

Note: This monitoring checklist does not include changes from the 12/23/11 final rule 76 FR 80554 (Technical Revisions and Clarifications to subpart A and subpart W), or corrections from the pending proposed rule, "2012 Technical Corrections, Clarifying and Other Amendments to the Greenhouse Gas Reporting Rule, and Proposed Confidentiality Determinations for Certain Data Elements of the Fluorinated Gas Source Category." EPA is working to update these checklists. Additional information on the subpart W rules can be found at <http://www.epa.gov/climatechange/emissions/subpart/w.html>. Reporters should refer to the e-CFR for the final rule (http://ecfr.gpoaccess.gov/cqi/t/text/text-idx?c=ecfr&sid=9415fad5f1c7ea4d940d308e1ea74e11&tpl=/ecfrbrowse/Title40/40cfr98_main_02.tpl).

Petroleum and Natural Gas Systems

Monitoring Checklist for Onshore Natural Gas Processing



Final Rule: Mandatory Reporting of Greenhouse Gases (40 CFR Part 98)

What must be monitored?

If emissions are going to flares, need data elements under the source flare stacks.

Record these parameters on an annual basis, unless specified otherwise.

1. Reciprocating Compressor Rod Packing Venting

Record emissions at each reciprocating compressor in as-found mode. Each mode must be monitored at least once in any three consecutive calendar years.

Reciprocating Compressor Emissions in Operating Mode:

- | | |
|---|---|
| <input type="checkbox"/> Rod packing venting from reciprocating compressor in operational mode (standard cubic feet per hour) | <input type="checkbox"/> Blowdown vent emissions from reciprocating compressor in operational mode (standard cubic feet per hour) |
| <input type="checkbox"/> Total time the compressor is in operating mode (hours) | <input type="checkbox"/> Annual throughput (million standard cubic feet per day) |
| <input type="checkbox"/> Mole fraction of GHG in the vent gas | |

Reciprocating Compressors Emissions in Standby Pressurized Mode:

- | | |
|---|---|
| <input type="checkbox"/> Blowdown vent emissions from | <input type="checkbox"/> Total time the reciprocating compressor is |
|---|---|

reciprocating compressor in standby
pressurized mode (standard cubic
feet)

in standby, pressurized mode (hours)

- Mole fraction of GHG in the vent
gas

Reciprocating Compressors in Shutdown, Depressurized Mode:

- Unit isolation valve emissions from
reciprocating compressor in
shutdown depressurized mode
(standard cubic feet)
- Total time the reciprocating compressor is
in shutdown, depressurized mode (hours)
- Mole fraction of GHG in the vent
gas

Record emission factors for reciprocating compressors in each mode.

- Total annual reciprocating
compressor emissions in operating
mode (cubic feet)
- Total annual reciprocating compressor
emissions in standby, pressurized mode
(cubic feet)
- Total annual reciprocating
compressor emissions in shut down,
depressurized mode (cubic feet)
- Total number of compressors measured in
operating mode
- Total number of compressors
measured in standby, pressurized
mode
- Total number of compressors measured in
shutdown, depressurized mode
- Emission factor for rod packing
vent emission in operating mode
(cubic feet per hour)
- Emission factor for blowdown vent
emissions in operating mode (cubic feet
per hour)
- Emission factor for blowdown vent
emissions in standby pressurized
mode (cubic feet per hour)
- Emission factor for isolation valve in
shutdown, depressurized mode (cubic feet
per hour)

Record emissions from each reciprocating compressor in all modes and total annual emissions.

- Concentration of CH₄ in
- Concentration of CO₂ in produced/feed

produced/feed natural gas for reciprocating compressor in onshore natural gas processing facilities

natural gas for reciprocating compressor in onshore natural gas processing facilities

- | | |
|--|---|
| <input type="checkbox"/> Total time the reciprocating compressor is in standby, pressurized mode in reporting year (hours) | <input type="checkbox"/> Total time the reciprocating compressor is in shutdown, depressurized mode in reporting year (hours) |
| <input type="checkbox"/> Total annual compressor emission from all modes of operation (standard cubic feet) | <input type="checkbox"/> Total time the compressor is in operating mode in reporting year (hours) |

2. Centrifugal Compressor Wet Seal Degassing Venting

Record emissions at each centrifugal compressor in as-found mode. Each mode must be monitored at least once in any three consecutive calendar years.

Centrifugal Compressor Emissions in Operating Mode:

- | | |
|--|--|
| <input type="checkbox"/> Wet seal oil degassing vents emissions from centrifugal compressor in operational mode (standard cubic feet per hour) | <input type="checkbox"/> Blowdown vent emissions centrifugal compressor in operational mode (standard cubic feet per hour) |
| <input type="checkbox"/> Total time the centrifugal compressor is in operating mode (hours) | <input type="checkbox"/> Number of wet seals connected to the degassing vent |
| <input type="checkbox"/> Type of meters used for making measurements | <input type="checkbox"/> Fraction of operating time wet seal degassing vent gas is sent to vapor recovery or fuel gas |
| <input type="checkbox"/> Mole fraction of GHG in the vent gas | <input type="checkbox"/> Annual throughput (million standard cubic feet per day) |

Centrifugal Compressors in Not-operating, Depressurized Mode:

- | | |
|--|---|
| <input type="checkbox"/> Unit isolation valve emissions from centrifugal compressor in shutdown depressurized mode (standard cubic feet) | <input type="checkbox"/> Total time the centrifugal compressor is in shutdown, depressurized mode (hours) |
| <input type="checkbox"/> Mole fraction of GHG in the vent gas | |

Record emission factors for centrifugal compressors in each mode.

- | | |
|--|---|
| <input type="checkbox"/> Total annual emissions from all centrifugal compressor in operating mode (cubic feet) | <input type="checkbox"/> Total annual emissions from all centrifugal compressor in shut down, depressurized mode (cubic feet) |
| <input type="checkbox"/> Total number of centrifugal compressors measured in operating mode | <input type="checkbox"/> Total number of centrifugal compressors measured in shutdown, depressurized mode |
| <input type="checkbox"/> Emission factor for wet seal degassing vent in operating mode (cubic feet per hour) | <input type="checkbox"/> Emission factor for blowdown vent emissions in operating mode (cubic feet per hour) |
| <input type="checkbox"/> Emission factor for isolation valve in shutdown, depressurized mode (cubic feet per hour) | |

Record emissions from each centrifugal compressor in all modes and total annual emissions.

- | | |
|--|--|
| <input type="checkbox"/> Concentration of CH ₄ in produced/feed natural gas for centrifugal compressor in onshore natural gas processing facilities | <input type="checkbox"/> Concentration of CO ₂ in produced/feed natural gas for centrifugal compressor in onshore natural gas processing facilities |
| <input type="checkbox"/> Total time the centrifugal compressor is in shutdown, depressurized mode in reporting year (hours) | <input type="checkbox"/> Total annual centrifugal compressor emission from all modes of operation (standard cubic feet) |
| <input type="checkbox"/> Total time the centrifugal compressor is in operating mode in reporting year (hours) | |

3. Blowdown Vents

- | | |
|--|---|
| <input type="checkbox"/> Number of repetitive blowdowns for each equipment type of a unique volume | <input type="checkbox"/> Total volume of blowdown equipment chambers (including pipelines, compressors and vessels) between isolation valves (cubic feet) |
| <input type="checkbox"/> Actual temperature in the blowdown equipment chamber | <input type="checkbox"/> Actual pressure in the blowdown equipment chamber (psia) |

- (°F)
- Emissions per equipment type
(cubic feet)

4. Dehydrator Vents

For glycol dehydrator with a throughput greater than or equal to 0.4 million cubic feet per day:

- | | |
|--|--|
| <input type="checkbox"/> Feed natural gas flow rate
(million standard cubic feet per day) | <input type="checkbox"/> Feed natural gas water content |
| <input type="checkbox"/> Outlet natural gas water content | <input type="checkbox"/> Absorbent circulation pump type (natural gas pneumatic/air pneumatic/ electric) |
| <input type="checkbox"/> Absorbent circulation rate | <input type="checkbox"/> Absorbent type (TEG/DEG/EG) |
| <input type="checkbox"/> Use of stripping natural gas (Y/N) | <input type="checkbox"/> Use of flash tank separator (Y/N) |
| <input type="checkbox"/> Total time of operation (hours) | <input type="checkbox"/> Wet natural gas temperature (°F) |
| <input type="checkbox"/> Wet natural gas composition | <input type="checkbox"/> Wet natural gas pressure (psig) |
| <input type="checkbox"/> Concentration of CH ₄ in natural gas | <input type="checkbox"/> Concentration of CO ₂ in natural gas |
| <input type="checkbox"/> Vent gas controls used | |

For glycol dehydrator with a throughput less than to 0.4 million standard cubic feet per year:

- | | |
|--|---|
| <input type="checkbox"/> Count of glycol dehydrators | <input type="checkbox"/> Vent gas controls used |
|--|---|

For absorbent desiccant dehydrators:

- | | |
|---|---|
| <input type="checkbox"/> Count of desiccant dehydrators | <input type="checkbox"/> Vent gas controls used |
| <input type="checkbox"/> Time between refilling (days) | <input type="checkbox"/> Pressure of the gas (psia) |
| <input type="checkbox"/> Height of the dehydrator vessel (ft) | <input type="checkbox"/> Inside diameter of the vessel (ft) |

- Percent of packed vessel volume that is gas

5. Acid Gas Removal (AGR) Vent Stacks

If using Calculation Methodology 1:

- Total throughput into the AGR unit and/or total throughput out of the AGR unit (cubic feet per year)
- Volume fraction of CO₂ content in the vent from the AGR unit
- Emissions recovered and transferred outside the facility (cubic feet)

If using Calculation Methodology 2:

- Total throughput flowing out of the AGR unit at actual conditions (cubic feet)
- Volume fraction of CO₂ content in vent gas from the AGR unit
- Emissions recovered and transferred outside the facility (cubic feet)

If using Calculation Methodology 3:

- Total throughput through the AGR unit at actual conditions (cubic feet)
- Volume fraction of CO₂ content in natural gas into the AGR unit
- Volume fraction of CO₂ content in natural gas out of the AGR unit
- Actual pressure (psia)
- Actual Temperature (°F)
- Emissions recovered and transferred outside the facility (cubic feet)

If using Calculation Methodology 4:

- Natural gas feed temperature
- Natural gas feed pressure
- Natural gas flow rate
- Acid gas content of feed natural gas
- Unit operating hours, excluding downtime for maintenance or standby
- Acid gas content of outlet natural gas

- | | |
|---|--|
| <input type="checkbox"/> Solvent pressure | <input type="checkbox"/> Exit temperature of natural gas |
| <input type="checkbox"/> Solvent circulation rate | <input type="checkbox"/> Solvent temperature |
| <input type="checkbox"/> Solvent weight | |

6. Flare Stack Emissions

- | | |
|--|--|
| <input type="checkbox"/> Continuous flow monitor on flare (Y/N) | <input type="checkbox"/> Continuous gas analyzer on the gas to the flare (Y/N) |
| <input type="checkbox"/> Volume of gas sent to flare annually (cubic feet) | <input type="checkbox"/> Percent of gas sent to un-lit flare |
| <input type="checkbox"/> Flare combustion efficiency (98% if manufacturer data not available) | <input type="checkbox"/> Mole fraction of CO ₂ in gas to the flare |
| <input type="checkbox"/> Mole fraction of gas hydrocarbon constituents (such as methane, ethane, propane, butane, and pentanes-plus) | <input type="checkbox"/> Actual Process Temperature (°F) |
| <input type="checkbox"/> Actual Process Pressure (psia) | |

7. Valves

- | | |
|---|---|
| <input type="checkbox"/> Concentration of CH ₄ in feed natural gas | <input type="checkbox"/> Concentration of CO ₂ in feed natural gas |
| <input type="checkbox"/> Report CO ₂ emissions from all valves (standard cubic feet) | <input type="checkbox"/> Report CH ₄ emissions from all valves (standard cubic feet) |
| <input type="checkbox"/> Operating time of leaking component (hours) | <input type="checkbox"/> Total number of components found leaking |

8. Connectors

- | | |
|---|---|
| <input type="checkbox"/> Concentration of CH ₄ in feed natural gas | <input type="checkbox"/> Concentration of CO ₂ in feed natural gas |
| <input type="checkbox"/> Report CO ₂ emissions from all connectors (standard cubic feet) | <input type="checkbox"/> Report CH ₄ emissions from all connectors (standard cubic feet) |
| <input type="checkbox"/> Operating time of leaking component (hours) | <input type="checkbox"/> Total number of components found leaking |

9. Open Ended Lines

- | | |
|---|---|
| <input type="checkbox"/> Concentration of CH ₄ in feed natural gas | <input type="checkbox"/> Concentration of CO ₂ in feed natural gas |
| <input type="checkbox"/> Report CO ₂ emissions from all open ended lines (standard cubic feet) | <input type="checkbox"/> Report CH ₄ emissions from all open ended lines (standard cubic feet) |
| <input type="checkbox"/> Operating time of leaking component (hours) | <input type="checkbox"/> Total number of components found leaking |

10. Pressure Relief Valves

- | | |
|---|---|
| <input type="checkbox"/> Concentration of CH ₄ in feed natural gas | <input type="checkbox"/> Concentration of CO ₂ in feed natural gas |
| <input type="checkbox"/> Report CO ₂ emissions from all pressure relief valves (standard cubic feet) | <input type="checkbox"/> Report CH ₄ emissions from all pressure relief valves (standard cubic feet) |
| <input type="checkbox"/> Operating time of leaking component (hours) | <input type="checkbox"/> Total number of components found leaking |

11. Meters

- | | |
|---|---|
| <input type="checkbox"/> Concentration of CH ₄ in feed natural gas | <input type="checkbox"/> Concentration of CO ₂ in feed natural gas |
| <input type="checkbox"/> Report CO ₂ emissions from all meters (standard cubic feet) | <input type="checkbox"/> Report CH ₄ emissions from all meters (standard cubic feet) |
| <input type="checkbox"/> Operating time of leaking component (hours) | <input type="checkbox"/> Total number of components found leaking |