



New Mexico Environment Department Testimony in EIB 21-27 (R)

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Section 20.2.50.117 – Natural Gas Well
Liquids Unloading



Overview of Natural Gas Well Liquids Unloading

- ❑ Liquids unloading is used to remove fluids in the wellbore of a natural gas well.
- ❑ Managing liquid build-up is fundamental to maintaining production, avoiding early abandonment of wells, and maximizing resource recovery.
- ❑ Wells and reservoirs follow a continuum of flow regimes in their economic life as the reservoir depletes, production declines, wellbore (tubing) velocity goes down, and liquid loading begins to occur in the wellbore.
- ❑ Liquid loading begins when the gas velocity is not sufficient to lift liquids up to the surface.



Overview of Natural Gas Well Liquids Unloading

- New wells typically have sufficient production rates and flowing velocity so that liquids loading is not an issue.
- As the reservoir depletes, production rates and velocities declines. Eventually liquids loading begins to be an issue. The time at which liquids loading occurs varies from well to well based on the reservoir characteristics.
- The following techniques can be used individually or in combination to manage liquids and maintain production:
 - ▣ **Intermitting:** Shutting in a well so that when the well is restarted the production rate and velocity are higher and the well can “unload” liquids through the normal production route to sales;
 - ▣ **Velocity strings:** Installing a smaller diameter tubing string in the well that increases the flow velocity at a given production rate to drag liquids up the wellbore and prevent liquid loading; and
 - ▣ **Surfactants and foaming agents:** Using surfactants and foaming agents to the bottom of a well creating foam with lower specific gravity which enables liquids to be carried up the wellbore at lower velocities.



Overview of Natural Gas Well Liquids Unloading

- Eventually a well will reach a point where the reservoir energy is not sufficient to remove the liquids.
- Manual and automated liquid unloading
- Common methods are:
 - Plunger lift - Consists of a plunger that is dropped down the well bore when the gas pressure declines.
 - Installing artificial lift
 - Installing wellhead compression



Overview of Emissions and Control Options

- ❑ VOC emissions occur when the well is vented to the atmosphere to unload fluids or when the liquids are unloaded through atmospheric tanks and is vented to the atmosphere.
- ❑ To reduce emissions and waste of gas during manual (i.e., non-automated) liquids unloading activities, operators can monitor manual liquids unloading events onsite within close proximity to the well or via remote telemetry to ensure that the well returns to normal production operation as soon as possible.



Basis of Proposed Provisions

- The proposed requirements are based on requirements in Colorado Reg. 7, Pennsylvania GP-5 and GP-5A, and the Wyoming Permitting Guidance.
- **Colorado Reg. 7**: requires owners and operators to first use any means of creating differential pressure to attempt to unload the liquids from the well without venting, and then to use best management practices to minimize hydrocarbon emissions when venting to the atmosphere. The owner/operator is required to be present on-site during any planned well liquids unloading and to estimate emissions from the event.
- **Pennsylvania GP-5 and GP-5A**: Requirements similar to the Colorado rule, except that control or recovery/reuse of emissions is required, where safe.
- **Wyoming Permitting Guidance**: requires that owners/operators minimize VOC emissions to the extent practicable during manual and automated blowdown/venting episodes. Personnel are required to remain on site to ensure minimal gas venting, and to estimate emissions from the event.



Estimated Emission Reductions and Costs

- NMED estimated emission reductions of 4,272 tpy of VOC for installing plunger lifts at wells where they are not presently in use.
- No estimates are available to quantify the reductions expected from implementation of the proposed best management practices.
- Costs for installing plunger lifts include capital costs of \$20,000 and operating costs of \$2,400, based on data from ICF International, *Economic Analysis of Methane Emission Reduction Potential from Natural Gas Systems*, (May 2016).



Summary of Applicability and Emission Standards

20.2.50.117 NATURAL GAS WELL LIQUID UNLOADING:

A. Applicability: Liquid unloading operations resulting in the venting of natural gas including down hole well maintenance events at natural gas wells are subject to the requirements of 20.2.50.117 NMAC. Liquid unloading operations that do not result in the venting of any natural gas are not subject to this Part. Owners and operators of a natural gas well subject to this Part must comply with the standards set forth in Paragraph (3) of Subsection B of 20.2.50.117 NMAC within two years of the effective date of this Part.

B. Emission standards:

(1) The owner or operator of a natural gas well shall use best management practices during the life of the well to avoid the need for venting of natural gas associated with liquid unloading.

(2) The owner or operator of a natural gas well shall use the following best management practices during venting associated with liquid unloading to minimize emissions, consistent with well site conditions and good engineering practices:

- (a) reduce wellhead pressure before blowdown or venting to atmosphere;
- (b) monitor manual venting associated with liquid unloading in close proximity to the well or via remote telemetry; and
- (c) close ~~well head~~ vents to the atmosphere and return the well to normal production operation as soon as practicable.

(3) The owner or operator of a natural gas well shall employ methodologies ~~use one of the following methods~~ to reduce emissions during venting associated with a liquid ~~an~~ unloading event:

- (a) ~~installation and~~ use of a plunger lift;
- (b) ~~installation and~~ use of ~~an~~ artificial lift ~~engine; or~~
- (c) ~~installation and~~ use of a control device;
- (d) use of an automated control system; or
- (e) other control if approved by the department.

~~(4) The owner or operator of a natural gas well shall install an~~



Summary of Monitoring and Recordkeeping Requirements

~~EMT on the natural gas well in accordance with 20.2.50.112 NMAC.~~

C. Monitoring requirements:

(1) The owner or operator shall monitor the following parameters during venting associated with liquid unloading:

- (a) wellhead pressure;
- (b) flow rate of the vented natural gas (to the extent feasible); and
- (c) duration of venting to the storage vessel, tank battery, or atmosphere.

(2) The owner or operator shall calculate the volume and mass of VOC ~~vented~~ emitted during a venting event associated with a liquid unloading event.

~~(3) A liquid unloading event shall include the scanning of the EMT and monitoring data entry in accordance with the requirements of 20.2.50.112 NMAC.~~

~~(34)~~ The owner or operator shall comply with the monitoring requirements of 20.2.50.112 NMAC ~~in 20.2.50.112 NMAC.~~

D. Recordkeeping requirements:

(1) The owner or operator shall keep the following records for ~~liquid unloading~~:

- (a) unique identification number and location (latitude and longitude) of the well;
- (b) date of the unloading event ~~date the liquid unloading was performed~~;
- (c) wellhead pressure;
- (d) flow rate of the vented natural gas (to the extent feasible. If not feasible, the owner or operator shall use the maximum potential flow rate in the emission calculation);
- (e) duration of venting to the storage vessel, tank battery, or atmosphere;
- (f) a description of the management practice used to minimize venting ~~release~~ of VOC emissions before and during the ~~liquid unloading~~;



Summary of Monitoring and Recordkeeping Requirements

(g) the type of control device or control technique used to control VOC emissions during venting associated with the~~the~~ liquid unloading event; and

(h) a calculation of the VOC emissions vented during the~~the~~ liquid unloading event based on the duration, calculated volume, and mass of composition of the produced gas~~VOC~~.

(2) The owner or operator shall comply with the recordkeeping requirements in 20.2.50.112 NMAC.

E. Reporting requirements: The owner or operator shall comply with the reporting requirements in 20.2.50.112 NMAC.

[20.2.50.117 NMAC - N, XX/XX/2021]