



Panel on Challenges and Opportunities of Treatment, Beneficial Use
and Management of CBM Produced Water

The Regulatory Environment

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Options for Managing CBM Water

- Discharge to surface water
- Inject underground for disposal
- Evaporate
- Haul/pipe for offsite disposal
- Beneficial reuse
 - Agriculture
 - Industrial use
 - Domestic use
 - Other
- Some of these activities are subject to state and federal regulations

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Overview of Regulatory Requirements Relating to Surface Discharge

- National Pollutant Discharge Elimination System (NPDES) permits are required for discharges to surface waters
- Issued by state agencies
- Contain numerical limits on selected pollutants
- May require best management practices or other operational controls
- Limits are based on technical feasibility of treatment and protection of water quality
- There are currently no national discharge standards for CBM water
 - EPA is studying the CBM sector and will decide next year if national effluent limitations guidelines are needed
 - In the mean time, states can establish limits using best professional judgment



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Overview of Regulatory Requirements Relating to Underground Injection

- If CBM water is injected, it must be authorized by an Underground Injection Control (UIC) permit issued by the state or an EPA Region.
- Class II wells are used for injecting produced water
- If water is treated and injected into a shallow aquifer for reuse, a Class V well permit is required
- Given the process used to produce CBM (extract water from the coal seam to reduce hydrostatic pressure), injection of water back to the coal seam (comparable to enhanced recovery) is not practical



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Requirements for Other Water Management Options

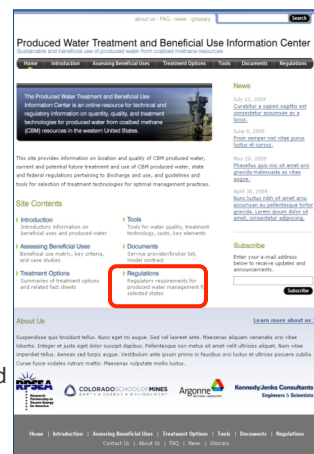
- Some water management options are generally approved without specific regulatory requirements
 - Evaporation
 - Irrigation
 - Industrial use
- Water managed by those options typically must meet certain process quality requirements that ensure good operations rather than meeting regulatory requirements
- Example
 - Use as cooling tower makeup water would not require any permits
 - Owner of cooling tower would need to make sure the water was clean enough to meet the process specifications



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How Can Users Obtain Regulatory Information?

- The project team is building a RPSEA project website that will provide links to each of the states.
 - Should be available some time in 2010
- Regulatory information format will be similar to the Regulatory Module on Argonne's Produced Water Management Information System (PWMIS) – see next page for example
 - Identify responsible agencies
 - Provide contact information
 - Give bulleted outline of state regulatory requirements, permitted activities, and prohibited activities
 - contain hot links to the actual text of the regulations and to applications, forms, etc.
- Users can contact state agencies directly for clarification



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Sample Content for Regulatory Information (1 of 3)

State Regulations: Colorado

The [Colorado Oil and Gas Conservation Commission](#) (COGCC), a division of the [Department of Natural Resources](#) (DNR), regulates oil and gas activities in Colorado. The COGCC has broad statutory authority with respect to impacts on any air, water, soil, or biological resources resulting from oil and gas operations. The COGCC implements the state ground water standards and classifications as they relate to oil and gas exploration and production (E&P) activities. The COGCC has jurisdiction for all Class II injection wells, except those on Indian lands. The COGCC has jurisdiction for the management of all E&P wastes except at commercial disposal facilities. The [Colorado Department of Public Health and Environment](#) (CDPHE) administers the environmental protection laws related to air quality, waste discharge to surface water, and commercial disposal facilities.

Contact

[Colorado Oil and Gas Conservation Commission](#)
1120 Lincoln Street, Suite 801
Denver, CO 80203
(303) 894-2100 (phone)
(303) 894-2109 (fax)

[Colorado Department of Public Health and Environment](#)
4300 Cherry Creek Drive, South
Denver, CO 80246-1530
(303) 692-3066 (phone)
(303) 759-5355 (fax)

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Sample Content for Regulatory Information (2 of 3)

Produced Water Management Practices and Applicable Regulations

The regulations of the Colorado Oil and Gas Conservation Commission (COGCC) can be accessed online by selecting "Final Amended Rules" on the [COGCC home page](#) (under Public Announcements) and again in the next window. (The amended rules are contained in a pdf-file dated Dec. 17, 2008.)

The COGCC's rules governing the management of exploration and production waste are contained in the 900 series. The COGCC's rules governing enhanced recovery projects are contained in the 400 series. Otherwise, the Colorado Department of Public Health and Environment (CDPHE) has promulgated [regulations on water quality and supply, solid waste, and hazardous waste](#).

- **900 Series: Exploration and Production Waste Management** — The definition of E&P waste under the Oil and Gas Conservation Act basically follows the federal exemption from the definition of hazardous waste for oil and gas E&P waste. Management Options for Produced Water (**Rule 907c**) include the following.
 - **Treatment of produced water** — Produced water shall be treated prior to placement in a production pit to prevent crude oil and condensate from entering the pit.
 - **Produced water disposal through:**
 - **Injection** into a properly permitted Class II well (Rule 325);
 - **Evaporation/percolation** in a properly permitted pit;
 - **Disposal at permitted commercial facilities;**
 - **Disposal by roadspraying on lease roads outside sensitive areas** for produced waters with less than 3,500 mg/l TDS when authorized by the surface owner. Roadspraying shall not impact waters of the state, shall not result in pooling or runoff, and the adjacent soils shall meet the allowable concentrations in Table 90-1-1. Flowback fluids shall not be used for dust suppression; or
 - **Discharging into state waters**, in accordance with the Water Quality Control Act and the implementing rules and regulations. Produced water discharged may be put to beneficial use in accordance with applicable state statutes and regulations governing the use and administration of water.
 - **Evaporation in a properly lined pit** at a properly permitted **centralized E&P waste management facility** (Rule 908).
 - **Produced water reuse and recycling** — Produced water may be reused for enhanced recovery, drilling, and other uses in a manner consistent with existing water rights and in consideration of water quality standards and classifications established by the [CDPHE Water Quality Control Commission](#) for waters of the state, or any point of compliance established by the Director (Rule 324D).
 - **Mitigation** — Water produced during operation of an oil or gas well may be used to provide an alternate domestic water supply to surface owners within the oil or gas field, in accordance with all applicable laws, including, but not limited to, obtaining the necessary approvals from the [CDPHE Water Quality Control Commission](#) for constructing a new "waterworks." Produced water not so used shall be disposed in accordance with the disposal, reuse, and recycling regulations described above. The water produced shall be to the benefit of the surface owner within the oil and gas field and may not be sold for profit or traded.
- **400 Series: Enhanced Recovery Projects**
 - **Approval** — All operations must be authorized.
 - **Casing and Cementing** — Wells used for injection of fluids into the producing formation shall be cased with safe and adequate casing or tubing so as to prevent leakage, and shall be so set or cemented that damage will not be caused to oil, gas, or fresh water resources. (Each injection well must satisfactorily pass a mechanical integrity test prior to injection.)
 - **Notice of Commencement and Discontinuance of Injection Operations** — Operators must notify the COGCC immediately upon commencement and within ten days of discontinuance of all injection operations. When any well in an approved enhanced recovery unit operation is converted to or from an injection status, notice must be given within thirty days (Sundry Notice, Form 4). Before plugging any intake and oil and gas wells, notice must be given by the well owner.
- **Produced Water Discharge Permits** can be obtained through the [CDPHE Water Quality Control Division](#).

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Sample Content for Regulatory Information (3 of 3)

- Add a new section (not currently part of PWMIS) that describes State regulations, laws, and policies regarding beneficial use of produced water

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Impediments to Beneficial Reuse of CBM Water

- Feasibility Issues
 - Availability of water in sufficient quantity and quality for a long enough period of time to justify an investment
 - Need to account for historical swing in natural gas prices and the effect that has on production
 - Cost of reuse compared to disposal
 - How clean must water be before the reuse?
- Legal Concerns
 - Gas producers have a fear of liability from an end user of the water
 - Water rights laws are state-specific and can be very complicated
 - Regulatory requirements may be a moving target

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Conclusions

- CBM production generates a lot of water
- The Rocky Mountain states have a need for additional water resources
- Beneficial reuse of the water is a desirable goal
- Gas producers must follow existing water management regulations and may be subject to additional requirements in the future
- There are some feasibility and legal barriers that impede beneficial reuse of the water
- This project hopes to make progress in mitigating those barriers



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