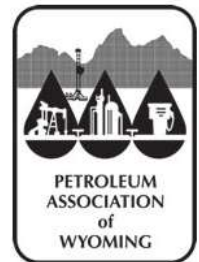


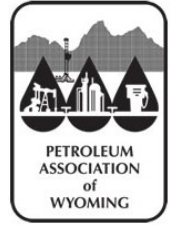


Petroleum Association of Wyoming BLM Flare/Vent Rule

November 10, 2016



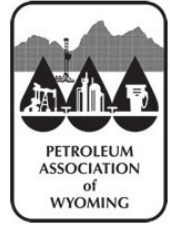
§3179.8 BLM Proposed Measurement Language



Concerns

- 50 mcf/d is arbitrary and sets a tight tolerance for some production units. Current NTL-4A allows for estimation of volumes.
- Difficult to accurately measure low pressure, low volumes and/or fluctuating flowrates.
- Drastic well rate changes in first 12 months or in upset conditions. What do you design to?
- Revised OO3, 4, 5 incorporated applicable API MPMS Sections. Proposed rule does not incorporate API MPMS 14.10, which clearly articulates that accurate measurement is challenged in flare applications.
- RIA underestimates quantity of meters (635) & cost (\$1M annualized); a single company may hit the 635 mark alone. Minimum cost of \$25k vs. \$7.5k/meter install.

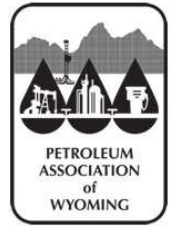
Limitations of High & Low Pressure Flare Meters (API MPMS 14.10)



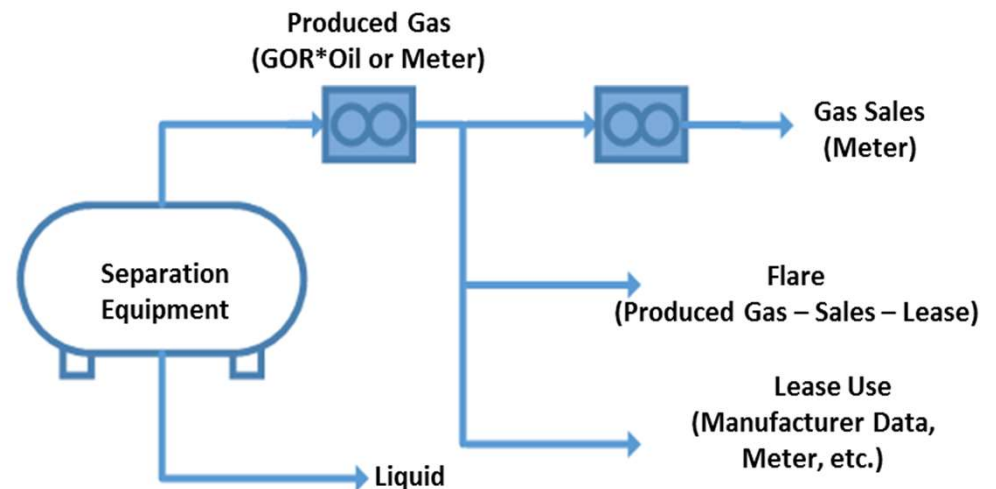
Meter	Limitations	Cost
Differential Pressure (Orifice)	Adds pressure drop (safety), poor for high variability, calibration challenge	Low
Thermal Mass	Gas composition, moisture, thermal	Medium
Ultrasonic	Low velocity, moisture, thermal	Medium - High

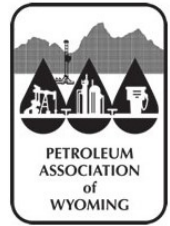
Technology	Sensitivity to Entrained Mist or Liquid	Sensitivity to Fouling	Ability to Detect Fouling
Differential Pressure	Low to Moderate (varies with liquid load)	Moderate	Physical Inspection
Thermal Flow	High	High	Physical Inspection
Optical	Moderate	High	Meter Diagnostics
Ultrasonic	Low (unless sensor is immersed in liquid, then very high)	High	Meter Diagnostics
Vortex	Low (if meter is installed in horizontal line and bluff body is horizontal)	Low to High (varies with meter design)	Physical Inspection

§3179.8 Wells with Produced Gas and Sales Meters



- Adding flared gas meter to locations with produced gas meter and sales meter will create unmanageable accounting.
 - Math balancing will not be attainable due to inaccurate flared gas measurement.
 - Subtraction will always be more consistent.
- Flared gas = produced gas – sales – beneficial use gas
- Consistent with NTL4A, BLM's proposed rule should allow for subtraction methodologies.



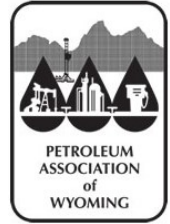


§3179.8 Wells Without Produced Gas Meters

- For locations without produced gas meters, GOR averages can be more accurate than flared gas measurement.
- Methods of establishing accurate GOR:
 - Periodic testing (test separator)
 - Measurement during flowback
 - Aggregate data from nearby wells
 - Temporary and mobile measurement equipment
 - GOR based on averaging days when no flare occurs; allows use of sales meter
 - i.e. $GOR = (Sales\ Meter + Beneficial\ Use + ZERO\ Flare) / Oil$
- While the GOR may change day to day, evidence shows that it changes very little over an extended period. *
- World Bank reference recommends using the gas oil ratio (GOR) as a “reasonable” alternative to metering and updating GOR “annually” using at least “24-hour tests”.
- Wyoming (like many other states such as MT, ND, UT) allow for one or more of these methods of establishing GOR.

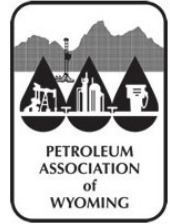
* - Clearstone Engineering Ltd. "Guidelines on Flare and Vent Measurement." *The Global Gas Flaring Reduction Partnership (GGFR) and the World Bank* (18 September 2008)

Rule Impacts to Wyoming



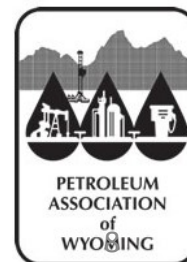
- BLM's proposed rule is outside the authority of BLM. BLM is proposing air quality rules that are covered by US EPA, Wyoming DEQ and WOGCC.
- PAW believes BLM's economic analyses must be redone to reflect current economic realities.
- BLM's proposed rule may impact Wyoming Office of State Lands to fulfil it's Constitutional requirements of obtaining income from state trust lands encompassed within federal units due to BLM permitting delays.
- PAW opposes the retroactive application of the rule. Operators will be required to undertake a substantial economic risk to retrofit existing facilities, and in some cases this action will render wells uneconomic causing premature plugging and abandonment of producing wells.
- PAW opposes the suggestion of increased royalties or the suggestion that BLM can force a producer to curtail production due to flaring amounts. A number of reasons for flaring exist and must be considered.

Rule Impacts to Wyoming, cont.

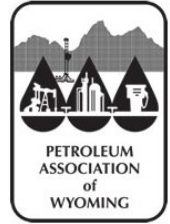


- BLM's proposal to regulate existing sources will increase NO_x. NO_x is an ozone precursor. BLM should be required to conduct a General Conformity analysis for the Wyo. non-attainment area in UGRB to ensure increased NO_x will not impact attainment.
- BLM should clarify that vented inert natural gases that cannot be marketed and have no value are unavoidably lost and not royalty bearing.
- LDAR requirements are currently in place with EPA and in some instances WDEQ. BLM's LDAR requirements are consistent with neither and thus will cause confusion. PAW does not agree LDAR is consistent with royalty collection.
- PAW is concerned how BLM will impose the rule when federal units contain State or fee minerals. Wyoming is a "split-estate" state where this will occur often. Will state rules be followed or only federal regulations?

Supplemental Slides



Recommended Language Changes to §3179.8



PAW supports the regulatory changes to §3179.8 as provided by North Dakota Petroleum Council

§ 3179.8 Measuring and reporting volumes of gas vented and flared from wells.

(a) The operator must estimate or measure all volumes of gas vented or flared from wells, and report those volumes under applicable ONRR reporting requirements, including 30 CFR part 1210.

(b) The operator may choose to calculate volumes at the high pressure flare in lieu of measurement using one of the following methodologies: ~~whether to estimate or measure such volumes, except that measurement is required:~~

(1) If the high pressure produced gas is measured, flared gas volumes may be determined by subtraction as follows: flared volume = produced gas – gas sold – beneficially used gas; or

(2) Flared gas volumes may be determined through use of a representative gas to oil ratio (GOR) as follows: flared volume = GOR * oil produced – gas sold – beneficially used gas.

The GOR must be updated periodically and be based on test separator results, produced gas meters, flowback equipment, aggregate data from nearby wells, temporary and mobile measurement equipment or a representative average of good sales meter data; or

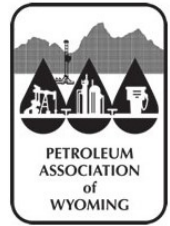
(3) If the flaring follows a day of no flaring, flared volumes may be determined through use of prior day's sales data as follows: flared volume = day 1 sales – day 2 sales (assuming beneficial use is constant); or

(4) Such other methods as may be approved by the Supervisor.

(c) This section does not apply to venting or flaring from low pressure production vessels or storage tanks.

~~(1) If the operator estimates that the volume of gas vented or flared from a flare stack or manifold equals or exceeds 50 Mcf per day; or~~

~~(2) If the BLM determines and informs the operator that the additional accuracy offered by measurement is necessary for effective implementation of this Subpart.~~ |



Quotes from API MPMS 14.10

- “No single type or design of flow meter is suitable in all flare gas measurement applications.”
- “Flares are safety relief systems which typically receive highly unpredictable rates of flow and varying compositions”
- “...some of the traditional paradigms applicable to custody transfer measurement systems...must be abandoned altogether or highly modified in flare measurement”
- “...fouling substances (liquid droplets and or mist or other contaminants) may be present even in well designed flare systems”
- “The potential for two-phase or liquid flow through the meter should be avoided”
- “Flare applications typically involve widely changing gas mixtures and large turndown ratios.”
- “Orifice meters, which produce significant permanent pressure loss, are typically not suitable as flare meters...”
- “Thermal flow meters have significant sensitivity to variations in gas composition... [and] are not recommended for applications where liquid droplets or liquid mist are normally present due to their extreme sensitivity to these substances.”
- “Ultrasonic flow meters...can be sensitive to the fouling of wetted components by liquid droplets, mists or contaminants in the process fluid.”