

CBM PRODUCED WATER

Regulatory Jurisdiction
COGCC

Produced water is an exploration & production waste
Managed under COGCC Rules 907.c.

EXPLORATION AND PRODUCTION WASTE (E&P WASTE) shall mean those wastes associated with operations to locate, remove or gas from the ground or to remove impurities from such substances and which are **uniquely associated with and intrinsic to oil and gas exploration, development, or production operations** that are exempt from regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Sections 6921 - 6924.

CBM PRODUCED WATER

Regulatory Jurisdiction
COGCC

Colorado Department of Public Health and Environment
Water Quality Control Division
Colorado Discharge Permit System (CDPS)

Division of Water Resources
Beneficial use/Water rights
Permits
Trib./Non-Trib

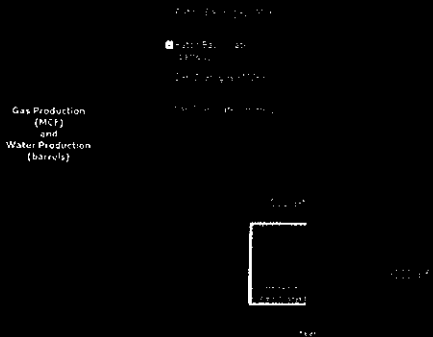
CBM PRODUCED WATER DISPOSAL METHODS RATON BASIN

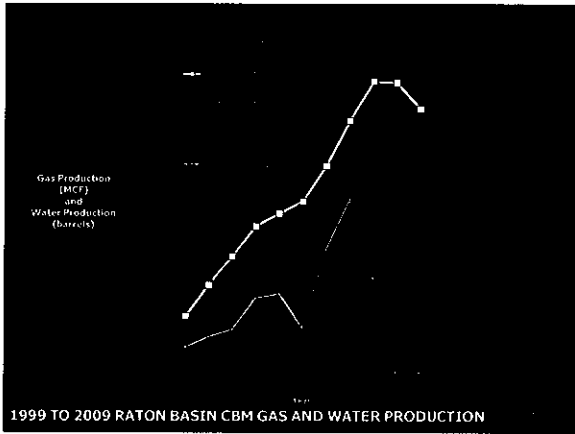
- Surface Water Discharge (WQCD-CDPS permit)
- Pits – Evaporation and/or percolation
- Underground Injection Wells
- Re-use/recycling
- Road watering
 - Lease roads per COGCC Rule 907
 - County roads through agreement with WQCD, Las Animas County and COGCC

CBM PRODUCED WATER DISPOSAL METHODS RATON BASIN

- Centralized E&P Waste Management Facility (rule 908)
- Commercial Disposal
- Mitigation: temporary water supply, fire fighting

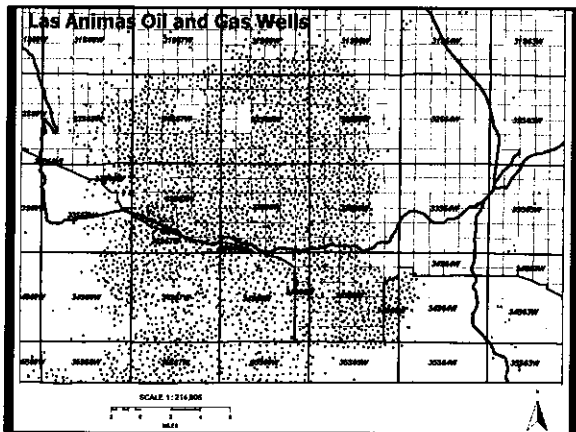
2009 CBM GAS AND WATER PRODUCTION – RATON and SAN JUAN BASINS

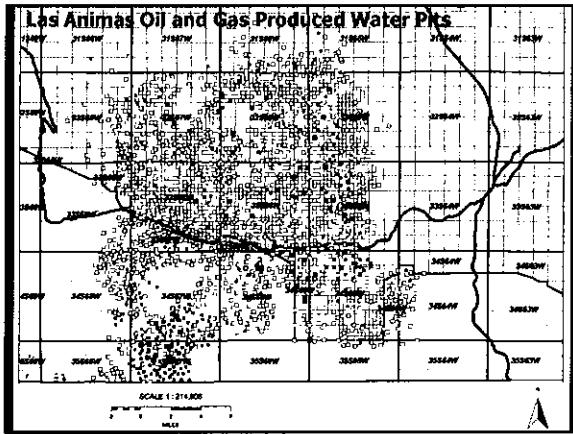


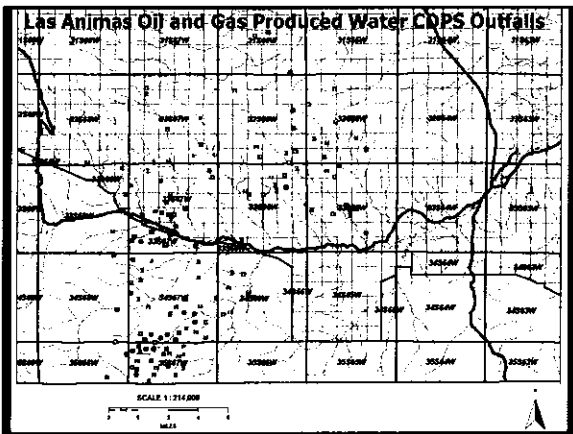


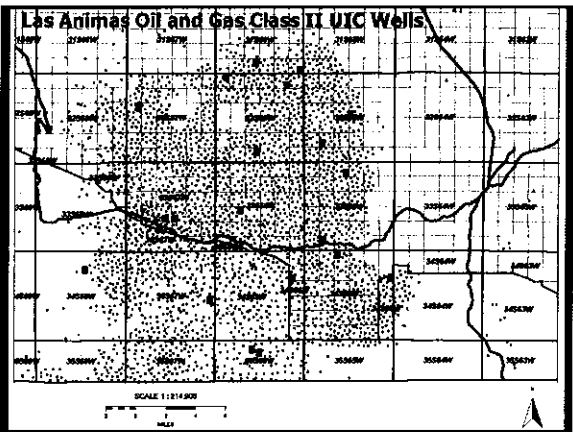
CBM PRODUCED WATER DISPOSAL 2006

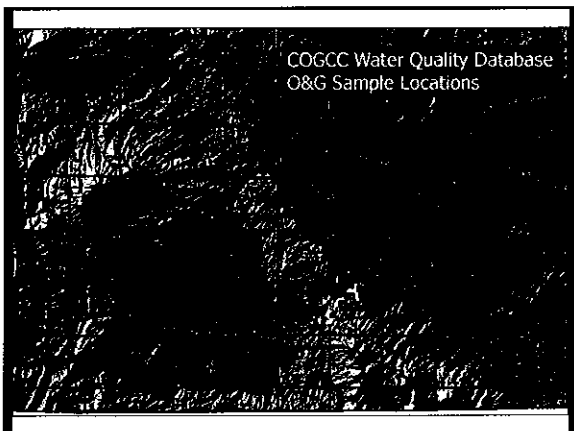
BARRELS	% of Total <small>(est. available)</small>	DISPOSAL METHOD
70,833,358 <small>(Total Produced)</small>	100%	Surface Water Discharge
102,938,267 <small>(Total Available)</small>	15%	Injected
202,771,625 <small>(Total Available)</small>	20%	Pits
702,768,304 <small>(Total Available)</small>	65%	Surface Water Discharge











CBM PRODUCED WATER QUALITY

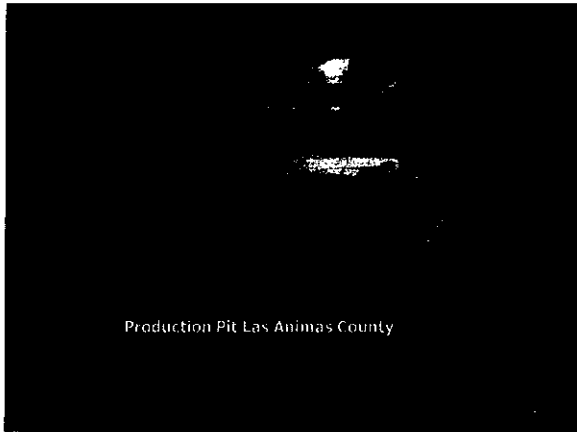
Huerfano	Minimum	Maximum	Median
Total Dissolved Solids (TDS) mg/l	498	5119	800
Sodium mg/l	166	1694	325
SAR	12	84	60
Las Animas			
Total Dissolved Solids (TDS) mg/l	175	15235	1910
Sodium mg/l	95	5260	710
SAR	2.1	220	69

RATON BASIN PRODUCTION PITS

Evaporation and/or percolation
≈ 1900 permitted pits

Issues

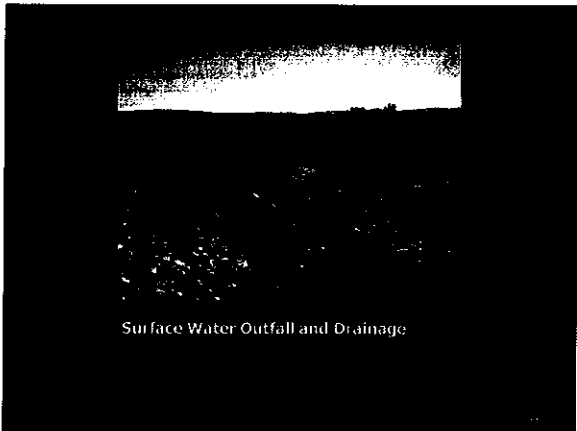
- Leaks, overfills
 - Unlined pits leak through fractures
 - Unlined pits leak through permeable zones to ground surface to surface water
 - Pit lining failures
- Potential impacts to groundwater
- Access by domestic animals and wildlife

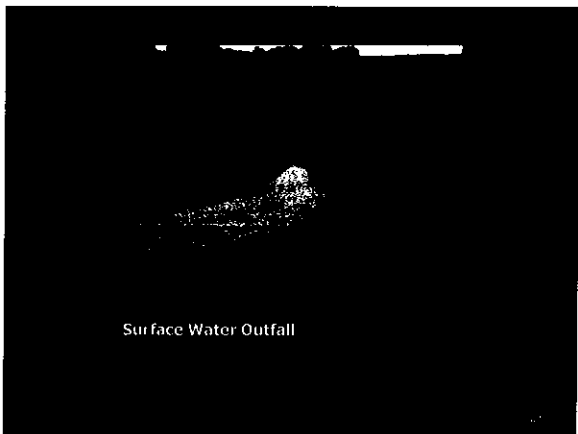


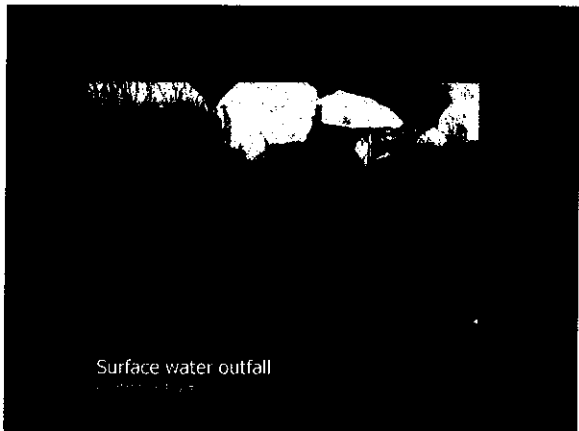
Memorandum of Understanding (MOU)
 Effective February 15, 2000
 COGCC shall respond to spills/releases to surface water of E&P wastes (that are not violation of an existing CDPS permit)
 WQCD shall respond to any spill/release of any violation of an existing CDPS permit
 WQCD has right to participate in any COGCC response, evaluation or remediation
 COGCC notifies WQCD of enforcement plans for spills/releases of E&P waste

SURFACE WATER DISCHARGE
 Permit through WQCD
 - Colorado Discharge Permit
 - Narrative Standard protecting agricultural uses recently revised through stakeholder process
 - May be put to beneficial use in accordance with applicable state statutes and regulations

ISSUES
 - Erosion
 - Soil/crop damage
 - Immersion of non-hydric vegetation
 - Impacts to groundwater
 - Discoloration, odors, algal mats







UNDERGROUND INJECTION CONTROL (UIC)

- 19 - UIC WELLS (Las Animas)
- 1- Class I UIC WELL (Huerfano)
- 43 – UIC wells (La Plata)
- 1 – UIC well (Archuleta)



Summary

Multiple state agencies with regulatory
role in CBM produced water issues
Overlap?
