

# Powder River Gas – Coal Creek POD

## Compliance with

### Onshore Order #7: Disposal of Produced Water

#### **Introduction:**

In association with its Coal Creek CBNG testing project, Powder River Gas (PRG) has proposed in its POD to treat the produced water via an ion exchange process, and to mix the treated effluent with untreated water to the degree allowable without exceeding the in stream surface water quality criteria for EC and SAR. This mixed effluent would then be discharged to the Tongue River under a MPDES permit. Residual brine volumes are estimated to average approximately 1.0% of the total feed volume. The residual brine produce through this process will be shipped off site following all federal state and local laws. This brine will then be injected into a properly permitted Class 1 injection well. In association with its treatment plant PRG will need to construct an impoundment to allow for the settling of suspended solids prior to treatment, and to allow for storage capacity for times when maintenance of the treatment facility is required. This impoundment would be located on private surface/private minerals. This impoundment would be lined with a 20 mil polyethylene liner, and separated into 2 chambers; one each for treated and untreated water. A monitoring well would be installed within 50 feet topographically down-gradient of the impoundment in order to monitor for leakage.

According to section I.B of Onshore Order #7 (43 CFR 3160; OSO#7) the purpose of OSO#7 is to “*specify informational and procedural requirements for submitted of an application for the disposal of produced water, and the design, construction and maintenance requirements for pits...*” (I.B).

Section I.C of OSO #7 states that “*This Order is applicable to disposal of produced water from completed wells on Federal and Indian (except Osage) oil and gas leases. It does not apply to approval of disposal facilities on lands other than Federal and Indian lands*”. Section II.B of OSO#7 states that “*Federal lands means all lands and interests in lands owned by the United States which are subject to the mineral leasing laws, including mineral resource or nonmineral estates reserved to the United States in the conveyance of a surface or nonmineral estate*”.

#### **Treatment and Discharge to Surface Waters:**

The primary means of disposal of produced water for this project (~99%) would be via treatment and discharge to the Tongue River under a MPDES (NPDES) surface water discharge permit. The requirements for this option are discussed in section III.G.1 of OSO#7, which states:

*The person applying to use this disposal method shall furnish a copy of the NPDES permit issued by the EPA or the primacy State, a current water quality analysis and a Sundry Notice, Form 3160-5, describing site facilities (e.g., retention ponds, skimmer pits and equipment, tanks, and any additional surface disturbance). Operations from the point of origin to the point of discharge [are] under the jurisdiction of the BLM.*

*Operations from the point of discharge downstream are under the jurisdiction of EPA or the primacy State. [Bold added]*

Powder River Gas has applied for a MPDES permit from the Montana Department of Environmental Quality (MDEQ), and the EA for the Coal Creek POD is being prepared jointly with the MDEQ to fulfill its requirement under the Montana Environmental Policy Act (MEPA). A copy of this permit is included in Appendix B of this report. The effective date of this permit is January 1<sup>st</sup>, 2005. As a Condition of Approval (COA) for the Federal APDs associated with this project it is required that an effective MPDES permit be in place prior to the discharge of any produced water. Current water quality analysis and descriptions of the site facilities are included in the Coal Creek Plan of Development (POD). As such, this discharge to surface waters can be approved.

The operations between the points of origin for the produced water (the Federal CBNG wells) and the point of discharge for this project include the proposed impoundment, and the water treatment facility, both of which are located on private surface/minerals. Since the Scope of OSO#7 (I.C) states that it "*does not apply to approval of disposal facilities on lands other than Federal and Indian lands*" the requirement that "*operations from the point of origin to the point of discharge [are] under the jurisdiction of the BLM*" is interpreted to mean that all operations on Federal or Indian lands from the point of origin to the point of discharge are under the jurisdiction of the BLM. Therefore, the actual approval of these facilities is not within the jurisdiction of the BLM. The BLM does have jurisdiction over determining if removing water from the Federal lease to be disposed of at off lease facilities is appropriate (OSO#7 III.B.2.a.). The criteria for making this determination are contained in OSO#7, and these criteria will be applied to these facilities in order to evaluate the appropriateness of these facilities being used to manage of water produced from Federal wells.

The criteria for pits contained in OSO#7 will be applied to the impoundment, although this impoundment is not for "disposal" of the water, but rather for treatment (removal of sediment) and short term storage.

Section III.B.2.b.ii states:

*"When approval is requested for removing water that is produced from wells on leased Federal and/or Indian lands and is to be disposed of into a pit located on State or privately-owned lands, the operator shall submit to the authorized officer, in addition to a Sundry Notice, Form 3160-5, a copy of the permit issued for the pit by the State or any other regulatory agency, if required, for disposal in such pit. **Submittal of the permit will be accepted by the authorized officer and approval will be granted for removal of the produced water unless the authorized officer states in writing that such approval will have adverse effects on the Federal/Indian lands or public health and safety. If such a permit is not issued by the State or other regulatory agency, the requested removal of the produced water from leased Federal or Indian lands will be denied.**" [Bold added]*

Powder River Gas has applied for a permit for the impoundment from the Montana Board of Oil and Gas Conservation (MBOGC), and the EA for the Coal Creek POD is being prepared jointly with the MBOGC to fulfill its requirement under the MEPA. A copy of this application is included at the end of this appendix.

A MPDES permit from the MDEQ is not needed for discharge into this impoundment since it does not qualify as state waters. This is due to untreated CBNG water having been defined as a pollutant, and MCA - 75-5-103 (29) stating that:

- (a) *"State waters" means a body of water, irrigation system, or drainage system, either surface or underground.*
- (b) *The term does not apply to:*
  - (i) ***ponds or lagoons used solely for treating, transporting, or impounding pollutants"*** [Bold added]

As a COA for the Federal APDs associated with this project it is required that produced water can not be discharged to this impoundment unless an effective MBOGC permit is in place. Based upon the analysis in this Hydrology Technical Report, and the EA for this project, this impoundment is not anticipated to *"have adverse effects on the Federal/Indian lands or public health and safety"*.

The treatment facility is addressed under section III.G.3 of OSO#7, which states:

*"New technology or any other proposal meeting the objective of this Order that meets the requirements of State and Federal laws and regulations."*

The operator has certified that they will comply with all applicable Federal, State, and local laws and regulations. As such, approval to use this treatment system can be granted.

**Residual Brine:**

Approximately 1% of the feed water for the treatment facility would be injected into a properly permitted Class 1 injection well in Wyoming. Again, approval of this facility is not under the jurisdiction of the BLM, however the removal of water produced from Federal wells is under BLM jurisdiction, so the criteria contained in OSO#7 will be used to evaluate the appropriateness of these facilities being used to manage water produced from Federal wells.

The proposed Class 1 wells are located on private surface/minerals; as such they would be covered under section III.B.2.b.i which states:

*"When approval is requested for removing water that is produced from wells on leased Federal or Indian lands and that is to be injected into a well located on State or privately-owned lands, the operator shall submit to the authorized officer, in addition to a Sundry Notice, Form 3160-5, a copy of the **Underground Injection Control permit** issued for the injection well by Environmental Protection Agency or the State where the State the achieved primacy. **Submittal of the Underground Injection Control permit will***

***be accepted by the authorized officer and approval will be granted for the removal of the produced water unless the authorized officer states in writing that such approval will have adverse effects on the Federal/Indian lands or public health and safety."***

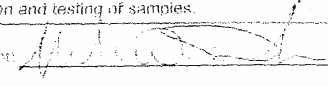
A print-off of the approved Class 1 UIC permits in Wyoming, showing that the proposed injection wells have been permitted, is included at the end of this appendix. These are pre-existing injection wells with existing UIC permits, therefore no COAs are required for the use of these facilities. Based upon the analysis contained in this Technical Report it is anticipated approving the use of these injection wells for the management of the produced brine will not "*have adverse effects on the Federal/Indian lands or public health and safety*".

In conclusion, with the applied COAs, all of the proposed water management facilities meet the requirements of OSO#7.

# **MBOGC Impoundment Application**

**MONTANA BOARD OF OIL AND GAS CONSERVATION**  
2535 ST. JOHNS AVENUE  
BILLINGS, MONTANA 59102  
(406) 656-0040

**Application For Permit To Construct Or Operate An Earthen Pit Or Pond**  
(Production Facility Only)

New pit <input checked="" type="checkbox"/> Existing pit <input type="checkbox"/>		Lease Name:
Operator <b>POWDER RIVER GAS, LLC</b>		Lease Type (Private/State/Federal): <b>Private and Federal</b>
Address <b>850 VAL VISTA</b>		Unit Name: <b>Coal Creek Federal</b>
City <b>SHERIDAN</b> State <b>WYOMING</b> Zip Code <b>82801</b>		Field or Area:
Telephone Number (307) 673-1500 Telefax Number (307) 673-1400		County: <b>Bighorn</b>
API Number: <b>25 ■■■■■■</b>		Location of Pit- 1/4 1/4 Section, Township, and Range: <b>SE/NW, Sec 7 T8S R41E</b>
Describe the purpose of the earthen pit or pond (if temporary, indicate anticipated time pit will be in use):  The proposed pit will be utilized in order to temporarily store treated coalbed natural gas (CBNG) produced effluent. The purpose of temporary storage is to allow for suspended sediment to settle out of treated CBNG effluent prior to discharge into the Tongue River.		
Number and type of wells using this pit: _____ Oil <u>18</u> Gas _____ Injection _____ Other (specify) _____		
Average water inflow: <u>15,428</u> bbls./day Maximum pit volume: <u>10,000</u> bbls.		
Describe type and origin of fluids, name and location of source wells, producing formations, and approximate fluid volume contributed by each well:  Fluid will be treated CBNG produced effluent.  For specific source well information, please see Exhibit 1.  Two water sample analyses are attached. The first is an untreated wellhead sample; the second is a post-treatment sample.		
Provide a copy of full water analysis with application for new pits only. Board may require a water analysis for existing pits. Please see attached water analysis.  The water analysis must include the date and source of sample (treater, wellhead, pit, etc.), and the name, address, and telephone numbers of laboratories. Standard methods must be used for all collection and testing of samples.		
BOARD USE ONLY Approved Date: _____ Permit Expires: _____ By: _____ Title: _____		Signed Agent:  Typed name and title: <u>Mark W. Diebert</u> Natural Resource Specialist - Agent for Powder River Gas, LLC Date: <u>September 25, 2003</u>
CONDITIONS OF APPROVAL ON REVERSE.		

**SUPPLEMENTAL INFORMATION**

Attach the following information to this permit application:

**FOR NEW PITS:** Attach diagrams of a top view and two side views of the pit or pond. The diagrams must show the length, width, depth, cut and fill, maximum fluid level, area of topsoil stockpile, and the height and width of berms. Identify the location of additional items such as fences, liners, monitoring wells, tanks, lines, siphons, or other equipment if used. Diagrams need not be prepared by an engineer or surveyor.

**FOR EXISTING PITS:** Attach color 3"x 5" (or larger) photographs of existing pit or pond. Indicate the date photographs were taken and name and address of the photographer. All photographs must accurately portray the size and condition of the earthen pit or pond at the time this application is submitted.

Describe the type and amount of material or liner used, if any, to seal the pit or pond. If a synthetic liner is used, indicate the liner thickness (mils), bursting strength, tensile strength, tear strength, puncture resistance, hydrostatic resistance, or attach the manufacturer's specification sheet to this application.

Due to the fact that all effluent entering the pit will be treated, no adverse environmental impacts to surface or ground water are anticipated, thus no liner is proposed.

Describe the proposed method of treatment and/or disposal of the liquid and solid contents upon abandonment of the pit or pond:

All effluent entering the pit will be treated to a level better than that of the ambient water quality of the Tongue River. In addition, water quality of treated effluent will be better than that required by the Montana Department of Environmental Quality for surface discharge.

Treated effluent will only be held in the pit temporarily and then pumped directly to the Tongue River. Based on this information no treatment or disposal of contaminants is anticipated after abandonment of the pit.

**NOTE:** The Operator must comply with all applicable federal, state, county, and local laws and regulations concerning the handling, treatment, and disposal of wastes.

This pit or pond was previously permitted by \_\_\_\_\_ (operator(s)) on the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_. Attach a copy(ies) of the previous permit(s).

**BOARD USE ONLY**

**CONDITIONS OF APPROVAL**

The operator must comply with the following condition(s):

Failure to comply with conditions of approval may void this permit.

# EXHIBIT 1

## Proposed CBNG Wells for the Coal Creek Project Area

Well Name	Flow Rate (bbls/day)	Formation	Township	Range	Section	Qtr/Qtr
Long Fed. 5-6W	857	Wall	8 South	41 East	6	SW/NW
Long Fed. 5-6F	857	Flowers-Goodale	8 South	41 East	6	SW/NW
Long Fed. 11-6W	857	Wall	8 South	41 East	6	NE/SW
Long Fed. 11-6F	857	Flowers-Goodale	8 South	41 East	6	NE/SW
Long Fed. 13-6W	857	Wall	8 South	41 East	6	SW/SW
Long Fed. 13-6F	857	Flowers-Goodale	8 South	41 East	6	SW/SW
Long Fed. 15-6W	857	Wall	8 South	41 East	6	SW/SE
Long Fed. 15-6F	857	Flowers-Goodale	8 South	41 East	6	SW/SE
Paradox 1-7W	857	Wall	8 South	41 East	7	NE/NE
Paradox 1-7F	857	Flowers-Goodale	8 South	41 East	7	NE/NE
Paradox 3-7W	857	Wall	8 South	41 East	7	NE/NW
Paradox 3-7F	857	Flowers-Goodale	8 South	41 East	7	NE/NW
Paradox 7-7W	857	Wall	8 South	41 East	7	SW/NE
Paradox 7-7F	857	Flowers-Goodale	8 South	41 East	7	SW/NE
Paradox 11-7W	857	Wall	8 South	41 East	7	NE/SW
Paradox 11-7F	857	Flowers-Goodale	8 South	41 East	7	NE/SW
Dunning 5-7W	857	Wall	8 South	41 East	7	SW/NW
Dunning 5-7F	857	Flowers-Goodale	8 South	41 East	7	SW/NW

Report ID: 010305564

WATER QUALITY REPORT

Client: Quaneco  
P. O. Box 7370  
Sheridan, WY

UNTREATED WELLHEAD SAMPLE

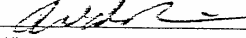
Project: Expiration Well  
Sample ID: Coal Creek #1  
Lab ID: 0103W05564  
Matrix: Water  
Condition: Cool/Intact

Date Received: 05/06/03  
Date Reported: 05/20/03  
Date Sampled: 05/06/03  
Time Sampled: 0945

Parameter	Analytical		Analysis						
	Result	Units	Units	PQT	Method	Date	Time	Init	
<b>General Parameters</b>									
Lab pH	8.6	s.u.		0.1	EPA 150.1	05/06/03	2121	DB	
Lab Conductivity @ 25°C	1,380	µmhos/cm		5	SM 2510 B	05/06/03	2121	DB	
Total Dissolved Solids @ 180°C	910	mg/L		10	SM 2540 C	05/07/03	1400	RM	
Total Suspended Solids	13	mg/L		5	SM 2540 D	05/08/03	0815	LK	
Total Alkalinity as CaCO <sub>3</sub>	822	mg/L		1.0	SM 2320 B	05/06/03	2121	DB	
Total Hardness as CaCO <sub>3</sub>	5.0	mg/L		1.0	SM 2340 B	05/15/03	1222	...	
Ammonia Nitrogen	0.80	mg/L		0.05	EPA 350.1	05/20/03	1205	RP	
Total Kjeldahl Nitrogen	<1	mg/L		1	EPA 351.1	05/20/03	1054	RP	
Nitrogen as N (Total)	0.8	mg/L		0.1	Calculations	05/20/03	1054	RP	
Chemical Oxygen Demand	<5	mg/L		5	SM 5220 D	05/07/03	1050	RM	
Oil & Grease	<5	mg/L		5	EPA 413.1	05/07/03	0830	DB	
Methane	30,000	mg/L		200	8015B	05/07/03		MS	
Total Phosphorus	0.22	mg/L		0.05	EPA 200.7	05/15/03	1222	BA	
<b>Anions</b>									
Bicarbonate as HCO <sub>3</sub>	930	mg/L	15.24	meq/L	1.0	SM 2320 B	05/06/03	2121	DB
Carbonate as CO <sub>3</sub>	35.7	mg/L	1.19	meq/L	1.0	SM 2320 B	05/06/03	2121	DB
Chloride	3.0	mg/L	0.08	meq/L	1.0	EPA 300.0	05/06/03	0633	LK
Fluoride	4.93	mg/L	0.26	meq/L	0.08	SM 4500-F-C	05/06/03	2121	DB
Nitrate + Nitrite as N	<0.01	mg/L	<0.01	meq/L	0.01	EPA 353.2	05/19/03	1023	RP
Sulfate	<1.0	mg/L	<0.01	meq/L	1.0	EPA 300.0	05/06/03	0633	LK
<b>Cations</b>									
Calcium	2.0	mg/L	0.10	meq/L	1.0	EPA 200.7	05/15/03	1222	BA
Magnesium	<1.0	mg/L	0.06	meq/L	1.0	EPA 200.7	05/15/03	1222	BA
Potassium	2.2	mg/L	0.06	meq/L	1.0	EPA 200.7	05/15/03	1222	BA
Sodium	369	mg/L	16.05	meq/L	1.0	EPA 200.7	05/15/03	1222	BA

These results are below the lab's detection limit.

Reference: U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.  
"Standard Methods For The Examination of Water and Wastewater", 18th ed., 1985.  
U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.  
Test Methods for Evaluating Solid Waste, SW-846, U.S.E.P.A., Third Edition, Final Update II, 1994.

Reviewed By: 

Report ID: 010305564

WATER QUALITY REPORT

Client: Quaneco  
P. O. Box 7370  
Sheridan, WY

UNTREATED WELLHEAD SAMPLE

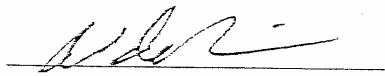
Project: Exploration Well  
Sample ID: Coal Creek #1  
Lab ID: 0103W05564  
Matrix: Water  
Condition: Cool/Intact

Date Received: 05/06/03  
Date Reported: 05/20/03  
Date Sampled: 05/06/03  
Time Sampled: 0945

Parameter	Analytical		Units	PQL	Method	Analysis		
	Result	Units				Date	Time	Init.
<b>Dissolved Metals</b>								
Aluminum	<0.1	mg/L		0.1	EPA 200.7	05/15/03	1436	BA
Arsenic	<0.003	mg/L		0.003	EPA 200.8	05/08/03	1152	MS
Barium	0.113	mg/L		0.005	EPA 200.8	05/08/03	1152	MS
Boron	0.6	mg/L		0.1	EPA 200.7	05/15/03	1436	BA
Cadmium	<0.0001	mg/L		0.0001	EPA 200.8	05/08/03	1152	MS
Chromium	<0.001	mg/L		0.001	EPA 200.9	05/02/03	1433	MH
Copper	<0.001	mg/L		0.001	EPA 200.8	05/08/03	1152	MS
Iron	0.03	mg/L		0.01	EPA 200.7	05/15/03	1436	BA
Lead	<0.003	mg/L		0.003	EPA 200.8	05/08/03	1152	MS
Manganese	<0.005	mg/L		0.005	EPA 200.7	05/15/03	1436	BA
Selenium	<0.001	mg/L		0.001	EPA 200.8	05/08/03	1152	MS
Strontium	0.074	mg/L		0.005	EPA 200.7	05/15/03	1436	BA
Zinc	0.01	mg/L		0.01	EPA 200.7	05/15/03	1436	BA
<b>Total Recoverable Metals</b>								
Aluminum	0.2	mg/L		0.1	EPA 200.7	05/15/03	1438	BA
Arsenic	<0.003	mg/L		0.003	EPA 200.8	05/08/03	1155	MS
Barium	0.131	mg/L		0.005	EPA 200.8	05/08/03	1155	MS
Boron	0.6	mg/L		0.1	EPA 200.7	05/15/03	1438	BA
Cadmium	<0.0001	mg/L		0.0001	EPA 200.8	05/08/03	1155	MS
Chromium	<0.001	mg/L		0.001	EPA 200.9	05/02/03	1433	MH
Copper	<0.001	mg/L		0.001	EPA 200.8	05/08/03	1155	MS
Iron	0.10	mg/L		0.01	EPA 200.7	05/15/03	1438	BA
Lead	<0.003	mg/L		0.003	EPA 200.8	05/08/03	1155	MS
Manganese	0.007	mg/L		0.005	EPA 200.7	05/15/03	1438	BA
Selenium	<0.001	mg/L		0.001	EPA 200.8	05/08/03	1155	MS
Strontium	0.077	mg/L		0.005	EPA 200.7	05/15/03	1438	BA
Zinc	<0.01	mg/L		0.01	EPA 200.7	05/15/03	1438	BA

Trace metals may vary in the samples listed

Reference: EPA 800/R94/111, "Methods for the Determination of Metals in Environmental Samples-Supplement I", May 1994

Reviewed By: 

Report ID: 010306410

1633 Terra Avenue  
 Sheridan, WY 82801

WATER QUALITY REPORT

Client: EMIT  
 P. O. Box 6785  
 Sheridan, WY 82801  
 Project: Misc.  
 Sample ID: Loop-Hyd. Lime  
 Lab ID: 0103W06411  
 Matrix: Water  
 Condition: Cool/Intact

TREATED SAMPLE

Date Received: 05/19/03  
 Date Reported: 05/20/03  
 Date Sampled: 05/16/03  
 Time Sampled: 1100

Parameter	Analytical Result	Units	PQL	Method	Analysis		
					Date	Time	Init.
<b>General Parameters</b>							
Lab pH	8.2	s.u.	0.1	EPA 150.1	05/19/03	2143	DB
Lab Conductivity @ 25°C	493	µmhos/cm	5	SM 2510 B	05/19/03	2143	DB
Total Alkalinity as CaCO <sub>3</sub>	237	mg/L	1.0	SM 2320 B	05/19/03	2143	DB
<b>Anions</b>							
Bicarbonate as HCO <sub>3</sub>	289	mg/L	1.0	SM 2320 B	05/19/03	2143	DB
Chloride	27.1	mg/L	1.0	EPA 300.0	05/19/03	1257	LK
<b>Cations</b>							
Calcium	126	mg/L	1.0	EPA 200.7	05/19/03	1600	BA
Magnesium	1.2	mg/L	1.0	EPA 200.7	05/19/03	1600	BA
Sodium	1.1	mg/L	0.2	EPA 200.7	05/19/03	1600	BA

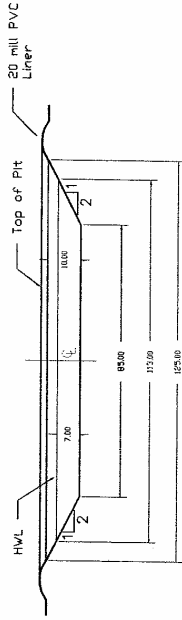
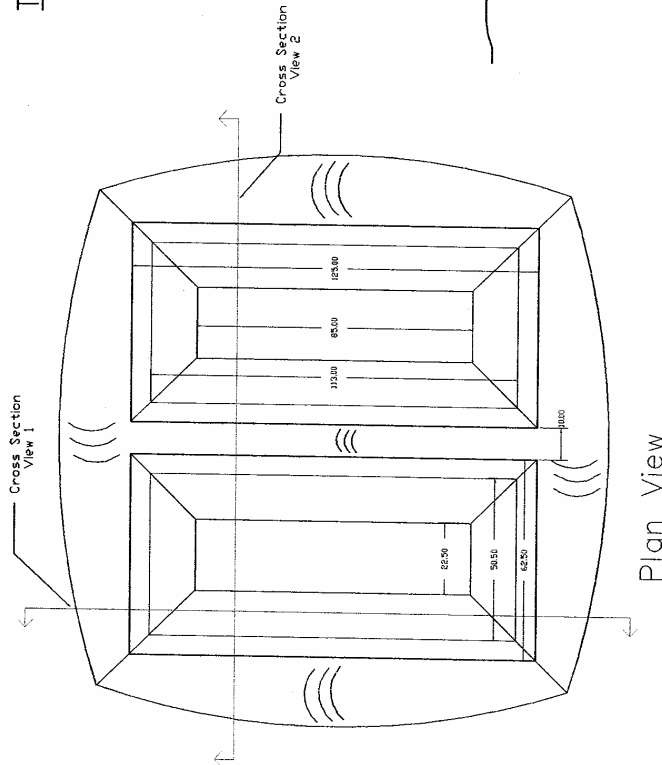
These results only apply to the samples tested.

Reference: U.S.E.P.A. 600/4-77-100, "Methods for the determination of water quality samples", 1989.  
 "Standard Methods for the Examination of Water and Wastewater", 18th ed., 1988.  
 EPA 800/R-82-100, "Methods for the Determination of Inorganic Substances in Environmental Samples", Aug. 1983.  
 EPA 800/R-84-111, "Methods for the Determination of Metals in Environmental Samples-Supplement I", May 1984.

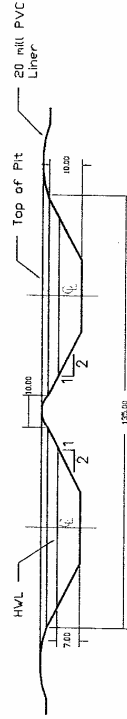
Reviewed By: Karen Barten  
 Karen Barten, Project Manager

Coal Creek Federal  
Treatment Facility Containment Pit

Reservoir Capacity = 1.2 acre-feet




Cross Section View 1



Cross Section View 2

Township 8 South  
Range 41 East  
Section 7 SE/NW

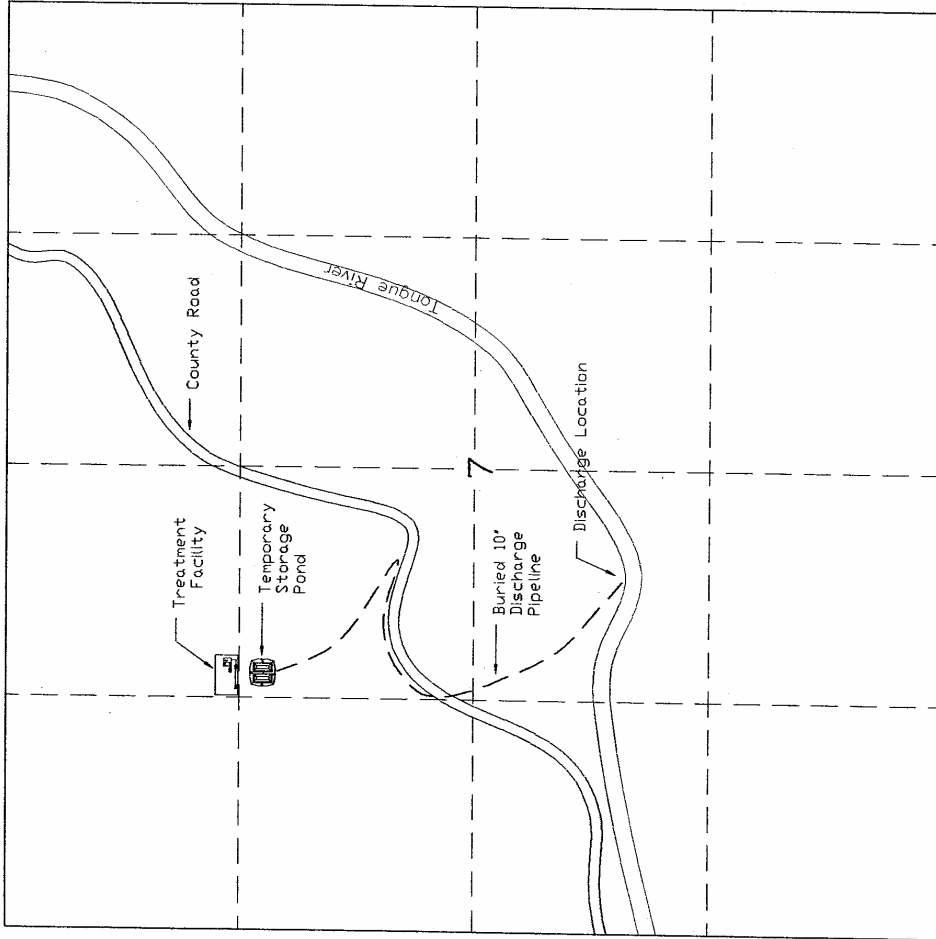
Latitude -- 45.15178  
Longitude -- -106.76066


Powder River Gas Coal Creek Project	
	
<b>WESTERN LAND SERVICES</b> Sheridan, WY 82801 307.675-1817	
Prepared By: HKH	Date: September 21, 2004

Coal Creek Federal  
Treatment Facility  
Containment Pit

Reservoir Capacity =  
1.2 acre-feet

Township 8 South  
Range 41 East  
Section 7 SE/NW

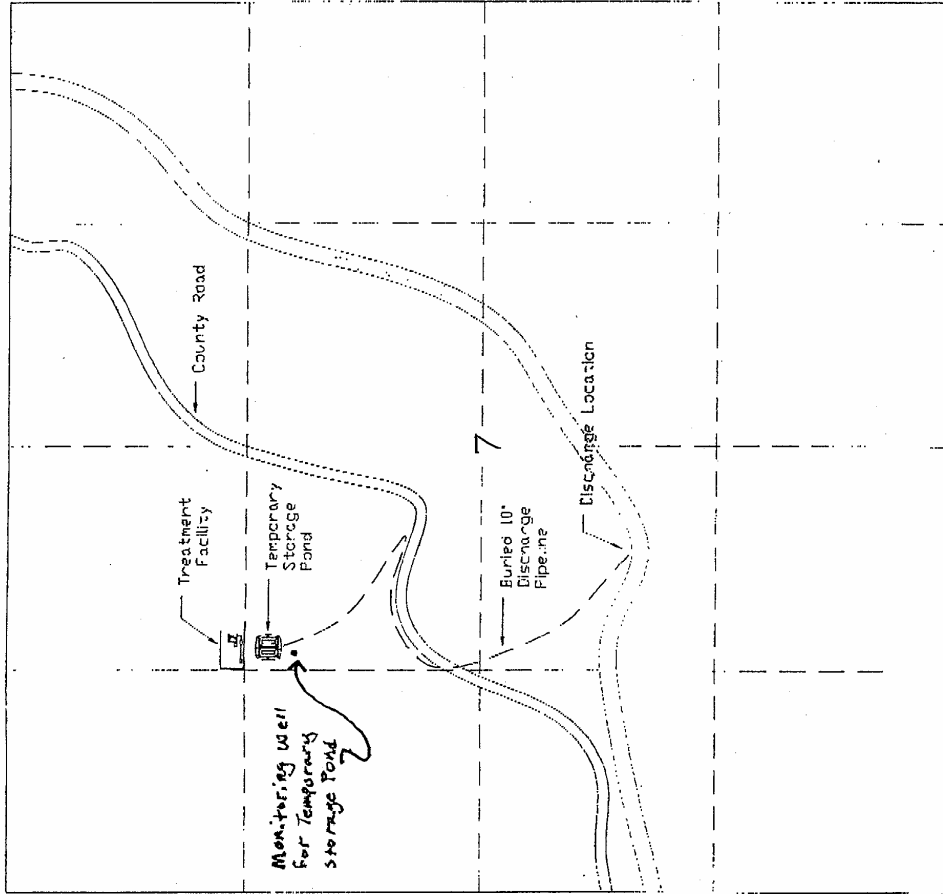



Powder River Gas Coal Creek Project	
	
<b>WESTERN LAND SERVICES</b> Sheridan, WY 82801 (307) 672-1817	
Prepared by: HCH	Date: September 21, 2004

Cool Creek Federal  
Treatment Facility  
Containment Pit

Reservoir Capacity =  
1.2 acre-feet

Township 8 South  
Range 41 East  
Section 7 SE/4NW



Powder River Gas Cool Creek Project	
	
WESTERN LAND SERVICES	
Shelton, WY 82801 (307) 637-1811	
Prepared by: HRCF	Date: September 21, 2004

# Y Environmental

## MONITOR WELL INSTALLATION DIAGRAM

**Project:** Western Land Leak Detection System Piezometers

**Location:** XYZ Project

**Contractor:** Y Environmental

**Method:** Direct Push, 2-3/8" O.D. , or 2-3/4" O.D.

**Monitor Well No.:** 1

**Borehole No.:** 1

**Crew:** YAM, RAM

**WELL BOX/HEAD:** 6"x5' Stickups

**Note:** All measurements taken from existing ground surface with the exception of the elevations which are tied in to the reference point at each site.

**WELL CASING:**

Inside Diameter: .95"  
 Material: PVC  
 Schedule: 80 screen = 0.010 slot

Riser/Blank: from (A): 0.5 ft.  
 to (E): 11.25 ft.

Slotted/Screened: from (E): 11.25 ft.  
 to (G): 21.25 ft.

End Cap from (G): 21.25  
 to (H): 21.5

**SURFACE SEAL:** Concrete: from (B): 0 ft.  
 to (C): 1 ft.

**BENTONITE SEAL:** Material Granular Bentonite  
 from (C): 1 ft.  
 to (D): 8.5 ft.

**SAND:** Material 10/20 Silica  
 from (D): 8.5 ft.  
 to (F): 22 ft.

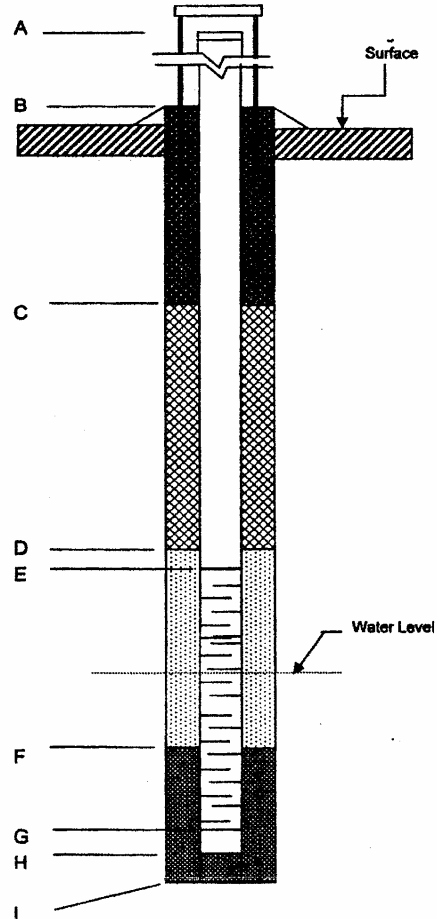
**NATURAL CAVE-IN:** from (F): n/a ft.  
 to (I): n/a ft.

**ELEVATIONS:**

Surface Elevation: n/a ft.  
 Top of Casing Elevation: n/a ft.

**STATIC WATER LEVEL:** Date: n/a ft.  
 Date: n/a ft.  
 Date: n/a ft.  
 Date: n/a ft.

Depth to Bottom Cap (H): 21.5 ft.  
 Depth to Bottom of Borehole (I): 22 ft.



**NOTE:** All Depths measured from existing ground surface

# **WY-DEQ UIC Permits**

**Wyoming DEQ**

Water Quality Division  
FURS System

**UIC Permits On File**

Report Date: 12/15/03

Company - Facility	County	Facility #	Total Wells	Under Const	Active Wells	Temp Aband	Perm Aband	Aband Prior	
<b>INJECTION CLASS: 1</b>									
<b>INJECTION SUB-CLASS: 11</b>									
Alpha Development Corporation-COLE CREEK F41-27G	Converse	WYS 009-009	1	0	1	0	0	0	
BP America Production Company-WHITNEY CANYON	Uinta	WYS 041-027	2	0	2	0	0	0	
ChevronTexaco-CARTER CREEK DISPOSAL WELLS	Lincoln	WYS 023-021	2	0	2	0	0	0	
Cogema Mining, Inc.-CHRISTENSEN RANCH DISPOSAL	Johnson	WYS 019-011	4	2	2	0	0	0	
Cogema Mining, Inc.-IRIGARAY DISPOSAL WELLFIELD	Johnson	WYS 019-004	2	2	0	0	0	0	
Cortez Energy, Inc.-CORTEZ ENERGY COMMERCIAL	Converse	WYS 009-014	1	0	1	0	0	0	
Devon Energy Production Company, L.P.-BEAVER CREEK	Fremont	WYS 013-032	3	1	2	0	0	0	
Dyno Nobel, Inc.-COASTAL CHEM, DISPOSAL WELLS	Laramie	WYS 021-045	4	1	3	0	0	0	
EOG Resources, Inc.-INJECTION WELL B5A-35	Sublette	WYS 035-002	1	0	1	0	0	0	
Kissack Water and Oil Service-HAMM NUMBER 1	Campbell	WYS 005-138	1	0	1	0	0	0	
Kissack Water and Oil Service-HORSE CREEK FEDERAL 1-8	Weston	WYS 045-005	2	1	1	0	0	0	
Kissack Water and Oil Service-KISSACK DISPOSAL WELL #1	Campbell	WYS 005-110	0	0	0	0	0	0	
Kissack Water and Oil Service-KUEHNE 31-25	Campbell	WYS 005-070	1	0	1	0	0	0	
Kissack Water and Oil Service-SHELL FOX #1	Campbell	WYS 005-081	1	0	0	0	1	0	
Landrica Development Company-KFx DISPOSAL WELLS	Campbell	WYS 005-093	3	1	0	2	0	0	
Mel's Water Service-FEDERAL HANAGAN 1-15	Fremont	WYS 013-059	1	0	1	0	0	0	
Power Resources, Inc.-HIGHLAND CLASS 1 INJECTION WELLS	Converse	WYS 009-011	3	2	1	0	0	0	
Power Resources, Inc.-NORTH BUTTE INJECTION SYSTEM	Campbell	WYS 005-030	2	2	0	0	0	0	
Power Resources, Inc.-RENO CREEK INJECTION WELLS	Campbell	WYS 005-013	2	2	0	0	0	0	
Power Resources, Inc.-SMITH RANCH DISPOSAL WELLS	Converse	WYS 009-035	2	0	2	0	0	0	
Prima Exploration Inc.-C-H MINNELUSA UNIT W1 #6	Campbell	WYS 005-072	1	0	0	0	1	0	
Quantum, Inc.-OLSEN NUMBER 1-A	Campbell	WYS 005-087	1	0	0	0	1	0	
Questar Pipeline Company-YELLOW CREEK BRINE DISPOSAL	Uinta	WYS 041-049	10	10	0	0	0	0	
Schmid Oilfield Services-GRAHAM RESERVOIR 1-14 DISPOSAL	Lincoln	WYS 023-029	1	1	0	0	0	0	
Wyoming Waste Water Disposal, LLC-KENNETH DESELMS #1	Laramie	WYS 021-036	1	0	1	0	0	0	
Yellow Creek Production and Water Disposal, LLC-CARPENTER	Uinta	WYS 041-016	1	1	0	0	0	0	
<b>Sub - Subtotal</b>					53	26	22	2	3
<b>SUBTOTAL</b>					53	26	22	2	3
<b>INJECTION CLASS: 3</b>									
<b>INJECTION SUB-CLASS: 3T</b>									
FMC Wyoming Corporation-FMC TRONA MINING PROJECT	Sweetwater	WYS 037-076	22	0	22	0	0	0	
Rhone Poulenc-O.C.I. IN SITU TRONA	Sweetwater	WYS 037-073	4	4	0	0	0	0	
<b>Sub - Subtotal</b>					26	4	22	0	
<b>INJECTION SUB-CLASS: 3U</b>									
Cogema Mining, Inc.-CHRISTENSEN RANCH AMENDMENT	Campbell	WYS 005-102	2588	0	164	2333	91	0	
Cogema Mining, Inc.-IRIGARAY COMMERCIAL ISL	Johnson	WYS 019-009	1580	0	0	1477	103	0	
Energy Fuels Nuclear, Inc.-RENO CREEK PROJECT	Campbell	WYS 005-099	0	0	0	0	0	0	
OPI Western-BISON BASIN COMMERCIAL ISL	Fremont	WYS 013-039	500	0	0	0	500	0	
Power Resources, Inc.-GAS HILLS ISL PROJECT	Fremont	WYS 013-046	0	0	0	0	0	0	
Power Resources, Inc.-HIGHLAND ISL MINE	Converse	WYS 009-020	3603	0	1005	2550	48	0	
Power Resources, Inc.-NORTH BUTTE IN SITU PROJECT	Campbell	WYS 005-089	500	460	39	0	1	0	
Power Resources, Inc.-RUBY RANCH ISL	Campbell	WYS 005-049	0	0	0	0	0	0	
Power Resources, Inc.-RUTH COMMERCIAL IN SITU PROJECT	Johnson	WYS 019-016	532	500	32	0	0	0	
Power Resources, Inc.-SMITH RANCH ISL PROJECT	Converse	WYS 009-030	1724	165	729	830	0	0	
Solution Mining, Inc.-BLIZZARD HEIGHTS COMMERCIAL ISL	Big Horn	WYS 003-003	0	0	0	0	0	0	
<b>Sub - Subtotal</b>					11027	1125	1969	7190	743

Monday, December 15, 2003

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