

[Company Name], [Date Submitted]

Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.  
In Response to Data Request, R15-01-008 2020 June Report  
Appendix 7; Rev. 03/31/20

Notes:  
Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.  
At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange  
Use the Population based emission factor if facility is not surveyed. Use Leaker based emission factor if facility is surveyed, and report only the found leaking components.

Underground Storage Facility Leaks and Emissions:

ID	Geographic Location	Source	Number of Sources	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Emission Factor (Mscf/day/dev)	Annual Emissions (Mscf)	Explanatory Notes / Comments
----	---------------------	--------	-------------------	---------------------------	------------------------	------------------------	--------------------------------	-------------------------	------------------------------

Note: No facilities of this type.

[Company Name], [Date Submitted]

Rulemaking (RL) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.

In Response to Data Request, R15-01-008 2020 June Report

Appendix 7: Rev. 03/31/20

Notes:

Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.

At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange.

The emissions captured in this tab represent the emissions associated with the operational design and function of the compressor. Any intentional release of natural gas for safety or maintenance purposes should be included in the Workdowns worksheet.

- 2020 Reporting Changes:
- 1) New Column for Measurement Frequency - See how comments. If you have any questions contact Ed Charbonneau at 415-703-2421 or via email.
  - 2) Added new column for Emission Factor: Measurement Date - Pressurized Operations.
  - 3) Added a fourth compressor operating mode "Offline" In addition, a measurement of emissions (EF) should be taken during Offline mode, to ensure that no emissions are emanating from the system.
  - 4) Alternate emissions measurement method, where applicable and measured by the operator.
  - 5) Alternate emissions measurement method, where applicable and measured by the operator.
  - 6) Breakdown and Isolation values
  - 7) Measure centrifugal compressors measures additional columns added for these emissions:
    - Dry seal
    - Wet seal
    - Wet seal oil degassing vents in Pressurized life mode

Transmission Compressor Vented Emissions:							New Column	New Column				New Column: See Conditional Notes	Use these EF columns as well as the columns for the Compressor Measurements related to Columns 9 thru 48 when they are applicable. If the data is not captured by the operator, then add a note explaining why the applicable measurement data was not recorded or available in the Explanatory Notes / Comments column.	If no measurements are taken in 2019, the enter N/A	<div>CPUC Staff strongly encourage more frequent measurement of the following compressor vented emissions. Compliance minimum is once annually, though Staff suggest the minimum frequency should be quarterly and measured at roughly the same time each quarter (e.g. on or around the compressor survey given mode of operation). More frequent measurements, e.g. monthly would be better due to the temporal changes in conditions that affect emissions. The more frequent measurements also provide an opportunity to detect worn rod packing or seals, which exacerbate emissions, and with timely awareness of suboptimal operations gas operators have an opportunity for accelerating maintenance to correct worn parts. The following steps for reporting more frequent measurements in 2019 are outlined in the adjacent cell, and should be provided if available.</div> <div>Advance notice for 2021 reporting, CPUC Staff will propose quarterly reporting at the winter workshop. Therefore, gas companies are requested to start measuring compressor emissions on at least a quarterly basis for the remainder of 2020, if not doing so already. This will ensure gas companies are prepared to report these emissions in accordingly in 2021.</div> <div>The Columns 7 thru 48 were added to the template and should be used for the indicated measured compressor emissions, which include Centrifugal compressors in accordance with OGR and your operating practice.</div> <div>For the 2019 data reporting of compressor vented emissions: Where more than one measurement was taken during the year (e.g. after a maintenance cycle", monthly, or quarterly), use the measured EF multiplied by the activity hours that occurred during the corresponding period. For example, if the compressor measurement was taken quarterly, then the measured EF should be multiplied by the activity hours that occurred in the respective quarter, and the same for more frequent measurements (e.g. monthly, weekly etc.). For each compressor devote one row per measurement period (see example provided). In the case of a single annual measurement EF, then that EF would apply to the activity hours for each respective mode for the entire year (which is consistent with year-year-reporting practice).</div> <div>* If a measurement is taken after a maintenance cycle and no other measurements were taken during the remainder of the year, then use the measured EF for the activity hours occurring after the measurement date thru 12/31/xx. The activity hours prior to the maintenance of the compressor from the beginning of the year should use the previously measured EF, even if the EF was measured in the prior year.</div>														
ID	Geographic Location	Compressor Type	Prime Mover	Number of Cylinders	Number of Seals	Seal Type	Measurement Frequency	Emission Factor: Measurement Date: Pressurized Operations	Operating Mode: Pressurized Operating (hours)	Operating Mode: Pressurized Idle (hours)	Operating Mode: Depressurized Idle (hours)	Operating Mode: Offline (hours)	Emission Factor: Pressurized Operating (x) (lb/hr)	Emission Factor: Pressurized Idle (x) (lb/hr)	Emission Factor: Depressurized Idle (x) (lb/hr)	Emission Factor: Offline (x) (lb/hr)	Emission Factor: Pressurized Operating Wet Packing (x) (lb/hr)	Emission Factor: Pressurized Operating Wet Seal Oil Degassing Vents (x) (lb/hr)	Emission Factor: Pressurized Operating Wet Seal (x) (lb/hr)	Emission Factor: Pressurized Operating Dry Seal (x) (lb/hr)	Emission Factor: Pressurized Offline Rod Packing (x) (lb/hr)	Emission Factor: Pressurized Offline Breakdown Value (x) (lb/hr)	Emission Factor: Pressurized Offline Wet Seal Oil Degassing Vents (x) (lb/hr)	Emission Factor: Pressurized Offline Wet Seal (x) (lb/hr)	Emission Factor: Pressurized Offline Dry Seal (x) (lb/hr)	Emission Factor: Pressurized Offline Isolation Value (x) (lb/hr)	Annual Emissions (lb/yr)	Explanatory Notes / Comments	
Hypothetical values used to provide an example.																													

provided as an example.

[Company Name], [Date Submitted]

Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks  
Consistent with Senate Bill 1371, Leno.

In Response to Data Request, R15-01-008 2020 June Report

Appendix 7; Rev. 03/31/20

Notes:

Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.

At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange

**Underground Storage Blowdowns:**

ID	Geographic Location	Source	Compressor Type	Number of Blowdown Events	Annual Emissions (Mscf)	Explanatory Notes / Comments
----	---------------------	--------	-----------------	---------------------------	-------------------------	------------------------------

[Company Name], [Date Submitted]

Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.

In Response to Data Request, R15-01-008 2020 June Report

Appendix 7; Rev. 03/31/20

Notes:

Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.

At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange

The emissions captured on this tab represent the emissions associated with the operational design and function of the component. Any intentional release of natural gas for safety or maintenance purposes should be included on the Blowdowns worksheet.

**Underground Storage Component Vented Emissions (See note above):**

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Pressure (psi)	Survey Date (MM/DD/YY)	Number of Days Emitting	Emission Factor, Engineering or Manufacturer's based Estimate of Emissions (Mscf/day)	Annual Emissions (Mscf)	Explanatory Notes / Comments
----	---------------------	-------------	------------	--------------	----------------	------------------------	-------------------------	---	-------------------------	------------------------------

[Company Name], [Date Submitted]

Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.

In Response to Data Request, R15-01-008 2020 June Report

Appendix 7; Rev. 03/31/20

Notes:

Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.

At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange

The emissions captured on this tab represent the emissions associated unintentional leaks that if repaired would not leaking. If the component is releasing gas or "bleeding" as a result of its design or function then it is not to be captured in this tab.

**Underground Storage: Compressor and Component Fugitive Leaks (see note above):**

12/31/2019

1/1/2019

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Pressure (psi)	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Prior Survey Date (MM/DD/YY)	Number of Days Leaking	Emission Factor or Engineering Estimate (Mscf/day)	Emissions (Mscf)	Explanatory Notes / Comments
----	---------------------	-------------	------------	--------------	----------------	---------------------------	------------------------	------------------------------	------------------------	--	------------------	------------------------------

[Company Name], [Date Submitted]

**Rulemaking (R.) 15-01-008 to Adopt Rules and Procedures Governing Commission Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno.**

**In Response to Data Request, R15-01-008 2020 June Report  
Appendix 7; Rev. 03/31/20**

Pursuant to SB 1371, Leno - Natural gas: leakage abatement, the California Public Utilities Commission (CPUC) requests that the following information be transmitted to the CPUC and the State Air Resources Board (ARB):  
Note - Definitions in Data Request, R15-01-008 2018 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#7):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request R15-01-008 2018 June Report.

Notes:

Use a formula-derived value with the formula used in the Annual Emissions column. Do not use a copy and paste-as-value.

At the end of Annual Emissions Column, add a summation total in a cell for a column total, and then highlight orange

**Underground Storage Dehydrator Vented Emissions:**

ID	Geographic Location	Type of Dehydrator (Glycol or Desiccant)	Vapor Recovery Unit or Thermal Oxidizer (Y/N)	Annual Volume of Gas Withdrawn (Mscf)	Emission Factor (Y/N)	Engineering Estimate (Y/N)	Annual Emissions (Mscf)	Explanatory Notes / Comments
----	---------------------	--	---	---------------------------------------	-----------------------	----------------------------	-------------------------	------------------------------

Appendix 7 - Rev. 03/31/20

Header column "Comment" boxes displayed below for reference.	
Column Heading	Description and Definition of Required Contents (IF not self-explanatory)
Storage Leaks & Emissions	
<b>ID</b>	
<b>Geographic Location</b>	GIS, zip code, or equivalent
<b>Source</b>	W/C = wellhead connector W/V = wellhead valve W/PRV = wellhead pressure relief valve W/OEL = wellhead open-ended line W/F = wellhead flange W/O = wellhead other C = casing P = pipeline O = other
<b>Number of Sources</b>	
<b>Discovery Date</b>	Report Discovery Date if calculating wellhead component emissions using Leaker EFs
<b>Repair Date</b>	Report Discovery Date if calculating wellhead component emissions using Leaker EFs
<b>Number of Days Leaking</b>	Calculate Number of Days Leaking using the formula: Repair Date minus Discovery Date + 1 day
<b>Emission Factor (Mscf/yr)</b>	
<b>Annual Emissions (Mscf)</b>	
<b>Explanatory Notes / Comments</b>	

Compressor Vented Emissions	
<b>ID</b>	
<b>Geographic Location</b>	GIS, zip code, or equivalent
<b>Compressor Type</b>	C = centrifugal R = reciprocating
<b>Prime Mover</b>	E = electric motor C = internal combustion engine
<b>Number of Cylinders in Compressor</b>	

<b>Number of Seals</b>	
<b>Seal Type</b>	W = wet D = dry O = other
<b>Measurment Frequency</b>	A - Annual Q - Quarterly M - Monthly W - Weekly D - Daily
<b>Emission Factor: Measurement Date - Pressurized Operations</b>	
<b>Operating Mode: Pressurized Operating (hours)</b>	Use these EF columns as well as the columns for the Compressor Measurements noted in Columns R thru AB when they are applicable. If the data is not captured by the operator, then add a note explaining why the applicable measurement data was not recorded or available in the Explanatory Notes / Comments column.
<b>Operating Mode: Pressurized Idle (hours)</b>	
<b>Operating Mode: Depressurized Idle (hours)</b>	
<b>Operating Mode: Offline (Hours)</b>	
<b>Emission Factor: Pressurized Operating (scf/hr)</b>	
<b>Emission Factor: Pressurized Idle (scf/hr)</b>	
<b>Emission Factor: Depressurized Idle (scf/hr)</b>	
<b>Emission Factor: Offline (scf/hr)</b>	If the "Offline" hours are counted, then a measurement of "offline" emissions should be taken to determine whether emissions occur. (We should not assume they are zero.)

The Columns P thru AB were added to the template and should be used for the indicated measured compressor emissions, which include Centrifugal compressors in accordance with OGR and your operating practice.

For the 2019 data reporting of compressor vented emissions: Where more than one measurement was taken during the year (e.g. after a maintenance cycle\*, monthly, or quarterly), use the measured EF multiplied by the activity hours that occurred during the corresponding



Emission Factor: Pressurized Operating - Rod Packing (scf/hr)	These are new columns for reporting year 2020 of 2019 data. These only apply to operators who during their operations and surveys of compressor stations measure their Compressor Vented Emissions for these components of the compressor. Not all gas operators measure vented emissions and establish flow rates for vented emissions while at the various modes of operation.	occurred during the corresponding period. For example, if the compressor measurement was taken quarterly, then the measured EF should be multiplied by the activity hours that occurred in the respective quarter, and the same for more frequent measurements (e.g. monthly, weekly etc.). For each compressor devote one row per measurement period (see example provided). In the case of a single annual measurement EF, then that EF would apply to the activity hours for each respective mode for the entire year (which is consistent with prior year reporting practice).
Emission Factor: Pressurized Operating - Blowdown Valve (scf/hr)	<p>CPUC Staff strongly encourage more frequent measurement of the following compressor vented emissions. Compliance minimum is once annually, though Staff suggest the minimum frequency should be quarterly and measured at roughly the same time each quarter (e.g. on or around the component survey given mode of operation). More frequent measurements, e.g. monthly would be better due to the temporal changes in conditions that effect emissions. The more frequent measurements also provide an opportunity to detect worn rod packing or seals, which exacerbate emissions, and with timely awareness of suboptimal operations gas operators have an opportunity for accelerating maintenance to correct worn parts. The following steps for reporting more frequent measurements in 2019 are outlined in the adjacent cell, and should be provided if available.</p> <p>Advance notice for 2021 reporting, CPUC Staff will propose quarterly reporting at the winter workshop. Therefore, gas companies are requested to start measuring compressor emissions on at least a quarterly basis for the remainder of 2020, if not doing so already. This will ensure gas companies are prepared to report these emissions in accordingly in 2021.</p>	<p>* If a measurement is taken after a maintenance cycle and no other measurements were taken during the remainder of the year, then use this measured EF for the activity hours occurring after the measurement date thru 12/31/xx. The activity hours prior to the maintenance of the compressor from the beginning of the year should use the previously measured EF, even if the EF was measured in the prior year.</p>
Emission Factor: Pressurized Operating - Wet Seal Oil Degassing Vent (scf/hr)		
Emission Factor: Pressurized Operating - Wet Seal (scf/hr)		
Emission Factor: Pressurized Operating - Dry Seal (scf/hr)		
Emission Factor: Pressurized Idle - Rod Packing (scf/hr)		
Emission Factor: Pressurized Idle - Blowdown Valve (scf/hr)		
Emission Factor: Pressurized Idle - Wet Seal Oil Degassing Vent (scf/hr)		
Emission Factor: Pressurized Idle - Wet Seal (scf/hr)		
Emission Factor: Pressurized Idle - Dry Seal (scf/hr)		
Emission Factor: Pressurized Idle - Isolation Valve (scf/hr)		
Emissions (Mscf)		

Explanatory Notes / Comments	
------------------------------	--

Blowdowns	
ID	
Geographic Location	GIS, zip code, or equivalent
Source	W = wellhead rework C = compressor P= pipeline O = other
CompressorType	C = centrifugal R = reciprocating
Number of Blowdown Events	
Annual Emissions(Mscf)	
Explanatory Notes / Comments	

Component Vented Emissions	
ID	
Geographic Location	GIS, zip code, or equivalent
Device Type	C = connector OE = open-ended line M = meter P = pneumatic device PR = pressure relief valve V = valve O = other devices
Bleed Rate	L = low bleed I = intermittent bleed H = high bleed NA = not applicable
Manufacturer	
Pressure (psi)	MOP = maximum operating pressure over the past year
Survey Date (MM/DD/YY)	

<b>Number of Days Emitting</b>	Because the emissions are a factor of design or function, these emissions counted for the entire year.
<b>Emission Factor, Engineering or Manufacturer's based Estimate of Emissions (Mscf/day)</b>	Explain in the comment column the basis for your emission estimate.
<b>Annual Emissions (Mscf)</b>	
<b>Explanatory Notes / Comments</b>	

<b>Compressor and Component Leaks</b>	
<b>ID</b>	
<b>Geographic Location</b>	GIS, zip code, or equivalent
<b>Device Type</b>	C = connector OE = open-ended line M = meter P = pneumatic device PR = pressure relief valve V = valve O = other devices
<b>Bleed Rate</b>	L = low bleed I = intermittent bleed H = high bleed NA = not applicable
<b>Manufacturer</b>	
<b>Pressure (psi)</b>	MOP = maximum operating pressure over the past year
<b>Discovery Date (MM/DD/YY)</b>	List the actual discovery date.  If the leak was discovered in the year of interest, then we will assume the component was leaking from the beginning of the year for emissions reporting purposes.
<b>Repair Date (MM/DD/YY)</b>	Date that the component repair stopped the leak. Any associated blowdowns as a result of the repair should be included in the blowdowns tab.

<p><b>Prior Survey Date (MM/DD/YY)</b></p>	<p>Before the discovery date of the leak, there was a "Prior Survey Date" when the compressor station was tested and no leak was found.</p> <p>There should be records as to when the compressor station was last surveyed. If the survey spanned two or more days, enter the final date.</p> <p>Note, a facility level survey date is sufficient to establish the prior survey date.</p>
<p><b>Number of Days Leaking</b></p>	<p>The algorithm that is used for determining the number of days leaking should conform to the following guidance:</p> <p>For the number days leaking prior to the date of discovery (survey date in the year of interest), calculate the number of days between the Discovery Date and the Prior Survey Date then divided by 2. [Dividing by 2 approximates the average time leaking between the leak discovery and the prior survey date. See below guidance when a leak is discovered in a prior period and repaired in the year of interest.]</p> <p><math>(\text{Discovery Date} - \text{Prior Survey Date})/2</math></p> <p>Calculate the number of days leaking after discovery (survey) date, by subtracting the discovery date from the repair date, unless the leak has not been repaired, where the number of days should be calculated by subtracting the discovery date from December 31 of the year of interest.*</p> <p><math>(\text{Repair Date} - \text{Discovery Date})</math>, unless repair date greater than 12/31/XX then use 12/31/XX</p> <p>---</p> <p><math>\text{Days Leaking} = (\text{Repair Date} - \text{Discovery Date}) + (\text{Discovery Date} - \text{Prior Survey Date})/2 + 1</math></p> <p>* [This requires tracking the leak across different years, because the leak could be minor and conceivably span more than year before getting repaired. Therefore, in the cases where a leak is carried over to a subsequent year, an annual calculation should be made to reflect that the number of days leaking in the prior year have already been reported in the annual emissions inventory. In subsequent years the carried over leaks should reflect a beginning date of January 1 of the year of interest.]</p>
<p><b>Emission Factor or Engineering Estimate (Mscf/day)</b></p>	
<p><b>Emissions (Mscf)</b></p>	

Explanatory Notes / Comments	
------------------------------	--

Dehydrator Vented Emissions	
ID	
Geographic Location	GIS, zip code, or equivalent
Type of Dehydrator (Glycol or Desiccant)	
Vapor Recovery Unit OR Thermal Oxidizer (Y/N)	In order to claim 0 emissions, a Vapor Recovery Unit OR thermal oxidizer must be used 100% of the time during operation
Annual Volume of Gas Withdrawn (Mscf)	
Emission Factor (Y/N)	<p>If the glycol dehydrator has a Vapor Recovery Unit (VRU) or a thermal oxidizer, the emission factor is 0.</p> <p>If using a desiccant dehydrator, the emission factor is 2.23E-03 mt CH<sub>4</sub>/MMscf</p>
Engineering Estimate (Y/N)	If using an engineering estimate, please include an attachment of methodology or software used as a separate document. Record the annual emissions
Annual Emissions (Mscf)	<p>For dehydrators using an emission factor, annual emissions are calculated by multiplying annual volume of gas withdrawn and the emission factor</p> <p>For dehydrators using an engineering estimate, record the annual emissions</p>
Explanatory Notes / Comments	