

IMPLEMENTATION GUIDANCE FOR RECLAMATION AND BONDING OF
ON-CHANNEL RESERVOIRS THAT STORE
COALBED NATURAL GAS PRODUCED WATER

Wyoming Department of Environmental Quality
Water Quality Division
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Section 1 - Need and Authority

The rapid development of coalbed natural gas (CBNG) in the greater Powder River Basin (PRB) of Wyoming has resulted in the construction of large numbers of produced water retention reservoirs. These reservoirs are constructed “on-channel” by damming natural drainages or “off-channel” by excavating pits or ponds.

Reclamation and bonding of the off-channel reservoirs is required by the Wyoming Oil and Gas Conservation Commission (WOGCC), the Office of State Lands and Investments (OSLI), and the US Bureau of Land Management (BLM). The BLM will require bonding and reclamation of on-channel reservoirs located over federal oil and gas leases. However, there is concern that there is no mechanism for bonding and reclamation of on-channel reservoirs where there is no federal nexus.

Reclamation of the reservoirs, once the CBNG produced water is no longer being discharged, is important for the long term environmental health of the area. Un-reclaimed reservoirs cause fragmentation and isolation of drainages. This fragmentation will have an adverse impact on the natural biota as well as an adverse impact on agricultural uses of the land. Dry reservoir bottoms that are not re-vegetated may result in fugitive dust, may promote the spread of noxious weeds, and may expose salts and sediments that could contain toxic constituents such as selenium.

The purpose of this document is to describe how the Water Quality Division (WQD) of the Wyoming Department of Environmental Quality (DEQ) will implement the requirements of section 35-11-102 of the Wyoming Environmental Quality Act (EQA) as they pertain to reclamation of on-channel CBNG ponds. Section 35-11-102 of the EQA states, in part, that “it is the policy and purpose of this act to enable the state to prevent, reduce, and eliminate pollution; to preserve and enhance the air, water, and reclaim the land of Wyoming”. Sections 35-11-109(a)(i) and (iii) of the EQA give the Director of the DEQ the authority to carry out and implement the purposes of the act. Section 35-11-109(a)(xiii) of the EQA gives the Director the authority to hold bonds to ensure reclamation of disturbed lands. Sections 35-11-110(a)(ii) and (x) give similar authority to the division Administrators.

Section 2 - Applicability

This guidance applies to any CBNG operator who has or will construct dams across natural drainages to store and manage CBNG produced water. The resultant reservoirs, because of their location, may hold natural runoff in addition to CBNG produced water. To avoid duplication, off-channel reservoirs that are bonded by the WOGCC, OSLI, or BLM are excluded from the requirements of this guidance. This guidance envisions that all on-channel reservoirs constructed or modified after August 2005 must be bonded by the BLM or DEQ effective immediately. On-channel CBM reservoirs in existence prior to August 2005, must be bonded by the BLM or DEQ as their WYPDES permits are renewed or modified to the extent that public notice is required.

Section 3 - Definitions

The following terms are defined for purposes of this Guidance:

- (a) “Administrator” means the Administrator of the Water Quality Division.
- (b) “Approximate original contours” means the surface configuration achieved after removal of the embankment, backfilling and grading so that the reclaimed land resembles the general surface configuration of the land prior to construction of the reservoir as it blends into and complements the drainage pattern of the surrounding terrain.
- (c) “Director” means the Director of the Wyoming Department of Environmental Quality.
- (d) “Existing reservoir” is a reservoir that existed on the original date of this guidance and was not constructed or modified for the purpose of managing produced water from coal bed natural gas operations.
- (e) “Reservoir” means any on-channel, man-made water detention structure created primarily to manage produced water from coalbed natural gas operations and which is designated as a receiving water in a WYPDES permit.
- (f) “WQD” means the Water Quality Division of the Department of Environmental Quality.
- (g) “WYPDES” means the Wyoming Pollution Discharge Elimination System.

Section 4 - Implementation

The requirements of this guidance shall be implemented through the issuance of WYPDES permits. After the original date of this guidance, no CBNG operation with an on-channel CBNG reservoir will receive a new, renewed, or modified WYPDES permit unless the requirements of this guidance have been met.

Section 5 - General Reclamation and Bonding Requirements

(a) During reservoir construction, topsoil shall be salvaged and stockpiled. Topsoil stockpiles shall be separate from the dam embankment and marked in the field with a sign. Such stockpiles shall be protected from erosion through temporary seeding and containment berms, and/or other approved means. A Topsoil covering may be used on dams, but topsoil may not be used for the dam core. This requirement shall not apply to reservoirs in existence on the original date of adoption of this guidance.

(b) Each reservoir must have a sign showing the WYPDES permit and outfall number and that sign must be retained until bond release.

(c) For all reservoirs that will not be retained by the landowner, the permittee shall perform the following reclamation requirements once the discharge of CBNG produced water to the reservoir permanently ends:

(i) At the time of reservoir closure:

(A) Sample and analyze the soil on the floor of the reservoir and submit the results of sampling to the WQD using the form provided as Appendix C to this document. Further reclamation may not proceed until the WQD reviews the soil quality data and gives permission to proceed;

(B) Excavate layers of salts and mineral residue that may exceed acceptable concentrations. Isolate this material so it will not leach into surface or groundwater. Appendix A to this document shall be used by the WQD to determine acceptable soil quality;

(C) Backfill, contour and grade the disturbed area of the reservoir to the approximate original contours and stabilize all surface drainage channels that flow through the disturbed area.

(D) Replace topsoil, seed and mulch the area with a native grass and shrub seed mixture, unless the landowner specifies some other seed mixture consistent with the land use. If the area is open to active grazing, the permittee shall make arrangements to protect the reclaimed area to ensure successful re-vegetation.

(d) For reservoirs where only a portion of the impoundment is authorized for retention by the landowner under the Waiver of Reclamation requirements in section 7 of this guidance, the permittee shall perform the reclamation requirements of subsection (a) of this section for those portions of the reservoir to be reclaimed, except that the disturbed area is not required to be reclaimed to the approximate original contours. However, the disturbed area above the authorized reservoir level, including the remaining embankment, spillway and outlet structures must be stabilized to provide for long-term low maintenance care.

(e) Provide to the Administrator an acceptable performance security, or a federally insured certificate of deposit, other government security or cash, or a self-bond to cover the estimated cost of reclamation per the requirements of this subsection. This security is to ensure that funds are available to the department if the permittee fails to perform the reclamation requirements of this guidance. The Administrator shall prescribe the forms and conditions of the security.

(i) If the applicant desires to use a letter of credit as the performance security, the applicant shall meet the requirements of Chapter 12 of the LQD's rules for non-coal operations.

(ii) If the applicant desires to utilize self-bonding for some or all of the security, the applicant shall provide the information required in LQD Non-coal Rules, Chapter 6, Section 2, subsections (a)(i) through (xii), excluding (v) and (xiii)(D). For purposes of application of this guidance to CBNG operations, "mining operation" and "non-coal operator" shall mean "CBNG operations". The Administrator shall render a decision on the self-bonding application in accordance with Sections 3 and 4, of LQD's Non-coal Rules, Chapter 6.

(f) The size of the performance security required by this guidance shall be determined as follows:

(i) Where excavation, backfilling and topsoiling to meet the requirements of this section involves 5,000 cubic yards of earthwork or less, the security shall be \$7,500 during the first calendar year of this guidance. This amount shall escalate by 3 percent on January 1 of each year. The amount of the security will be recalculated whenever the WYPDES permit for the reservoir is renewed or has a modification requiring public notice.

(ii) Where the excavation, backfilling and topsoiling to meet the requirements of this section involves between 5,000 cubic yards and 10,000 cubic yards of earthwork, the security shall be \$12,500 during the first calendar year of this guidance. This amount shall escalate by 3 percent on January 1 of each year. The amount of the security will be recalculated whenever the WYPDES permit for the reservoir is renewed or has a modification requiring public notice.

(iii) Where the excavation, backfilling and topsoiling to meet the requirements of this section exceeds 10,000 cubic yards of dirt work, the security amount shall be based upon a certified professional engineer's estimate that quantifies the reclamation costs including associated costs to remove pipes, concrete and other structural components. This amount shall escalate by 3 percent on January 1 of each year. The amount of the security will be recalculated whenever the WYPDES permit for the reservoir is renewed or has a modification requiring public notice. For purposes of this subsection, the security amount shall be at least \$13,000.00 and this amount shall escalate by 3 percent on January 1 of each year.

(g) The applicant may request that one security instrument be held for multiple reservoirs.

Section 6 – Well Reclamation

(a) All monitoring or other wells associated with any reservoir bonded under this guidance document shall be reclaimed in accordance with the provisions of Appendix B.

Section 7 - Waiver of the Bond and Reclamation Requirements

(a) If the permittee provides a letter from the landowner indicating the landowner's desire that an existing reservoir (see definition) be retained after the CBNG operations are complete, and provides certification from the SEO that the reservoir may be left permanently, no bond is required from DEQ and the reservoir does not have to be reclaimed.

(b) Once a permittee has ceased discharge to a reservoir (see definition) the permittee may request that the bond for that reservoir be released without reclamation. Such request must include:

- (i) A signed statement from the landowner requesting retention of the reservoir; and
- (ii) Certification from the SEO that the reservoir may be left permanently;
- (iii) Submission of proof that the well reclamation requirements of Section 6 above have been met.

(c) If a landowner asks that a portion of a reservoir be retained after CBNG operations are complete, the requirements of this policy shall apply only to the portions of the reservoir the landowner does not ask to be retained.

Section 8 - Bond Release and Forfeiture Procedures

(a) When a permittee has determined that a reservoir has been successfully reclaimed, he shall send a written request to the Administrator that an inspection of the site be made.

(b) Except as provided under the Waiver section of this guidance, no security shall be released until the reclamation requirements have been completed. The security will be retained until successful reclamation has been confirmed by an on-site investigation by the Administrator or his representative.

(c) If the Director determines that the permittee has failed to do the construction work necessary to reclaim the reservoir within one year after cessation of CBNG discharge to the reservoir, the Director may request that the Attorney General begin bond forfeiture proceedings. For good cause, the permittee may request an extension for not more than one additional year.

(d) If, after three growing seasons, the Director determines that re-vegetation of the site has failed and that the permittee is no longer making a good faith effort to re-vegetate the site, the Director may request that the Attorney General begin bond forfeiture proceedings.

(e) The Director may request that the Attorney General begin bond forfeiture proceedings without delay if the permittee declares bankruptcy or abandons the project.

(f) The Attorney General shall institute forfeiture proceedings by providing written notice to the surety and the permittee that the bond will be forfeited. The permittee will have 30 days from receipt of the Attorney General's notice to demand a hearing before the Environmental Quality Council. If no demand for hearing is made, the Attorney General shall proceed with the forfeiture.

Appendix A

I. Soil Quality Limits

<u>Parameter</u>	<u>Limits</u>
pH	5.5 – 8.5
Conductivity (umhos/cm)	8,000
SAR	15
Selenium	.1 ppm
Boron	5 ppm
Molybdenum	1 ppm
Arsenic	2 ppm

II. Sampling Locations

Each reservoir shall be sampled at two locations. One location shall be at the lowest elevation within the reservoir. The second location shall be at a point approximately halfway between the lowest elevation and the high water mark.

III. Sampling Methodology

At each location described above, two samples shall be collected for analysis. The first sample shall be a soil increment of 0-6 inches from the surface. The second sample shall be a soil increment of 6-48 inches from the surface.

IV. Analytical Methods

Analytical methods shall be as described in Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1 available at the following website: <http://deq.state.wy.us/lqd/guidelns/guide1.pdf>

Appendix B

Requirements for Well Plugging and Abandonment

Wells that are not properly plugged can act as a preferential pathway for surface contamination to reach and impair groundwater quality, and could cause injury to livestock, wildlife, or humans. Permittees, consultants, and others who construct and install monitor wells, test wells, injection wells, artificial recharge wells, public drinking water supply wells, and geothermal wells are reminded that wells that are no longer useful must be plugged in order to ensure that groundwater is protected and preserved for future use, and to eliminate the potential for physical injury. Wells need to be properly plugged and abandoned when they "...have not been used for a period of one year, unless the owner demonstrates his intention to use the well again by properly maintaining it".

Properly maintaining a well means: 1) the well has no defects which will allow the impairment of the quality of water in the well or in the water bearing formation penetrated; 2) the well is covered and the cover is water tight; 3) the well is marked so that it can be clearly seen; and 4) the area surrounding the well is kept clear of brush or debris. (Water Quality Rules and Regulations, Chapter 11, Part G, Section 70 "Plugging and Abandonment").

Plugging and Abandonment requirements (Water Quality Rules and Regulations, Chapter 11, Part G, Section 70) include: filling and sealing part or all of the well with impervious material; marking the location of the well; and filing a plugging and abandonment report. Abandoned public water supply wells must be plugged by filling the well with cement grout (Water Quality Rules and Regulations, Chapter 12, Section 9).

Further information on the requirements for well plugging and abandonment, including a form to report the plugging and abandonment of wells can be downloaded from the Groundwater Section's webpage:

Plugging and Abandonment Requirements:

<http://deq.state.wy.us/wqd/groundwater/downloads/Rules%20and%20Regs/CHAPXI%20-%20Part%20G.pdf>

Plugging and Abandonment Form:

<http://deq.state.wy.us/wqd/groundwater/downloads/P&A%20Form.pdf>

Plugging requirements for solid mineral exploration boreholes are regulated by the Department's Land Quality Division (307-777-7756).

Appendix C

Reservoir Closure Application

BOND INFORMATION

Bond Number: _____
WYPDES Permit Number: _____
Permittee: _____
Reservoir Name: _____
Legal Description: _____ STATE LANDS? _____

SOIL SAMPLING RESULTS

Lowest elevation in reservoir results:

0-6 inch increment.

pH _____
Conductivity (umhos/cm) _____
SAR _____
Selenium (ppm) _____
Boron (ppm) _____
Molybdenum (ppm) _____
Arsenic (ppm) _____

6-48 inch increment.

pH _____
Conductivity (umhos/cm) _____
SAR _____
Selenium (ppm) _____
Boron (ppm) _____
Molybdenum (ppm) _____
Arsenic (ppm) _____

Mid-level in reservoir results:

0-6 inch increment.

pH _____
Conductivity (umhos/cm) _____
SAR _____
Selenium (ppm) _____
Boron (ppm) _____
Molybdenum (ppm) _____
Arsenic (ppm) _____

6-48 inch increment.

pH _____
Conductivity (umhos/cm) _____
SAR _____
Selenium (ppm) _____
Boron (ppm) _____
Molybdenum (ppm) _____

Arsenic (ppm) _____

Please attach supporting laboratory analysis reports

If any soil analysis results are in exceedence of limits defined in Appendix A provide a detailed plan for mitigation of the residue.

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