

Wyoming Department of Environmental Quality
Water Quality Division
WYPDES Program

Statement of Basis

Major Modification

APPLICANT NAME: Pennaco Energy, Inc.

MAILING ADDRESS: 3601 Southern Drive
Gillette, WY 82718

FACILITY LOCATION: Longhorn Lease, which is located in the SESW of Section 2 and the NENE of Section 3 in Township 55 North, Range 73 West in Campbell County. The produced water will be discharged into one on-channel reservoir (class 3B) located in an unnamed ephemeral tributary (class 3B) to Whitetail Creek (class 4B) and one on-channel reservoir (class 4B) located in the main channel of Whitetail Creek (class 4B) which is tributary to the Little Powder River (class 2AB). The daily maximum permitted flow rate for this facility is 0.54 million gallons per day (MGD). The CBM wells at this facility will discharge effluent originating from the Canyon, Wall, and Pawnee coal seams.

NUMBER: WY0038326

The terms of permit WY0038326 are hereby modified as follows:

- 1. The radium²²⁶ effluent limit is updated to reflect current WDEQ permitting approaches.*
- 2. In accordance with current WDEQ regulations, the permit monitoring requirements for total petroleum hydrocarbons (TPH) are removed.*

With the exception of items explicitly delineated in this major modification, all terms and conditions of permit WY0038326, including Parts II and III of the renewed permit, shall remain in full force and effect.

This facility is a typical coal bed methane production facility in which groundwater is pumped from a coal bearing formation resulting in the release of methane from the coal bed. The permit authorizes the discharge to the surface of groundwater produced in this way provided the effluent quality is in compliance with effluent limits that are established by this permit. In developing effluent limits, all federal and state regulations and standards have been considered and the most stringent requirements incorporated into the permit. The EPA Effluent Guidelines and Standards for Oil and Gas Extraction Point Source Category (Part 435, Subpart E) predate the development of coal bed methane extraction technology; however the technology is similar enough to conventional gas extraction that, in the professional judgement of the WDEQ, this effluent limit guideline is appropriately applied to coal bed methane gas production. The guideline limits oil and grease effluent concentrations to less than 35 mg/l and requires that discharges of produced water be used for agricultural production and/or wildlife propagation. This permit does not cover activities associated with discharges of drilling fluids, acids, stimulation waters or other fluids derived from the drilling or completion of the wells.

The permittee has chosen option 2 of the coal bed methane permitting options. Under this permitting option, the produced water is immediately discharged to a class 2 or 3 receiving stream which is eventually tributary to a class 2AB perennial water of the state. The permit establishes effluent limits for the end of pipe, which are protective of all the designated uses defined in Chapter 1 of Wyoming Water Quality Rules and Regulations. This may include drinking water, game and non-game fish, fish consumption, aquatic life other than fish, recreation, agriculture, wildlife, industry and scenic value. Based on a review of this permit application and previous applications in this area, it has been determined that no active irrigation uses of surface water occur downstream from this facility on Whitetail Creek.

The Wyoming DEQ has determined through review of the permit application and available scientific information that effluent discharged from this facility is unlikely to reach the Little Powder River. The applicant has submitted a water budget which demonstrates that all of the CBM effluent produced at this facility can be contained in the two on-channel reservoirs at this site. It is unlikely that effluent from this facility will reach the Little Powder River. However, in the event that produced water does reach the Little Powder River, this permit establishes a monitoring station on the receiving stream (Whitetail Creek) prior to its confluence with the Little Powder River. This station will function to monitor any effluent flows to the Little Powder River.

This permit authorizes discharge of CBM produced water from outfalls 001 and 002. These outfalls will discharge into two on-channel reservoirs as described in Table 1 (Part I.B.12) of the permit. Neither the reservoirs nor their spillways will constitute regulated discharge points under this permit.

Permit effluent limits are based on federal and state regulations and are effective as of the date of issuance. The daily maximum effluent flow limit for this facility is 0.54 MGD. The pH must remain within 6.5 and 8.5 standard units. Effluent limits for total dissolved solids (5,000 mg/l), specific conductance (7,500 micromhos/cm) and sulfates (3,000 mg/l) are included to protect for stock and wildlife watering. These limits are based upon Wyoming Water Quality Rules and Regulations, Chapter 7 and apply to discharge from any permitted outfall. In addition, the permit establishes a dissolved manganese limit of 720 $\mu\text{g/l}$, a total barium limit of 1800 $\mu\text{g/l}$, a total arsenic limit of 3.6 $\mu\text{g/l}$, and a chlorides limit of 46 mg/l. These limits are based on standards for class 2AB waters which are intended to protect for the above listed designated uses and reflect the application of "tier two" anti-degradation protection as set forth in the "Wyoming Surface Water Quality Standards - Implementation Policies." This permit also establishes a dissolved iron limit of 1000 $\mu\text{g/l}$, which reflects the application of "tier one" anti-degradation protection for the Little Powder River (class 2AB). The permit originally established a total radium²²⁶ limit of 1 pCi/l and a total petroleum hydrocarbons (TPH) limit of 10 mg/l at the end of pipe. Based upon water quality data collected by the WDEQ since the time this permit was originally issued, a permitting approach for establishing total radium limits in coal bed methane permits has been developed. This approach is based upon the distance of the outfall from a class 2 water. The removal of the originally-established total radium²²⁶ limit is based on this permitting approach. In addition, review of discharge monitoring report data for CBM facilities indicates that the maximum reported concentrations for total petroleum hydrocarbons (TPH) were far below the limit of 10 mg/l. Therefore, according to the *Wyoming Water Quality Rules and Regulations, Chapter 2*, revised November 10, 2004, Section 5.c.iii.A, the TPH limit for CBM facilities is considered unnecessary, and will be removed from this facility. Based on this information, it is the WDEQ's determination that removing the total radium²²⁶ and total petroleum hydrocarbons limits from this facility conforms to the anti-backsliding requirements as defined by Section 402(o).2.B.i of the Clean Water Act.

Results are to be reported twice-yearly and if no discharge occurs at a given outfall for an entire sampling period, then "no discharge" is to be reported for that outfall. The permit also requires that an initial monitoring of the effluent be conducted within the first 60 days of discharge and the results submitted to WDEQ and the U.S. Environmental Protection Agency within 120 days of the commencement of discharge.

The permit also requires sampling at designated water quality monitoring stations located on the receiving streams (Whitetail Creek) and at locations on the mainstem (Little Powder River, class 2AB water) to which Whitetail Creek is tributary. Water quality monitoring stations on the Little Powder River will be located upstream and downstream of this facility. Effluent samples at the designated water quality monitoring stations must be collected

on a monthly sampling basis and are to be reported semiannually. If no effluent from this facility reaches the tributary monitoring station (TRIB1) during an entire sampling month, then "no discharge" is to be reported and samples need not be collected at the three water quality monitoring stations for that monthly sampling period. At the designated water quality monitoring stations, monitoring will be required for calcium, magnesium, sodium, sodium adsorption ratio, specific conductance, and total flow. Information gathered from the water quality monitoring stations may result in modification of the permit to protect existing uses on the tributary and mainstem.

The designated water quality monitoring stations are located on the tributary (Whitetail Creek) in the SWSE of Section 10 in Township 55 North, Range 71 West; and on the mainstem (Little Powder River) in the SENW of Section 11 and the NWNE of Section 10 in Township 55 North, Range 71 West. Established water quality monitoring stations on the mainstem are to be located outside the mixing zone of the tributaries with the mainstem.

There shall be no discharge of floating solids or visible foam in other than trace amounts, nor shall the discharge cause formation of visible deposits of iron, hydrocarbons or any other constituent on the bottom or shoreline of the receiving water. In addition, erosion control measures will be implemented to prevent significant damage to or erosion of the receiving water channel at the point of discharge.

The discharge of wastewater and the effluent limits that are established in this permit have been reviewed to ensure that the levels of water quality necessary to protect the designated uses of the receiving waters are maintained and protected. An antidegradation review has been conducted and verifies that the permit conditions, including the effluent limitations established, provide a level of protection to the receiving water consistent with the antidegradation provisions of Wyoming surface water quality standards.

Self monitoring of effluent quality and quantity is required on a regular basis with reporting of results semiannually. The permit is scheduled to expire on December 31, 2007. This expiration date was determined through review of the watershed permitting schedule which the WDEQ is implementing in order to synchronize the permitting and expiration of facilities within the same watershed. This holistic approach will provide for more efficient permitting of point-source discharges.

Jason Thomas
Water Quality Division
Department of Environmental Quality
Drafted May 9, 2004

Modified (major) by Jennifer Zygmunt
Water Quality Division
Department of Environmental Quality
Drafted January 10, 2005

AUTHORIZATION TO DISCHARGE UNDER THE
WYOMING POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, (hereinafter referred to as "the Act"), and the Wyoming Environmental Quality Act,

Pennaco Energy, Inc.

is authorized to discharge from the wastewater treatment facilities serving the

Longhorn Lease

located in

the SESW of Section 2 and the NENE of Section 3 in Township 55 North, Range 73 West in Campbell County

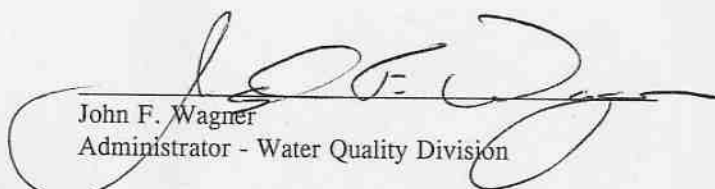
to receiving waters named

one on-channel reservoir (class 3B) located in an unnamed ephemeral tributary (class 3B) to Whitetail Creek (class 4B) and one on-channel reservoir (class 4B) located in the main channel of Whitetail Creek (class 4B) which is tributary to the Little Powder River (class 2AB)

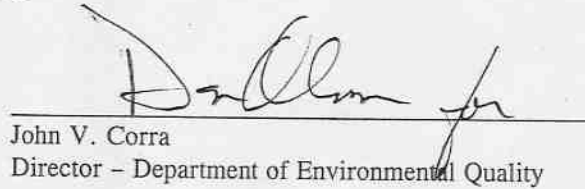
in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

This modification shall become effective on the date of signature by the Director of the Department of Environmental Quality. With the exception of items explicitly delineated in this major modification, all terms and conditions of permit WY0038326, including Parts II and III of the renewed permit, shall remain in full force and effect.

This permit and the authorization to discharge shall expire at midnight, December 31, 2007.


John F. Wagner
Administrator - Water Quality Division

7/7/05
Date


John V. Corra
Director - Department of Environmental Quality

7/8/05
Date

PART IA. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Effective immediately and lasting through December 31, 2007, the quality of effluent discharged by the permittee shall, at a minimum, meet the limitations set forth below. The permittee is authorized to discharge from outfalls serial numbers 001 - 002.

1. Such discharges shall be limited as specified below:

a.

Effluent Limits

<u>Effluent Characteristic</u>	<u>Daily Maximum</u>
Chlorides, mg/l	46
Dissolved Iron, µg/l	1000
Dissolved Manganese, µg/l	720
pH, standard units	6.5 - 8.5
Specific Conductance, micromhos/cm	7500
Sulfates, mg/l	3000
Total Arsenic, µg/l	3.6
Total Barium, µg/l	1800
Total Dissolved Solids, mg/l	5000
Total Flow, MGD	0.54

* This shall be the combined total flow from outfalls 001 - 002.

- Note:
- 1) 'Dissolved' value for metals refers to the amount that will pass through a 0.45 µm membrane filter prior to acidification to 1.5-2.0 with Nitric Acid.
 - 2) 'Total' value for metals refers to the total recoverable amount of that metal in the water column.

The pH shall not be less than 6.5 standard units nor greater than 8.5 standard units in any single grab sample.

This facility has a total combined daily maximum flow rate of 0.54 million gallons per day (MGD) from outfalls 001 through 002. The produced water will originate from the Canyon, Wall, and Pawnee coal seams.

Information gathered from the water quality monitoring stations may result in modification of the permit to protect existing uses on the tributary and the mainstem.

There shall be no discharge of floating solids or visible foam in other than trace amounts, nor shall the discharge cause formation of a visible sheen or visible hydrocarbon deposits on the bottom or shoreline of the receiving water.

All waters shall be discharged in a manner to prevent erosion, scouring, or damage to stream banks, stream beds, ditches, or other waters of the state at the point of discharge. In addition, there shall be no deposition of substances in quantities which could result in significant aesthetic degradation, or

degradation of habitat for aquatic life, plant life or wildlife; or which could adversely affect public water supplies or those intended for agricultural or industrial use.

2. Discharges shall be monitored by the permittee as specified below:

a. Routine monitoring End of Pipe (001-002)

For the duration of the permit, at a minimum, samples for the constituents described below shall be collected at the indicated frequencies. The first routine monitoring for the time frame during which the monitoring of initial discharge occurs will, at a minimum, consist of flow measurements for the duration of the six-month monitoring time frame. Monitoring will be based on semi-annual time frames, from January through June, and from July through December.

<u>Parameter</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Bicarbonate, mg/l	Monthly for April through September	Grab
Dissolved Calcium, mg/l	Monthly for April through September	Grab
Dissolved Calcium, meq/l	Monthly for April through September	Grab
Chloride, mg/l	Annually	Grab
Dissolved Iron, µg/l	Annually	Grab
Dissolved Manganese, µg/l	Annually	Grab
Dissolved Magnesium, mg/l	Monthly for April through September	Grab
Dissolved Magnesium, meq/l	Monthly for April through September	Grab
pH, standard units	Once Every Six Months	Grab
Dissolved Sodium, mg/l	Monthly for April through September	Grab
Dissolved Sodium, meq/l	Monthly for April through September	Grab
Sodium Adsorption Ratio, unitless	Monthly for April through September	Calculated
Specific Conductance, µmhos/cm	Monthly for April through September	Grab
Sulfate, mg/l	Annually	Grab
Total Alkalinity, mg/l as CaCO ₃	Monthly for April through September	Grab
Total Arsenic, µg/l	Annually	Grab
Total Barium, µg/l	Annually	Grab
Total Flow, MGD	Monthly	Continuous

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At the outfall of the final treatment unit which is located out of the natural drainage and prior to admixture with diluent waters.

b. Water Quality Monitoring Stations (TRIB1, ULPR, DLPR)

For the duration of the permit, at a minimum, samples for the constituents described below shall be collected at the indicated frequencies. Monitoring will be based on monthly time frames, and reported semiannually.

<u>Parameter</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Dissolved Calcium, mg/l	Monthly	Grab
Dissolved Calcium, meq/l	Monthly	Grab
Dissolved Magnesium, mg/l	Monthly	Grab
Dissolved Magnesium, meq/l	Monthly	Grab
Dissolved Sodium, mg/l	Monthly	Grab
Dissolved Sodium, meq/l	Monthly	Grab
Sodium Adsorption Ratio, unitless	Monthly	Calculated
Specific Conductance, μ mhos/cm	Monthly	Grab
Flow*, MGD	Monthly	Instantaneous

*Flow measurement is not required for the two monitoring stations located on the Little Powder River (ULPR, DLPR).

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): designated water quality monitoring stations are located on the receiving stream (Whitetail Creek) and in the main channel of the Little Powder River, upstream and downstream of the confluence with Whitetail Creek. Legal locations of these water quality monitoring stations (TRIB1, ULPR, and DLPR) are specified in Table 1 below. Established water quality monitoring stations on the mainstem are to be located outside the mixing zone with the tributary and the mainstem. Results are to be reported semiannually and if no effluent from this facility intercepts the tributary monitoring station (TRIB1) during an entire sampling month, then "no discharge" is to be reported for all three water quality monitoring stations that month and samples need not be collected at the three water quality monitoring stations for that monthly sampling period.

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other

waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and approval by, the permit issuing authority.

2. Reporting

Results of routine end of pipe and water quality station monitoring during the previous six (6) months shall be summarized and reported semiannually on a Discharge Monitoring Report Form (DMR). If the discharge is intermittent, the date the discharge began and ended must be included. The information submitted on the first semiannual DMR shall contain a summary of flow measurements and any additional monitoring conducted subsequent to the submittal of the initial monitoring report. If required, whole effluent toxicity testing (biomonitoring) results must be reported on the most recent version of EPA Region VIII's Guidance for Whole Effluent Reporting. Monitoring reports must be submitted to the state water pollution control agency at the following address postmarked no later than the 15th day of the second month following the completed reporting period. The first report following issuance of this modification is due on February 15th, 2006.

Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the Signatory Requirements contained in Part II.A.11.

Wyoming Department of Environmental Quality
Water Quality Division
Herschler Building, 4 West
122 West 25th Street
Cheyenne, WY 82002
Telephone: (307) 777-7781

If no discharge occurs during the reporting period, "no discharge" shall be reported. If discharge is intermittent during the reporting period, sampling shall be done while the facility is discharging.

3. Definitions

- a. The "monthly average" shall be determined by calculating the arithmetic mean (geometric mean in the case of fecal coliform) of all composite and/or grab samples collected during a calendar month.
- b. The "weekly average" shall be determined by calculating the arithmetic mean (geometric mean in the case of fecal coliform) of all composite and/or grab samples collected during any week.
- c. The "daily maximum" shall be determined by the analysis of a single grab or composite sample.
- d. "MGD", for monitoring requirements, is defined as million gallons per day.
- e. "Net" value, if noted under Effluent Characteristics, is calculated on the basis of the net increase of the individual parameter over the quantity of that same parameter present in the intake water measured prior to any contamination or use in the process of this facility. Any contaminants contained in any intake water obtained from underground wells shall not be adjusted for as described above and, therefore, shall be considered as process input to the final effluent. Limitations in which "net" is not noted are calculated on the basis of gross measurements of each parameter in the discharge, irrespective of the quantity of those parameters in the intake waters.

- f. A "composite" sample, for monitoring requirements, is defined as a minimum of four grab samples collected at equally spaced two hour intervals and proportioned according to flow.
- g. An "instantaneous" measurement for monitoring requirements is defined as a single reading, measurement, or observation.
- h. A "pollutant" is any substance or substances which, if allowed to enter surface waters of the state, causes or threatens to cause pollution as defined in the Wyoming Environmental Quality Act, Section 35-11-103.
- i. "Total Flow" is the total volume of water discharged, measured on a continuous basis and reported as a total volume for each month during a reporting period. The accuracy of flow measurement must comply with Part III.A.1.

4. Test Procedures

Test procedures for the analysis of pollutants, collection of samples, sample containers, sample preservation, and holding times, shall conform to regulations published pursuant to 40 CFR, Part 136, unless other test procedures have been specified in this permit.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date and time of sampling;
- b. The dates and times the analyses were performed;
- c. The person(s) who performed the analyses and collected the samples;
- d. The analytical techniques or methods used; and
- e. The results of all required analyses including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine the results.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the administrator at any time. Data collected on site, copies of Discharge Monitoring Reports and a copy of this WYPDES permit must be maintained on site during the duration of activity at the permitted location.

8. Penalties for Tampering

The Act provides that any person who falsifies, tampers with or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or both.

9. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

10. Facility Identification

All facilities discharging produced water shall be clearly identified with an all-weather sign posted at each outfall and flow monitoring locations (points of compliance). This sign shall, as a minimum, convey the following information:

- a. The name of the company, corporation, person(s) who holds the discharge permit, and the WYPDES permit number;
- b. The contact name and phone number of the person responsible for the records associated with the permit;
- c. The name of the facility (lease, well number, etc.) and the outfall number as identified by the discharge permit.

11. Identification and Establishment of Discharge Points

According to 40 CFR 122.21(k)(1), the permittee shall identify the expected location of each discharge point on the appropriate WYPDES permit application form. The location of the discharge point must be identified to within an accuracy of 15 seconds. This equates to a distance of 1,510 feet.

In order for the permit not to be subjected to additional public notice, the location of the established discharge point must be within 1,510 feet of the location of the discharge point originally identified on the permit application. In addition, the discharge must be within the same drainage and must discharge to the same landowner's property as identified on the original application form. If the three previously stated requirements are not satisfied, modification of the discharge point location(s) constitutes a major modification of the permit as defined in Part I.B.12. The permittee shall provide written notification of the establishment of each discharge point in accordance with Part I.A.2.a above.

12. Location of Discharge Points

As of the date of permit issuance, authorized points of discharge were as follows:

SEE TABLE 1 FOR A LIST OF OUTFALLS

13. Location of water quality monitoring stations

As of the date of issuance, authorized water quality monitoring stations were as follows:

SEE TABLE 1 FOR A LIST OF WATER QUALITY MONITORING STATIONS

Table 1: WY0038326 - Longhorn Lease

Discharge Point	Qtr/Qtr	SECTION	TWP (N)	RNG (W)	LATITUDE	LONGITUDE	Drainage / Description
001	SESW	2	55	73	44.769427	-105.607735	Discharges to on-channel "Haley Reservoir" in unnamed ephemeral tributary of Whitetail Creek
002	NENE	3	55	73	44.782151	-105.617673	Discharges to on-channel "Stay Out #2 Reservoir" in Whitetail Creek
TRIB1	SWSE	10	55	71	44.762158	-105.379454	Tributary monitoring station on Whitetail Creek
ULPR	SENW	11	55	71	44.765504	-105.364451	Upstream Little Powder River monitoring station (above Whitetail Creek)
DLPR	NWNE	10	55	71	44.770522	-105.377572	Downstream Little Powder River monitoring station (below Whitetail Creek)

Note: All CBM wells at this facility are permitted to discharge to any of the above listed outfalls (001-002).

The outfalls listed in the above table may be moved from the established location without submittal of a permit modification application provided all of the following conditions are satisfied:

1. The new outfall location is within 2640 feet of the established outfall location.
2. The new outfall location is within the same drainage or immediate permitted receiving waterbody.
3. There is no change in the affected landowners.
4. Notification of the change in outfall location must be provided to the WYPDES Permits Section on a form provided by the WQD Administrator within 10 days of the outfall location change. The form must be provided in duplicate and legible maps showing the previous and new outfall location must be attached to the form.

Moving an outfall location without satisfying the four above listed conditions will be considered a violation of this permit and subject to full enforcement authority of the WDQ.

An outfall relocation as described above will not be allowed if the new outfall location is less than one mile from the confluence of a Class 2 waterbody and the dissolved iron limits established in the permit for the outfall are based upon Class 3 standards.

Requests for modification of the above list will be processed as follows. If the requested modification satisfies the definition of a minor permit modification as defined in 40 CFR 122.63 modifications will not be required to be advertised in a public notice. A minor modification constitutes a correction of a typographical error, increase in monitoring and/or reporting, revision to an interim compliance schedule date, change in ownership, revision of a construction schedule for a new source discharger, deletion of permitted outfalls, and/or the incorporation of an approved local pretreatment program.

A request for a minor modification must be initiated by the permittee by completing the form titled Wyoming Pollutant Discharge Elimination System Permit Modification Application For Coal Bed Methane. Incomplete application forms will be returned to the applicant.