Regulatory Issues Affecting Management of Produced Water from Coal Bed Methane Wells

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Acknowledgements

John Veil’s work is funded by:

United States Department of Energy
Office of Fossil Energy

and the National Petroleum Technology Office
Topics for Discussion

- U.S. national discharge requirements
- The permitting process
- Applicability to CBM water
U.S. Requirements for Discharging Laws
- Clean Water Act

Discharge Regulations
- National Pollutant Discharge Elimination System (NPDES) program
- Effluent limitations guidelines (ELGs)

Permits and Guidance
- Environmental Protection Agency (EPA) or delegated states issue NPDES permits for discharges
EPA Oil and Gas Effluent Limitations Guidelines (ELGs) [40 CFR 435]

- Onshore
- Stripper (<10bbl/day)
- Agricultural and wildlife use
- Coastal
- Offshore

98th meridian
Offshore and Coastal ELGs

• Best Available Technology (BAT) for offshore produced water:
  - Oil and grease limits before discharge
    ✓ 29 mg/l monthly average
    ✓ 42 mg/l daily maximum

• BAT for coastal produced water
  - zero discharge except in Cook Inlet, Alaska
  - Offshore limits are required there
ELGs for Wells Located Onshore

- **Onshore subcategory**
  - zero discharge

- **Stripper subcategory**
  - No national requirements
  - Jurisdiction left to state or EPA region

- **Agricultural and Wildlife Use subcategory**
  - produced water must have a use
    - Water must be of good enough quality for wildlife, livestock, or other agricultural use
    - Produced water must actually be put to that use
  - Oil and grease limit of 35 mg/l maximum
Establishing NPDES Permit Limits and Conditions – Simplified Overview

Step 1 – Develop technology-based limits

Step 2 – Develop water quality-based limits

Step 3 – Determine other permit conditions
Establishing NPDES Permit Limits and Conditions

Step 1 - Develop Technology-based Limits

Are there any applicable ELGs?

- yes → Apply ELGs
- no → Need to develop BPJ (best professional judgment) limits

Borrow ELGs from another industry

Develop your own BPJ limits

Are other ELGs strict and comprehensive enough?

- yes → Develop additional technology-based limits
- no → Final technology-based limits

GO TO STEP 2
Establishing NPDES Permit Limits and Conditions
Step 2 - Develop Water Quality-based Limits

Do technology-based limits developed in step 1 protect water quality?

- determine background concentrations of pollutants and dilution
- compare concentrations to water quality standards

yes

no

Develop water quality-based limits:
- stricter limits for pollutants already covered by technology-based limits
- limits for other pollutants not covered by technology-based limits

May need to do modeling and determine mixing zone

Final water quality-based limits

GO TO STEP 3
Establishing NPDES Permit Limits and Conditions

Step 3 – Determine Other Permit Conditions

Use numerical limits developed in steps 1 and 2 and determine monitoring and reporting methods and frequency

Are other types of controls necessary?
- best management practices plans
- operational requirements
- restrictions on flow or other activities

no

yes

Develop other types of controls and add to permit

Final permit
How Does This Relate to CBM Produced Water?

- During development of oil and gas industry ELGs, EPA did not envision or study CBM industry
- Some parties suggest that oil and gas industry ELGs are not relevant to CBM water
  - CBM water is more like drainage from coal mines (regulated by coal mining ELGs at 40 CFR 434) than produced water from conventional oil and gas production
  - CBM water could be regulated by BPJ
History of CBM Water Regulation

- Alabama fought the early battles
  - In the mid-1970s, CBM was produced for mine safety, not as a product
  - During Arab oil embargo, natural gas prices rose, and coal companies tried to collect and sell the gas
  - In early 1980s, Alabama producers petitioned EPA Region 4 for relief from oil and gas ELGs
    - Being east of 98th meridian, Agricultural and Wildlife subcategory did not apply
  - EPA agreed that, at least in Alabama, CBM water was not regulated by oil and gas ELGs
Permitting Practices in Alabama

- Alabama DEM originally issued NPDES permits based on coal ELGs and other water quality-based limits

- Currently, permits contain:
  - Limits on pH, Fe, Mn, BOD, oil and grease, DO
  - Monitoring for conductivity, chlorides, effluent toxicity
  - Install diffuser
  - BMP plan
Permitting Practices in Region 8

• WY, MT, and CO have NPDES primacy except for:
  – Tribal lands in all 3 states
  – Federal facilities in CO

• Each state has elected to develop permits with limits based on BPJ and water quality protection
  – Did not use oil and gas/agricultural and wildlife use ELGs
Related EPA Activities

- Preparation of study assessing water management options, effectiveness and cost
  - Would help EPA write permits for tribal lands
  - Could be used by environmental advocacy groups to challenge permits issued by states
  - Draft study should be ready soon

- EPA headquarters, ELG office has been petitioned to develop new ELGs for CBM water
  - No decision made on this
Discussion

• For first few CBM discharges, states can carefully assess impacts
• When hundreds or thousands of new wells are drilled and huge volumes of water are produced in historically arid areas, situation becomes more complicated. Impacts on:
  - Surface water hydrology
  - Ground water elevation and water quality
  - Soils/crops
  - Western culture
Other Water Management Options

- Types of options
  - Injection
    - Shallow – aquifer recharge
    - Deep – disposal
  - Land application
    - Irrigation
  - Storage and evaporation
  - Livestock and wildlife water supplies

- Considerations in selecting options
  - What do regulations allow?
  - Cost
  - Ease of regulatory approval
  - Technical feasibility
Final Thoughts

- National Energy Strategy counts on expansion of CBM production
- Need strategies to manage water with both environmental protection and affordable costs
- EPA study on water treatment options and costs should provide useful information
  - States may elect to but are not required to follow the findings and recommendations of the EPA study
- Communication between stakeholders is necessary to meet the dual concerns of environmental protection and energy supply
For More Information

Download a full report on this subject at: