

June 16, 2017

Mr. Ed Charkowicz
Safety and Enforcement Division
California Public Utilities Commission
2nd Floor
505 Van Ness Ave.
San Francisco, Ca. 94102

Subject: Response to Data Request - Central Valley Gas Storage R15-01-008 2017 Annual Report

Dear Mr. Charkowicz,

Central Valley Gas Storage, LLC (CVGS) hereby submits information as requested in Data Request Central Valley Gas Storage R15-01-008 2017 Annual Report. The files included with this submittal include the Natural Gas Leakage Abatement Report, in partial fulfillment of 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, and the following Appendices, which are submitted with the Natural Gas Leakage Abatement Report:

- Appendix 1: Transmission Pipelines Rev. 3/31/17
- Appendix 2: Transmission M&R Stations Rev. 3/31/17
- Appendix 7: Underground Storage Rev. 3/31/17
- Appendix 8: Summary Tables Rev. 3/31/17

The Leakage Abatement Report is in the format provided in Attachment 3 of the Administrative Law Judge's Ruling in R.15-01-008 Issuing Staff Data Request Regarding 2017 Annual Reporting Requirements and Directing Responses by June 16, 2017 ("the Reporting Ruling"), and Appendices 1, 2, 7, and 8 are in the format using the report templates provided by the CPUC on the R. 15-01-008 web page. Calculations in Appendix 2 and Appendix 7 use component emission factors taken from Appendix 9 (Rev. 3/31/17) provided by the CPUC at the same web page where noted. CVGS did not complete, and is not submitting, Appendices 3, 4, 5, or 6 because the information sought by those Appendices do not apply to CVGS' facilities, which do not include any Transmission Compressor Stations, Distribution Main or Services, Distribution M&R Stations, or Customer Meters.

In addition to the material submitted herewith, CVGS is submitting the same documents through the "Supporting Documents" feature on the Commission's Electronic Filing System and will post a version of the response with locational data redacted on its web site, in compliance with the Reporting Ruling

All submittals in compliance with the Reporting Ruling have been prepared under the direction of, and reviewed by, Stephen Wassell, Vice President Storage and Peaking Operations responsible for the operations of CVGS.

The objectives of Southern Company Gas, and of CVGS, are to operate their businesses in a safe and reliable manner and in compliance with applicable laws, rules and regulations. If there are any questions concerning this Response to Data Request, please contact me at (630) 245-7825 or e-mail me at jboehme@southernco.com.

Sincerely,

/s/

John Boehme
Manager, Regulatory Affairs

cc: Stephen Wassell
Mark Stephens
Keith Bodger
Terrel Ferreira – California Air Resources Board



Central Valley Gas Storage, LLC

Natural Gas Leakage Abatement Report

In partial fulfillment of

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.

And In Response to Data Request
Central Valley Gas Storage R15-01-008 2017 Annual Report

By: Stephen Wassell
Vice President Storage and Peaking Operations

Date: 6/16/2017

Introduction

The following data¹ has been prepared to comply with Senate Bill 1371 (Leno, 2014), Section 2, Article 3, Order Instituting Rulemaking (OIR) 15-01-008, and to provide responses to Data Request Central Valley Gas Storage R15-01-008 2017 Annual Report.

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):

- (1) A summary of changes to utility leak and emission management practices from January 1st, 2016 to December 31st, 2016. The report must include a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Response:

Central Valley Gas Storage, LLC (CVGS) was designed and constructed using a number of best management practices for limiting methane emissions consistent with the U.S. EPA Natural Gas STAR program and use of these measures have resulted in the very low emissions documented in the spreadsheet Appendices. CVGS' measures already in place are successfully limiting methane emissions and total annual natural gas emissions for the facility remain below 1000 Mscf.

¹ As defined in Data Request Central Valley Gas Storage R15-01-008 2017 Annual Report

Change for 2016: CVGS conducted a concept test to determine the feasibility and cost-effectiveness for an emissions reduction measure in which a portable compressor is utilized to capture and reinject gas leaking past compressor rod packing. The portable compressor was put in place in June, 2016.

Reasoning: The measure would capture gas that would otherwise leak past rod packing and be vented and instead inject the gas back into system piping.

Methane Reduction Impact: In calendar year 2015, emissions of this nature totaled 398 Mscf. Prior to use of the compressor in 2016, CVGS emitted 229 Mscf due to rod packing leakage. With the compressor being used, only 9 Mscf was identified during the second half of the year during a brief period when the compressor was inoperable.

Analysis: CVGS is not convinced that this measure is cost-effective, since equipment rental and installation costs totaled more than \$12,000 during 2016, and the value of the gas prevented from escaping was as follows:

- If 2015 rod packing emissions are used as the alternative, the value of the gas saved would be \$1,990 using a conservative cost of \$5/Mscf.
- If 2016 (first half) rod packing emissions are used as the alternative, the value of the gas saved would be \$1,145 using a conservative cost of \$5/Mscf.

The cost of employing this measure is clearly far greater than the economic value of the emissions prevented.

- (2) A list of new graded and ungraded gas leaks discovered, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by grade,

Central Valley Gas Storage, LLC

Natural Gas Leakage Abatement Report In Partial Fulfillment 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, and In Response to Data Request
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component or equipment, pipe size, schedule and material, pressure, age, date discovered and annual volume of gas leaked for each, by month, from January 1st, 2016 through December 31st, 2016.

Response:

See Appendix 1 – Note that CVGS conducted leak surveys during 2016 but did not identify any leaks for tracking during the year.

- (3) A list of graded and ungraded gas leaks repaired, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by month, from January 1st, 2016 through December 31st, 2016. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, date of repair, annual volume of gas leaked for each and the number of days from the time the leak was discovered until the date of repair.

Response:

See Appendix 1 – Note that CVGS conducted leak surveys during 2016 but did not identify any leaks for tracking during the year.

- (4) A list of ALL open graded and ungraded leaks, regardless of when they were found, tracked by geographic location in a Geographic Information System (GIS) or best equivalent that are being monitored, or are scheduled to be repaired, by month, from January 1st, 2016 through December 31st, 2016. Include the grade,

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Reduce Natural Gas Leaks Consistent with Senate Bill 1371, Leno, and In Response to Data Request
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component or equipment, pipe size, schedule and material, pressure, age, date discovered, scheduled date of repair, and annual volume of gas leaked for each.

Response:

See Appendix 1 – CVGS had no known open and unrepaired leaks from January 1st, 2016 through December 31st, 2016.

- (5) System-wide gas leak and emission rate data, along with any data and computer models used in making that calculation, for the 12 months ending December 31st, of the reporting year.

Response:

See Appendix 8.

- (6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 Annual Report for the 12 months ending December 31st, 2016.

Response:

See Appendices 1, 2 and 7.

- (7) An annual report on measures that will be taken in the following year to reduce gas leaks and emissions to achieve the goals of SB 1371. The report must include

a detailed summary of changes, including the reasoning behind each change and an explanation of how each change will reduce methane leaks and emissions.

Response:

CVGS is taking the following additional measures in 2017 which will facilitate continued reduction of leaks and emissions:

- 1. Measure: CVGS is conducting daily inspections of every well following a leak inspection protocol provided to the California Department of Conservation - Division of Oil, Gas and Geothermal Resources.**

Reasoning: CVGS has been required to conduct the daily leak inspections since the adoption of Emergency Regulations in February, 2016.

Methane Reduction Impact: No additional leaks have been identified to date, but CVGS can quickly remediate or resolve any leaks that may develop.

- 2. Measure: CVGS is replacing the rod packing on its compressors in 2017**

Reasoning: New rod packing will significantly reduce the amount of gas emitted through compressor rod packing.

Methane Reduction Impact: CVGS has not detected gas being emitted through rod packing on two of its three compressors. However, on the third compressor, CVGS noted and calculated emissions of 398 Mscf in 2015 and 238 Mscf in 2016. By replacing the packing, these emissions should be significantly, if not completely, reduced.

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Issued: March 31, 2017

Appendix 1

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following questions in the above mentioned data requests are answered using the spreadsheets in this Appendix (#1):

(2) A List of new graded and ungraded gas leaks discovered, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered and annual volume of gas leaked for each, by month, from January 1st through December 31st of the previous calendar year.

(3) List of graded and ungraded gas leaks repaired, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, from January 1st through December 31st of the previous calendar year. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, date of repair, annual volume of gas leaked for each and the number of days from the time the leak was discovered until the date of repair.

(4) List of ALL open graded and ungraded leaks, regardless of when they were found, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, that are being monitored or are scheduled to be repaired, from January 1st through December 31st of the previous calendar year. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, scheduled date of repair, and annual volume of methane leaked for each.

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.

Response:

Transmission Pipeline Leaks:

ID	Geographic Location	Pipe Material	Pipe Size (nominal)	Pipe Age (months)	Pressure (psi)	Leak Grade	Above Ground or Below Ground	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Scheduled Repair Date (MM/DD/YY)	Reason for Not Scheduling a Repair	Number of Days Leaking	Emission Factor (Mscf/Day)	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	PC	24	60	1040	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	No leaks identified on CVGS transmission pipeline during 2016; no leaks awaiting repair.
Sum total														0	

Central Valley Gas Storage

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Issued: March 31, 2017

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Appendix 1

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 Note - Definitions in Data Request Central Valley Gas Storage R15-01-008 2017 June Report

The following questions in the above mentioned data requests are answered using the spreadsheets in this Appendix #1:

- (2) A List of new graded and ungraded gas leaks discovered, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, by grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered and annual volume of gas leaked for each, by month, from January 1st through December 31st of the previous calendar year.
- (3) List of graded and ungraded gas leaks repaired, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, from January 1st through December 31st of the previous calendar year. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, date of repair, annual volume of gas leaked for each and the number of days from the time the leak was discovered until the date of repair.
- (4) List of ALL open graded and ungraded leaks, regardless of when they were found, tracked by geographic location in a Geographic Information System (GIS) or best equivalent, that are being monitored or are scheduled to be repaired, from January 1st through December 31st of the previous calendar year. Include the grade, component or equipment, pipe size, schedule and material, pressure, age, date discovered, scheduled date of repair, and annual volume of methane leaked for each.

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
 Response:

Transmission Pipeline Damage (3rd party dig-ins, natural disasters, etc.):

ID	Geographic Location	Damage Type	Pipe Material	Pipe Size (nominal)	Pipe Age (months)	Pressure (psi)	Leak Grade	Above Ground or Below Ground	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Number of Days Until Permanent Repair	Emission Factor (Mscf/Day)	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	N/A	PC	24	60	1040	N/A	N/A	N/A	N/A	N/A	N/A	0	No damage on CVGS transmission pipeline during 2016	
Sum total													0		

Central Valley Gas Storage

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

Issued: March 31, 2017

Appendix 1

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#1):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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.

Response:

Transmission Pipeline Blowdowns:

ID	Geographic Location	Number of Blowdown Events	Annual Emissions (Mscf)	Explanatory Notes / Comments
Pig Launcher Station	39.362000, -122.260000	1	5.700	Pig Launcher blow down 11/01/16; emissions calculated using pipe volume and pressure at time of blow down
Pig Receiver	95970	2	10.900	Pig Receiver blow downs 11/03/16; emissions calculated using pipe volume and pressure at time of blow downs
	Sum total		16.600	

Central Valley Gas Storage

**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,
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

Issued: March 31, 2017

Appendix 1

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 **2017 June Report**

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#1):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 **2017 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

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 in the Blowdowns worksheet.

Response:

Transmission Pipeline Component Vented Emissions:

Total Number of Devices	Device Type	Bleed Rate	Manufacturer	Emission Factor (Mscf/day)	Annual Emission (Mscf)	Explanatory Notes / Comments
0	N/A	N/A	N/A	0	0	No Pipeline Components emitting gas by design on the CVGS Pipeline
			Sum total		0	

Central Valley Gas Storage

Company Name

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

Issued: March 31, 2017

Appendix 1

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#1):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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

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.

Response:

Transmission Pipeline Component Fugitive Leaks:

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Emission Factor (Mscf/day)	Annual Emission (Mscf)	Explanatory Notes / Comments
CVGS	95970	N/A	N/A	N/A	N/A	N/A	N/A	0	0	CVGS Pipeline components were surveyed for leaks during 2016; no leaks identified.
Sum total									0	

Central Valley Gas Storage

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

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Appendix 1

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#1):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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

Response:

Transmission Pipeline Odorizers:

ID	Geographic Location	Number of Units	Emission Factor (Mscf/yr)	Annual Emission (Mscf)	Explanatory Notes / Comments
CVGS	95970	0	0	0	CVGS system does not have an odorizer
		Sum total		0	

Central Valley Gas Storage

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3/31/2017

Appendix 2

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#2):

(6) Calculable or estimated fugitive emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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.

Facilities emissions that are based on a population count times an emission factor (See Appendix 9 for guidance).

Response:

Transmission M&R Station Total Leaks and Emissions:

Number of Stations	Station Classification	Emission Factor (Mscf/yr)	Annual Emission (Mscf)	Explanatory Notes / Comments
1	T	N/A	0	Interconnect Station was thoroughly surveyed for leaks during 2016 ; none were identified and none are awaiting repair.
	Sum total		0	

Central Valley Gas Storage

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Appendix 2

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#2):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 June Report.

Note:

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.

Response:

Transmission M&R Station Blowdowns:

ID	Geographic Location	Number of Blowdown Events	Annual Emissions (Mscf)	Explanatory Notes / Comments
Station 401	39.362000, -122.2608	0	0	No CVGS M&R Station blowdowns during 2016
	Sum total		0	

Central Valley Gas Storage

**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.
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

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Appendix 2

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#2):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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.

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.

Response:

Transmission M&R Station Component Vented Emissions:

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Number of Days Emitting	Annual Emissions (Mscf)	Explanatory Notes / Comments
Station 401	39.362000, -122.7	P	I	Becker	366	21.082	One device at M&R Station; calculation using Emission Factor for device as per Intermittent Bleed device number (0.0576 Mscf/day) in Appendix 9 posted by the CPUC.
Sum total						21.082	

Central Valley Gas Storage

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and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

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Appendix 2

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#2):

(6) Calculable or estimated emissions and non-graded gas leaks, as defined in Data Request Central Valley Gas Storage R15-01-008 2017 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.

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.

Response:

Transmission M&R Station Component Fugitive Leaks:

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Annual Emissions (Mscf)	Explanatory Notes / Comments
Station 401	39.362000, -122.2	N/A	N/A	N/A	N/A	N/A	0	0	Interconnect Station components were thoroughly surveyed for leaks in 2016 and none were identified.
							Sum total	0	

Central Valley Gas Storage

**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,
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

Issued: March 31, 2017

Appendix 7

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

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.

Response:

Underground Storage Facility Leaks and Emissions:

ID	Geographic Location	Source	Number of Sources	Emission Factor (Mscf/yr)	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	N/A	0	N/A	0	No leaks identified during 2016 from wellheads, casing or pipelines associated with the storage wells
			Sum Total		0	

Central Valley Gas Storage

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Appendix 7

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

The emissions captured on 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 on the Blowdowns worksheet.

Response:

Underground Storage Facility Compressor Vented Emissions (see note above):

ID	Geographic Location	Compressor Type	Prime Mover	Number of Cylinders in Compressor	Number of Seals	Seal Type	Operating Mode: Pressurized Operating (hours)	Operating Mode: Pressurized Idle (hours)	Operating Mode: Depressurized Idle (hours)	Emission Factor: Pressurized Operating (scf/hr)	Emission Factor: Pressurized Idle (scf/hr)	Emission Factor: Depressurized Idle (scf/hr)	Annual Emissions (Mscf)	Explanatory Notes / Comments
Unit #1	95970	R	C	8	N/A	N/A	1245	5381	1703	0	0	0	0	No venting from Compressor #1 observed during 2016
Unit #2	95970	R	C	8	N/A	N/A	2203	1680	4897	0	0	0	0	No venting from Compressor #2 identified during 2016
Unit #3	95970	R	C	8	N/A	N/A	1327	5409	2050	0	0	0	0	No venting from Compressor #3 observed during 2016
Sum Total												0		

Central Valley Gas Storage

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, and in Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

Issued: March 31, 2017

Appendix 7

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

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

Response:

Underground Storage Facility Compressor Fugitive Leaks (See note above):

ID	Geographic Location	Compressor Type	Prime Mover	Number of Cylinders in Compressor	Number of Seals	Seal Type	Operating Mode: Pressurized Operating (hours)	Operating Mode: Pressurized Idle (hours)	Operating Mode: Depressurized Idle (hours)	Emission Factor: Pressurized Operating (pcf/hr)	Emission Factor: Pressurized Idle (pcf/hr)	Emission Factor: Depressurized Idle (pcf/hr)	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Annual Emissions (Mscf)	Explanatory Notes / Comments
Unit #2	95970 R	C		8	N/A	N/A	2203	1680	4897	0	0.596354167	0	1/1/2016	6/6/2017	16	229,000	Rod Packing Leak. 15 leak events between January 1 and June 6, 2016. - Engineering estimate
Unit #2	95970 R	C		8	N/A	N/A	2203	1680	4897	0	0.079741667	0	7/6/2016	7/10/2016	5	9,449	Rod Packing Leak. It leaked for five days during a period when the temporary compressor was not in operation.
Sum Total															238,449		

See further explanation at right

Further explanation for Compressor #2 emissions - Engineering estimate:

CVGS observed pressure reduction in 2016 on Unit #2 piping during periods where the unit was pressurized and idle. For each of these periods, CVGS calculated the amount of gas lost past the compressor rod packing, between the time the unit was shut down and the time the unit was re-started, based on the observed pressure drop and the volume of gas in the compressor and associated piping between isolation valves. These calculations for pressurized idle periods in the first half of 2016 totaled 229 Mscf. In June, 2016 CVGS installed a portable compressor as discussed in the response to Question 1 in the Abatement Report. With the compressor being used, only 9 Mscf was identified during the second half of the year during a brief period when the compressor was inoperable.

Central Valley Gas Storage

**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.
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

Central Valley Gas Storage

**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.
and In Response to Data Request Central Valley Gas Storage R15-01-008 2016 May Report**

Issued: March 31, 2017

Appendix 7

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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

Response:

Underground Storage Blowdowns:

ID	Geographic Location	Source	Compressor Type	Number of Blowdown Events	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	C	R	10	136.967	Total blowdowns for the three compressors at the facility - Engineering estimate
CVGS	95970	O	N/A	2	13.482	Blowdown from Filter/Separator - Engineering estimate
CVGS	95970	O	N/A	2	16.600	Station Blowdowns - Engineering estimate
CVGS	95970	W	N/A	2	1.440	Two well workover events on observation wells. - Engineering estimate
CVGS	95970	O	N/A	13	19.505	13 well temperature logging events in 2016. - Engineering estimate
				Sum Total	187.994	

Central Valley Gas Storage

**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.
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report**

Issued: March 31, 2017

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Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

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.

Response:

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
CVGS	95970	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	There were no component vented emissions during 2016
Sum Total								0		

Central Valley Gas Storage

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

Issued: March 31, 2017
Appendix 7

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

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.

Response:

Underground Storage Component Fugitive Leaks (see note above):

ID	Geographic Location	Device Type	Bleed Rate	Manufacturer	Pressure (psi)	Discovery Date (MM/DD/YY)	Repair Date (MM/DD/YY)	Number of Days Leaking	Emission Factor or Engineering Estimate (Mscf/day)	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	V	N/A	N/A	1128	4/20/2016	4/20/2016	1	0.059	0.059	Leak from scrubber dump valve - Engineering estimate
CVGS	95970	V	N/A	N/A	1128	5/12/2016	5/28/2016	11	0.1047	1.152	Gas loss from Unit #2 check valve - Engineering estimate
CVGS	95970	V	N/A	N/A	1100	2/5/2016	2/5/2016	36	0.0336	1.210	One leak was identified on a grease fitting check valve during a special leak survey conducted in February 2016 and repaired the same day. The Emission Factor of 0.0336 Mscf/day for a Low Continuous Bleed Pneumatic Device used in Underground Storage was selected from Appendix 9 posted by the CPUC as the most appropriate factor for this particular leak based on consultation with and determination by the CPUC and the ARB.
Sum Total										2.421	

Central Valley Gas Storage

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

Issued: March 31, 2017

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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 Central Valley Gas Storage R15-01-008 2017 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 Central Valley Gas Storage R15-01-008 2017 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

Response:

Underground Storage Dehydrator Vented Emissions:

ID	Geographic Location	Number of Sources	Emission Factor (Mscf/yr)	Annual Emissions (Mscf)	Explanatory Notes / Comments
CVGS	95970	0	N/A	0	Dehydrators are vented to Vapor Recover Units so no methane is emitted.
		Sum Total		0	

Central Valley Gas Storage

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.
and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

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Appendix 8 Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#8):

(5) System-wide gas leak rate data, Central Valley Gas Storage R15-01-008 2016 May Report along with any data and computer models used in making that calculation, for the 12 months ending December 31st, of the reporting year.

Response:

Summary Tables:

System Categories	Emission Source Categories	Fugitive or Vented	Total Annual Volume of Leaks & Emissions (Mscf)	Total Annual Count of Leak & Emission Items	
Transmission Pipelines	Pipeline Leaks	Fugitive	0	0	
	All Damages	Fugitive	0	0	
	Blowdowns	Vented	16.600	3	
	Component Emissions	Vented	0	0	
	Component Leaks	Fugitive	0	0	
	Odorizers	Vented	N/A	N/A	CVGS System does not have an odorizer.
Transmission M&R Stations	Station Leaks & Emissions	Fugitive	0	0	
	Blowdowns	Vented	0	0	
	Component Emissions	Vented	21.082	1	One intermittent bleed pneumatic device at M&R station.
	Component Leaks	Fugitive	0	0	
Transmission Compressor Stations	Compressor Emissions	Vented	N/A	N/A	
	Compressor Leaks	Fugitive	N/A	N/A	
	Blowdowns	Vented	N/A	N/A	
	Component Emissions	Vented	N/A	N/A	
	Component Leaks	Fugitive	N/A	N/A	
	Storage Tank Leaks & Emissions	Vented	N/A	N/A	
Distribution Main & Service Pipelines	Pipeline Leaks	Fugitive	N/A	N/A	
	All Damages	Fugitive	N/A	N/A	
	Blowdowns	Vented	N/A	N/A	
	Component Emissions	Vented	N/A	N/A	
	Component Leaks	Fugitive	N/A	N/A	
Distribution M&R Stations	Station Leaks & Emissions	Fugitive	N/A	N/A	
	Blowdowns	Vented	N/A	N/A	
	Component Emissions	Vented	N/A	N/A	
	Component Leaks	Fugitive	N/A	N/A	
Customer Meters	Meter Leaks	Fugitive	N/A	N/A	
	Above Ground MSA Leaks	Fugitive	N/A	N/A	
	Vented Emissions	Vented	N/A	N/A	
Underground Storage	Storage Leaks & Emissions	Fugitive	0	0	
	Compressor Emissions	Vented	0	0	
	Compressor Leaks	Fugitive	238.449	1	Leakage through packing vent on Compressor #2
	Blowdowns	Vented	187.994	29	
	Component Emissions	Vented	0	0	
	Component Leaks	Fugitive	2.421	3	All component leaks repaired in 2016; none awaiting repair
	Dehydrator Vent Emissions	Fugitive	N/A	N/A	Facility uses Vapor Recovery Units; no methane emitted from dehydrators
Unusual Large Leaks	(Description)		0	0	

Central Valley Gas Storage

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, and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

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Appendix 8

Rev. 3/31/17

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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#8):

(5) System-wide gas leak rate data, Central Valley Gas Storage R15-01-008 2017 June Report along with any data and computer models used in making that calculation, for the 12 months ending December 31st, of the reporting year.

Response:

System Wide Leak Rate Data

1/1/2016 - 12/31/2016

Gas Storage Facilities:

Average Close of the Month Cushion Gas Storage Inventory (Mscf)	Average Close of the Month Working Gas Storage Inventory (Mscf)	Total Annual Volume of Injections into Storage (Mscf)	Total Annual Volume of Withdrawals from Storage (Mscf)	Explanatory Notes / Comments
1380000	7742143	7862351	6159326	

Transmission System:

Total Annual Volume of Gas Used by the Gas Department (Mscf)	Total Annual Volume of Gas Transported to or for Customers* in State (Mscf)	Total Annual Volume of Gas Transported to or for Customers* out of State (Mscf)	Total Annual Volume of Gas Transported to utility-owned or third-party storage fields for injection into storage (Mscf)	Explanatory Notes / Comments
100802	6159326	0	0	

Distribution System:

Total Annual Volume of Gas Used by the Gas Department (Mscf)	Total Annual Volume of Gas Transported to or for Customers* in State (Mscf)	Total Annual Volume of Gas Transported to or for Customers* out of State (Mscf)	Explanatory Notes / Comments
N/A	N/A	N/A	

*The term customers includes anyone that the utility is transporting gas for, including customers who purchase gas from the utility. Customers can be anyone including residential, businesses, other utilities, gas transportation companies, etc.

Central Valley Gas Storage

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. and In Response to Data Request Central Valley Gas Storage R15-01-008 2017 June Report

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Appendix 8

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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 Central Valley Gas Storage R15-01-008 2017 June Report

The following question in the above mentioned data request is answered using the spreadsheets in this Appendix (#8):

(5) The system-wide gas leak rate data, as defined in Data Request Central Valley Gas Storage R15-01-008 2016 May Report along with any data and computer models used in making that calculation, for the 12 months ending December 31st, of the reporting year.

Response:

Summary Tables:

Natural Gas Properties	Average Mole Percent	Explanatory Notes / Comments
Methane	94.1	
Carbon Dioxide	0.8	
Ethane	4.5	
C3+	0.1	
C6+	0	(Less than 0.01 percent)
Oxygen	0	
Hydrogen	0	
Sulfur	0	
Water		This composition analysis does not include water because it is removed before gas is re-delivered to PG&E. If water were included, prior to dehydration, it would amount to approximately 0.5% by volume. Therefore, if water vapor were added to the composition analysis, the other numbers would be reduced very slightly but not significantly.
Carbon Monoxide	0	
Particulate Matter	0	
Inert Gas	0.5 Nitrogen	
Odorant		

Source - Gas composition analysis from information provided by PG&E instrument on May 2, 2017 at the CVGS/PG&E interconnect station. Information used to respond to May 1, 2017 CPUC data request for study undertaken by the California Council on Science and Technology. Composition in 2016 is not believed to be significantly different than this analysis.