SLR Today

We provide an opportunity for great people to ***partner*** with great clients in a collaborative, respectful and entrepreneurial 'One Team' culture.

6 **Regions**

with **over 10,000** live projects globally

130+

Offices

in **24** countries

4,400+

Staff with a collaborative **'one team'** culture

45+

Technical Services

Environmental, Engineering, Scientific, Advisory

SLRCONSULTING.COM

40 CFR Part 98 Subpart W – Petroleum and Natural Gas Systems: RY2025 Updates

April 2025

SLR

Agenda

- Timeline
- Source-Applicability by Segment
- Operational Changes
- Disaggregation of Reporting
- New Sources for Reporting
  - Other Large Release Events
  - Drilling Mud Degassing
  - Crankcase Venting
- Significantly-Modified Existing Sources
  - Natural Gas Pneumatic Device Venting
  - Flare Stacks

Timeline

- June 2022 – Proposed Revisions Published
- April 2023 – Proposed Supplement Published
  - Scope 2 and Global Warming Potential (GWP) changes
- August 2023 – Revised Proposed Revisions Published
  - Include measurement-based quantifications
  - Clarifications
- May 2024 – Final Revisions Published
  - September & October 2024 – minor citation revisions released
- **January 1, 2025 – Final Rule is implemented for reporting on March 31, 2026**
- March 14, 2025 - Waste Emissions Charge (WEC) disapproved and no longer has any force of law. Facilities will not be required to submit their WEC fillings.

Source-Applicability by Segment

	(b) Offshore Production	(c) Onshore Production	(d) Processing	(e) Transmission Compression	(f) Underground Storage	(g) LNG Storage	(h) LNG Import Export	(i) Distribution	(j) Gathering and Boosting	(m) Transmission Pipeline
(a) Natural Gas Pneumatic Device Venting		X		X	X				X	
(c) Natural Gas Driven Pneumatic Pump Venting		X	X						X	
(d) AGRs and NRUs		X	X						X	
(e) Dehydrator Vents		X	X						X	
(f) Well Venting for Liquids Unloading		X								
(g) Well Venting During Completions and Workovers with HF		X								
(h) Gas Well Venting During Completions and Workovers without HF		X								
(i) Blowdown Vent Stacks			X	X			X		X	X
(j) Hydrocarbon Liquids and Produced Water Storage Tanks		X							X	
(k) Condensate Storage Tanks				X						
(l) Well Testing Venting and Flaring		X								
(m) Associated Gas Venting and Flaring		X								
(n) Flare Stack Emissions		X	X	X	X	X	X		X	
(o) Centrifugal Compressor Venting		X	X	X	X	X	X		X	
(p) Reciprocating Compressor Venting		X	X	X	X	X	X		X	
(q) Equipment Leak Surveys										
(r) Equipment Leaks by Population Count		X	X	X	X	X	X	X	X	
(w) EOR Injection Pump Blowdown		X								
(x) EOR Hydrocarbon Liquids Dissolved CO2		X								
(y) Other Large Release Events										
(z) Combustion Equipment		X						X	X	
(dd) Drilling Mud Degassing										
(ee) Crankcase Venting										

Key:

Blue = Still Applicable

Green = New Source

Operational Data Changes

Stemming from Subpart W Revisions to Existing Sources and Methodologies

- Dehy Wet Gas Sampling Frequency
  - 98.233(e)(1) – "Analyze the composition of wet natural gas once every five years (samples must be collected within 6 months of startup or by January 1, 2030, whichever is later)"
- Produced Liquids Sampling Frequency
  - 98.233(j)(1) and (j)(2) – "Sample and analyze sales or stabilized oil for API gravity, and hydrocarbon liquids or produced water for composition within six months of equipment start-up or by January 1, 2030, whichever is later, and at least once every five years thereafter."
- Tank Upstream Temperature / Pressure
  - Well, separator, or non-separator equipment temperature and pressure must be measured annually
- OOOOb/FIP/SIP-Applicable Reciprocating Compressors and Centrifugal Compressors in Production and Gathering & Boosting Segments
  - Must use the "as-found" compressor source methodology (98.233(o)(2) and (4), 98.233(p)(2) and (4)) or the continuous flow meter methodology (98.233(o)(5) and 98.233(p)(5)) to quantify emissions from compressor sources

Disaggregation of Reporting

- Emissions and Activity Data to be reported at Well or Site Level
  - Sub-basin or County Level Sources
    - Liquids Unloading, Completions & Workovers, Storage Tanks
  - Basin-level Sources
    - Natural Gas Pneumatics, Blowdown Vent Stacks, Equipment Leaks, Combustion
- New Reporting Elements
  - Unique well name or ID and coordinates for each well-pad (Production)
  - Unique site name or ID, site type and coordinates for each site (G&B)
    - Compressor station, centralized oil production, gathering pipeline, other fence-line site (booster station, dehydration facility, treating facility)

New Sources for Reporting

98.233(y) Other Large Release Events

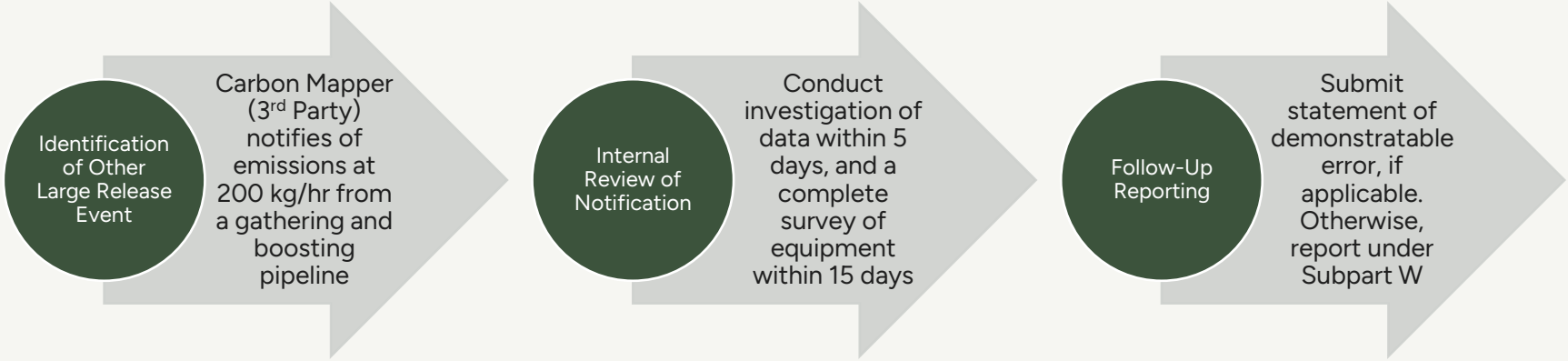
98.233(dd) Drilling Mud Degassing

98.233(ee) Crankcase Venting

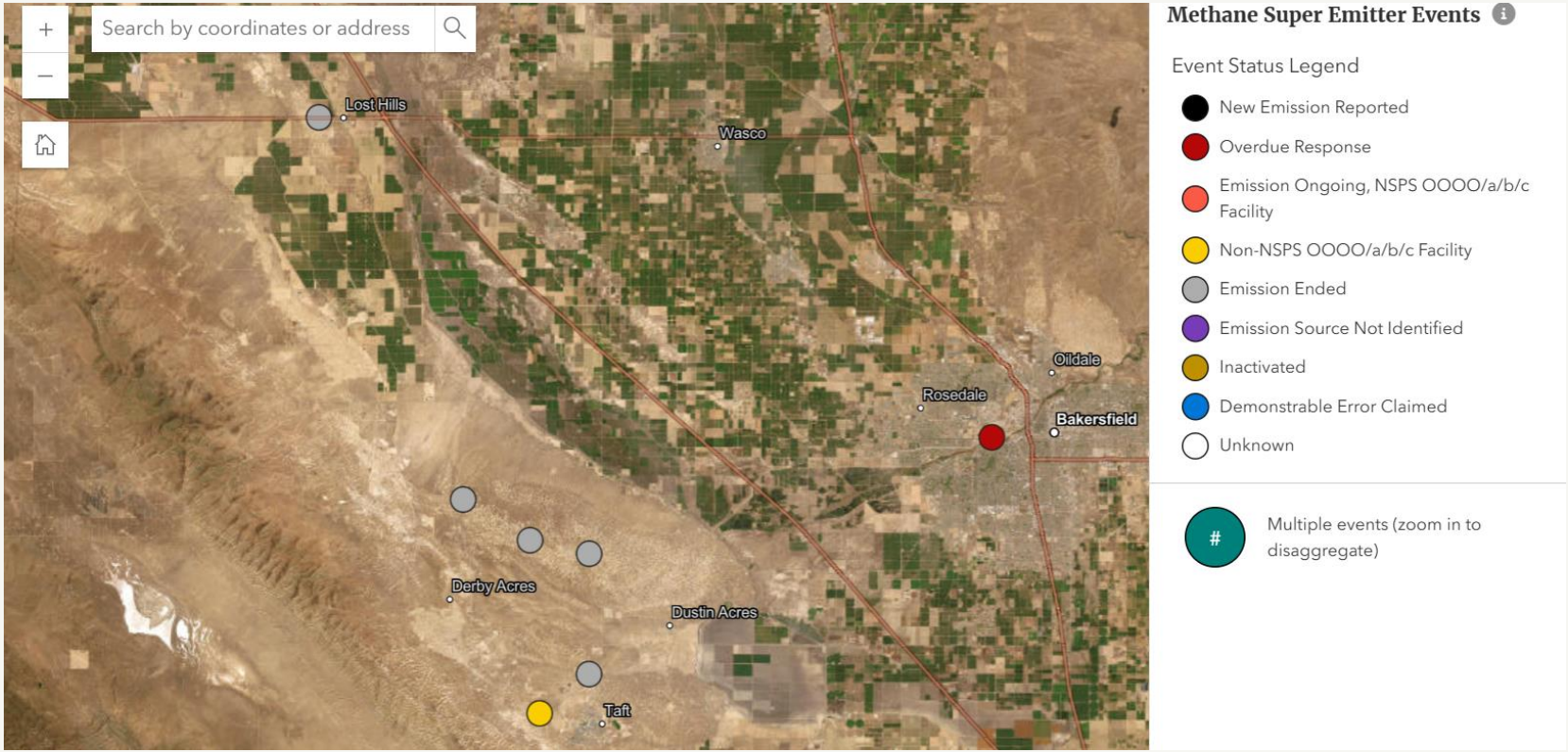
Other Large Release Events – Qualifications

- Monitoring or Measurement Surveys can include:
  - § 98.234(a) through (d) - OGI, Method 21, Infrared Laser Beam Illuminated Instrument, Acoustic Leak Detection Device, Flow Meters, Calibrated Bags, High Volume Sampler, AVO
  - Advanced screening methods such as monitoring systems mounted on vehicles, drones, helicopters, airplanes, or satellites with a 90% probability of detection at 100 kg/hr of CH_4
- EPA-provided notification/confirmation under the Super Emitter program, an applicable approved state plan, or applicable Federal plan
  - After notification, the operator has an opportunity to determine if it is their location.
- Evaluate emission events > 100 kg CH_4/hr (instantaneous)
  - Sources <u>not</u> subject to reporting (e.g., explosion or well blowout) – report all emissions from the event under 98.236(y)
  - Sources <u>subject</u> to reporting (e.g., stuck dump valve or unlit flare) – report emissions in excess of the source-specific calculations under 98.236(y)

Other Large Release Events – Example



Other Large Release Events – Data Explorer



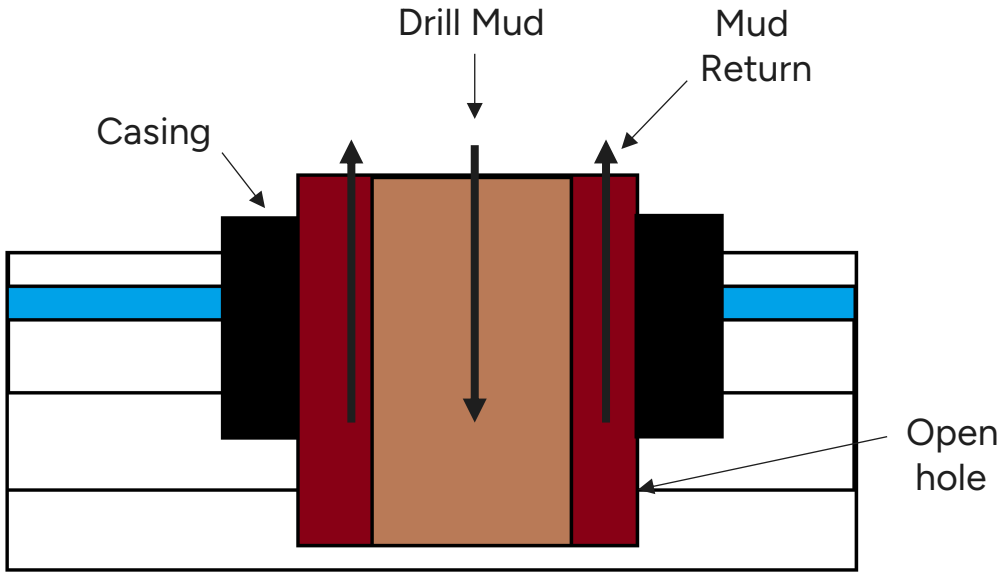
Other Large Release Events - Calculations

- Emission Rate
  - Aggregate release points with a common RCA under one event
- Event Start Time
  - Process monitoring parameters, if available
  - Most recent monitoring or measurement survey (98.234(a) through (d))
  - Assume 91 days prior to detection
- Event End Time
  - Confirmed date of repair or cessation of emissions

*when an event is identified using AVO methods, previous AVO inspections can be used to limit the start date of an event

Drilling Mud Degassing

- The practice of safely removing pockets of free gas entrained in the drilling mud once it is outside of the wellbore

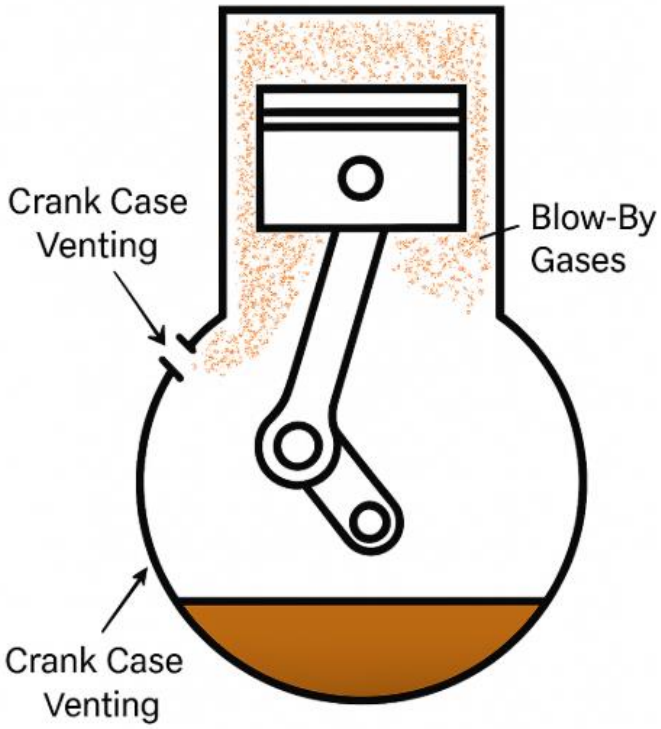


Drilling Mud Degassing - Calculations

- 98.233(dd)(1) Method 1: If you have taken mudlogging measurements.
  - Must be from the penetration of the first hydrocarbon bearing zone until drilling mud ceases to be circulated in the wellbore, including mud pumping rate and gas trap-derived gas concentration
  - Calculate CH_4 emissions from mud degassing for one representative well in each sub-basin and within the equivalent stratigraphic interval
- 98.233(dd)(2) Method 2: If you have not taken mudlogging measurements.
  - Uses provided emission factors
- 98.233(dd)(3) Method 3: If you have taken mudlogging measurements
  - For some, ***but not all***, of the time the well bore has penetrated the first hydrocarbon bearing zone until drilling mud ceases to be circulated in the wellbore, including mud pumping rate and gas trap-derived gas concentration
  - Use appropriate method (1 or 2) based on the amount of time spent takin/not taking measurements.

Crankcase Venting

- For each reciprocating internal combustion engine (RICE) with a rated heat capacity greater than 1 MMBtu/hr (or the equivalent of 130 HP)



Crankcase Venting – Calculations

- 98.233(ee)(1) Method 1: Direct Measurement of Crankcase Venting
  - Screening determination – use OGI, Method 21, or infrared laser beam illuminated instrument
    - Leak detected – use flow rate determination
    - No leak detected – assume zero emissions
  - Flow rate determination – use a flow meter, calibrated bagging, or a high volume sampler to determine the volumetric flow from the crankcase vent at standard conditions and within 10 to 100 % of peak load during normal operations
- 98.233(ee)(2) Method 2: Default Emissions Factor
  - Multiplied by the total operating hours per year for the RICE

Significantly-Modified Existing Sources

98.233(a) Natural Gas Pneumatic Device Venting

98.233(n) Flare Stack Emissions

Natural Gas Pneumatic Device Venting - Comparison

Existing Methodology	New Methodology
N/A	**98.233(a)(1) – Continuous Measurement of NG Supply** Applicable for all devices in all segments
N/A	**98.233(a)(2) – Periodic Measurement of Device Venting** Applicable for all devices in all segments
N/A	**98.233(a)(3) – Leaker Emission Factor** Onshore Production or G&B / Intermittent devices / Malfunction or properly operating
98.233(a) – Default Emission Factors Low-bleed – 1.39 scf/hr/device High-bleed – 37.3 scf/hr/device Intermittent-bleed – 13.5 scf/hr/device	**9.233(a)(4) – Default Emission Factors** Low-bleed – 6.8 scf/hr/device High-bleed – 21 scf/hr/device Intermittent-bleed – 8.8 scf/hr/device

*Comparing emission factors for the Production and Gathering & Boosting segments as an example

Flare Stack Emissions

Existing Methodology	New Methodology
N/A	**98.233(n)(1)(i) – Tier 1 (98% DE / 96.5% CE)** “Refinery-Level” - Testing under §63.645, Monitoring under §63.644
N/A	**98.233(n)(1)(ii) – Tier 2 (95% DE / 93.5% CE)** “OOOOb” - §60.5417b must be met
98.233(n) Default DE and CE of 98% is assumed	**98.233(n)(1)(iii) – Tier 3 (92% DE / 90.5% CE)** Default if Tier 1 or 2 can’t be met
N/A	**98.233(n)(1)(v) – Measured Destruction Efficiency** Destruction efficiency is calculated to be 1.5 plus the measured combustion efficiency
N/A	**98.233(n)(9) – CEMS for CO_2** Must use CEMS data if the device measures CO_2 concentration and flow rate

Do you have any questions?

Making
Sustainability
Happen

SLRCONSULTING.COM

Madison Edson
Project Air Quality Engineer
M (425)-770-0125
E medson@slrconsulting.com

Heather Miller
Project Air Quality Engineer
M (480)-278-3389
E hmiller@slrconsulting.com