

BEFORE THE ENVIRONMENTAL QUALITY COUNCIL  
STATE OF WYOMING

**FILED**

JUN 20 2007

In the Matter of the Appeal )  
of William P. Maycock from ) Docket No. 06-3818  
WYPDES Permit No. WY0050857 )

Terri A. Lorenzon, Director  
Environmental Quality Council

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**WILLIAMS' PREHEARING MEMORANDUM**

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**INTRODUCTION**

Williams respectfully submits to the Council that the issues raised by Mr. Maycock when first filing his appeal in 2006 no longer exist, such that the appeal should be dismissed. After much deliberation, on June 19, 2007, Williams filed its request for a modification of the permit to make it far more restrictive with the requirement of full containment of produced water in reservoirs (Exhibit 1). Moreover, since October 26, 2006, DEQ has ordered Williams to continue its containment of its produced water discharges in reservoirs, a restriction Williams has complied with and will continue to do so (or face corrective action, see Exhibit 2) pending formal approval of Williams' application for full containment on this permit. Thus, with full reservoir containment restrictions, Mr. Maycock's requests to protect downstream grazing pastures and bottomlands from discharges of produced water down South Prong of Barber Creek ("South Prong") are realistically satisfied.

**THE MODIFICATION SOUGHT BY WILLIAMS TO FULLY CONTAIN PRODUCED WATER IN RESERVOIRS FULLY ADDRESSES PROTECTION OF THE DRAINAGE**

As Williams' attached application shows, Williams seeks to modify its permit to require full containment of produced water discharges to reservoirs; that is, reservoirs capable of containing all produced water plus up to a 50-year/24-hour storm event, which DEQ considers full containment of produced water. Such a permit amendment, once approved, would prohibit and

fundamentally change the nature of the existing discharge permit from one allowing discharges into the South Prong drainage (Option 2) into a much more stringent permit mandating full containment in reservoirs (Option 1B). In short, permitted discharges of produced water will no longer be allowed down South Prong under WYPDES Permit No. WY0050857<sup>1</sup>. Such a modification would formalize and make part of the actual permit DEQ's requirement for Williams to contain its produced water "for protection of downstream crop and livestock production" (DiRienzo Oct 26, 2006 Letter, Ex. 2).

Protection of South Prong downstream pastures/bottomlands on Mr. Maycock's ranch are at the heart of the issues and landowner concerns in this case. In a June 6, 2006 letter to DEQ, Mr. Maycock's counsel requested DEQ to "*modify* or terminate permit WY0050857 so as to protect down drainage grazing pastures and bottomlands and other lands from the adverse impacts of the produced CBM effluent *proposed to be discharged under this permit*" (emphasis added). In September 2006, Maycock's counsel sent another letter to DEQ stating Williams will "start discharging water down the South Prong" and *requesting a major modification* to protect downstream agricultural uses. Finally, in December 2006, this Petition was filed, focusing on "water that Williams proposes to discharge from the on-channel reservoirs [that] will cross the Maycock ranch" (Pet. at ¶ 3h).

Without belaboring the obvious, the very predicate for this appeal, that Williams will discharge produced water from its reservoirs down the South Prong drainage on Mr. Maycock's ranch, simply would not occur with a full containment permit requirement. Protection of

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<sup>1</sup> A rare and huge storm event that exceeds the 50 year/24-hour freeboard capacity of a reservoir to hold all produced and stormwater after such an event could result in a discharge of produced water mixed with rainfall down the South Prong drainage. Reasonable environmental protection does not and should not include an event that presumably occurs only once every 50 years from a massive rainfall, approximately 3.2 inches of rain in 24 hours in the Powder River Basin.

downstream lands is thus assured, with no need to expend the limited time and resources of the Council or the parties on an academic exercise that, under the current circumstances, does nothing to contribute to environmental protection.<sup>2</sup>

### **CONCLUSION AND ACTION REQUESTED**

The core issues of this permit appeal, Williams' previous ability to discharge produced water down the South Prong drainage and the environmental impacts from such discharges down that drainage are simply no longer issues in this case. Williams now formally sought to modify its permit to prohibit such discharges, substituting a full containment in reservoirs requirement, such that the discharges down the drainage complained of by Mr. Maycock will not happen. Such a modification will memorialize in the permit what DEQ ordered several months ago.

It is undeniable that the highly restrictive containment now sought by Williams, preventing discharges and their impacts (whatever those might have been) down the drainage, resolves the issues in the appeal. To dwell on those issues, no longer part of this case, wastes precious time and resources of the Council, DEQ and Williams with no possibility of a corresponding benefit to *the environment*.

If the parties cannot agree to the Council dismissing this appeal, then Williams respectfully requests the Council to dismiss the appeal<sup>3</sup> as moot, since the issues of discharge down the drainage and impact of those discharges are no longer in controversy or in need of decision.

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<sup>2</sup> With all respect to the Council's June 13 Order, the parties cannot reasonably comply at this time with requirements for witness, stipulation and exhibit requirements since no discovery schedule has been set nor discovery conducted. Moreover, such requirements should also be rendered moot by Williams' application to modify the challenged permit to full containment and Williams' operating under the DEQ containment order until that application is acted upon.

<sup>3</sup> If necessary, and if the parties cannot reasonably agree that the issues in this appeal would be resolved by the full containment modification, Williams will file a motion to dismiss, and any further scheduling of this case should begin with such a dispositive motion and a requirement that Mr. Maycock amend his petition to allege violations not resolved by the permit modification.

Respectfully submitted June 20, 2007.

A handwritten signature in black ink, appearing to read "Jack D. Palma, II", written over a horizontal line.

Jack D. Palma, II, P.C.  
Mark R. Ruppert  
Matt J. Micheli  
Holland & Hart LLP  
P. O. Box 1347  
Cheyenne, WY 82003-1347  
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Facsimile: (307) 778-8175

ATTORNEYS FOR WILLIAMS  
PRODUCTION RMT CO.



**CERTIFICATE OF SERVICE**

I hereby certify that on June 20, 2007, I served the foregoing Prehearing

Memorandum to the following by:

Mike Barrash  
Sr. Assistant Attorneys General  
Wyoming Attorney General's Office  
123 Capitol Building  
Cheyenne, WY 82002  
(307) 777-3542 - facsimile

- U.S. Mail, postage prepaid
- UPS – overnight delivery
- Hand Delivery
- Fax
- E-mail (mbarra@state.wy.us)

Tom C. Toner  
Attorney At Law  
319 W. Dow Street  
P.O. Box 6288  
Sheridan, WY 82801-1688  
(307) 672-6250 - facsimile

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1



*CBM Associates, Inc.*

345 Sinclair St. • Gillette, WY 82718 • Office: (307) 686-6664 • Fax: (307) 686-6640

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GROUNDWATER & SURFACE WATER HYDROLOGY • WATER RESOURCE MANAGEMENT • ENVIRONMENTAL PERMITTING & COMPLIANCE

June 18, 2007

Ms. Jennifer Zygmunt  
Wyoming Department of Environmental Quality  
Water Quality Division  
122 West 25th Street, Herschler Bldg. 4-W  
Cheyenne, Wyoming 82002

**RE: Major Modification for WY0050857 – South Prong Barber Creek**  
Williams Production RMT Company

Dear Ms. Zygmunt:

Please approve the enclosed modification for WY0050857-South Prong Barber Creek. Included are the following items:

- WYPDES Major Modification for Coal Bed Natural Gas produced water
- Tables 1A and 1B: Outfall Information
- Table 2: Well Information
- Table 3: Reservoir Information
- Table 4: Bonding Information
- Historical Flow
- Water Balance and Water Balance Explanation
- Watershed Calculations
- Representative Water Quality
- Compliance Evaluation with an Exceedance Summary Table
- Permit Application Map

Williams Production RMT Company seeks authorization to discharge produced water under an Option 1B WYPDES permit. Please note that this permit was previously permitted under Option 2. The produced water will be discharged to eleven (11) on-channel reservoirs located in Class 3 waters of the state. Capacity retained within each location will contain the run-off from a 50yr-24hr storm event.

If you have any questions, please call me at (307) 686-6664.

Sincerely,

Mark Dunn, E.I.T.  
Environmental Engineer

cc: Williams Production RMT Company  
CBM Associates, Inc. – Gillette and Laramie

*CBM ASSOCIATES, INC. ADDITIONAL OFFICES:*

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920 E. Sheridan Street  
Laramie, WY 82070  
307.742.4991

500 W. Lott Street  
Buffalo, WY 82834  
307.684.0252

743 Horizon Court, Suite 250  
Grand Junction, CO 81506  
970.420.2224

3036 South Flower Court  
Lakewood, CO 80227  
303.973.2302

SUBMIT ONE HARD COPY AND ONE ELECTRONIC COPY

**WYOMING POLLUTANT DISCHARGE ELIMINATION SYSTEM**

**APPLICATION FOR PERMIT TO SURFACE DISCHARGE PRODUCED WATER FROM COAL BED METHANE NEW DISCHARGES, RENEWALS, OR MAJOR MODIFICATIONS**

Revised: 06-22-06

**For Agency Use Only**

Application Number

WY00 \_\_\_\_\_

Date Received:

\_\_\_\_\_  
(mo/dav/vr)

PLEASE PRINT OR TYPE (Submission of illegible materials will result in return of the application to the applicant)

1. Check the box corresponding to the type of application being applied for:

New CBM permit

CBM permit renewal

Permit number

Expiration Date:

CBM permit major modification

Permit number

WY0050857 Expiration Date: 12/31/2008

2. Identify the river basin in which the discharge will occur:

Belle Fourche

Cheyenne

Powder

Little Powder

Tongue

Other (identify)

3. Select permit option(s): *if more than one option is selected, the applicant must describe which option applies to which outfall.*

Option 1A – Discharge is contained within a class 4 water body: Containment within an off-channel pit (class 4C) OR containment within a headwater reservoir situated within a class 4 channel and capable of containing all effluent plus up to a 50-year / 24-hour storm event.

Option 1B – Discharge is contained within a class 3 water body: Containment within a natural closed basin or playa lake (class 3A) OR containment within a headwater reservoir situated within a class 3 channel and capable of containing all effluent plus up to a 50-year / 24-hour storm event.

Option 2 – This option includes any on-channel discharge (including discharge into an on-channel reservoir) that does not meet the impoundment requirements specified in options 1A or 1B above.

If applying for outfalls under Option 2, will discharges from the facility proposed in this application require the use of assimilative capacity credits for salt and sodium in the Powder River?

Yes

No

4. General Facility Location: Township(s) **49 and 50** Range(s) **76**

Immediate Receiving Stream(s) **Tributary to South Prong Barber Creek**

5. Name of the facility producing the discharge (this is the facility name that will appear on the WYPDES permit)

**South Prong Barber Creek**

6. Company, Contact Name, mailing address, e-mail address, and telephone number of the individual or company which owns the facility producing the discharge, and the person (consultant) responsible for permit submission.

<i>Company Contact Name</i> <b>Peggy Carter</b>	<i>Consultant Contact Name</i> <b>Mark Dunn</b>
<i>Company Name</i> <b>Williams Production RMT Company</b>	<i>Company Name</i> <b>CBM Associates, Inc.</b>
<i>Mailing Address</i> <b>300 North Works Ave.</b>	<i>Mailing Address</i> <b>345 Sinclair Street</b>
<i>City, State, and Zip Code</i> <b>Gillette, WY 82716</b>	<i>City, State, and Zip Code</i> <b>Gillette, WY 82718</b>
<i>Telephone Number</i> <b>(307) 686-1636</b>	<i>Telephone Number</i> <b>(307) 686-6664</b>
<i>E-Mail Address</i> <b><u>peggy.carter@williams.com</u></b>	<i>E-Mail Address</i> <b><u>mdunn@cbmainc.com</u></b>

7. If submitting a major modification or permit renewal, please describe all requested permit modifications (i.e. add 2 outfalls, add 23 wells, move outfall 001 500 feet...):

1. **Reclassify as an Option 1B permit**
2. **Delete 10 wells**
3. **Add 18 wells**
4. **Remove outfalls 003 and 007**
5. **Remove two reservoirs**
6. **Remove Water Quality Monitoring Stations**
7. **Add flow monitoring stations (FMS)**
8. **Add containment units (CU)**
9. **Raise the total recoverable arsenic limit in accordance with the antidegradation policy and new Chapter 1 standard**
10. **Raise the dissolved chloride limit to 230 mg/L in accordance with Class 3 protection**
11. **Replace total recoverable aluminum requirements with dissolved aluminum requirements**
12. **Remove routine monitoring requirements for arsenic**
13. **Reduce monitoring of total recoverable barium from semi-annual to initials only**

\*NOTE: Major modification applications requesting to increase the permitted flow for a facility will be processed as RENEWALS. Major modification applications for permits within six months of their expiration date will also be processed as RENEWALS.

8. Name(s) and mailing address(es) of owner(s) of the surface rights on whose land the discharge occurs (in cases where the land is owned by the state or federal government but surface rights are leased to a private individual, provide lessee's name and address)

**Please see the attached list of land owners.**

9. For all facilities relying on reservoirs of any type as part of their water management plan, attach a water balance that demonstrates, considering total maximum projected discharge inflows, natural precipitation, evaporation and infiltration, the amount of the discharge that will be contained within the reservoirs, and the circumstances and

volume of effluent that could potentially be discharged. If applying for an Option 1A or 1B permit, the water balance must demonstrate that the containment unit will be adequately sized to contain all projected discharge and storm water runoff from a 50 year, 24 hour storm event. If actual flow rates are available, use the maximum flow rate from all active wells within the previous six months of operation in the water balance.

**Please see attached water balance and explanation. The enclosed water balance demonstrates full containment of a 50yr-24hr storm event.**

10. For Option 2 facilities with planned reservoir releases to the Powder River, include analyses of expected water quality within the reservoirs. Reservoir water quality analyses must include all constituents, with the appropriate detection limits and units, listed in the table included with question #19 of this application.

**Not applicable, filing for an option 1B non-discharging permit.**

11. Attach a description and a clear, legible, detailed topographic map of the discharging facility. Include the following:
- A legend
  - Well locations
  - Ponds **Not applicable**
  - Reservoirs
  - Stock tanks **Not applicable**
  - Discharge points (outfalls)
  - Immediate receiving streams
  - Water quality monitoring stations **Not applicable**
  - Irrigation compliance points **Not applicable**
  - Location of nearest downstream irrigator **Not applicable, filing for an option 1B permit**
  - Section, Township, and Range information
  - If proposing to use class 4C off-channel pits, include footprint outline of the proposed pits. To denote setback distance, include a distance marker from closest side of pit to the nearest water feature, floodplain, or stream alluvium. Identify latitude and longitude in decimal degrees (using a minimum of 6 decimal places) for each end point of the setback distance marker. **Not applicable**

**Please see the attached permit map.**

*If any of the above are not applicable please indicate in the description and include a brief explanation as to why the item is not applicable)*

12. Describe the control measures that will be implemented to prevent significant damage to or erosion of the receiving water channel at the point of discharge.

**Produced water will be discharged slowly through a vertical, large diameter riser pipe and allowed to flow down the side of the corrugated pipe to dissipate energy. The discharged water will pass over rip-rap or scoria placed at a gentle slope prior to entering the receiving stream.**

13. Describe the control measures that will be implemented to achieve water quality standards and effluent limits. If proposing to utilize a treatment process, provide a detailed description of the treatment process, including, but not limited to: Water quality analyses demonstrating the effluent quality before and after treatment; waste stream volumes and planned method of disposal; aquatic life toxicity data for any chemicals being used in the treatment process; description of how the chemicals will be handled at the facility and the potential for any impacts to waters of the state in the event of a spill; and diagrams of the facility indicating the water treatment path. Additional sheets and diagrams may be attached.

**The discharge riser may include a metal collar to increase aeration of the produced water. This added aeration will aid in the oxidation of dissolved metals, particularly iron. The oxidized metal will precipitate out of the flow and be deposited in the rip-rap or scoria flow paths.**

14. Outfall locations must be established as part of a preliminary field reconnaissance survey using GPS or conventional survey equipment and documented in Table 1. Please document the type of equipment used, the expected accuracy of your measurements, and a brief rationale for locating the outfalls at the requested sites below.

**Outfall locations were determined using a handheld GPS unit with an accuracy of generally 60 feet or better. The outfalls are located on ephemeral stream channels in locations where the discharged water will benefit livestock and wildlife.**

15. Complete the attached Table 1. Provide all the information requested in the table for each proposed discharge point or monitoring point. If proposing changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Option 2 permits, except those located in the Belle Fourche or Cheyenne River Basins, must include water quality monitoring station locations. Option 1B headwater reservoir discharges (reservoirs other than playa lakes capable of 50 year, 24 hour stormwater runoff containment) must include flow monitoring station locations. Option 1A and 1B permits must include containment unit monitoring station locations. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.

**Please see the attached Tables 1A and 1B: Outfall Information**

16. Complete the attached Table 2. Provide all the information requested in the table for each well associated with this proposed discharge authorization. If proposing changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided.

**Please see the attached Table 2: Well Information**

17. Complete the attached Table 3. Provide all the information requested in the table for each reservoir proposed for containment of CBM produced water. Specified locations refer to the approximate center of the reservoir. If proposing changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.

**Please see the attached Table 3: Reservoir Information**

18. Complete the attached Table 4. Provide all information requested in the table related to reservoir bonding requirements for each reservoir proposed for the containment of CBM produced water. If proposing any changes (a major modification) to an existing facility, clearly indicate the desired changes on the table. Additional tables may be attached. Use the format provided. Information related to reservoirs is only required if the facility's water management plan includes reservoir containment.

**Please see the attached Table 4: Bonding Information**



19. Provide the results of water analyses for a sample collected from a location representative of the quality of the water being proposed for discharge for all of the chemical parameters listed in the table below. The sample must be collected from well(s) or outfall(s) within a twenty mile radius of the proposed facility's location, and from the same coal formation(s) and the same approximate depth(s) as proposed in this application. If filing an application for a permit renewal or modification, the representative sample must be collected from the facility being proposed for renewal or modification. Explain why this sample is representative of the produced water to be discharged.

**The initial laboratory analysis from WY0050857-006 is representative of Big George production within the area. Laboratory analyses from the Gates-Wall and Werner coal seams have been included. These analyses are associated with wells approximately 4.8 – 5.3 miles from the proposed permit area and should be considered representative of each coal seam**

Sample ID	Sample Date	QTR/QTR	SEC	TWP	RNG	FORMATION
PW 42 21 5075W 49 005 48543	2/23/2006	SENE	21	50	75	Werner
PW 32 28 5075GW 49 005 54930	2/23/2006	SWNE	28	50	75	Gates-Wall
DP WY0050857 006 ET40	4/6/2005	SENW	2	49	76	Big George

*Samples from co-mingled coal seams are acceptable as long as the sample(s) meet the following criteria:*

- all of the coal seams being proposed for development are represented in the co-mingled sample, with no contribution from coal seams not being proposed for development at the new facility.
- the ratio of each coal seam's contribution is approximately the same in the sample and the proposed development,
- documentation is provided to verify the criteria listed in A. and B.

The analyses must be conducted in accordance with approved EPA test procedures (40 CFR Part 136). Include a signed copy of your lab report that includes the following:

- detection limits
- results of each of the chemical parameters at the chemical state given below
- quarter/quarter, section, township and range of the sample collection location
- Time and date of sample collection
- Time and date of analysis for each parameter
- Analyst's initials for each parameter
- Detection limit for each parameter as achieved by the laboratory
- WYPDES permit number and outfall number, where the sample was collected.
- Origin of produced water (coal seam and legal location of sample collection location)

If more than one coal seam is being proposed for development, the permittee must submit a lab analysis and complete information characterizing water quality from each coal seam being proposed for development. If the permittee is proposing to include discharges from a coal seam not previously developed at this facility, the permittee must submit a lab analysis and complete information characterizing water quality from the new coal seam being proposed for development. A mixing analysis may be required if the representative water quality analysis from the new coal seam indicates that the inclusion of the new effluent source may result in degradation of existing effluent quality. Analyses must be provided in the units listed below.

Parameter* (See notes following the table on chemical states)	Required Detection Limits and Required Units
Alkalinity, Total	1 mg/l as CaCO <sub>3</sub>



<u>Parameter*</u> (See notes following the table on chemical states)	<u>Required Detection Limits and Required Units</u>
Aluminum, Total Recoverable	50 µg/l
Arsenic, Total Recoverable	1 µg/l
Barium, Total Recoverable	100 µg/l
Bicarbonate	10 mg/l
Cadmium, Dissolved	5 µg/l
Calcium, Dissolved	50 µg/l, report as mg/l
Chlorides	5 mg/l
Copper, Dissolved	10 µg/l
Dissolved Solids, Total	5 mg/l
Fluoride, Dissolved	100 µg/l
Hardness, Total	10 mg/l as CaCO <sub>3</sub>
Iron, Dissolved	50 µg/l
Lead, Dissolved	2 µg/l
Magnesium, Dissolved	100 µg/l, report as mg/l
Manganese, Dissolved	50 µg/l
Mercury, Dissolved	1 µg/l
pH	to 0.1 pH unit
Radium 226, Total Recoverable	0.2 pCi/l
Radium 228, Total Recoverable**	0.2 pCi/l
Selenium, Total Recoverable	5 µg/l
Sodium Adsorption Ratio	Calculated as unadjusted ratio
Sodium, Dissolved	100 µg/l, report as mg/l
Specific Conductance	5 micromhos/cm
Sulfates	10 mg/l
Zinc, Dissolved	50 µg/l

*\*Discharges into drainages other than the Powder River geologic basin may require analysis of additional parameters, please contact the WDEQ for a separate list.*

*\*\*This parameter is only required for those discharges located within one stream mile of a class 2 water.*

20. For new facilities, provide the expected (estimated) flow volume from each well in gallons per day, and provide the rationale behind the flow volume estimate. For existing facilities, provide actual flow data from all wells within the last six months.

Flow: **18,900 gpd/well**

Rationale: **Current discharge rate**

21. For applications for new facilities, are any of the required chemical constituents in the laboratory analysis present in concentrations above Wyoming Water Quality Standards?

YES  **NO Not applicable. This is an existing facility.**

If the answer to question # 16 is yes, answer 21.a. – 21.b below. If no, proceed to question 23.

a. Which constituents?

**Not applicable**

b. Has this constituent been addressed in the response to question 13?

**Not applicable**

22. For applications for existing facilities, has the facility ever exceeded permit limits or water quality standards?

YES  NO

If the answer to question 22 is yes, answer 22.a. – 22.c. If no, proceed to question 23.

a. Which constituents?

**Dissolved iron, dissolved zinc, total radium 226**

b. Has the exceedance been addressed?

**Yes**

c. Describe how the exceedance was addressed.

**Please see the attached Compliance Evaluation and Exceedance Summary Table for a complete description of compliance issues specifically addressing any exceeding parameters, sample results, dates of correspondence to the WDEQ, and resolution methods.**

23. Is there active irrigation in the drainage downstream of the discharge? *(Please note that this response includes both artificially and naturally irrigated bottomlands as defined in the Draft Agricultural Use Protection Policy for the interpretation and implementation of Chapter 1, Section 20 of the Wyoming Water Quality Rules and Regulations ).*

**Not applicable, filing for an option 1B permit.**

YES  NO

If yes, at a minimum, the WYPDES Program requires submission of the following information:

1. Location(s) of irrigation diversions and/or sub-irrigated acreage;
2. Type(s) of Crops grown under irrigation;
3. Description of Irrigation Practices
4. A topographic map showing irrigated acreage, any structures, ownership of irrigated acreage.

**Not applicable, filing for an option 1B permit.**

In addition to the minimum information described above, the WYPDES Program may require additional information should the permittee request site-specific effluent limits protective of irrigation uses. Contact the WYPDES Program for more information regarding requirements for site-specific SAR, TDS, and EC limits.

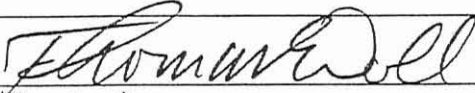
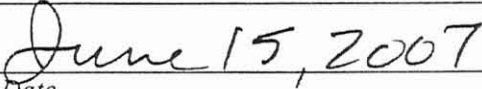
24. Provide name(s) and address(es) for all downstream irrigators between the outfalls and the mainstem.

**Not applicable, filing for an option 1B permit.**

25. Provide a listing of all active permits or construction approvals received or applied for by the applicant for the site described in this permit application in accordance with *Chapter 2, Section 5.T. of the Wyoming Water Quality Rules and Regulations*.

- See Table 2 for a complete list of API numbers associated with this permit.
- SWPPP: South Prong 1 & 2, permit WYR102254

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I am requesting **11** outfalls in this application.

Thomas E. Doll, P.E.	District Manager
<i>Printed Name of Person Signing*</i>	<i>Title</i>
	
<i>Signature*</i>	<i>Date</i>

\*All permit applications must be signed in accordance with *Section 14, Chapter 2 of the Wyoming Water Quality Rules and Regulations*, “for” or “by” signatures are not acceptable.

Section 35-11-901 of Wyoming Statutes provides that:

Any person who knowingly makes any false statement, representation, or certification in any application ... shall upon conviction be fined not more than \$10,000 or imprisoned for not more than one year, or both. Permittees are required to retain records of all data used to complete permit applications in accordance with *Chapter 2, Section 5, Part 5.V.vii of the Wyoming Water Quality Rules and Regulations*.

Mail this application to:

WYPDES Permits Section  
 Department of Environmental Quality/WQD  
 122 West 25<sup>th</sup> Street, Herschler Building, 4W  
 Cheyenne, WY 82002

Permits issued under the WYDPES Program are subject to an annual \$100 permit fee for as long as permit is active. The annual billing cycle is based on the state’s fiscal year from July 1 to June 30. There is no need to pay the fee with the application. All permit fees are invoiced after June 30<sup>th</sup> of each year.

## Land Owners

Record, Joan and Jerry  
273 State Hwy. 335  
Sheridan, WY 82801

Record, Phillip T.  
273 State Hwy. 335  
Sheridan, WY 82801

Table 1A - Outfall Information: WY0050857 - South Prong Barber Creek

Desired Changes	Discharge Point (Outfalls) #	Immediate Receiving Stream	Mainstem	Distance to Closest 2AB Channel & Mainstem (Miles)	Quarter / Quarter	Section	Twn (N)	Rng (W)	Nad 83 Latitude	Nad 83 Longitude	County	Reservoir Name and Type
	001	Tributary to South Prong Barber Creek	Powder River	18.78	SESW	34	50	76	44.256536	105.990161	Campbell	Laney (On-channel)
	002	Tributary to South Prong Barber Creek	Powder River	18.76	SESW	34	50	76	44.257486	105.988599	Campbell	Antelope (On-channel)
Removed	003	Tributary to South Prong Barber Creek	Powder River	18.78	NWNE	3	49	76	44.254632	105.982853	Campbell	Grasshopper Hollow (On-channel)
	004	Tributary to South Prong Barber Creek	Powder River	18.77	SESE	34	50	76	44.257046	105.978005	Campbell	Bessie Holms (On-channel)
	005	Tributary to South Prong Barber Creek	Powder River	19.11	SENE	3	49	76	44.251165	105.977081	Campbell	Grassy Flat (On-channel)
	006	Tributary to South Prong Barber Creek	Powder River	19.42	SENW	2	49	76	44.251243	105.968003	Campbell	Cricket (On-channel)
Removed	007	Tributary to South Prong Barber Creek	Powder River	19.10	SENW	2	49	76	44.252623	105.966653	Campbell	Deception (On-channel)
	008	Tributary to South Prong Barber Creek	Powder River	19.21	SENW	2	49	76	44.249972	105.966102	Campbell	Wide Top (On-channel)
	009	Tributary to South Prong Barber Creek	Powder River	19.87	NWNE	11	49	76	44.238823	105.961422	Campbell	All the way (On-channel)
	010	Tributary to South Prong Barber Creek	Powder River	19.80	SENE	11	49	76	44.237883	105.960572	Campbell	Midway (On-channel)
	011	Tributary to South Prong Barber Creek	Powder River	18.99	SENE	11	49	76	44.235793	105.959582	Campbell	Bang (On-channel)
	012	Tributary to South Prong Barber Creek	Powder River	19.04	NWSE	11	49	76	44.234832	105.961832	Campbell	Cake Shed (On-channel)
	013	Tributary to South Prong Barber Creek	Powder River	21.16	NWNE	13	49	76	44.227183	105.941982	Campbell	Crescent (On-channel)

Table 1A - Outfall Information: WY0050857 - South Prong Barber Creek

Desired Changes	Station Name	Station Description	Quarter / Quarter	Section	TwN (N)	Rng (W)	Nad 83 Latitude	Nad 83 Longitude	Notes regarding water quality monitoring station types
Removed	DPR	Downstream Powder River Water Quality Monitoring Station	SWSE	32	51	77	44.347017	-106.149348	None
Removed	TRIB1	Tributary Water Quality Monitoring Station	SWNW	9	50	77	44.322892	-106.136896	None
Removed	UPR	Upstream Powder River Water Quality Monitoring Station	SWSW	9	50	77	44.317335	-106.139346	None
Added	CU001	Containment Unit 001 (Laney)	SESW	34	50	76	44.257458	-105.990690	None
Added	CU002	Containment Unit 002 (Antelope)	SESW	34	50	76	44.257666	-105.989604	None
Added	CU004	Containment Unit 004 (Bessie Holms)	SESE	34	50	76	44.257837	-105.979184	None
Added	CU005	Containment Unit 005 (Grassy Flat)	SENE	3	49	76	44.252165	-105.978088	None
Added	CU006	Containment Unit 006 (Cricket)	SENE	2	49	76	44.251655	-105.968284	None
Added	CU008	Containment Unit 008 (Wide Top)	SENE	2	49	76	44.250629	-105.966087	None
Added	CU009	Containment Unit 009 (All the way)	NWNE	11	49	76	44.239205	-105.961655	None
Added	CU010	Containment Unit 010 (Midway)	SENE	11	49	76	44.238393	-105.960815	None
Added	CU011	Containment Unit 011 (Bang)	SENE	11	49	76	44.236295	-105.959842	None
Added	CU012	Containment Unit 012 (Cake Shed)	NWSE	11	49	76	44.235267	-105.962092	None
Added	CU013	Containment Unit 013 (Crescent)	NWNE	13	49	76	44.227445	-105.942494	None
Added	FMS001	Flow Monitoring Station downstream of 001	NESW	34	50	76	44.258209	-105.990990	None
Added	FMS002	Flow Monitoring Station downstream of 002	SESW	33	50	76	44.257837	-105.990047	None
Added	FMS004	Flow Monitoring Station downstream of 004	NWSE	34	50	76	44.260477	-105.981997	None
Added	FMS005	Flow Monitoring Station downstream of 005	NWNE	3	49	76	44.253949	-105.981364	None
Added	FMS006	Flow Monitoring Station downstream of 006	NENW	2	49	76	44.254531	-105.967958	None
Added	FMS008	Flow Monitoring Station downstream of 008	NENW	2	49	76	44.251864	-105.966408	None
Added	FMS009	Flow Monitoring Station downstream of 009	NWNE	11	49	76	44.242130	-105.962712	None
Added	FMS010	Flow Monitoring Station downstream of 010	NWNE	11	49	76	44.238630	-105.960996	None
Added	FMS011	Flow Monitoring Station downstream of 011	SWNE	11	49	76	44.236968	-105.960155	None
Added	FMS012	Flow Monitoring Station downstream of 012	NWNE	11	49	76	44.239466	-105.962155	None
Added	FMS013	Flow Monitoring Station downstream of 013	SESW	12	49	76	44.229271	-105.945114	None

Please note that not all station types may be applicable for a particular facility. Additional spaces may be added, if necessary. Use the format provided. Please denote reservoir type(s) - on-channel, off-channel, playa, headwater Option 1B - in the appropriate column. Please note that reservoir information is not required if reservoir containment is not part of the facility's water management plan; for instance, information about existing "incidental" downstream reservoirs is not required.

Table 1B - Outfall Information as Permitted: WY0050857 - South Prong Barber Creek

Discharge Point (Outfalls) #	Immediate Receiving Stream	Mainstem	Distance to Closest 2AB Channel & Mainstem (Miles)	Quarter / Quarter	Section	Twn (N)	Rng (W)	Nad 83 Latitude	Nad 83 Longitude	County	Reservoir Name and Type
001	Tributary to South Prong Barber Creek	Powder River	18.78	SESW	34	50	76	44.256536	-105.990161	Campbell	Laney (On-channel)
002	Tributary to South Prong Barber Creek	Powder River	18.76	SESW	34	50	76	44.257486	-105.988599	Campbell	Antelope (On-channel)
004	Tributary to South Prong Barber Creek	Powder River	18.77	SESE	34	50	76	44.257046	-105.978005	Campbell	Bessie Holms (On-channel)
005	Tributary to South Prong Barber Creek	Powder River	19.11	SENE	3	49	76	44.251165	-105.977081	Campbell	Grassy Flat (On-channel)
006	Tributary to South Prong Barber Creek	Powder River	19.42	SENW	2	49	76	44.251243	-105.968003	Campbell	Cricket (On-channel)
008	Tributary to South Prong Barber Creek	Powder River	19.21	SENW	2	49	76	44.249972	-105.966102	Campbell	Wide Top (On-channel)
009	Tributary to South Prong Barber Creek	Powder River	19.87	NWNE	11	49	76	44.238823	-105.961422	Campbell	All the Way (On-channel)
010	Tributary to South Prong Barber Creek	Powder River	19.80	SENE	11	49	76	44.237883	-105.960572	Campbell	Midway (On-channel)
011	Tributary to South Prong Barber Creek	Powder River	18.99	SENE	11	49	76	44.235793	-105.959582	Campbell	Bang (On-channel)
012	Tributary to South Prong Barber Creek	Powder River	19.04	NWSE	11	49	76	44.234832	-105.961832	Campbell	Cake Shed (On-channel)
013	Tributary to South Prong Barber Creek	Powder River	21.16	NWNE	13	49	76	44.227183	-105.941982	Campbell	Crescent (On-channel)



Table 1B - Outfall Information as Permitted: WY0050857 - South Prong Barber Creek

Station Name	Station Description	Quarter / Quarter	Section	Twn (N)	Rng (W)	Nad 83 Latitude	Nad 83 Longitude	Notes regarding water quality monitoring station types
CU001	Containment Unit 001 (Laney)	SESW	34	50	76	44.257458	-105.990690	None
CU002	Containment Unit 002 (Antelope)	SESW	34	50	76	44.257666	-105.989604	None
CU004	Containment Unit 004 (Bessie Holms)	SESE	34	50	76	44.257837	-105.979184	None
CU005	Containment Unit 005 (Grassy Flat)	SENE	3	49	76	44.252165	-105.978088	None
CU006	Containment Unit 006 (Cricket)	SENW	2	49	76	44.251655	-105.968284	None
CU008	Containment Unit 008 (Wide Top)	SENW	2	49	76	44.250629	-105.966087	None
CU009	Containment Unit 009 (All the Way)	NWNE	11	49	76	44.239205	-105.961655	None
CU010	Containment Unit 010 (Midway)	SENE	11	49	76	44.238393	-105.960815	None
CU011	Containment Unit 011 (Bang)	SENE	11	49	76	44.236295	-105.959842	None
CU012	Containment Unit 012 (Cake Shed)	NWSE	11	49	76	44.235267	-105.962092	None
CU013	Containment Unit 013 (Crescent)	NWNE	13	49	76	44.227445	-105.942494	None
FMS001	Flow Monitoring Station downstream of 001	NESW	34	50	76	44.258209	-105.990990	None
FMS002	Flow Monitoring Station downstream of 002	SESW	33	50	76	44.257837	-105.990047	None
FMS004	Flow Monitoring Station downstream of 004	NWSE	34	50	76	44.260477	-105.981997	None
FMS005	Flow Monitoring Station downstream of 005	NWNE	3	49	76	44.253949	-105.981364	None
FMS006	Flow Monitoring Station downstream of 006	NENW	2	49	76	44.254531	-105.967958	None
FMS008	Flow Monitoring Station downstream of 008	NENW	2	49	76	44.251864	-105.966408	None
FMS009	Flow Monitoring Station downstream of 009	NWNE	11	49	76	44.242130	-105.962712	None
FMS010	Flow Monitoring Station downstream of 010	NWNE	11	49	76	44.238630	-105.960996	None
FMS011	Flow Monitoring Station downstream of 011	SWNE	11	49	76	44.236968	-105.960155	None
FMS012	Flow Monitoring Station downstream of 012	NWNE	11	49	76	44.239466	-105.962155	None
FMS013	Flow Monitoring Station downstream of 013	SESW	12	49	76	44.229271	-105.945114	None

Please note that not all station types may be applicable for a particular facility. Additional spaces may be added, if necessary. Use the format provided. Please denote reservoir type(s) - on-channel, off-channel, playa, headwater Option 1B - in the appropriate column. Please note that reservoir information is not required if reservoir containment is not part of the facility's water management plan; for instance, information about existing "incidental" downstream reservoirs is not required.

Table 2 - Well Information: WY0050857 - South Prong Barber Creek

Change	Well Name	API Number	Coal Seam	Well Depth	Location (QQ, Section, Township, Range)	Discharges to Outfall #*
*AWAO - All wells permitted to discharge to all outfalls						
Added	12-1-4976WE	N/A	Werner	Not Available	SWNW 1-49-76	AWAO
Added	12-1-4976GW	N/A	Gates-Wall	Not Available	SWNW 1-49-76	AWAO
Added	14-1-4976WE	N/A	Werner	Not Available	SWSW 1-49-76	AWAO
Added	14-1-4976GW	N/A	Gates-Wall	Not Available	SWSW 1-49-76	AWAO
	Record 21-1-4976 WE	49-005-52094	Werner	1740	NENW 1-49-76	AWAO
	Record 21-1-4976 WA	49-005-52092	Big George	2126	NENW 1-49-76	AWAO
	Record 21-1-4976 BG	49-005-52098	Big George	1385	NENW 1-49-76	AWAO
Added	23-1-4976WE	N/A	Werner	Not Available	NESW 1-49-76	AWAO
Added	23-1-4976GW	N/A	Gates-Wall	Not Available	NESW 1-49-76	AWAO
	Record 32-1-4976 WE	49-005-52095	Werner	1790	SWNE 1-49-76	AWAO
	Record 32-1-4976 WA	49-005-52093	Big George, Wall	2385	SWNE 1-49-76	AWAO
	Record 32-1-4976 BG	49-005-52097	Big George	1425	SWNE 1-49-76	AWAO
Added	34-1-4976GW	N/A	Gates-Wall	Not Available	SWSE 1-49-76	AWAO
Added	34-1-4976WE	N/A	Werner	Not Available	SWSE 1-49-76	AWAO
Added	41-1-4976GW	N/A	Gates-Wall	Not Available	NENE 1-49-76	AWAO
Added	41-1-4976WE	N/A	Werner	Not Available	NENE 1-49-76	AWAO
Added	M Maycock 42-1-4976GW	49-005-55348	Gates-Wall	2280	SENE 1-49-76	AWAO
Added	M Maycock 42-1-4976WE	N/A	Werner	Not Available	SENE 1-49-76	AWAO
	SPU Record 14-2-4976WE	49-005-52264	Werner	1830	SWSW 2-49-76	AWAO
	SPU Record 14-2-4976GW	49-005-52263	Gates	2331	SWSW 2-49-76	AWAO
	SPU Record 14-2-4976 BG	49-005-50247	Big George	1614	SWSW 2-49-76	AWAO
	J Record 21-2-4976WE	49-005-51155	Werner	1725	NENW 2-49-76	AWAO
	J Record 21-2-4976GW	49-005-51156	Big George, Wall	2185	NENW 2-49-76	AWAO
	J Record 21-2-4976BG	49-005-51128	Big George	1410	NENW 2-49-76	AWAO
	SPU Record 23-2-4976WE	49-005-51154	Werner	1813	NESW 2-49-76	AWAO
	SPU Record 23-2-4976GW	49-005-50268	Gates	2325	NESW 2-49-76	AWAO
	SPU Record 23-2-4976BG	49-005-49745	Big George	1552	NESW 2-49-76	AWAO
	J Record 32-2-4976WE	49-005-51152	Werner	1750	SWNE 2-49-76	AWAO
	J Record 32-2-4976GW	49-005-51153	Gates	2291	SWNE 2-49-76	AWAO
	J Record 32-2-4976BG	49-005-51127	Big George	1453	SWNE 2-49-76	AWAO
	SPU Record 34-2-4976GW	49-005-52265	Gates	2230	SWSE 2-49-76	AWAO
	SPU Record 34-2-4976WE	49-005-52266	Werner	1750	SWSE 2-49-76	AWAO
	SPU Record 34-2-4976BG	49-005-51126	Big George	1452	SWSE 2-49-76	AWAO
	SPU Record 12-3-4976BG	49-005-51125	Big George	1595	SWNW 3-49-76	AWAO
	SPU Record 12-3-4976GW	49-005-51150	Gates	2187	SWNW 3-49-76	AWAO
	SPU Record 12-3-4976WE	49-005-51151	Werner	1815	SWNW 3-49-76	AWAO
	SPU Record 23-3-4976WE	49-005-52268	Werner	1735	NESW 3-49-76	AWAO
	SPU Record 23-3-4976BG	49-005-51122	Big George	1633	NESW 3-49-76	AWAO
	SPU Record 23-3-4976GW	49-005-52267	Gates	2114	SWNE 3-49-76	AWAO
	SPU Record 34-3-4976WE	49-005-52270	Werner	1755	SWSE 3-49-76	AWAO
	SPU Record 34-3-4976GW	49-005-52269	Gates	2120	SWSE 3-49-76	AWAO
	SPU Record 34-3-4976BG	49-005-51124	Big George	1530	SWSE 3-49-76	AWAO
	SPU Record 43-3-4976WE	49-005-51148	Werner	1835	NESE 3-49-76	AWAO
	SPU Record 43-3-4976GW	49-005-51149	Gates	2256	NESE 3-49-76	AWAO
	SPU Record 43-3-4976BG	49-005-51121	Big George	1582	NESE 3-49-76	AWAO
	SPU Record 32-10-4976BG	49-005-51177	Big George	1619	SWNE 10-49-76	AWAO
	SPU Record 32-10-4976GW	49-005-52261	Gates	2008	SWNE 10-49-76	AWAO
	SPU Record 32-10-4976WE	49-005-52262	Werner	1680	SWNE 10-49-76	AWAO
	SPU Record 41-10-4976WE	49-005-52272	Werner	1740	NENE 10-49-76	AWAO
	SPU Record 41-10-4976GW	49-005-52271	Gates	2208	NENE 10-49-76	AWAO
	SPU Record 41-10-4976BG	49-005-51123	Big George	1545	NENE 10-49-76	AWAO
	SPU Record 43-10-4976WE	49-005-52388	Werner	1685	NESE 10-49-76	AWAO
	SPU Record 43-10-4976GW	49-005-52387	Wall	2088	NESE 10-49-76	AWAO
	SPU Record 43-10-4976BG	49-005-52386	Werner	1701	NESE 10-49-76	AWAO
Added	21-12-4976GW	N/A	Gates-Wall	Not Available	NENW 12-49-76	AWAO
Added	21-12-4976WE	N/A	Werner	Not Available	NENW 12-49-76	AWAO
Added	32-12-4976GW	N/A	Gates-Wall	Not Available	SWNE 12-49-76	AWAO
Added	32-12-4976WE	N/A	Werner	Not Available	SWNE 12-49-76	AWAO
Added	41-12-4976GW	N/A	Gates-Wall	Not Available	NENE 12-49-76	AWAO

Table 2 - Well Information: WY0050857 - South Prong Barber Creek

Change	Well Name	API Number	Coal Seam	Well Depth	Location (QQ, Section, Township, Range)	Discharges to Outfall #*
*AWAO - All wells permitted to discharge to all outfalls						
Added	41-12-4976WE	N/A	Werner	Not Available	NENE 12-49-76	AWAO
Deleted	W Maycock 23-31-5075WE	N/A	Werner (Gates)	Not Available	NESW 31-50-75	AWAO
Deleted	W Maycock 23-31-5075BG	49-005-55933	Big George	1432	NESW 31-50-75	AWAO
Deleted	W Maycock 23-31-5075GW	49-005-55930	Wall	2235	NESW 31-50-75	AWAO
	Caru State 12-36-5076 WE	49-005-52982	Werner	1635	SWNW 36-50-76	AWAO
	Caru State 12-36-5076 GW	49-005-52981	Wall	2146	SWNW 36-50-76	AWAO
Deleted	Caru State 12-36-5076 B	49-005-42769	Big George	1335	SWNW 36-50-76	AWAO
Deleted	Caru State 14-36-5076 B	49-005-52983	Big George, Werner	1619	SWSW 36-50-76	AWAO
	Caru State 14-36-5076 WE	49-005-52985	Werner	1630	SWSW 36-50-76	AWAO
	Caru State 14-36-5076 GW	49-005-52984	Wall	2251	SWSW 36-50-76	AWAO
Deleted	Caru State 23-36-5076 B	49-005-52999	Big George	1280	NENW 36-50-76	AWAO
Deleted	Caru State 21-36-5076 B	49-005-52986	Big George	1432	NENW 36-50-76	AWAO
	Caru State 21-36-5076 WE	49-005-52998	Werner	1760	NENW 36-50-76	AWAO
	Caru State 21-36-5076 GW	49-005-52987	Big George, Wall	2178	NENW 36-50-76	AWAO
	Caru State 23-36-5076 GW	49-005-52992	Wall	2230	NENW 36-50-76	AWAO
	Caru State 23-36-5076 WE	49-005-52997	Werner	1645	NENW 36-50-76	AWAO
	Caru State 32-36-5076 WE	49-005-52996	Werner	1755	SWNE 36-50-76	AWAO
	Caru State 32-36-5076GW	49-005-52991	Wall	Not Available	SWNE 36-50-76	AWAO
Deleted	Caru State 32-36-5076 B	49-005-53000	Big George	1387	SWNE 36-50-76	AWAO
	Caru State 34-36-5076 WE	49-005-52995	Werner	1725	SWSE 36-50-76	AWAO
Deleted	Caru State 34-36-5076 B	49-005-53001	Big George	1382	SWSE 36-50-76	AWAO
	Caru State 34-36-5076 GW	49-005-52990	Wall	2210	SWSE 36-50-76	AWAO
Deleted	Caru State 41-36-5076 B	49-005-53002	Big George	1493	NENE 36-50-76	AWAO
	Caru State 41-36-5076 WE	49-005-52994	Werner	1855	NENE 36-50-76	AWAO
	Caru State 41-36-5076 GW	49-005-52989	Big George, Wall	2232	NENE 36-50-76	AWAO
	Caru State 43-36-5076 WE	49-005-52993	Werner	1820	NESE 36-50-76	AWAO
	Caru State 43-36-5076 GW	49-005-52988	Big George, Wall	2284	NESE 36-50-76	AWAO
Deleted	Caru State 43-36-5076 B	49-005-53003	Big George	1417	NESE 36-50-76	AWAO

Total Number of Wells: 76

Table 3 - Reservoir Information: WY0050857 - South Prong Barber Creek

Desired Changes	Reservoir Name	Reservoir Storage Volume (acre/feet)	SEO Permit #	SEO Reservoir Requirements	Location				Geographic Location*	
					Qtr/ Qtr	Sec	Township (N)	Range (W)	NAD 83 Latitude	NAD 83 Longitude
	Cricket	5.81	P15325S	None	SENW	2	49	76	44.251655	-105.968284
<b>Remove</b>	<b>Deception</b>	<b>1.70</b>	<b>P15326S</b>	<b>None</b>	<b>NENW</b>	<b>2</b>	<b>49</b>	<b>76</b>	<b>44.253033</b>	<b>-105.967141</b>
	Wide Top	12.74	P15331S	None	SENW	2	49	76	44.250629	-105.966087
<b>Remove</b>	<b>Grasshopper Hollow</b>	<b>3.10</b>	<b>P15327S</b>	<b>None</b>	<b>NWNE</b>	<b>3</b>	<b>49</b>	<b>76</b>	<b>44.255167</b>	<b>-105.982885</b>
	Grassy Flat	12.21	P15328S	None	SENE	3	49	76	44.252165	-105.978088
	All the way	1.70	P15319S	None	NWNE	11	49	76	44.239205	-105.961655
	Bang	3.75	P15321S	None	SENE	11	49	76	44.236295	-105.959842
	Cake Shed	4.10	P15323S	None	SWNE	11	49	76	44.235267	-105.962092
	Midway	3.75	P15330S	None	SENE	11	49	76	44.238393	-105.960815
	Crescent	10.01	P15324S	None	NWNE	13	49	76	44.227445	-105.942494
	Antelope	12.14	P15320S	None	SESW	34	50	76	44.257666	-105.989604
	Bessie Holms	8.11	P15322S	None	SESE	34	50	76	44.257837	-105.979184
	Laney	9.65	P15329S	None	SESW	34	50	76	44.257458	-105.990690

\*Geographic location for on-channel impoundments represents the approximate of Center of Dam - Center of Channel location for off-channel impoundments represents the approximate center of the impoundment.

Table 4 - Bonding Information: WY0050857 - South Prong Barber Creek							
			Please check only one "reservoir reclamation volume" box for each reservoir				
Desired Changes	Reservoir Name	Reservoir Bonding Authority	Reservoir Reclamation Volume* less than 5000 cubic yards?	Reservoir Reclamation Volume* between 5000 and 10,000 cubic yards	Reservoir Reclamation Volume* greater than 10,000 cubic yards	Reservoir constructed/ upgraded** prior to September 1, 2005	Bond Currently posted with bonding authority?
	Midway	BLM	√			No	No
	Crescent	BLM			√	No	No
<b>Remove</b>	<b>Grasshopper Hollow</b>	<b>BLM</b>	√			<b>No</b>	<b>No</b>
	Laney	BLM		√		Yes	No
	Grassy Flat	BLM		√		Yes	No
	Bang	BLM		√		No	No
	Antelope	BLM			√	Yes	No
	All the way	BLM	√			No	No
	Cake Shed	BLM	√			No	No
	Bessie Holms	BLM		√		Yes	No
	Wide Top	WDEQ		√		Yes	Yes
	Cricket	WDEQ		√		Yes	Yes
<b>Remove</b>	<b>Deception</b>	<b>WDEQ</b>	√			<b>No</b>	<b>No</b>

\* "Reservoir Reclamation Volume" is the volume of backfill and/or topsoil needed to fill the reservoir upon reclamation, in cubic yards. This can also be measured in the amount of material that was excavated to create the reservoir. Please note that reservoir information is not required if reservoir containment is not part of the facility's water management plan; for instance, information about existing "incidental" downstream reservoirs is not required.

\*\* "Reservoir constructed/upgraded" information relates to the September 2005 memo regarding topsoil storage on-site. A 'NO' response in this column represents that either the reservoir is not constructed or that it requires upgrades which would require topsoil stockpiling on site. A 'Yes' response in this column represents that the reservoir has been constructed prior to September 2005 and any upgrades, if required, do not require the stockpiling of topsoil.



**Historical Flow: WY0050857 - South Prong Barber Creek**

Permitted Flow (MGD) Per Well/day	0.0576
Original Number of Wells	36
Current number of wells	76
<b>Permitted Flow (MGD)</b>	<b>2.1</b>

Outfall #	(November 2006 thru April 2007 Average)	Flow, MGD
001		0.0044
002		0.0006
004		0.0050
005		0.0044
006		0.0044
008		0.0000
009		Not constructed
010		Not constructed
011		Not constructed
012		Not constructed
013		Not constructed
<b>Current Total Flow</b>		<b>0.0189</b>

\*Generally, well flow decreases with time, and the current flows are less than permitted.

**Table 5a: Annual, Twenty-four-hour, Reservoir Water Budget Estimates for Option 1A or 1B Facilities**

All Option 1 impoundments must contain all CBM discharge plus up to a 50-yr/24-hr storm runoff event.

Calendar Year	Existing/Proposed Reservoir Name	Associated Outfall(s)	Number of Wells Discharging to Outfall(s)	Discharge rate per well (gallons per minute)	Reservoir Surface Area (acres)	Freeboard Reservoir Capacity (acre feet) <sup>2</sup>	Drainage Area (square miles) <sup>3</sup>	Potential Inflows (acre feet)			Potential Outflows (acre feet)			Excess Reservoir Capacity (Freeboard Reservoir Capacity - Total Inflow - Total Outflow)
								CBM Discharge <sup>4</sup>	50-yr/24-hr Storm Runoff <sup>5</sup>	Total Inflow	Evaporation <sup>6</sup>	Infiltration <sup>7</sup>	Total Outflow	
Year 1	Cricket	006	59	5.26	0.72	2.38	0.02	0.10	1.02	1.12	0.01	0.10	0.11	1.37
Year 2	Cricket	006	64	3.89	0.72	2.48	0.02	0.08	1.02	1.10	0.00	0.09	0.09	1.46
Year 3	Cricket	006	69	2.84	0.72	2.35	0.02	0.06	1.02	1.08	0.00	0.07	0.07	1.33
Year 4	Cricket	006	76	2.19	0.72	1.99	0.02	0.05	1.02	1.07	0.00	0.06	0.06	0.98
Year 5	Cricket	006	76	1.42	0.72	2.58	0.02	0.04	1.02	1.06	0.00	0.04	0.04	1.56
Year 1	Wide Top	008	59	5.05	1.15	2.79	0.005	0.19	0.26	0.45	0.02	0.14	0.15	2.49
Year 2	Wide Top	008	66	3.74	1.15	1.23	0.005	0.16	0.26	0.42	0.01	0.11	0.13	0.94
Year 3	Wide Top	008	66	3.46	1.15	1.68	0.005	0.14	0.26	0.40	0.02	0.11	0.13	1.41
Year 4	Wide Top	008	76	2.19	1.15	2.46	0.005	0.10	0.26	0.36	0.00	0.08	0.08	2.17
Year 5	Wide Top	008	76	1.87	1.15	3.74	0.005	0.09	0.26	0.35	0.02	0.07	0.09	3.49
Year 1	Grassy Flat	005	59	5.05	1.50	3.25	0.04	0.17	2.04	2.21	0.02	0.13	0.15	1.20
Year 2	Grassy Flat	005	65	3.81	1.50	2.67	0.04	0.14	2.04	2.18	0.01	0.11	0.13	0.62
Year 3	Grassy Flat	005	69	2.73	1.50	3.04	0.04	0.11	2.04	2.15	0.00	0.10	0.10	1.00
Year 4	Grassy Flat	005	76	2.19	1.50	2.79	0.04	0.09	2.04	2.13	0.00	0.08	0.08	0.73
Year 5	Grassy Flat	005	76	1.37	1.50	4.27	0.04	0.06	2.04	2.10	0.00	0.05	0.05	2.22
Year 1	All the way	009	59	5.26	0.34	1.42	0.01	0.05	0.51	0.56	0.00	0.06	0.06	0.93
Year 2	All the way	009	63	3.97	0.34	1.52	0.01	0.04	0.51	0.55	0.00	0.05	0.05	1.02
Year 3	All the way	009	69	2.84	0.34	1.32	0.01	0.03	0.51	0.54	0.00	0.04	0.04	0.82
Year 4	All the way	009	76	2.28	0.34	1.12	0.01	0.03	0.51	0.54	0.00	0.03	0.03	0.62
Year 5	All the way	009	76	1.42	0.34	1.14	0.01	0.02	0.51	0.53	0.00	0.02	0.02	0.64
Year 1	Bang	011	59	5.05	0.75	1.79	0.02	0.07	1.02	1.09	0.00	0.08	0.09	0.79
Year 2	Bang	011	59	4.85	0.75	1.84	0.02	0.07	1.02	1.09	0.01	0.08	0.09	0.84
Year 3	Bang	011	69	2.84	0.75	1.90	0.02	0.05	1.02	1.07	0.00	0.06	0.06	0.89
Year 4	Bang	011	76	2.19	0.75	1.60	0.02	0.04	1.02	1.06	0.00	0.05	0.05	0.59
Year 5	Bang	011	76	1.42	0.75	1.88	0.02	0.03	1.02	1.05	0.00	0.03	0.03	0.86
Year 1	Cake Shed	012	59	5.26	0.82	2.22	0.03	0.07	1.53	1.60	0.01	0.09	0.10	0.71
Year 2	Cake Shed	012	64	3.89	0.82	2.20	0.03	0.06	1.53	1.59	0.00	0.08	0.08	0.68
Year 3	Cake Shed	012	69	2.84	0.82	2.01	0.03	0.05	1.53	1.58	0.00	0.06	0.06	0.49
Year 4	Cake Shed	012	76	2.19	0.82	1.70	0.03	0.04	1.53	1.57	0.00	0.05	0.05	0.18
Year 5	Cake Shed	012	76	1.37	0.82	2.07	0.03	0.02	1.53	1.55	0.00	0.03	0.03	0.55
Year 1	Midway	010	59	5.26	0.75	2.08	0.02	0.07	1.02	1.09	0.01	0.08	0.09	1.08
Year 2	Midway	010	64	3.89	0.75	2.10	0.02	0.06	1.02	1.08	0.00	0.07	0.07	1.09
Year 3	Midway	010	69	2.84	0.75	1.92	0.02	0.05	1.02	1.07	0.00	0.06	0.06	0.91
Year 4	Midway	010	76	2.19	0.75	1.62	0.02	0.04	1.02	1.06	0.00	0.05	0.05	0.61
Year 5	Midway	010	76	1.42	0.75	1.93	0.02	0.03	1.02	1.05	0.00	0.03	0.03	0.92
Year 1	Crescent	013	59	5.05	0.97	2.62	0.01	0.15	0.51	0.66	0.01	0.12	0.14	2.10
Year 2	Crescent	013	66	3.74	0.97	1.97	0.01	0.13	0.51	0.64	0.01	0.10	0.12	1.45
Year 3	Crescent	013	66	3.46	0.97	2.44	0.01	0.12	0.51	0.63	0.02	0.10	0.12	1.93
Year 4	Crescent	013	76	2.19	0.97	2.45	0.01	0.09	0.51	0.60	0.00	0.07	0.07	1.93
Year 5	Crescent	013	76	1.87	0.97	3.45	0.01	0.07	0.51	0.58	0.02	0.06	0.08	2.94
Year 1	Antelope	002	59	5.05	1.20	2.81	0.01	0.18	0.51	0.69	0.02	0.13	0.15	2.27

Year 2	Antelope	002	66	3.74	1.20	1.60	0.01	0.15	0.51	0.66	0.01	0.11	0.13	1.07
Year 3	Antelope	002	66	3.46	1.20	2.15	0.01	0.14	0.51	0.65	0.02	0.11	0.13	1.63
Year 4	Antelope	002	76	2.19	1.20	2.57	0.01	0.10	0.51	0.61	0.00	0.08	0.08	2.04
Year 5	Antelope	002	76	1.87	1.20	3.83	0.01	0.09	0.51	0.60	0.02	0.07	0.09	3.32
Year 1	Bessie Holms	004	59	5.26	1.20	2.50	0.01	0.14	0.51	0.65	0.01	0.11	0.13	1.98
Year 2	Bessie Holms	004	65	3.81	1.20	2.42	0.01	0.11	0.51	0.62	0.01	0.10	0.11	1.91
Year 3	Bessie Holms	004	69	2.73	1.20	2.60	0.01	0.08	0.51	0.59	0.00	0.08	0.08	2.09
Year 4	Bessie Holms	004	76	2.19	1.20	2.25	0.01	0.07	0.51	0.58	0.00	0.07	0.07	1.73
Year 5	Bessie Holms	004	76	1.37	1.20	3.20	0.01	0.05	0.51	0.56	0.00	0.04	0.04	2.69
Year 1	Laney	001	59	5.39	1.05	2.74	0.02	0.15	1.02	1.17	0.01	0.12	0.14	1.70
Year 2	Laney	001	65	4.07	1.05	2.43	0.02	0.13	1.02	1.15	0.01	0.10	0.11	1.39
Year 3	Laney	001	69	3.03	1.05	2.79	0.02	0.10	1.02	1.12	0.00	0.09	0.09	1.76
Year 4	Laney	001	76	2.34	1.05	2.46	0.02	0.09	1.02	1.11	0.00	0.07	0.07	1.43
Year 5	Laney	001	76	2.00	1.05	3.52	0.02	0.07	1.02	1.09	0.02	0.06	0.08	2.50

**FOOTNOTES**

<sup>1</sup> Discharge rate per well is calculated using current flow data and projected flows (given a well completion schedule and 4% monthly production decline rate)

<sup>2</sup> Freeboard Capacity is calculated using a CBMA developed water management tool which utilizes well completions schedules, water production decline rates, reservoir infiltration decline rates, and monthly evaporation rates. This value reflects the day where the water level in the reservoirs is projected to be at its highest given the projected production rates which are generally less than the permitted flow rate.

<sup>3</sup> Watershed areas are calculated using ArcGIS by heads-up digitizing, using USGS Quad maps and 2006 NAIP aerial photos.

<sup>4</sup> Daily CBM discharge equals (total wells) \* (discharge rate per well) \* (60 minutes/hr) \* (24 hrs/day) / (325851.43 gallons/acre-ft) \* (reservoir losses/total reservoir losses) which equals the permitted flow rate divided proportionally amongst the reservoirs in order to show a worst case scenario.

<sup>5</sup> 50-year/24-hour storm runoff is calculated HEC-HMS and the NRCS curve number system (see attached table).

<sup>6</sup> See attached explanation document for source and formula/rationale for total daily evaporation (all evaporation rates are based upon the surface area of the stored volume of CBNG water rather than the entire surface area).

<sup>7</sup> See attached explanation document for source and formula/rationale for total daily infiltration (all infiltration rates are based upon the stored volume of CBNG water rather than the entire capacity).

**ADDITIONAL COMMENTS**

Total number of contributing CBM wells may differ (in some years) from the total number of wells listed in [Table 2: Well Information](#) because as the project develops, wells will be brought online when capacity becomes available. Some evaporation rates may equal zero because the most conservative day of the year falls in the winter where evaporation is negligible.





### Infiltration and Evaporation Rates from Reservoirs

Potential infiltration loss rates can be estimated for CBNG containment reservoirs based on a series of hydrologic studies conducted by the USGS for small stock ponds in the Powder River region of Wyoming. Pertinent findings of available literature for this region of Wyoming are as follows.

USGS Water Supply Paper 1531. *Hydrology of the Upper Cheyenne River Basin: Part A. Hydrology of Stock-Water Reservoirs in Upper Cheyenne River Basin*, by R.C. Culler, 1961. Fifty-four reservoirs with an average surface area of 2.12 acres were monitored for four years, 1951 - 1954. Reported evaporation and seepage loss rates are shown in Table 1.

Table 1: Evaporation and seepage losses from 1951 – 1954 in the Cheyenne River Basin		
Year	Evaporation (feet/month)	Seepage (feet/month)
1951	0.41	1.28
1952	0.38	0.80
1953	0.44	0.76
1954	0.41	0.82

The stock-water reservoirs in the Culler study were typically much older bodies of water than CBM-related reservoirs. A newly constructed CBM-related reservoir should have a much higher seepage rate than the seepage rates of reservoirs addressed in the Culler study, especially if the reservoir bottom was excavated relatively deeply according to standard practice.

The following references provide additional guidance:

USGS Water Resources Series No. 47, *Characteristics of Wyoming Stock-Water Ponds and Dike Spreader Systems*, by Verne E. Smith, July 1974. The authors discuss the hydrology of stock-water ponds, evapotranspiration, and seepage. While this study was conducted for stock ponds, the governing concepts are pertinent to CBM water management requirements in small reservoirs.

USGS Water Resources Investigations 82\_4105, *Evapotranspiration Rates at Selected Sites in the Powder River Basin, Wyoming and Montana*, by L.W. Lenfest, 1987. This report provides the results of studies at twelve sites where the authors evaluated the effects of alluvial valley width on measured evapotranspiration.

Overall, the above references combined with recent field observations conducted by Hugh Lowham (USGS-retired) provide a reasonably consistent estimate of combined evaporation and seepage losses in newly constructed small reservoirs. Hugh Lowham, P.E., has summarized available data and field observations to yield the following estimates for total loss rates of newly constructed small reservoirs in the Powder River area:

- Very small reservoir (2 acre-feet storage volume): 40 gpm
- Small reservoir (10 acre-feet storage volume): 80 gpm
- Medium, reservoir (20 acre-feet storage volume): 200 gpm
- Large Reservoir (200 acre-feet storage volume): 400 gpm

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Note that these rates represent **initial combined evapotranspiration and infiltration losses**. Generally, initial infiltration rates decrease with time as a result of: 1) Gradual deterioration of the soil structure. 2) Partial sealing of the wetted soil profile by the formation of surface crust. 3) Detachment and migration of pore-blocking particles. 4) And swelling of clay particles (Hillel, 2004). Steady-state infiltration rates ( $I_s$ ) can be estimated by dividing initial loss rate estimates, as shown above, by a factor of 3.

Potential evapotranspiration rates for the Powder River Basin have been estimated from evaporation pan studies. Data for evaporation rates in Wyoming are available online from the Western Regional Climate Center (<http://www.wrcc.dri.edu/htmlfiles/westevap.final.html#WYOMING>). Mean evaporation rates were obtained from studies conducted during an 81-year period (1925-2005) of four-foot Class A evaporation pans at the Gillette 9 ESE Station. Actual lake evaporation rates can be calculated by multiplying observed pan loss rates by a pan coefficient factor of 0.70 (Viessman and Lewis, 2003). Mean and adjusted evaporation values are shown in the Table 2:

<b>Month</b>	<b>Evaporation Mean (inches)</b>	<b>Adjusted Evaporation Mean (inches)</b>
January	0	0
February	0	0
March	0	0
April	4.52	3.16
May	6.4	4.48
June	7.5	5.25
July	9.88	6.92
August	9.44	6.61
September	6.18	4.33
October	4.36	3.05
November	2.39	1.67
December	0	0
<b>Average</b>	<b>4.24</b>	<b>2.97</b>
<b>Average/year</b>	<b>50.67</b>	<b>35.47</b>

Subtracting average evaporation rates from the Lowham initial total loss rates and dividing by the steady state factor of 3 gives the resulting steady-state infiltration rates, shown below.

Very small reservoir (2 acre-feet storage volume, 0.67 acres of surface area): 12.92 gpm  
 Small reservoir (10 acre-feet storage volume, 1.36 acres of surface area): 25.84 gpm  
 Medium, reservoir (20 acre-feet storage volume, 2.49 acres of surface area): 65.15 gpm  
 Large Reservoir (200 acre-feet storage volume, 20.45 acres of surface area): 120.84 gpm

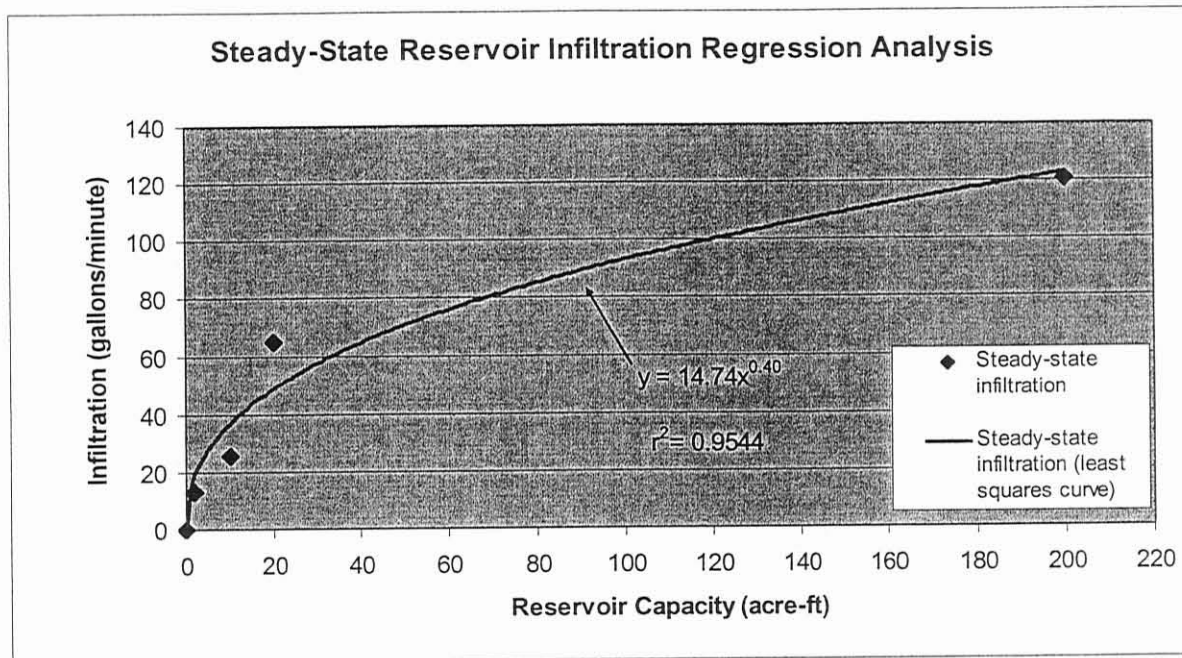
Curve fitting these data points on a graph yields the following power equation (see graph):

$$y = 14.74x^{0.40}$$

Where y is the steady-state infiltration rate in gallons per minute, and x is the reservoir capacity in acre-ft.



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While this equation provides a good approximation of predicted reservoir infiltration, it should be noted that all of the studies cited in this paper exhibit highly variable infiltration rates that are due, at least in part, to site-specific variations in geology and soils. Although this variability may not be fully predictable, the inclusion of additional site-specific data should better constrain actual seepage and evapotranspiration losses at a particular location once a new reservoir is constructed and operated.

#### References Cited:

- Hillel, Daniel. 2004. *Introduction to Environmental Soil Physics*. Academic Press, San Diego, CA. pp. 259-262.
- USGS Water Resources Investigations 82\_4105, *Evapotranspiration Rates at Selected Sites in the Powder River Basin, Wyoming and Montana*, by L.W. Lenfest, 1987.
- USGS Water Resources Series No. 47, *Characteristics of Wyoming Stock-Water Ponds and Dike Spreader Systems*, by Verne E. Smith, July 1974.
- USGS Water Supply Paper 1531. *Hydrology of the Upper Cheyenne River Basin: Part A. Hydrology of Stock-Water Reservoirs in Upper Cheyenne River Basin*, by R.C. Culler, 1961.
- Viessman, Warren Jr., Gary L. Lewis. 2003. *Introduction to Hydrology – 5<sup>th</sup> ed.* Prentice Hall, Upper Saddle River, NJ. pp. 155
- Western Regional Climate Center. *Wyoming Monthly Average Pan Evaporation*. Retrieved April 6, 2007 from <http://www.wrcc.dri.edu/htmlfiles/westevap.final.html#WYOMING>



Watershed Calculations: South Prong Barber Creek - WY0050857											
Watershed	Watershed Area	Hydraulic Length of Watershed	Basin Slope (%)	Time of Concentration	SCS Lag Time	Reservoir Volume	Precipitation			Calculated Runoff Volume from Event	Available Capacity
Laney	0.02	1307.49	6.86	0.19836	0.1190	9.65	Precip 50yr-24hr	3.0	in	1.02	8.63
Antelope	0.01	111.09	7.44	0.02607	0.0156	12.14	Precip 50yr-24hr	3.0	in	0.51	11.63
Bessie Holms	0.01	690.03	7.13	0.11579	0.0695	8.11	Precip 50yr-24hr	3.0	in	0.51	7.60
Grassy Flat	0.04	1210.48	6.61	0.19141	0.1148	12.21	Precip 50yr-24hr	3.0	in	2.04	10.17
Cricket	0.02	1382.02	7.74	0.19056	0.1143	5.81	Precip 50yr-24hr	3.0	in	1.02	4.79
Wide Top	0.005	297.06	2.76	0.11465	0.0688	12.74	Precip 50yr-24hr	3.0	in	0.26	12.48
All The Way	0.01	434.4	13.35	0.05155	0.0309	1.70	Precip 50yr-24hr	3.0	in	0.51	1.19
Midway	0.02	970.24	8.39	0.13571	0.0814	3.75	Precip 50yr-24hr	3.0	in	1.02	2.73
Bang	0.02	919.13	6.35	0.15794	0.0948	3.75	Precip 50yr-24hr	3.0	in	1.02	2.73
Cake Shed	0.03	847.68	6.69	0.14273	0.0856	4.10	Precip 50yr-24hr	3.0	in	1.53	2.57
Crescent	0.01	219.29	6.40	0.04991	0.0299	10.01	Precip 50yr-24hr	3.0	in	0.51	9.50

Totals

83.97

9.97

74.00



LABORATORY ANALYTICAL REPORT

Client: Williams Production RMT  
 Site Name: Kitty\_Jeffers\_Draw  
 Project: Produced\_Water  
 Client Sample ID: PW\_42\_21\_5075W\_49\_005\_48543  
 Location:  
 Samp FRQ/Type: OT  
 Lab ID: G06020428-001

Revised Date: 05/03/07  
 Report Date: 03/08/06  
 Collection Date: 02/23/06 09:00  
 Date Received: 02/23/06  
 Sampled By: Gayla Essen  
 Matrix: Aqueous  
 Tracking Number: 69285

Analyses	Result	Units	Result	Units	Qualifier	Method	Analysis Date / By
<b>FIELD PARAMETERS</b>							
pH, field	7.00	s.u.				FIELD	02/23/06 09:00 / ***
*** Performed by Sampler							
<b>MAJOR IONS, DISSOLVED</b>							
Bicarbonate as HCO <sub>3</sub>	1960	mg/L	32.1	meq/L	A2320 B		02/24/06 10:53 / mli
Chloride	10	mg/L	0.29	meq/L	E300.0		02/24/06 16:43 / mli
Fluoride	1.2	mg/L	0.06	meq/L	E300.0		02/24/06 16:43 / mli
Sulfate	<1	mg/L	<0.02	meq/L	E300.0		02/24/06 16:43 / mli
Calcium	52	mg/L	2.57	meq/L	E200.7		02/27/06 14:26 / eli-b
Magnesium	27	mg/L	2.24	meq/L	E200.7		02/27/06 14:26 / eli-b
Sodium	613	mg/L	26.6	meq/L	E200.7		02/27/06 14:26 / eli-b
<b>METALS, DISSOLVED</b>							
Aluminum	<50	ug/L			E200.8		03/01/06 05:32 / eli-b
Cadmium	<0.1	ug/L			E200.8		02/27/06 23:50 / eli-b
Copper	4	ug/L			E200.8		02/27/06 23:50 / eli-b
Iron	1620	ug/L			E200.7		02/27/06 14:26 / eli-b
Lead	<2	ug/L			E200.8		03/01/06 05:32 / eli-b
Manganese	17	ug/L			E200.7		02/27/06 14:26 / eli-b
Mercury	<0.06	ug/L			E200.8		02/27/06 23:50 / eli-b
Zinc	13	ug/L			E200.7		02/27/06 14:26 / eli-b
<b>METALS, TOTAL</b>							
Barium	1430	ug/L			E200.8		02/27/06 00:10 / eli-b
<b>METALS, TOTAL RECOVERABLE</b>							
Aluminum	<50	ug/L			E200.8		02/27/06 00:10 / eli-b
Arsenic	0.3	ug/L			E200.8		02/27/06 00:10 / eli-b
Selenium	<5	ug/L			E200.8		02/27/06 00:10 / eli-b
<b>NON-METALS</b>							
Alkalinity, Total as CaCO <sub>3</sub>	1610	mg/L			A2320 B		02/24/06 10:53 / mli
Conductivity @ 25 C	2660	umhos/cm			A2510 B		02/23/06 15:35 / daa
Hardness as CaCO <sub>3</sub>	240	mg/L			A2340 B		03/02/06 08:01 / clw
Sodium Adsorption Ratio (SAR)	17.2	unitless			Calculation		03/02/06 08:01 / clw
Solids, Total Dissolved TDS @ 180 C	1720	mg/L			A2540 C		02/24/06 09:35 / mli
<b>RADIOCHEMICAL</b>							
Radium 226	1.1	pCi/L			E903.0M		02/24/06 14:50 / eli-c
Radium 226 precision (±)	0.5	pCi/L			E903.0M		02/24/06 14:50 / eli-c

Report RL - Analyte reporting limit.  
 Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Williams Production RMT  
 Site Name: Kitty\_Jeffers\_Draw  
 Project: Produced\_Water  
 Client Sample ID: PW\_32\_28\_5075GW\_49\_005\_54930  
 Location:  
 Samp FRQ/Type: OT  
 Lab ID: G06020428-003

Revised Date: 05/03/07  
 Report Date: 03/08/06  
 Collection Date: 02/23/06 10:05  
 Date Received: 02/23/06  
 Sampled By: Gayla Essen  
 Matrix: Aqueous  
 Tracking Number: 69287

Analyses	Result	Units	Result	Units	Qualifier Method	Analysis Date / By
<b>FIELD PARAMETERS</b>						
pH, field	7.51	s.u.			FIELD	02/23/06 10:05 / ***
*** Performed by Sampler						
<b>MAJOR IONS, DISSOLVED</b>						
Bicarbonate as HCO <sub>3</sub>	1440	mg/L	23.6	meq/L	A2320 B	02/24/06 11:35 / mli
Chloride	10	mg/L	0.29	meq/L	E300.0	02/24/06 17:13 / mli
Fluoride	1.1	mg/L	0.06	meq/L	E300.0	02/24/06 17:13 / mli
Sulfate	6	mg/L	0.13	meq/L	E300.0	02/24/06 17:13 / mli
Calcium	32	mg/L	1.60	meq/L	E200.7	02/27/06 15:07 / eli-b
Magnesium	14	mg/L	1.13	meq/L	E200.7	02/27/06 15:07 / eli-b
Sodium	489	mg/L	21.3	meq/L	E200.7	02/27/06 15:07 / eli-b
<b>METALS, DISSOLVED</b>						
Aluminum	<50	ug/L			E200.8	03/01/06 05:53 / eli-b
Cadmium	<0.1	ug/L			E200.8	02/28/06 00:29 / eli-b
Copper	<1	ug/L			E200.8	02/28/06 00:29 / eli-b
Iron	2800	ug/L			E200.7	02/27/06 15:07 / eli-b
Lead	<2	ug/L			E200.8	03/01/06 05:53 / eli-b
Manganese	186	ug/L			E200.7	02/27/06 15:07 / eli-b
Mercury	<0.06	ug/L			E200.8	02/28/06 00:29 / eli-b
Zinc	<10	ug/L			E200.7	02/27/06 15:07 / eli-b
<b>METALS, TOTAL</b>						
Barium	755	ug/L			E200.8	03/01/06 02:24 / eli-b
<b>METALS, TOTAL RECOVERABLE</b>						
Aluminum	322	ug/L			E200.7	03/01/06 15:19 / eli-b
Arsenic	2.6	ug/L			E200.8	03/01/06 02:24 / eli-b
Selenium	<5	ug/L			E200.8	03/01/06 02:24 / eli-b
<b>NON-METALS</b>						
Alkalinity, Total as CaCO <sub>3</sub>	1180	mg/L			A2320 B	02/24/06 11:35 / mli
Conductivity @ 25 C	2010	umhos/cm			A2510 B	02/23/06 15:36 / daa
Hardness as CaCO <sub>3</sub>	140	mg/L			A2340 B	03/02/06 08:01 / clw
Sodium Adsorption Ratio (SAR)	18.2	unitless			Calculation	03/02/06 08:01 / clw
Solids, Total Dissolved TDS @ 180 C	1300	mg/L			A2540 C	02/24/06 09:36 / mli
<b>RADIOCHEMICAL</b>						
Radium 226	<0.2	pCi/L			E903.0M	02/24/06 14:50 / eli-c

Report Definitions: RL - Analyte reporting limit.  
 QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.





LABORATORY ANALYTICAL REPORT

Client: Williams Production RMT  
 Site Name: South\_Prong\_Barber\_Creek  
 Project: WYPDES  
 Client Sample ID: DP\_WY0050857\_006\_ET40  
 Location: SENW\_2\_49N\_76W  
 Samp FRQ/Type: IN\_A\_S1\_IR  
 Lab ID: G05040161-001

Revised Date: 06/15/07  
 Report Date: 04/22/05  
 Collection Date: 04/06/05 10:00  
 Date Received: 04/08/05  
 Sampled By: Todd Adams  
 Matrix: Aqueous  
 Tracking Number: 47030

Analyses	Result	Units	Result	Units	Qualifier	Method	Analysis Date / By
<b>FIELD PARAMETERS</b>							
pH, field	7.36	s.u.				FIELD	04/06/05 10:00 / ***
*** Performed by Sampler							
<b>MAJOR IONS, DISSOLVED</b>							
Bicarbonate as HCO3	2050	mg/L	33.6	meq/L		A2320 B	04/11/05 19:56 / mli
Chloride	11	mg/L	0.30	meq/L		E300.0	04/12/05 06:48 / mli
Fluoride	1.7	mg/L	0.09	meq/L		E300.0	04/12/05 06:48 / mli
Sulfate	<1	mg/L	<0.02	meq/L		E300.0	04/12/05 06:48 / mli
Calcium	32	mg/L	1.58	meq/L		E200.7	04/12/05 08:41 / eli-t
Magnesium	19	mg/L	1.54	meq/L		E200.7	04/12/05 08:41 / eli-t
Sodium	688	mg/L	29.9	meq/L		E200.7	04/12/05 08:41 / eli-t
<b>METALS, DISSOLVED</b>							
Cadmium	<0.1	ug/L				E200.8	04/13/05 19:19 / eli-t
Copper	<1	ug/L				E200.8	04/13/05 19:19 / eli-t
Iron	811	ug/L				E200.7	04/12/05 08:41 / eli-t
Lead	<2	ug/L				E200.8	04/13/05 19:19 / eli-t
Manganese	21	ug/L				E200.7	04/12/05 08:41 / eli-t
Mercury	<0.06	ug/L				E200.8	04/13/05 19:19 / eli-t
Zinc	21	ug/L				E200.7	04/12/05 08:41 / eli-t
<b>METALS, TOTAL</b>							
Barium	1270	ug/L				E200.7	04/13/05 01:25 / eli-t
<b>METALS, TOTAL RECOVERABLE</b>							
Aluminum	<50	ug/L				E200.8	04/11/05 22:19 / eli-t
Arsenic	0.9	ug/L				E200.8	04/11/05 22:19 / eli-t
Beryllium	<0.03	ug/L				E200.8	04/11/05 22:19 / eli-t
Selenium	<5	ug/L				E200.8	04/11/05 22:19 / eli-t
<b>NON-METALS</b>							
Alkalinity, Total as CaCO3	1680	mg/L				A2320 B	04/11/05 19:56 / mli
Conductivity @ 25 C	2780	umhos/cm				A2510 B	04/08/05 12:23 / tlc
Hardness as CaCO3	160	mg/L				A2340 B	04/14/05 17:44 / clw
Sodium Adsorption Ratio (SAR)	23.9	unitless				Calculation	04/14/05 17:45 / clw
Solids, Total Dissolved TDS @ 180 C	1890	mg/L				A2540 C	04/08/05 15:59 / mli
Total Petroleum Hydrocarbons	<1.0	mg/L				SW1664A	04/13/05 16:13 / ton
<b>RADIOCHEMICAL</b>							
Radium 226	0.8	pCi/L				E903.0M	04/11/05 08:25 / eli-c
Radium 226 precision (±)	0.3	pCi/L				E903.0M	04/11/05 08:25 / eli-c

Report RL - Analyte reporting limit.  
 Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
 ND - Not detected at the reporting limit.



## CBM Associates, Inc.

920 E. Sheridan St. • Laramie, WY 82070 • Office: (307) 742-4991 • Fax: (307) 745-1582

GROUNDWATER & SURFACE WATER HYDROLOGY • WATER RESOURCE MANAGEMENT • ENVIRONMENTAL PERMITTING & COMPLIANCE

June 15, 2007

Wyoming Department of Environmental Quality  
Water Quality Division  
122 West 25<sup>th</sup> Street  
Herschler Building, 4W  
Cheyenne, Wyoming 82002

**RE: COMPLIANCE EVALUATION for WYPDES Permit Application  
Williams Production RMT Company  
Major Modification for: South Prong Barber Creek CBM Wells, WY0050857**

Dear Water Quality Division,

This letter outlines specific requests for WYPDES permit requirement updates and provides information to address 'Item 22' in the application for a modification of the above-referenced WYPDES permit.

### Specific Requests for WYPDES Permit Updates

In addition to those items referenced on the cover letter of this application, Williams Production RMT Company requests that this modification:

#### All outfalls:

- Raise the total recoverable arsenic limit in accordance with the antidegradation policy and new Chapter 1 standard;
- Raise the dissolved chloride limit to 230 mg/L in accordance with Class 3 protection;
- Replace total recoverable aluminum requirements with dissolved aluminum requirements;
- Remove routine monitoring requirements for arsenic. No concentration has ever exceeded 1.7 µg/L;
- Reduce monitoring of total recoverable barium from semi-annual to initials only. No concentration has ever exceeded 1750 µg/L.

#### Item 22 of WYPDES Application

This permit has exceeded permit limits and/or water quality standards prior to submission of this application. CBM Associates, Inc. (CBMA) provides the following information, but cannot claim it is 100% accurate or all inclusive of exceedances.

22.a:

This permit has exceeded permit and/or water quality standards for the following constituents:

- Dissolved iron (Fe)
- Dissolved Zinc (Zn)
- Total radium 226 (Ra 226)

22.b and 22.c:

The attached Exceedance Summary Table outlines sampling, mitigation, and compliance activities for the above constituents since CBMA became aware of the potential or verified water quality concerns. The table specifically outlines the exceeding parameter, sample results, dates of correspondence to the WDEQ, and resolution methods.

Thank you for your consideration. If you have any questions regarding past exceedances or exceedances that WDEQ considers outstanding, please feel free to contact me at (307) 742-4991 or [clore@cbmainc.com](mailto:clore@cbmainc.com).

CBM ASSOCIATES, INC. ADDITIONAL OFFICES:

345 Sinclair Street  
Gillette, WY 82718  
307.686.6664

500 W. Lott Street  
Buffalo, WY 82834  
307.684.0252

743 Horizon Court, Suite 250  
Grand Junction, CO 81506  
970.263.8679

3036 South Flower Court  
Lakewood, CO 80227  
303.973.2302



Sincerely,  
CBM Associates, Inc.

*David R. Brewer for CB*

Caroline Lo Ré Brewer  
Environmental Compliance Professional

dr/CB





Williams Production RMT Company  
WYPDES Permit WY0050857: Exceedance Summary Table

Permitted Station	Permit Name	Exceeding Constituent	Sample Date	Sample Result	Date Reported to WDEQ	Compliance Attained Y/N	Resolution Method / Additional Information	Resample Date	Resample Result	Date Reported to WDEQ	Compliance Attained Y/N	Resolution Method / Additional Information	Resample Date	Resample Result	Date Reported to WDEQ	Compliance Attained Y/N	Resolution Method / Additional Information	Additional Comments	
DP_WY0050857_001	South Prong Barber Creek	Fe, dissolved	6/6/06	3720 µg/L	6/26/06	No	Resample	11/16/06	ND<50 µg/L	12/12/06	Yes	Resample was in compliance. To further demonstrate compliance, the next routine monitoring sample will be forwarded to WDEQ.							Outfall was visited but not flowing on the following dates: 7/26/06, 7/31/06, 8/30/06, 9/18/06. This caused a delay in sample collection.
DP_WY0050857_004	South Prong Barber Creek	Zn, dissolved	7/6/05	1060 µg/L	8/12/05	No	Resample	9/19/05	ND <10 µg/L	10/10/05	Yes	Complete. In compliance.							
DP_WY0050857_005	South Prong Barber Creek	Ra 226, total	2/27/05	1.3 ± 0.4 pCi/L	3/15/05	No	Resample	9/28/05	2.7 ± 0.3 pCi/L	1/24/06	No	WPC is developing a plan of action to mitigate this exceedance.	1/31/06	0.7 ± 0.4 pCi/L	4/13/06	Yes	Complete. WPC will also submit modification to raise limit.	The modification effective 12/9/2006 raised the radium limit to 60 pCi/L.	
DP_WY0050857_008	South Prong Barber Creek	Fe, dissolved	2/27/05	2200 µg/L	3/15/05	No	Resample	6/5/06	289 µg/L	6/20/06	Yes	Complete. In compliance.							



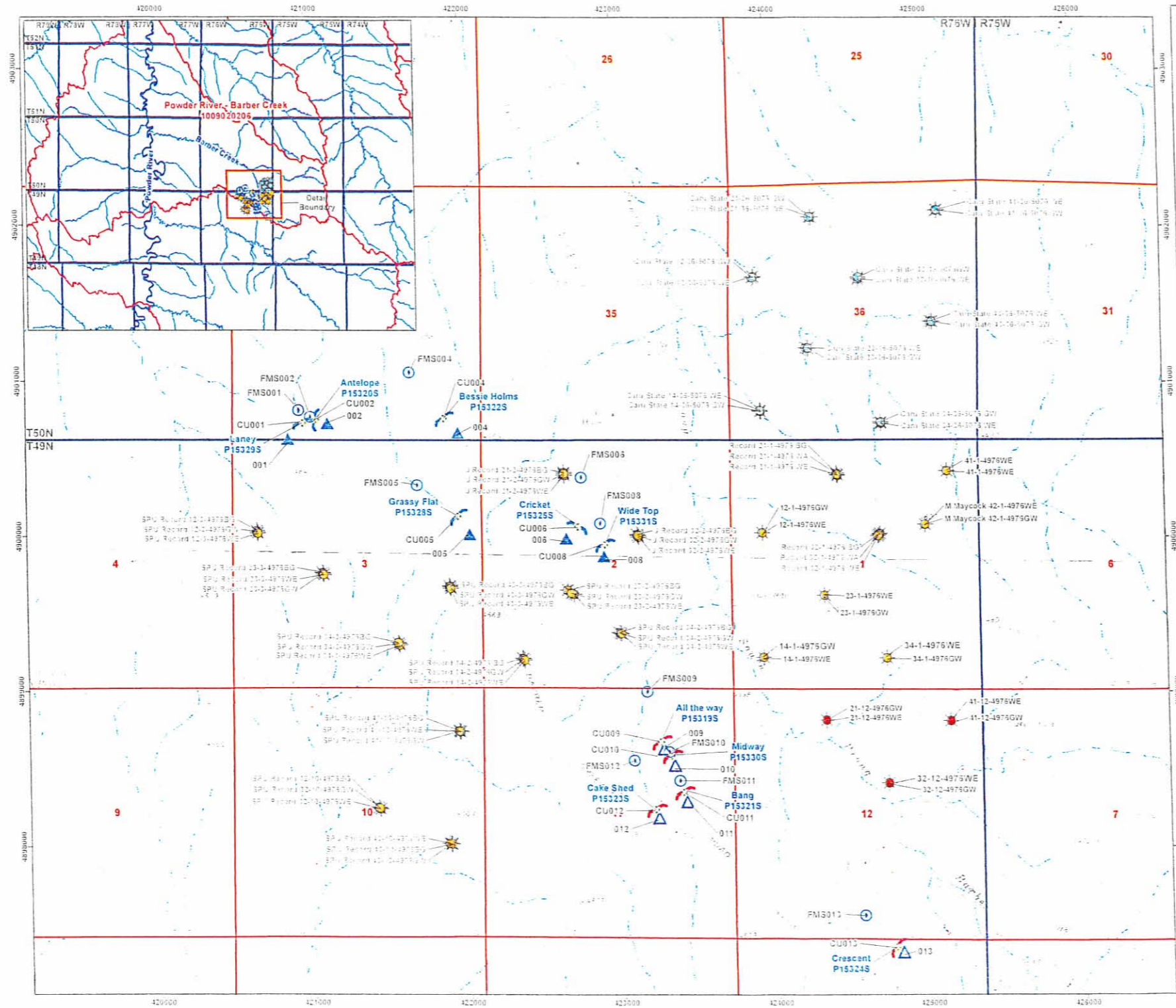
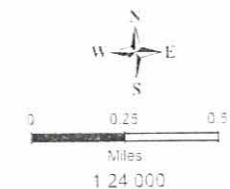
South Prong Barber Creek  
WYPDES  
Major Modification  
WY0050857

HUC 10 -1009020206

June 18, 2007

Explanation:

- CBM Well - Fed
- CBM Well - Fee
- CBM Well - State
- On-Channel Impoundment, Existing
- On-Channel Impoundment, Proposed
- Outfall, Constructed
- Outfall, Not Constructed
- CU Not Constructed
- FMS Not Constructed

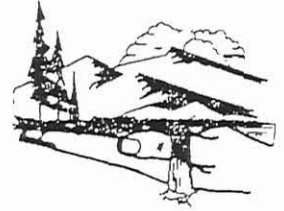


**2**



# Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Dave Freudenthal, Governor

John Corra, Director

October 26, 2006

Mr. Joe Olson  
Williams Production RMT Company  
300 North Works Avenue  
Gillette, WY 82716

RE: Wyoming Pollutant Discharge Elimination System (WYPDES) Permit  
WY0050857, South Prong Barber Creek CBM Wells

Dear Mr. Olson:

The WYPDES Program has received two letters from Mr. Tom Toner of Yonkee & Toner, LLP, who represents Mr. William Maycock. In these letters, Mr. Toner requests that based upon information that we have today, the permit limits in WY0050857 should be modified to be protective of known irrigation uses in Barber Creek.

At some point it may be appropriate to modify the permit to reflect that irrigation is occurring and to establish different limits. We do not, however, believe that it is necessary at this time to modify this particular permit.

Although the permit as it currently stands would allow discharges into the South Prong of Barber Creek, such discharges have not yet occurred. Williams has so far been successful in containing all discharges in reservoirs and managing the water to ensure that it does not reach or impact irrigated lands. Williams must continue containment of its produced water for protection of downstream crop and livestock production. Should you fail to maintain containment, we will take corrective action.

In April, 2006, Williams applied to modify various effluent limits and monitoring requirements on the current permit. A public notice of the proposed modification was issued on August 15, 2006 but the WQD has not yet taken a final action on that proposal. Because of the circumstances

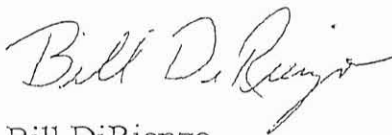


Mr. Joe Olson  
October 16, 2006  
Page 2

described above, we intend to also hold off making those modifications until such time that the permit is re-opened.

Please feel free to contact me at 307-777-7082 if you have any questions or would like to further discuss this matter.

Sincerely,



Bill DiRienzo  
WYPDES Program Manager  
Water Quality Division

WJD/rm/6-1016

Enclosures: June 6, 2006 – Toner Letter  
September 5, 2006 – Toner Letter

cc: John Wagner, DEQ/WQD  
Vicci Colgan, Attorney General's Office