

**COMMENTS ON
PETITION TO THE EQC**

**AMENDMENT TO WY WATER
QUALITY RULES**

BY JEFF CLINE

**REPRESENTING ANADARKO
PETROLEUM AS LAND OWNER AND
OPERATOR**

Purpose

- Briefly discuss the proposed rule changes, the effects on landowners, wildlife and operators, and, the feasibility of implementation.

Written comments and letters from the landowners/ranchers are arriving separately by mail.

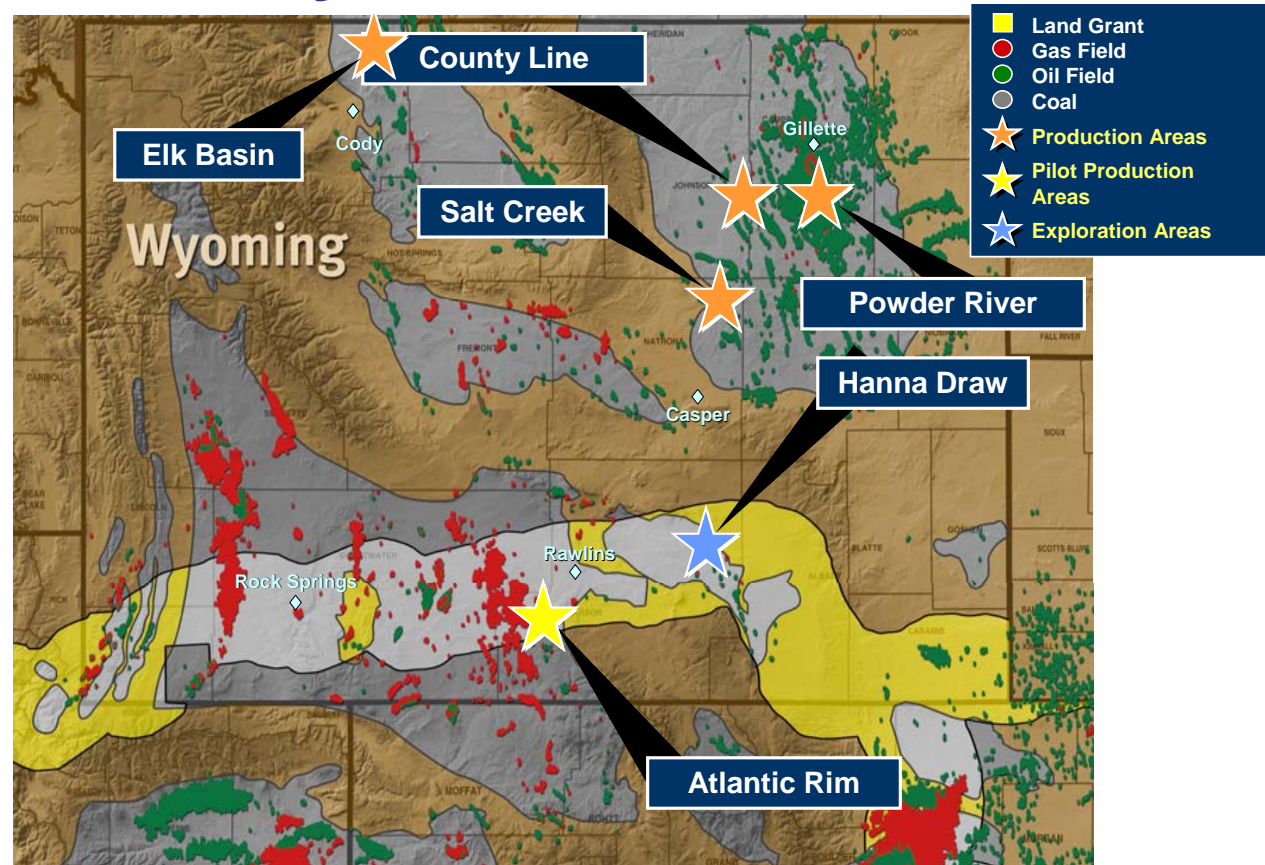
Anadarko Petroleum

- APC is a large independent energy company with over 250 employees who live in Wyoming.
- APC has a vested interest in Wyoming, being the largest surface owner; we are dedicated to care for this surface (about one million acres) which supports multiple use, and from which we extract minerals.

APC Wyoming Areas of Interest

Surface Water Release

- Salt Creek, Sussex, Lynch
- Powder River
- County Line
- Atlantic Rim
- Elk Basin
- Hanna



Items of Concern in Petition

- WDEQ to regulate water quantity discharges from production of oil & gas and CBNG
 - i.e. water releases to not exceed that actually used by cattle and wildlife

This cannot readily be permitted and is impossible to manage under NPDES permit

Items of Concern in Petition - Water Quantity

- How many cattle would be in the correct draw at the correct time?
- Shouldn't cattle have enough water to bathe, or cool off? Evaporation of limited quantity could result in toxicity.
- How to deal with evaporation, transportation loss, freezing?
- What is beneficial use to wildlife (*living things and especially mammals, birds, and fishes that are neither human nor domesticated*)? How much water does a fish or duck need? Does this apply to sage grouse? fish? deer?

New Water Quality Limits Recommended in Petition

- Sulfates – 500 mg/L
 - Detrimentally affects historic releases of conventional oil & gas produced water
- Barium – 0.2 mg/L
 - Detrimentally affects releases of produced water from CBNG operations
- Total dissolved solids – 2000 mg/L
 - Would detrimentally affect both types of operations
- Meeting above limits would require injection and/or treatment of produced water, with questionable benefit to the environment.

Effects to Ranchers & Oil/Gas Operations

- Water releases from historical oil & gas operations and from CBNG operations would be greatly diminished.
 - Harmful to Agricultural community dependent on the water for their livelihood
 - Harmful to wildlife
 - Harmful to the operators supporting workers in the state
 - Harmful to WY income

Case Studies

- Salt Creek Field in Central WY
 - Historical oil & gas discharges with high water volumes discharging for 35 years.
 - Six large ranches dependent on the water of Salt Creek for operations.
 - Well studied with a recent UAA documenting effects to environment and ranching.
- County Line Field in North East WY
 - Wardner Ranch owned / operated by APC
 - CBNG produced water discharging for 5 years to impoundments and draws

Summary Water Characteristics

Traditional O&G Produced Water

Chlorides + Sulfates system

- TDS 4000 to 5000 mg/L
- Sulfates to 3000 mg/L
- Barium - negligible

Summary Water Characteristics

CBNG Produced Water

Sodium bicarbonate system

- Sulfate - negligible
- TDS to 3000 mg/L; similar to Powder River
- Total Barium to 2.5 mg/L (Note that Ba levels in draws typically about 1 mg/L)

WYOMING

SALT CREEK OIL FIELD

STOCKMAN WERE AWARE OF POOLS OF OIL IN THE CREEK BOTTOMS DURING CATTLE TRAINING DAYS. THESE OIL SLEEPS LED TO THE DISCOVERY OF SALT CREEK, ONE OF WYOMING'S LARGEST OIL FIELDS, NINE MILES LONG BY FIVE MILES WIDE. IN 1923, THE FIRST CLAIMS WERE FILED IN THE 27,000-ACRE SALT CREEK FIELD. THE FIRST STRIKE IN THE FIELD OCCURRED IN 1928 AT A DEPTH OF 1,050 FEET. MANY WELLS ARE STILL ACTIVE. SALT CREEK WAS ONE OF THE FIRST UNITIZED OIL FIELDS IN THE UNITED STATES. UNDER UNITIZATION ONE COMPANY OPERATES PROPERTIES FOR ALL OWNERS AND MORE EFFICIENT RECOVERY METHODS CAN BE USED. IMPROVED PRACTICES IN SALT CREEK HAVE RECOVERED MANY ADDITIONAL MILLIONS OF BARRELS OF OIL.

Salt Creek Field









Confluence Salt Creek / Powder R.



COUNTY LINE FIELD ENVIRONMENT

Antelope Near Tire Tank Wardner Ranch CBNG Produced Water





Ducks on CBNG Produced Water







Irrigation Pivot – CBNG Produced Water; Geese



Antelope Feeding on Pivot CBNG Produced Water



Hay From Pivot – Wardner CBNG Produced Water



Wardner Ranch Cattle Enjoying CBNG Water in Impoundment



Summary

- Cattle and wildlife appear to thrive at both Salt Creek and County Line in released water from historical oil & gas and CBNG operations respectfully, under current water quantity and water quality controls.
- Therefore, it is unnecessary and even harmful to consider altering current water quantity and quality rules as advocated in the petition.

RECOMMENDATION

- EQC deny all elements of the petition

Proposed Water Management Alternatives

- Minimize water production, but water must be removed from the coal to produce gas
 - Downhole water/gas separation: not proven technology after 30 years of trials. Impossible in Powder River Basin
 - Alternative completions: Many alternatives tested; best methods in use
 - Use of Raman optical spectrometer: not applicable.
 - Directional drilling – result in more water

REASONS FOR RULE CHANGE

Proposed Water Management Alternatives

- Reinjection:
 - Typically not feasible because need receptive formation.
 - APC pipeline is a unique circumstance available only to APC, and at a very high cost.
- Water Treatment:
 - No proven technology. Reverse osmosis has suffered significant pilot plant failure.
 - Do you really want treatment plants? (See next slide).

Newpark Water Treatment Plant

20,000 bbl/day



Newpark Water Treatment Plant



Let's Continue With the Current Water Management & Not Get Snake Bit



Ranchers Opposed to Petition Salt Creek Area

- Frank Shepperson
- Lee Lohse
- Pete Meike
- Mark Iberlin