included to shut off and plug, as necessary, flowing wells into the Lakota Formation and Fall River Sandstone.

4.4 Operational Pumping Tests

This section (Pg. 4-8) states, "Pumping tests will be conducted to demonstrate that communication between the production zone and the underlying and overlying aquifers is not taking place...In some cases there may not be an underlying aquifer as the Morrison Formation contains approximately one hundred feet of shale and therefore is a confining unit." Describe how operational pumping tests will help determine appropriate locations and screen depths for monitoring wells given the complex, heterogeneous (in some instances, intertongued) stratigraphic environment associated with each specific production zone.

5.0 Attachment D – Maps and Cross Section of USDWs

5.1.1.2 Deadwood Aquifer

This section (Pg. 5-3) states, "Regionally, 'the Precambrian rocks act as a lower confining unit to the Deadwood Aquifer,' although local connection can exist." Powertech must discuss the nature and extent of this local connection.

5.1.1.5 Inyan Kara Aquifer

In this section (Pg. 5-4) it says that the Inyan Kara Group is two separate aquifers, the Fall River and the Lakota. However, in previous statements Powertech has stated that based on pump test results, the Inyan Kara Group is a single aquifer (at least in this area); please clarify.

5.2 Site Hydrogeology

Powertech needs to add a sub-section that specifically defines "underlying and overlying aquifers" for each production zone. The terms "underlying aquifer" and "overlying aquifer" are mentioned throughout the Application—especially in UIC Application Sections 4, 7, 8, 13 and 14. Please describe the geology/hydrogeology of the Inyan Kara Group in detail sufficient to allow a clear understanding of the various aquifer and confining units above and below the proposed production zones as well as within the proposed production zones. The department expects that the explanation/subdivision of the aquifer units will likely be of greater detail than the explanation/subdivision presented by Gott. The proposed ISL project area consists of a complex hydrogeological environment—more specific detail is needed to provide an adequate understanding of how the Applicant will impact ground water resources and control/monitor ISL activities.

5.2.1.1 Spearfish Formation Confining Unit

This section (Pg. 5-6 and 5-7) states, "In general, the Spearfish Formation is characterized by a thick sequence (250 to 450 feet) of red shale and siltstone...this sequence of shale serves as a hydrologic barrier or confining unit preventing nearly all vertical flow between the Paleozoic aquifers and the Jurassic/Cretaceous aquifers". Are the gypsum beds absent within the Spearfish in the proposed mining area?

5.2.1.3 Morrison Formation

The term "permeability" which is used in this section (Pg. 5-7), and throughout the application document, should probably instead be "hydraulic conductivity." However, Powertech should examine each use of the word "permeability" to ensure that "hydraulic conductivity" is appropriate to use in its place and that whatever term is used is consistent with the units of measurement.

5.2.1.4 Inyan Kara Group

This section (Pgs. 5-7 and 5-8) discusses the geologic and hydrogeologic characteristics of the Inyan Kara Group. Additional information from Gott and Wolcott, in their U.S. Geological Survey Professional Paper 763 (p. 9), describe the two fluvial units of the Fuson Member (Unit 3 and Unit 4) as follows. "Fluvial unit 4, the youngest rock unit in the Fuson Member, was deposited in channels eroded by north-west flowing streams during partial dissection of the

underlying variegated mudstone. The streams in places incised as much as 150 feet below the surface and cut completely through the variegated mudstone and into units 2 and 1 of the Chilson Member." Powertech needs to address the possibility that, locally, the Fuson may consist of channelized sandstone in direct contact with underlying Chilson Member sandstones to include the lowest unit of the Lakota Formation. How could this affect overall ISL dynamics (mining and restoration)? How would this affect production, injection, and monitoring well placement?

6.0 Attachment F – Maps and Cross sections of Geologic Structure of Area

Continue discussion of geology to the Precambrian rather than stopping with the lower confining layer.

6.1.2 Regional Stratigraphy

This section (Pg. 6-3) must mention the Minnewaste Limestone Member of the Inyan Kara Group within the regional description of the unit.

6.3 Overlying units: Mowry Shale and Skull Creek Shale

The common method for writing a geology report would be to write about the units from youngest to oldest or from oldest to youngest in order to maintain the order and understanding of the units with continuity. In this section (Pg. 6-6); based on the organization of the remainder of Chapter 6, it would be best to describe the units from youngest to oldest.

6.4 Production Zones Units: Fall River and Lakota Formation

Inyan Kara Group

Powertech needs to provide a detailed stratigraphic column that graphically displays and clearly labels/describes all Formations, Members, Sub-Members, Fluvial Units, and Fluvial Sub-Units within the Inyan Kara Group. The column must graphically indicate which Fluvial Units or Sub-Units and Sub-Members are expected to bear uranium, and which Fluvial Units or Sub-Units and Sub-Members comprise production zones. In addition, Powertech needs to provide cross-sections and map(s) depicting spatial/geographic distribution of Fall River production zones as compared with Lakota production zones.

Fuson Member

The ninth paragraph (Pg. 6-8) of this section discusses the isopach map of the Fuson Member (Plate 6.5). Of all the historic and recent logs of the permit area, what percentage of the holes were drilled in areas where no Fuson Siltstone-Shale unit was intercepted (i.e., only Fuson sandstone units were present)?

6.6 Site Geology

Paragraphs three and four (Pg. 6-11) of this section discuss cross sections that were generated using the 3D geologic model, C'Tech's Mining Visualization Systems (MVS). The cross sections provided in Plates 6.9, 6.10, 6.11, and 6.12 provide simple, broad-scale interpretations that portray the project-wide strata as even, continuous distributions of homogenous rock-types.

This "broad-scale simplicity" is inadequate, and differs markedly from the complexity of the finer-scale geologic model (3-D graphics) presented during past Department permit meetings in Pierre and Rapid City. Powertech must present detailed, fine-scale cross sections and 3-D graphical depictions of the Inyan Kara Group. At least one cross section and one 3-D graphic for the Dewey area, and one cross section and one 3-D graphic for the Burdock Area must be generated. These cross sections and 3-D graphics must a) depict the stratigraphic complexity within a 400'-long section or 4x100'x100' grid area; b) represent a section or area within each of the primary Dewey and Burdock production areas; c) depict a cross section or area oriented along the axis of a primary ore body or bodies; d) represent a portion of the project area for which there is extensive well log data; and e) depict and label stratigraphic detail at the Sub-Member level. Please include all well logs and geophysical logs used in the creation of these detailed cross sections and figures. In addition, please refer to these cross sections/figures within a detailed explanation of how interbedded/intertongued fluvial deposits will affect overall ISL dynamics, especially given a uniform "honeycomb" wellfield design.

In reference to Figure 6.3 (Pg. 6-10), the Belle Fourche Shale is shown to be present within the proposed permit boundary; therefore, this unit needs to be discussed in the geology section.

6.7 Site Structure

The second paragraph (Pg. 6-11) of this section discusses the Dewey Fault. The discussion must include whether the fault impacts the Inyan Kara Group and whether the 500 feet of displacement could bring a lower aquifer into contact or closer proximity to the Inyan Kara Group as this may have an impact on mining. This paragraph also needs to address stress fracturing, dissolution features, sinkholes, breccia pipes, or other features that may be associated with the Dewey Fault System and how these features may impact ground water and potential impacts to mining.

The second paragraph (Pg. 6-11) states that the Long Mountain Structural Zone is 7-miles southeast of the project. Is it 7-miles from the southeast edge of the PAA or the center of the PAA? Please clarify.

The fourth paragraph (Pg. 6-12) states, "South Dakota has a comparatively higher rate of seismicity than other areas in the northern plains states, although earthquakes in the area tend to be relatively rare and of low to moderate magnitude..." Explain or define the 'comparatively higher rate of seismicity' and the magnitude and proximity of earthquakes to the project area. Also, please indicate the source(s) of information used in making this interpretation.
A map must be referenced in this section that shows the location of the Long Mountain Structural Zone, Dewey Fault, Fanny Peak Monocline, and Barker Dome. In addition, what are the distances of the Fanny Peak Monocline and Barker Dome from the nearest edge of the PAA?

7.0 Attachment H – Operating Data

7.1 Chemical Storage, Solution Mining Method and Recovery Process

The second paragraph (Pg. 7-1) in this section discusses commonly used lixiviant for in-situ uranium mining. Please be specific about the lixiviant make-up for this project.

The fifth paragraph (Pg. 7-4) in this section discusses the disposal options for the reject brine. The three (3) options include disposal into a Class I or Class V injection well, or through land application. Disposal via a Class I is banned in the state of South Dakota. Disposal via a Class V well or through land application will require separate permits if approved. The land application option will require a ground water discharge permit (see ARSD 74:54:02) issued through the Water Management Board. A Class V permit would be issued by EPA Region VIII. In addition, there is no discussion of a physical location for an injection well or the formation that would receive the injected wastewater.

The fifth paragraph (Pg. 7-4) in this section states, "...the bleed stream will not be concentrated through a reverse osmosis process, but will be treated with additional ion exchange to remove residual uranium, followed by contact with barium chloride to remove radium. Other treatments may also be required before the bleed stream would be applied to the land through center-pivot irrigation systems to grow an agricultural crop." Please state to what degree the bleed water will be treated (i.e., SDGWQS, baseline levels...).

The fifth paragraph in this section (Pg. 7-4) discusses the use of land application for disposal of wastewater. What will be the expected water quality of the land applied solution? Please provide details on how the water will be treated prior to land application. Will ion exchange remove other parameters other than uranium and radium?

7.2 Dewey-Burdock Well Field Operation

The first paragraph (Pg. 7-4) of this section discusses the layout of a wellfield and states that either a 5-spot of 7-spot pattern will be used. Plate 7.1 depicts a site-specific wellfield layout that uses a 5-spot pattern. What well pattern will be used at the site? Once a wellfield layout is selected a detailed description must be submitted.

The second paragraph (Pg. 7-4) of this section discusses injection flow rates and injection pressures. Are the flow rates and pressures based on the operation of a 5 or 7-spot pattern?

The third paragraph (Pg. 7-5) of this section discusses the estimated average injection pressure at the pump discharge; how was this injection pressure determined?

The fourth paragraph (Pg. 7-5) of this section states that each wellfield will operate at an estimated flow rate of 1500 to 2000 gallons per minute (gpm). This statement conflicts with the statement in Section 7.2, page 7-4, which says the system is designed to operate at 4000 gpm; please clarify. In addition, the data contained in the application does not support how these pumping rates can be sustained. Please submit the data that supports the pumping rates discussed above.

7.2.1 Header House Control

This paragraph (Pg.7-5) states, "The individual well flows and pressures will be monitored and adjusted daily with a digital recorder in order to balance individual patterns so that the flow rate from a pattern is less than the flow rate to the pattern, thus maintaining uniform distribution of leach solution and a cone of depression for each individual pattern." It appears the meaning of this sentence is reversed, the sentence must read, "...so that flow rate from a pattern is **more** than

the flow rate to the pattern, thus maintaining uniform distribution of leach solution and a cone of depression for each individual pattern". Please clarify.

7.2.2 Detection and Cleanup of Piping Leaks

The first paragraph (Pg. 7-5) of this section states, "Should pressure/flow fluctuate outside "normal" operating ranges,..." how are "normal" operating ranges for pressure and flow defined?

8.0 Attachment I – Formation Testing Program

8.1 Fracture Pressure

The fifth paragraph (Pg. 8-2) of this section states, "The formation fracture pressure proposed for the project is 0.70 Pounds per square inch (psi) for every foot of depth to the top of the screened interval". What is the justification for choosing this fracture pressure? The fracture pressure must be based on site specific information; a more detailed discussion of this issue is required.

8.2.1 Summary of Previous Pump Test Results

The first paragraph (Pg. 8-2) in this section mentions the report "Hydrogeologic Investigations at Proposed Uranium Mine near Dewey, South Dakota" (Boggs, 1983); please submit a copy of this report to the Department.

8.2.2.1 Burdock Project Area

In the last bullet on page 8-7, Powertech states, "It is noted that the lower end of the hydraulic conductivity range is probably appropriate for use with the entire formation thickness (shale layers included)...". Powertech needs to support this assertion.

Burdock Pumping Test Conclusions

In the third paragraph (Pg. 8-10) of this section, Powertech states, "Whether the shale interbeds in the Lakota aquifer are sufficiently thick and continuous to serve as vertical confinement for the ISL operation will probably need to be evaluated by analyzing cores from borings as wellfields are drilled." Powertech needs to provide or direct the reader to the "conceptual stratigraphic cross-section" mentioned in this section.

The seventh paragraph (Pg. 8-11) of this section discusses field-scale pump tests that will probably need to be done to determine the degree of vertical confinement. The Department wants to make it clear that these pump tests will be a requirement of the Class III UIC permit. The permit application will not be complete until the Department reviews and approves the pump test results and interpretations.

8.2.2.2 Dewey Project Area:

Powertech makes reference to drawings 4.1 and 4.2 in Knight Piesold (2008c). Powertech needs to reference specific appendices where this information can be located, or include them as figures in the application.

Dewey Pumping Test Conclusions

The fifth paragraph (Pg. 8-15) of this section states, "Hydraulic communication through the Fuson member between the Fall River and underlying Lakota aquifers is not indicated...". The assumption must not be made that the information from only one well makes the Fuson a good confining unit for a mile radius from the pumped well.

10.0 Attachment K – Inspection Process

This section (Pgs. 10-1 & 10-2), in part, discusses the addition of oxygen and carbon dioxide to barren lixiviant. Typically, how much oxygen and carbon dioxide are expected to be added to the lixiviant for the proposed mining?

11.0 Attachment M – Construction Details

11.1 Well Construction Materials

The first paragraph (pg. 11-1) of this section states, "Drill cuttings will be returned to mud pits as TENORM". The application must define the difference between TENORM and 11e(2) substances to show how these materials can be handled differently.

The second paragraph (second sentence) of this section (Pg. 11-1) states, "Cement grout will be composed of high sulfate resistant Portland cement using adequate cement to yield a slurry weight of approximately 11 pounds per gallon". In accordance with the SD DENR's well construction standards ARSD 74:02:04:20(18), no more than six gallons of water can be mixed with each 94-pound sack of cement; this mixture yields a slurry weight of 15 pounds per gallon.

The second paragraph (third sentence) of this section (Pg. 11-1) states, "Cement grout could contain adequate bentonite to maintain the cement in suspension in accordance with Halliburton cement tables". In accordance with the SD DENR's well construction standards ARSD 74:02:04:53 no more than 2 percent bentonite can be added to the cement grout.

The third paragraph (third sentence) of this section (Pg. 11-1) states, "Casings and annular material will be maintained throughout the operating life of the well". What does this sentence mean? Please clarify.

11.2 Well Completion

The second paragraph (Pg. 11-5) in this section states, "The cementing material will be circulated up the annulus, until return of the uncut cementing agent is visible at the surface". Also note that in no case must the volume of displacement of fluid exceed the volume of the inside of the casing. Powertech must include a statement in this section that well completion will conform to ARSD 74:02:04 Well Construction Standards.

11.5.4 Reporting

This section (Pg. 11-8) discusses the mechanical integrity testing information (i.e., test date, test duration, beginning and ending pressures, etc.) that will be reported to the Department on a quarterly basis. In addition to the information outlined in the section there are additional quarterly reporting requirement in 74:55:01:49(3)(b).

12.0 Attachment N – Changes in Injected Fluid

This section does not contain any details regarding anticipated changes in pressure, native fluid displacement and direction of movement of injection fluid as stated in the first sentence. Please provide details.

13.0 Attachment O – Plans for Well Failures

13.2.1 Integrity Testing of Casing

This section (Pg.13-1 & 13-2) discusses the procedure for the mechanical integrity testing of wells. The test procedure outlined in the section is as follows, "Upon stabilization of pressure, readings are recorded at two-minute intervals for ten minutes". The procedure presently approved by the Department requires readings every five-minutes for a period of fifteen-minutes after stabilization of pressure.

13.2.3.1 General

The first paragraph (Pg. 13-2) of this section in part discusses the connection of wells to the header house. Based on this discussion it appears the monitoring wells will be connected to the header house. Is this correct?

13.2.3.2 Emergency Shutdown

The first paragraph (Pg. 13-3) of this section states, "Some headers houses may have a disconnect at the transformer pole…". Why will only some header houses have the disconnect?

13.3 Excursion Control

The third paragraph (Pg. 13-4) lists the operational excursion preventative measures that will be implemented. The operational excursion preventative measures must also include the items listed in, "**Production area operational monitoring requirements**", ARSD 74:55:01:46.

The fourth paragraph (Pg. 13-4) states, "The angle between adjacent monitor wells and the nearest injection well in the enclosed wellfield will be no greater than 70 degrees or 400 feet (closer if necessary to maintain the 70 degree angle) between the adjacent monitor wells to prevent an excursion from moving out the monitoring well ring undetected." This text is confusing. Using the 70 degree angle how is the distance from the monitoring well to the injection well calculated? Would it be:

$$a = b(\tan\theta)$$

where:
a = distance between monitor well and injection well
b = depth of hole
$\theta = 20^{\circ}$ (i.e., $90^{\circ} - 70^{\circ}$)?

The fourth paragraph (Pg. 13-4) also states, "Monitoring wells will be screened in the same zone as the production well." The paragraph further states "Prior to injecting chemicals into the well field, a pump test will be conducted showing that the exterior monitor wells are connected to the mining zone...". Powertech needs to address what will be done if neatly spaced monitoring wells screened in the same zone as production wells are not hydraulically connected to the mining zone. This is a real possibility given the complex, interbedded, intertongued channelized systems. Considering the interbedded nature (shale/sandstone/shale) of the Lakota Formation and Fall River Sandstone and the discontinuous confinement units, an excursion could possibly migrate to an adjacent sandstone unit that is not covered by a screened section of monitoring well.

The fourth paragraph (Pg. 13-4) in this section states, "There will be additional overlying monitoring wells within aquifers above the ore-bearing aquifer". Although it has been suggested that the Inyan Kara Group is a single aquifer, the Department would expect major sand units in both the Lakota Formation and Fall River Sandstone as well as sandstone interbeds within these formations to be monitored in an effort to detect excursions.

The fifth paragraph (Pg. 13-5) in this section states, "Sampling the monitoring wells located within the overlying aquifer and underlying aquifers on a frequent schedule". Monitoring must be done in accordance with ARSD 74:55:01:46(4), which requires wells installed above and below the production zone to be monitored on a monthly basis.

The seventh paragraph (Pg. 13-6) of this section states, "Most wells placed on excursion status were restored below their designated UCLs within 1 to 6 months (NUREG-1910, 2008)." This statement appears to be in reference to an existing and operational ISL operation. How does this statement relate to the proposed Dewey-Burdock operation?

The eighth paragraph (Pg. 13-6) of this section proposes the following parameters be used as indicators to monitor lixiviant travel and excursion control: uranium, chloride, sulfate, and total

dissolved solids (TDS). However, in accordance with ARSD 74:55:01:53(5), at a minimum the following parameters must be monitored as part of excursion control: pH, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, silica, uranium, ammonia, nitrate, TDS and specific conductance.

13.4.1 Historic Exploration Drill Holes

The last sentence in this section (Pg. 13-8) discusses inadequately abandoned wells and that they should be plugged in accordance with ARSD 74:11:08. ARSD 74:11:08 concerns the plugging and abandonment of test holes; for well abandonment follow the requirements in 74:02:04:67 and 69.

13.6 Holding Ponds

The second paragraph (Pg. 13-9) of this section discusses the use of ponds to settle out radium to levels allowable for land application. Please supply additional information on radium levels present prior to treatment and what levels will be present after treatment. The allowable level of radium and other constituents in the land application water will be determined by the SD DENR. Depending on the constituents present, Powertech may need to include RO units and evaporation as part of its treatment methods.

The fourth paragraph (Pg. 13-9) of this section states, "The ponds have been designed to meet ARSD 74:29:11:23...". There is no mention of storm water storage for the holding ponds. The ponds need to be designed for a minimum of a 100-year 24-hour storm event plus normal operating capacity.

Item No. 1 in the fourth paragraph (Pg 13-10) of this section discusses pond inflow amounts, consisting of production bleed and restoration flows, which amount to 320 gpm, 24 hours per day, year round. What is the source of this water? If it is Inyan Kara Group water the aquifer could be drawn down. If Madison aquifer water is used for restoration, there may be public concern and Water Rights issues. Powertech needs to consider recycling (re-injecting) restoration water after it has been treated.

Item No. 2 in the fourth paragraph (Pg 13-10) of this section discusses that all irrigation tail water and rainfall runoff from the land application area will be returned to the ponds. Please supply additional information on how the irrigation tail water and rainfall runoff will be returned to the ponds.

The fifth paragraph (Pg. 13-10) of this section discusses outflow from the ponds to the land application areas. It is unlikely that flows to the land application areas can be maintained on a 24-hour basis for 137 days straight as no surface water runoff will be permitted. As previously mentioned a ground water discharge permit will be required for the land application of wastewater. For additional information on the permitting process please see ARSD 74:29:05:14 through 74:29:05:20 and 74:54:02 inclusive.

The seventh paragraph (Pg. 13-10) discusses plans for disposal of waste water. This discussion was general in nature; more detail regarding waste water disposal is needed.

During the June 11, 2009, teleconference with the NRC, Powertech indicated that some of the holding ponds will be radium settling ponds. These ponds were not mentioned in the text of the UIC application.

14.0 Attachment P – Monitoring Program

14.2.1 General Monitoring Procedure

The first paragraph (Pg. 14-2) of this section states, "Production zone monitoring wells are installed...with a screened interval open to the sand unit containing the production zone." Define what the "sand unit" is for each area to be mined. Is it the formation, unit, member…? This also needs to be defined for the injection units.

The second paragraph (Pgs. 14-2 & 14-3) of this section in part discusses the number of monitoring wells in the overlying aquifer. The section states, "The first unit of overlying non-production zone monitoring wells will be evenly distributed through the production area with a minimum of one well for every four acres". ARSD 74:55:01:42 requires a minimum of one well per acre of production, however, an alternative non-production zone well location and spacing may be considered if the operator demonstrates the proposed location or spacing will adequately provide monitoring coverage. At present the information provided is not sufficient to demonstrate the effectiveness of the proposed alternative monitoring plan. This paragraph also states, "Where confining units are very thick and permeability negligible, requirements for vertical excursion monitoring can be relaxed or eliminated for underlying aquifers." This segment needs to be reworded; the level of monitoring required in underlying aquifers is something the Department will decide or approve based upon state laws and/or regulations in conjunction with site specific information provided by Powertech. The Morrison Formation is not a thick homogeneous unit of shale and will likely require some level of ground water quality monitoring.

The third paragraph (Pg. 14-3) of this section discusses the number of monitoring wells in the underlying aquifer. The section states, "Underlying non-production zone monitoring wells will be evenly distributed through the production area with a minimum of one well for every four acres of production area". ARSD 74:55:01:42 allows the operator to propose a monitoring well spacing plan for each underlying aquifer as long as the plan demonstrates the proposed location or spacing will adequately provide monitoring coverage. At present, the information provided is not sufficient to demonstrate the effectiveness of the proposed monitoring plan.

14.4.1 Water Monitoring Network

Private Wells

Please show the wells discussed in this section (Pg. 14-7) on a map and also provide information on these wells in a table. Information in the table must include: owner, location (longitude and latitude), and construction details for the wells if available.

In addition, this section only lists two sampling parameters (uranium and radium 226) for the private wells. At least initially these wells must be sampled for the parameters listed in Table 14.1: **Baseline Water Quality Parameters and Indicators for Groundwater**.

Baseline Production Zone Wells

The baseline sampling period listed in this section (Pg. 14-7) does not comply with ARSD 74:55:01:35. In accordance with ARSD 74:55:01:35, all baseline wells will be sampled at least once every month for a minimum of six months before any mining activities.

14.5.1 Fluid Volume and Rate

This section (Pg. 14-8) mentions that a bleed rate of 0.5% will be maintained during production. Other sections of the application discuss bleed rates of 1% to 3%. Please clarify what bleed rate will be used for this project.

14.5.2 Wellhead Pressure

In the second paragraph (Pg. 14-8) of this section there is a conflict concerning the number of monitoring wells that will be installed per acre in the overlying aquifer. Is it one well per acre or one well per every four acres? Please clarify.

14.6.1 Ground Water Quality

In the first paragraph (Pg. 14-9) of this section, Powertech must define the time frame for the collection of baseline ground water quality data for production and monitoring wells in each new well field instead of stating that the samples will be collected "over a sufficiently spaced interval". As previously stated, baseline monitoring data will be collected on a monthly basis for a minimum of six-months (See ARSD 74:55:01:35).

The second paragraph (Pg. 14-9) in this section discusses statistical analysis of the monitoring data using ASTM Standard D 6312. Please submit the ASTM Standard to the SD DENR for review.

The third paragraph (Pg. 14-9) in this section discusses using a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for sample analysis. Is the lab presently being used accredited under this program or will a different lab be used?

In reference to Table 14.1: **Baseline Water Quality Parameters and Indicator in Groundwater,** it appears the table is missing a few parameters. The table needs to include bicarbonate, carbonate, and selenium.

14.7 Excursions

The discussion in this section about (Pgs. 14-10 & 14-11) when an excursion is considered controlled is confusing. To clarify, an excursion is controlled when the water quality in the affected monitor wells has been restored to values consistent with local baseline water quality and restoration is confirmed by three consecutive weekly samples, (See ARSD 74:55:01:53.01).

14.8 Reporting

In the first paragraph (Pg.14-11) of this section the reference to EPA forms in Appendix G must be removed, since this is a state application. Also, Powertech must submit monthly instead of quarterly monitoring reports to the state.

The third paragraph (Pg. 14-12) of this section discusses substituting resistivity logs for mechanical integrity tests. In accordance with ARSD 74:55:01:29 mechanical integrity tests must be done every five (5) years. Resistivity logging can not be used as a substitute for mechanical integrity testing.

15.0 Attachment Q – Plugging and Abandonment Plan

15.1 Plugging and Abandonment Plan

In the fourth paragraph (Pg. 15-2) of this section, plugging of wells in unconfined aquifers is discussed, but how the plugging material will be conveyed down the well is not detailed. Plugging material must be conveyed via tremie pipe to any well less than 16-inches in diameter or greater than 50 feet deep.

In the fifth paragraph (Pg. 15-2) of this section, the composition of cement grout is listed as 11 pounds per gallon. This grout composition is incorrect; grout composed of neat cement must have a slurry weight of 15 ponds per gallon, while grout composed of 2% bentonite (w/7-gallons per sack) must have a weight of 14.4 pounds per gallon. (See ARSD 74:02:04:20(18) & 74:02:04:53)

In the sixth paragraph (Pg.15-5) of this section the locational information for abandoned wells is discussed. In addition to the information discussed in this paragraph the SD DENR also requires all abandoned wells be surveyed using global positioning system (GPS) equipment that has an accuracy of at least one meter, (See ARSD 74:55:01:59(8)(c).

15.1.1 Plugging and Abandonment Report

The first paragraph (Pg. 15-5) of this section discusses the notification requirements to the Department concerning the plugging of wells. While a plugging and abandonment report is required within 60-days after plugging, the Department must be notified 10-days prior to a well(s) being plugged so the Department can have a representative witness the plugging, (See ARSD 74:55:01:59(4). In addition, pursuant to ARSD 74:02:04:71 plugging reports must be filed with the SD DENR's-Water Rights Program Chief Engineer. Also see 74:29:11:42(3)(d), which also has reporting requirements for hole closure.

16.0 Attachment R – Necessary Resources

The first paragraph (Pg. 16-1) in this section states, "The cost estimate is based on a total of 377 wells...", the number of wells does not match the total of 614 wells listed on plate 7.1. The cost estimate needs to include the proposed operation that Powertech is requesting to be permitted under this application, not just a portion of it.

The first paragraph (Pg. 16-1) in this section and Table 16.1 conflict concerning average well depth; the paragraph states an approximate depth of 600 feet while the table uses an average depth of 650 feet. Please clarify.

The third paragraph (Pg. 16-2) in this section states, "...agencies must agree who is the lead agency responsible." (i.e., for the purpose of holding a comprehensive surety.) Powertech's suggestion will be taken into consideration; however, this is not a decision for Powertech to make. This section needs to be reworded.

In the fourth paragraph (Pg. 16-2) of this section, it lists bonding instruments acceptable to the NRC. Since this a state application, this section must list only the bonding instruments acceptable to the Boards of Water Management and Minerals and Environment. The boards will accept most of the mentioned bonding instruments. However, the boards may not accept deposits of government securities listed under number 4.

In the sixth paragraph (Pg. 16-2) of this section, since this is a state application, the reference to EPA must be removed from the application and must state that the approved surety will be submitted to the SD DENR.

17.0 Attachment S – Aquifer Exemption

Powertech needs to demonstrate that the mapable Lakota strata (i.e., Klfs, Klfss, and $Klfs_3$ sand units) that occur between the upper and lower production zones and the mapable sands in the upper Fall River ($Kfus_6$ and Kfusm) are not potential sources of higher-quality ground water and can be exempted.

17.2.1 Aquifer Exemption Boundary

In the second paragraph (Pg. 17-2) of this section it states, "there are legal and technical based criteria, guidance, and evaluations that Powertech also considered before proposing the aquifer exemption...". There is no mention of the state requirements for an aquifer exemption. ARSD 74:55:01:24 must be added to the list of criteria in this section.

17.2.2 Horizontal Boundary Justification

The first paragraph (Pg. 17-3) of this section states, "In order to determine the extent and configuration of the AEB, a worst case seepage velocity of 10 feet/day has been assumed.". How was this velocity determined?

The second paragraph (Pg. 17-3) discusses the distance the monitoring well ring will be located from the production area. The 400 foot distance for monitoring wells from the production zone is a maximum. Actual distances for the monitoring wells must be based on site specific data.

17.2.3.1 Lixiviant Compatibility with Ore Body

The first paragraph (Pg. 17-7) of this section discusses the use of a "simulated lixiviant" composed of hydrogen peroxide and sodium bicarbonate for the bottle roll tests. Will this be the actual lixiviant used in the mining process and if so what percentages of bicarbonate and hydrogen peroxide will be used?

The third paragraph (Pg. 17-8) of this section discusses that sulfate and vanadium were mobilized during the bottle roll tests. Were other metals mobilized and if so what were their concentrations? Please provide a list of all dissolved species tested for in the ore tests. In addition, how will sulfate oxidation affect uranium recovery and will it cause other metals to be mobilized? In addition, what difficulties would this create for reclamation? What additional steps need to be taken to account for the added difficulties of sulfate dissolution in the ground water?

17.2.5 Groundwater Quality

The second paragraph (Pg. 17-9) of this section indicates that 12 wells were sampled from March 2008 through February 2009, only the March through June 2008 data was provided in Appendix H. All data must be included in Appendix H.

17.2.6 Groundwater Restoration Method

The description of ground water restoration in this section is very general, with no specifics. No specific method has been selected. Please provide the specific method(s) that will be used for restoration along with the supporting data.

The first paragraph (Pg. 17-12) of this section briefly discusses restoration options. How does Powertech propose to address lixiviant-related contamination that is mixed into lower mobility ground water zones? There is no reference to reductant recirculation when referring to potential ground water restoration options or phases.

The second paragraph (Pg. 17-14) of this section discusses restoration to pre-operational baseline water quality conditions and what the alternatives are if baseline can not be reached. This paragraph is not entirely consistent with the requirements in ARSD 74:55:01:45.01. If it is determined that ground water can not be returned to baseline conditions then restoration values must meet the following criteria:

(1) To not exceed the applicable maximum allowable concentrations in South Dakota ground water quality standards listed in § 74:54:01:04;

(2) To not exceed the health advisory levels or secondary drinking water regulations set by the U.S. Environmental Protection Agency for other parameters not listed in Table 1 and Table 2 of § 74:54:01:04; and

(3) To not exceed values based on an appropriate statistical method for any parameters not listed in South Dakota ground water quality standards or in U.S. Environmental Protection Agency health advisory lists or secondary drinking water regulations.

In addition, the State of South Dakota does not have "class of use" designations for ground water. References to "class of use" must be removed from the permit application.

The fourth paragraph (Pg. 17-14) of this section discusses the similarity of the geology between the Crow Butte Mine in Nebraska and the proposed mine at Dewey-Burdock. The Department does not agree that the geologic conditions at Crow Butte and Dewey-Burdock are similar. The use of Crow Butte ISL restoration information in the discussion of the proposed Dewey-Burdock restoration must be qualified with an outline of the dissimilarities between the two sites. In addition, Powertech expects to find similar baseline water quality results to those found at Crow Butte. Since some baseline data already exists for the Dewey-Burdock site; how does this data compare to Crow Butte?

The last sentence (Pg. 17-25) of this section states, "The stability monitoring stage includes a period (typically 6-months to a year) in which the indicator parameters are monitored in order to establish successful restoration". In accordance with ARSD 74:55:01:58 stabilization monitoring data must be collected on a bimonthly basis for a minimum of six consecutive sample sets, so stabilization monitoring will be conducted for a minimum of one-year.

In reference to Table 17-4 (Pg. 17-19): **Total Metals, EPA Testing Methods and Permit Limits Identified by Region 8 EPA**, Powertech must be aware that the Department has ground water quality standards that are applicable to this project (See ARSD 74:54:01). In the ground water quality standards parameters such as sulfate and TDS are assigned maximum contaminant levels. In addition, the Department has adopted the proposed EPA MCL for radon of 300 pCi/l.

In reference to Table 17-5 (Pg. 17-21), the chloride concentration in well 677 exceeds the Department's ground water quality standard for chloride of 250 mg/l. In addition, in Tables 17.5 (Pg. 17-21) and 17.7 (Pg. 17-23) it appears the EPA taste threshold (250 mg/l) is being used for sulfate; it must be mentioned in the table notes that sulfate also has a health-based value of 500 mg/l.

In reference to Figure 17.6 the projected timeline is outdated and needs to be updated to reflect the current situation.

17.2.7.2 Exceedances of Other Drinking Water Standards

The first paragraph (Pg. 17-33) of this section discusses primary and secondary drinking water standards set by EPA. This paragraph must also include a discussion about South Dakota's ground water quality standards.

Table 17.16 (Pg. 17-33): **Water Quality Regulatory Limits for Public Drinking Water Supply Systems** lists the maximum contaminant level for sodium as 200 mg/l. It is not clear where this value came from; the EPA's 2006 Edition of Drinking Water Standards and Health Advisories lists a health based value for sodium of 20 mg/l and a taste threshold that ranges from 30-60 mg/l.

17.3 Project Schedule

Figure 17.5 (Pg. 17-37), **Map of Proposed Sequence for Development and Injection into the Well Fields,** is supposed to show the proposed sequence for wellfield development. It is not readily apparent as to how this map depicts the proposed sequence of wellfield development. Please submit plates showing the details of the Burdock wellfields shown in Figure 17.5. Also, please submit plates showing details of any other wellfields that will be part of the application.

17.4 Financial Assurance

In this section (Pg. 17-39 & 40), state bonding requirements instead of EPA requirements must be discussed, since this a state application. Also, for the state bonds, indirect costs that will be added to the base reclamation and water treatment costs and will include more than the 15 percent contingencies shown in Tables 17.17 and 17.18. Indirect costs include costs for mobilization, contingencies, profit and overhead, state excise tax, and state project administration. For large scale gold mines in South Dakota, indirect costs for reclamation and postclosure bonds have ranged between 40 and 50 percent.

Also, in addition to NRC, the state will also require an updated Annual Surety Estimate Revision.

17.5 Future Operations

This section (Pg. 17-40) discusses the potential for locating minable resources outside the proposed aquifer exemption boundary (AEB) and the ability to expand the AEB beyond the proposed limits through a technical revision (minor permit modification). While the Department does not have a problem placing a condition in the Class III UIC permit allowing technical revisions, it would not consider expansion of the AEB a minor permit modification. The expansion of the AEB would be considered a major permit modification requiring approval by the Water Management Board. In addition, Powertech will need a new large-scale permit to expand beyond permit boundaries. Powertech will also need to do a new special, exceptional, critical or unique lands request.

In reference to Plate 17.1, regarding "undiscovered" resources, there are numerous roll fronts in different sandstone units at the site. Each ore zone will need to be mapped and modeled as to the continuity and thickness of the confining unit.

18.0 Attachment U - Description of Business:

This section must contain assurance that the Applicant has the financial resources to execute the proposed ISL and restoration activities.

Appendix A – Climatic Data

No units are listed for temperatures. Please clarify.

Appendix C – Ground Water Wells

All available well logs and well construction reports for listed wells including wells developed for monitoring must be included in this appendix.

According to the baseline sampling plan (November 2007) provided to the Department, 12 new wells were drilled for the required baseline monitoring for the state. However, upon review of Appendices C and H and duplicate sampling performed by the state on the baseline monitoring wells it is noted that two wells within the Dewey area were actually developed in the 1980's. A well construction report, well log, and a valid mechanical integrity test need to be provided for these wells to document the screening intervals and integrity of these wells.

Appendix D – Abandoned Wells

It appears Appendix D is mislabeled "Abandoned Wells", as it only contains drill hole information. All drill hole logs for the drill holes listed in Appendix D need to be included in this appendix.

Appendix F – Pumping Tests

General Comments

The pump test data was reviewed to determine if the provided information was sufficient to adequately characterize the aquifers in the proposed uranium mine sites. The following comments summarize the primary findings of that review.

- Results of the previous pumping tests done by the Tennessee Valley Authority cannot be used to reliably predict the site specific hydraulic characteristics of the two proposed mining locations. These results can, however, be used to support an interpretation of heterogeneity/anisotropy of the sandstone units of the Inyan Kara Group.

- The 2008 pumping tests performed by Knight Piésold Co. utilized standard and appropriate methodology of conducting and analyzing pumping tests in confined aquifers and Knight Piésold Co. properly applied the analytical methodology to the results of the pumping tests. Their interpretations of the results are accompanied by necessary supporting data and diagrams and by discussions of limitations and problems associated with the tests and resulting data.

- The collected data, results, and interpretation of the aquifer characteristics at the two proposed mine sites indicate anisotropic and heterogeneous lithology. Information provided by Powertech indicates that the geologic and hydraulic characteristics of the Dewey and Burdock sites are sufficiently dissimilar so that results from one site cannot be used to characterize the other.

- The interpretations of Knight Piésold Co. are specific to each of the two pump test sites and cannot be used as being representative of other locations and depths of potential mining sites in the Inyan Kara Group sediments.

- Three cross sections were provided for the vicinity of pumping well 11-11C; cross sections C-C', D-D', and E-E'.
    - The geology of the upper Lakota Formation is depicted differently in well 11-11C on cross section D-D' than it is on the other two. The geology in the well cannot change from cross section to cross section.
    - On cross section C-C', the correlation of geology in the upper Lakota Formation from well 11-11C to hole FBS 135 does not seem to be supported by the geophysical logs depicted for these two holes/wells. However, it is difficult to adequately evaluate the lateral correlations of geology from hole to hole presented on the cross sections without having access to other supporting information such as descriptions of geology encountered while drilling the hole.
    - The inconsistency in geologic interpretation for the same hole on different cross sections must be clarified by Powertech.
    - The geologic descriptions and geophysical logs for each test hole must be provided to allow for independent review of the geologic interpretations and lateral correlations of geology made by Powertech.

Specific Comments

-Page 2-4 (end of page 2-4 and beginning of page 2-5)—this incorrectly states that the potentiometric surface of the Lakota Formation and Fall River Sandstone is 50-100' higher than the potentiometric surface of the underlying Unkpapa aquifer.

-Page 7-2, in the second to last paragraph, it says: "whether the shale interbeds in the Lakota aquifer are sufficiently thick and continuous to serve as vertical confinement for ISL operations will probably need to be evaluated by analyzing cores from borings as well fields are drilled." The Department concurs that field data is needed to determine the lateral continuity and degree of confinement that shale layers may or may not provide. Powertech must submit site specific field and/or laboratory data to support whatever interpretation is made.

-Page 7-2, in the last paragraph, Knight Piesold concludes "The 2008 test indicates that the lower and upper sandstone portions of the Fall River formation behave as a single, confined, aquifer with some form of lateral barrier due to changing lithology, such as a channel boundary." Please discuss whether this conclusion is consistent with the initial potentiometric surface measurements outlined in Section 4.1. In Section 4.1, the report states there is "nearly a 20 ft head difference upward between the wells screened in the lower Fall River and upper Fall River formation." Please provide a map that depicts the potentiometric surface of the Upper Fall River sands as compared to the potentiometric surface of the Lower Fall River aquifer.

Appendix A-2, Overview of Aquifer Test Analysis Procedures and Tools Used (This is a sub-appendix of Appendix F)

On page 3 of this Sub-appendix to Appendix F, Knight Piesold states, "There are multiple ore zones (e.g., three ore zones in the Fall River at Dewey) and each one will have its own well

screens, so one ore zone was picked to test." Throughout the UIC application, Powertech needs to explain that pump tests provide information germane to discrete ore zones, and that the information is not characteristic of general conditions throughout either the Fall River or Lakota aquifers or sub-aquifers. In other words, Powertech needs to clearly communicate that the pump tests do not characterize aquifer properties for all production zones within the lateral areas of the two proposed well fields. In addition, Powertech needs to explain why pump tests were not performed for each ore zone within the proposed Dewey and Burdock wellfields.

Appendix H Groundwater Quality Data

A summary table listing the wells and maps of the well locations (Figures 17.2 and 17.3) must be included in Appendix H as a handy reference. In addition, please provide all lab data sheets and lab QA/QC for data and lab verification.

The results for the state required baseline wells (12 wells shown on Figure 17.3) only cover a few months (April through May 2008). As per agreement during negotiations on the ground water baseline plan, wells, numbered 615, 622, 680, 681, 688, 689, 694, 695, 696, 697, 698, and 3026, were to be sampled on a monthly basis for a one year period. Please provide all baseline sampling results not just the first 4 or 5 samples

With the expansion of the proposed mine area in September 2008, two additional, upgradient baseline wells were proposed for the Dewey area (northern part of section 21). These wells have not been drilled, but they must be included in the state required ground water baseline plan.

Appendix J – Baseline Radiological Characteristics

1.1.9 Vegetation Sampling

This section (Pg. 68) states, "Three rounds of vegetation sampling were conducted…". What species were collected for the vegetation samples?

In reference to Figure 1.1-8, "One vegetation sample was collected in August, 2007; and April and July, 2008 at each AMS, the locations of which are shown on Figures 1.1-8." Figure 1.1-8 could not be located in the application.

1.1.10 Food Sampling

Powertech states that they collected tissue samples from a locally grazing cow to get baseline information on radionuclides concentrations in local food. Where and when was the one animal species sample collected from? Is the sample size/type sufficient to be representative of the animal species in the area?

Typographical Errors - Powertech Class III UIC Permit Application by SD DENR (8-4-09)

1.0 Introduction:

Regulatory Guidance

-Pg. 1-1, the reference in the first bullet must be changed from South Dakota Administrative Rules 74:55:01 to 74:29, since 74:55:01 is already mentioned in the second bullet and 74:29 are the rules that go with SDCL 45-6B.

Required Approvals and Submittals in Association with the In Situ Leach Mine Permit

-Pg. 1-2, paragraph beginning, **"A number of applications ",** line #5 beginning, "state and federal…"—sentence missing a word or words.

-Pg. 1-2, the first bullet should be changed to "In Situ Leach Mine Permit under SDCL 45-6B and ARSD 74:29.

-Pg. 1-3, paragraph beginning, **"In addition to submitting this Class III UIC application",** line #7 beginning, "approval of two exploration…"—sentence missing a word or words.

-Pg. 1-7, paragraph beginning, **"water (USDW's). In addition,"** ARSD 74:29 should also be mentioned in this paragraph.

2.0 Attachment A - Area of Review Methods

-Pg. 2-1, paragraph beginning, **"The AOR is established to maximize the data",** line #5 beginning, "to the fact that the Nuclear Regulatory…"—sentence missing a word or words.

-Pg. 2-1, paragraph beginning, **"The AOR is established to maximize the data",** line #7 sentence beginning, "This data in conjunction with other data…"—sentence missing a word or words or possibly needs to be two sentences.

-Pg. 2-4, paragraph beginning, **"Dewey Road, a gravel road"**, Dewey Road should also be referred to as County Road 6463.

3.0 Attachment B - Maps of Area and Area of Review

-Pg. 3-1, paragraph beginning, **"Plate 3.1 is a topographic",** line #1 beginning, "Plate 3.1 is a topographic map…",—sentence missing a word or words.

-Pg. 3-2, paragraph beginning, **"No injection wells, intake structures",** line #3 sentence beginning, "Springs identified on USGS…",—this sentence is confusing and needs to be re-written. Suggested language: "While springs were identified on USGS topographic maps outside the AOR, none were found within one-mile of the project area during field investigations."

-Pg. 3-2, paragraph beginning, **"No injection wells, intake structures",** line #5 beginning, "present and would not be...",—this sentence discusses flowing wells that are illustrated in Figure 17.1; a review of Figure 17.1 shows no flowing wells.

-Pg. 3-2, paragraph beginning, **"Figure 17.1 identifies the following",**—bullet number 2 "AOR boundary" is not shown on Figure 17.1.

-Pg. 3-2, paragraph beginning, **"The distribution manifold including...",**—this paragraph appears to be out of place.

-Pg. 3-4, Figure 3.2 "Exploration Holes" is numbered Figure 3.2 on the description beneath the map and labeled Figure 3.1 on the body of the map.

4.0 Attachment C – Corrective Action Plan and Well Data

-Pg. 4-1, paragraph beginning, **"Coverage of corrective action",** line #9 beginning, "There are currently no..."—add "Class III" between "existing" and "injection".

-Pg. 4-1, paragraph beginning, **"Coverage of corrective action",** line #10 beginning, "new wells is covered under..."—the citation listed in this sentence is incomplete, the correct citation is "74:55:01:59.03".

-Pg. 4-2, Figure 4.1, **"Abandoned Wells within 1 mile of the Proposed Permit Boundary",**—there are four well locations on this figure that are not numbered. The wells are in the following locations: T7, R1, Sections 2, 21, 22, and 24.

-Pg. 4-2, Figure 4.1, **"Abandoned Wells within 1 mile of the Proposed Permit Boundary",** —wells 502 and 621 are both labeled as alluvial, well 621 has a depth of 500 feet (according to Table A-2), it is unlikely the well is alluvial, please clarify.

-Pg. 4-8, paragraph beginning, **"Corrective Action will be taken",** line #4 beginning, "identified and their locations...", —replace "EPA" with "SDDENR".

5.0 Attachment D – Maps and Cross Section of USDWs

-Pg. 5-4, paragraph beginning, **"unit characterized by extensive secondary porosity",** line #5 beginning, "unconfined at its outcrop...",—change the "-3" and "-6" in the sentence to superscripts.

6.0 Attachment F – Maps and Cross Sections of Geologic Structure of Area

-Pg. 6-3, paragraph beginning, **"The oldest rocks in the region",** line #2 beginning, "core of the Black Hills uplift...",—remove the "d" from the end of the word "surfaced".

-Pg. 6-6, paragraph beginning, **"At the PAA the Skull Creek",** line #9 beginning, "PAA, these units outcrop..."—change "outcrop" to "crop out".

-Pgs. 6-6 & Pg. 6-11, in reference to **Plates 6.1, 6.9. 6.10, 6.11, and 6-12,** "Morrison" is misspelled on these plates. In addition, on Plate 6.9 the word "section" is misspelled.

-Pgs. 6-6, 6-7, & 6-8 in reference to **Plates 6.2, 6.3, 6.4, 6.5, and 6.6**. The red numbers on the plates, which appear to coincide with a particular borehole are not defined. Please define these numbers on each plate.

-Pg. 6-7, paragraph beginning, **"The early cretaceous Inyan Kara",** line #1 beginning, "The early cretaceous Inyan Kara", the word "the" after the comma in the sentence should not be capitalized.

-Pg. 6-7, paragraph beginning, **"The isopach map of the Fall River",** line #2 beginning, "The thickening of the formation...",—sentence missing a word or words.

-Pg. 6-7, paragraph beginning, **"The Minnewasta Limestone Member",** "Minnewasta" is spelled "Minnewaste".

-Pg. 6-8, paragraph beginning, **"The Chilson Member",** line #2 sentence beginning, "These deposits consist of...", the word "shale" is used twice in the sentence.

-Pg. 6-9, paragraph beginning, **"The site geology is shown",** line #1 beginning, "The site geology is shown...",—as the map in Figure 6.3 only shows the surficial geology the word "surficial" should be added to this sentence.

-Pg. 6-9, paragraph beginning, **"The site geology is shown",** line #1 sentence beginning, "The Fall River Formation...",—change "outcrop" to "crop out".

-Pg. 6-11, in reference to **Plate 6.8.** The "E" label is missing on the plate.

-Pg. 6-11, in reference to **Plates 6.13, 6.14, and 6.15**. Identify the boreholes, by number, that were used to construct the contours and explain on the map what the red numbers are. Also it appears that on Plates 4.14 and 6.15 that some of the boring locations are wrong or the elevation shown next to the boring location is incorrect.

7.0 Attachment H – Operating Data

-Figures 7.1 and 7.2, the print on these figures is not legible; it is too small. These figures must be submitted in a larger format so they are legible.

-Pg. 7-6, paragraph beginning, **"The individual well field patterns",** line #3 beginning, "pattern and so that flow..."—sentence appears to have an additional word, "and" should be removed from the sentence.

8.0 Attachment I – Formation Testing Program

-Pg. 8-2, paragraph beginning, **"The maximum allowable WHP will be",** line #7 beginning, "is not exceeded according to…",—change the citation in this sentence from 144.28(f)(3)(i) or (ii) to ARSD 74:55:01:44.

-Pg. 8-3 to 8-4, paragraph beginning, **"The tests developed the following",** line #14 (4th bullet) beginning, "The vertical hydraulic conductivity",—sentence missing a word or words.

-Pg. 8-6, paragraph beginning, **"A detailed description of the",**—this paragraph is confusing; make it clear to the reader as to where these reports are located.

-Pg. 8-11, paragraph beginning, **"The laboratory core data",** line #1 beginning, "The laboratory core data …",—units missing for vertical permeability, "$9.3x10^{-8}$".

-Pg. 8-11, paragraph beginning, **"The 2008 test indicates",** line #2 beginning, "behave as a single…",—it appears there are too many commas in this sentence.

10.0 Attachment K – Injection Process

-Pg. 10-2, paragraph beginning, **"…surface or deep) impacts from",** line #2 beginning, "compaction of the cretaceous…",—it appears the word "system" should be replaced with "sediments".

11.0 Attachment M – Construction Details

-Pgs. 11-2, 11-3, and 11-4, figures 11.1, 11.2, and 11.3, add the words "or bentonite" after the word "cement".

-Pg. 11-5, paragraph beginning, **"Injection, production and monitoring wells",** line #17 beginning, "surface to backfill…",—add after the word "surface", "via tremie pipe".

-Pg. 11-5, paragraph beginning, **"Injection, production and monitoring wells",** line #18 beginning, "experience at the location…",—per cent is one word.

-Pg. 11-5, paragraph beginning, **"A well completion report",** line #1 sentence beginning, "These reports will be…", remove this sentence and replace with; "The well completion reports will be submitted to the SD DENR-Water rights Program for review".

12.0 Attachment N – Changes in Injected Fluid

-Pg. 12-1, paragraph beginning, **"A bleed stream will be used",** line #1 beginning, "A bleed stream will be used…",—change "increase" to "increases".

13.0 Attachment O – Plans for Well Failures

-Pg. 13-1, paragraph beginning, **"The endangerment of USDWs",** line #8 (4th bullet), beginning, "Vertical migration of fluids…",—"test holes" should be added to this bullet.
-Pg. 13-3, paragraph beginning, **"Pre-operational excursion preventive"**, the numbered items in this paragraph start with #3. Item numbers 1 and 2 need to be added.

-Pg. 13-5, paragraph beginning, **"These controls work together",** line #3 sentence beginning, "The EPA UIC requirement…",—replace "EPA" with "SDDENR".

-Pg. 13-5, paragraph beginning, **"These controls work together",** line #4 beginning, "of defence for maintaining…"—need to correct the spelling of "defense".

-Pg. 13-7, paragraph beginning, **"It is improbable that failure",** line #3 sentence beginning, "As a result, annulus…"— sentence missing a word or words".

-On Pg. 3-10, paragraph beginning, **"With these design conditions",** eliminate the second sentence "Suggest insert information from KP pond design here to illustrate the magnitude of the ponds for the land application option."

14.0 Attachment P – Monitoring Program

-Pg. 14-1, paragraph beginning, **"During the Proposed Action",** line #5 beginning, "horizontally or vertically outside…"—remove the first "the" in this line.

-Pg. 14-2, paragraph beginning, **"Production zone monitoring wells",** line #9 beginning, "specified with the NRC's…", replace "NRC's Source Material License" with SD DENR's Class III UIC Permit".

-Pg. 14-2, paragraph beginning, **"Production zone monitoring wells",** line #12 beginning, "detection of an excursion…"—add "to" between "time" and "apply".

-Pg. 14-2, paragraph beginning, **"Production zone monitoring wells",** line #15 beginning, "no more than 400 feet…"—delete "s" from the word "productions".

-Pg. 14-4, paragraph beginning, **"South Dakota UIC Class III",** line #1 sentence beginning, "ARSD 74:29:11:32 …"—delete "74:29:11:32" and replace with "74:55:01:42".

-Pg. 14-4, paragraph beginning, **"South Dakota UIC Class III",** it appears this paragraph is in the wrong section. This paragraph should be in "**14.2.1 General Monitoring Procedure".**

-Pg. 14-4, paragraph beginning, **"Powertech's ground water monitoring",** line #4 beginning, "requirements were determined based …"—change "SDAR" to "ARSD"

-Pg. 14-5, paragraph beginning, **"http://water.usgs.gov/owq/Field Manual/.",** line #6

beginning, "SDAR 74:55:01:26:01 …"—change "SDAR" to "ARSD"

-Pgs. 14-5, 14-6, and 14-7, there is a large space between the paragraphs on pages 14-5 and 14-7 is there missing information or is this blank space intentional?

-Pg. 14-7, paragraph beginning, **"Monitoring safeguards utilized during",** line #1 beginning, "Monitoring safeguards utilized during …"— sentence missing a word or words".

-Pg. 14-7, paragraph beginning, **"Baseline production zone wells",** line #5 beginning, "They will be sample …"—add a "d" to the word "sample".

-Pg. 14-8, paragraph beginning, **"…be located within the production",** line #1 sentence beginning, "At the minimum …"—this sentence would be clearer if it read, "At a minimum, these wells will be completed in the aquifer overlying the production zone".

-Pg. 14-8, paragraph beginning, **"Nonproduction zone monitoring wells",** it appears this paragraph is in the wrong section at it discusses monitoring well locations. In addition, in the second sentence of this paragraph the words "monitoring well" are used twice, one set should be removed.

-Pg. 14-10, Table 14.1: **"Baseline Water Quality Parameters and Indicators for Groundwater",** in column 3 "Method" there is a footnote marker with method "A1030 E[1]". However, there is no corresponding footnote at the bottom of the table, please clarify

-Pg. 14-10, paragraph beginning, **"The monitoring program described",** line #10 beginning, "defence…"—need to correct the spelling of "defense".

-Pg. 14-12, paragraph beginning, **"significant events that took place",** lines #1-3 sentence beginning, "If an excursion is …"—this sentence is confusing; please rephrase to make it clearer.

15.0 Attachment Q – Plugging and Abandonment Plan

-Pg. 15-1, paragraph beginning, **"Wells will be opened",** line #4 beginning, "wells that are more…", add at the end of this sentence, "or less than 16 inches in diameter".

-Pg. 15-2, paragraph beginning, **"Bentonite grout, composed of",** line #3 beginning, "will contain a minimum …"—replace "if" with "of" between the word "density" and the number "9.4".

-Pg. 15-5, paragraph beginning, **"According to EPA 144.5(p)",** line #1 beginning, "According to EPA 114.5(p)…", add "ARSD 75:55:01:59.01" to this sentence.

-Pg. 15-5, paragraph beginning, **"According to EPA 144.5(p)",** line #3 beginning, "and Abandonment Report will…", replace "EPA" with "SD DENR-Water Rights Program".

-Pg. 15-5, paragraph beginning, **"The Plugging and Abandonment",** line #2 beginning,

"submission unless the EPA…", replace "EPA" with "SD DENR".

-Pg. 15-5, paragraph beginning, **"The Plugging and Abandonment)",** line #3 beginning, "period, the reports will be…", replace "EPA" with "SD DENR".

16.0 Attachment R – Necessary Resources

-Pg. 16-1, paragraph beginning, **"Following review and approval",** line #2 beginning, "instrument acceptable to EPA…", replace "EPA" with "SD DENR" in both places in this sentence.

17.0 Attachment S – Aquifer Exemption

-Pgs. 17-2 & 17-3, paragraph beginning, 'Spatial consideration are important", bullets 1 and 2 must have "40 CFR" added in front of "146.4" and "144.7(c)(1).

-Pg. 17-5, paragraph beginning, **"The cost of additional administrative",** line #2 beginning, "EPA for a new amended…", replace "EPA" with "SD DENR" in both places in this sentence.

-Pg. 17-8, paragraph beginning, **"In all four tests",** line #3 sentence beginning, "Sulfate was also generated …"—the word "lixiviant" is misspelled.

-Pg. 17-16, paragraph beginning, **"Table 17.3 contains the water quality",** it appears this and subsequent paragraphs are dealing with a new topic, this should be a new sub-section.

-Pg. 17-19, Table 17.4: **"Total Metals, EPA Testing Methods and Permit Limits Identified by Region 8 EPA",** in the regulatory limit column, the lifetime health advisory of 1.4 mg/l for boron is incorrect. According to the 2006 Edition of the EPA's Drinking Water Standards and Health Advisories the advisory for boron is 1 mg/l.

-Pg. 17-19, Table 17.6: **"Summary of Groundwater Radionuclide Concentrations from Quarterly Samples Wells",** the alpha particle dissolved concentration in well 631 for the second quarter of 2008 exceeds the MCL, but is not highlighted in the table. The uranium concentration in wells 677 and 678 for the second quarter of 2008 exceeds the MCL, but is not highlighted in the table. The radon 222 concentration in well 635 for the second quarter of 2008 exceeds the MCL, but is not highlighted in the table.

-Pg. 17-33, Table 17.16: **"Water Quality Regulatory Limits for Public Drinking Water Supply Systems",** in the EPA maximum contaminant level column, the lifetime health advisory of 1.4 mg/l for boron is incorrect. According to the 2006 Edition of the EPA's Drinking Water Standards and Health Advisories, the advisory for boron is 1 mg/l.

Appendix F - Pumping Tests

-Page 6-3, first sentence discusses "less permeable *ideologies*…", it appears this should

be "less permeable *lithologies*..."

Appendix H - Groundwater Quality Data

-All the ground water tables in this appendix are mislabeled, **"Appendix F"** they should be labeled **"Appendix H"**.