

# FUGITIVE EMISSIONS



## Reporting Year

- Select all
- 2022

## Reporting Period

- Select all
- Y3Q4
- Y4Q1

## Sampling Location

- Select all
- 1307
- 1400
- 2057A (well)
- BEI02 (A)
- C3PO
- DBE1
- DW54403
- EX01
- HADV01
- HDR01 (1)
- HZON1
- MDR1
-

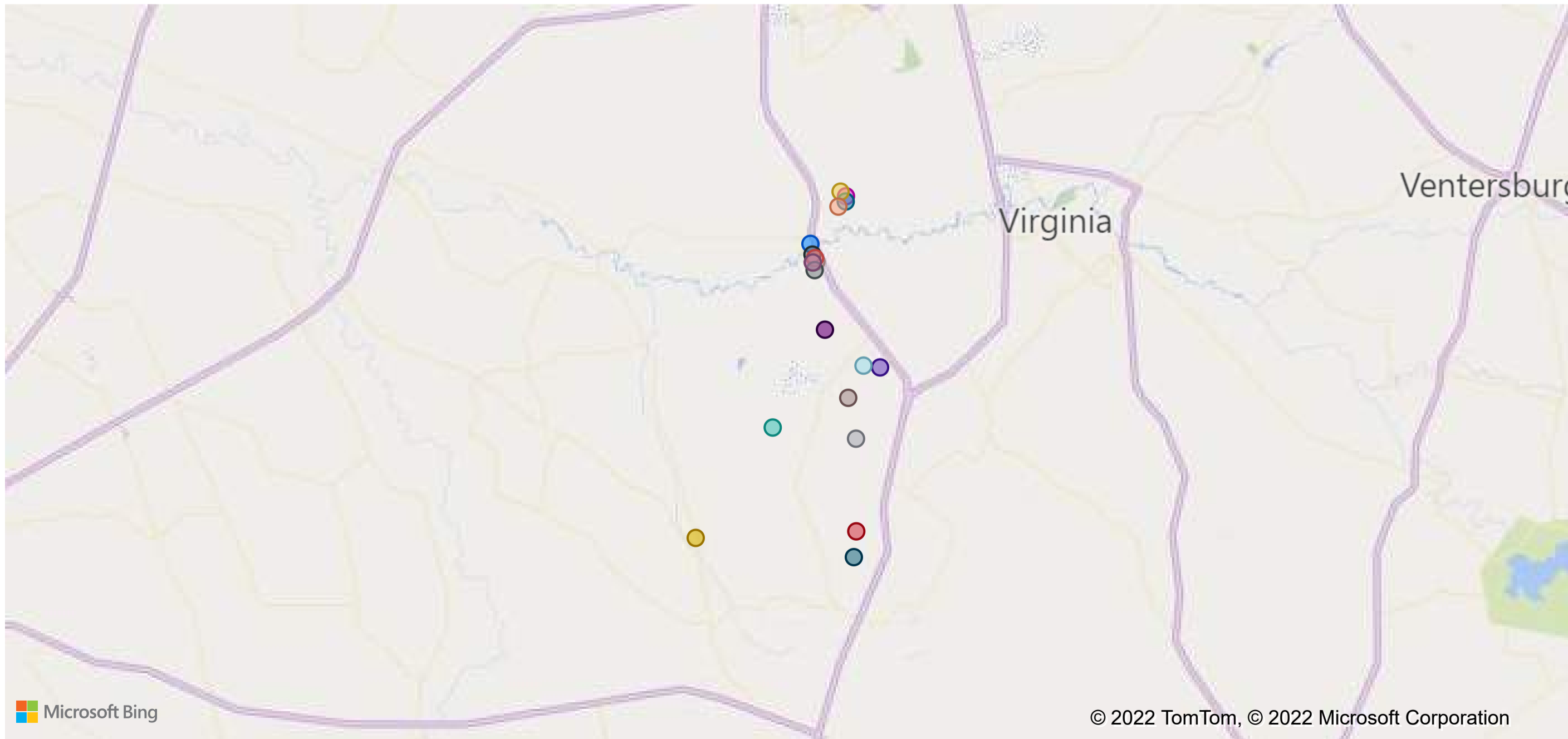
GWP Reference

23 Department of Environmental Affairs. 2017. Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry (Version No: TG-2016.1, April 2017).

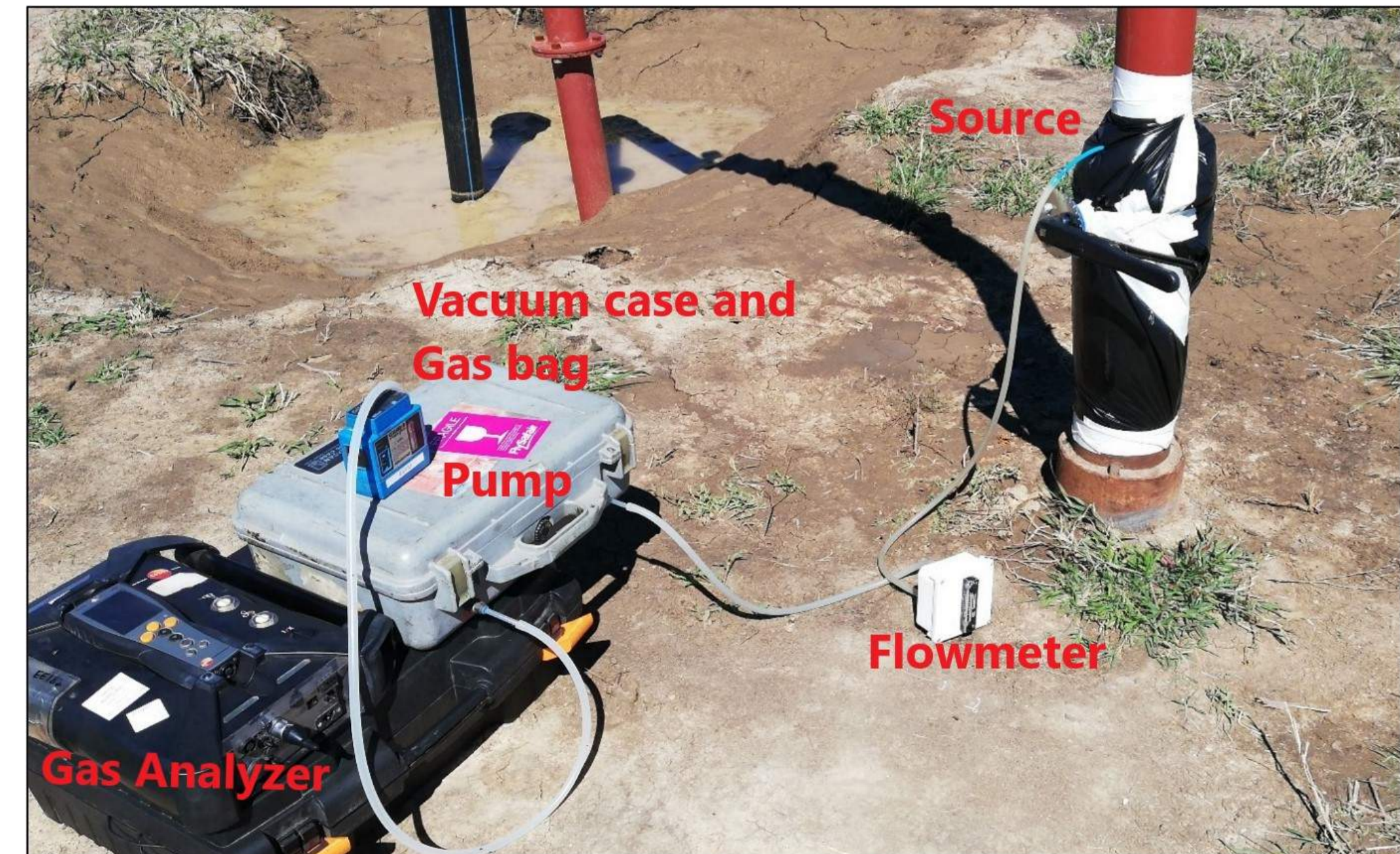
Methane	Carbon dioxide	Oxygen
US EPA 21 (modified)	Encapsulation, followed by ISO 12039	EN 14789
Not SANAS accredited	Reported on a dry basis	Reported on a dry basis
This method is intended to locate and classify leaks only, however the scope of work requires a measure of the concentration of the fugitive emissions at each gas well, as well as a measure of the mass emission rate of these fugitive emissions.	Sampling method in accordance with ISO 12039: Test Procedures; Configuration conforms to ISO 12039: Sampling	Sampling method in accordance with EN 14789: Field Operation; Configuration conforms to EN 14789: Description of Measuring Equipment

**Methodology** - A portable analyzer was used to *sniff* the vicinity of the flange or opening to determine the most likely source of fugitive emissions (if any), O<sub>2</sub> and CO<sub>2</sub> concentration, on a pipe or flange. The online analyzer is moved slowly along the length of the exposed support and pipework, looking for a release point. An anchored plastic bag, fitted with an outlet line at the top, is then placed over the source. The covering thoroughly seals the area surrounding the suspected fugitive emission source. The sample gas is directed to a vacuum case and collected in a foil gas bag, which is then submitted to a laboratory for methane analysis by gas chromatography with an electron capture detector (GC-ECD). The flow exiting the outlet line is measured using a calibrated flow meter.

**Well Locations** ● 1307 ● 1400 ● 2057A (well) ● BEI02 (A) ● C3PO ● DBE1 ● DW54403 ● EX01 ● HADV01



**Sampling Setup:**





# FUGITIVE EMISSIONS DATA TABLE

Reporting Year	Test Date	Reporting Period	Sampling Location	Ambient temp (oC)	Pressure (kPa)	CO2 % (v/v)	Methane % (v/v)	Gas Flow (l/min)	Methane (ton/month)	Instrument
2022	11 May 2022	Y4Q1	NEA02HT4	10.7	87.1	0.00	77.6	2.400	0.0002	BIOS-EE225
2022	11 May 2022	Y4Q1	PR_P0007	25.5	86.8	0.00	19.8	1.000	1.6746E-5	BIOS-EE225
2022	11 May 2022	Y4Q1	2057A (well)	21.2	87.1	0.00	50.3	0.250	1.0838E-5	BIOS-EE225
2022	11 May 2022	Y4Q1	1307	19.3	87.2	0.00	0.1	0.005	4.3423E-10	BIOS-EE225
2022	10 May 2022	Y4Q1	1400	25.7	86.6	0.00	0.1	0.005	4.2186E-10	BIOS-EE225
2022	11 May 2022	Y4Q1	BEI02 (A)	24.9	86.8	0.02	0.1	0.005	4.2416E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	C3PO	13.6	87.6	0.00	10.3	0.005	4.5824E-8	BIOS-EE225
2022	11 May 2022	Y4Q1	DBE1	24.8	86.7	0.00	0.1	0.005	4.2362E-10	BIOS-EE225
2022	10 May 2022	Y4Q1	DW54403	19.0	86.8	0.01	0.1	0.005	4.3233E-10	BIOS-EE225
2022	10 May 2022	Y4Q1	EX01	20.8	86.5	0.00	0.2	0.005	8.5689E-10	BIOS-EE225
2022	11 May 2022	Y4Q1	HADV01	16.2	87.1	0.00	0.1	0.005	4.3822E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	HDR01 (1)	20.2	87.6	0.00	0.1	0.005	4.3448E-10	BIOS-EE225
2022	10 May 2022	Y4Q1	HZON1	24.7	86.5	0.00	0.1	0.005	4.2298E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	MDR1	9.2	87.7	0.00	23.2	0.005	1.0485E-7	BIOS-EE225
2022	12 May 2022	Y4Q1	MDR-5	21.7	87.6	0.00	0.1	0.005	4.3242E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	P15	15.7	87.6	0.00	0.1	0.005	4.4155E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	PR_P0012	25.6	87.3	0.00	0.1	0.005	4.2546E-10	BIOS-EE225
2022	12 May 2022	Y4Q1	R2D2(b)	13.6	87.6	0.02	86.6	0.005	3.8532E-7	BIOS-EE225
2022	10 May 2022	Y4Q1	SPG03	24.6	86.4	0.02	0.1	0.005	4.2224E-10	BIOS-EE225
2022	11 May 2022	Y4Q1	ST23 (A)	23.4	86.9	0.00	0.1	0.005	4.2641E-10	BIOS-EE225

**Please note:**

Methane - all congeners with values below the laboratory's limit of detection are treated as the limit of detection value (**0.1%**).

Gas flow - For sampling locations with undetectable flowrate, the limit of detection of the flow meter was used for calculation purposes.

- ROTAMETER** - 0.5 l/min
- GILIBRATOR** - 0.02 l/min
- BIOS EE225** - 0.005 l/min
- BIOS EE226** - 0.05 l/min

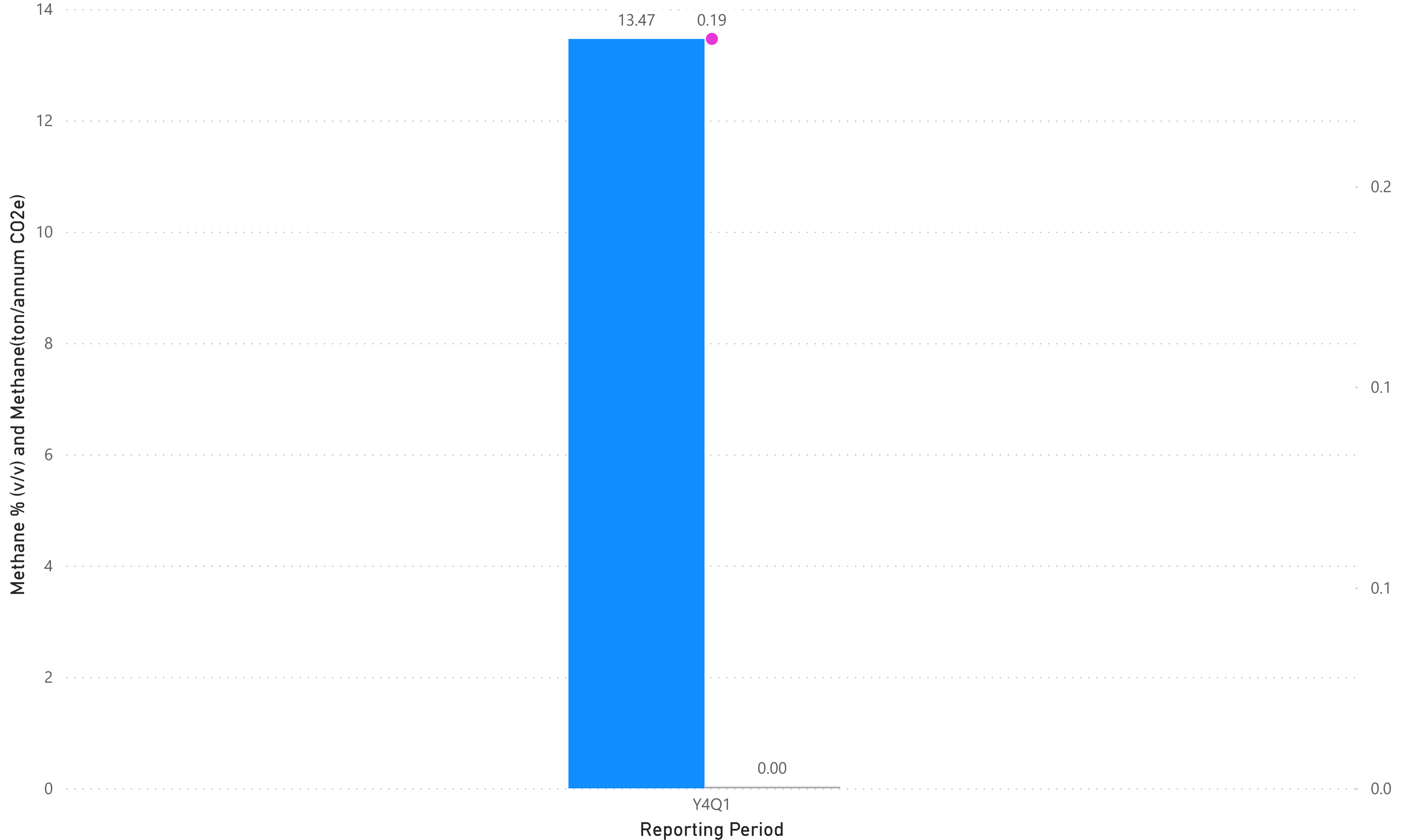
*\* Gilibrator detection limit used provided that no modifications made since Y1Q2 and flow measured is below detection*

*\* **Y3Q3:** BIOS EE225 detection limit used where no modifications were made since Y3Q2 and methane concentration and flow measured is below detection for both in Y3Q2 and Y3Q3. [HDR01 (1) & MDR-5]*



# FUGITIVE EMISSIONS CHART

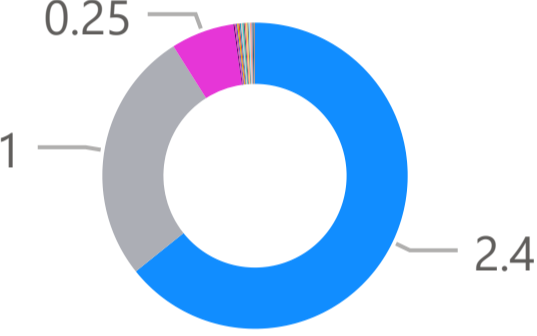
● Methane % (v/v) ● Methane(ton/annum CO2e) ● Gas Flow (l/min)



## Flow meter

### Sampli...

- NEA...
- PR\_P...
- 2057...
- 1307
- 1400
- BEI0...
- C3PO
- DBE1
- DW5...
- EX01
- HAD...



### Sampling Location

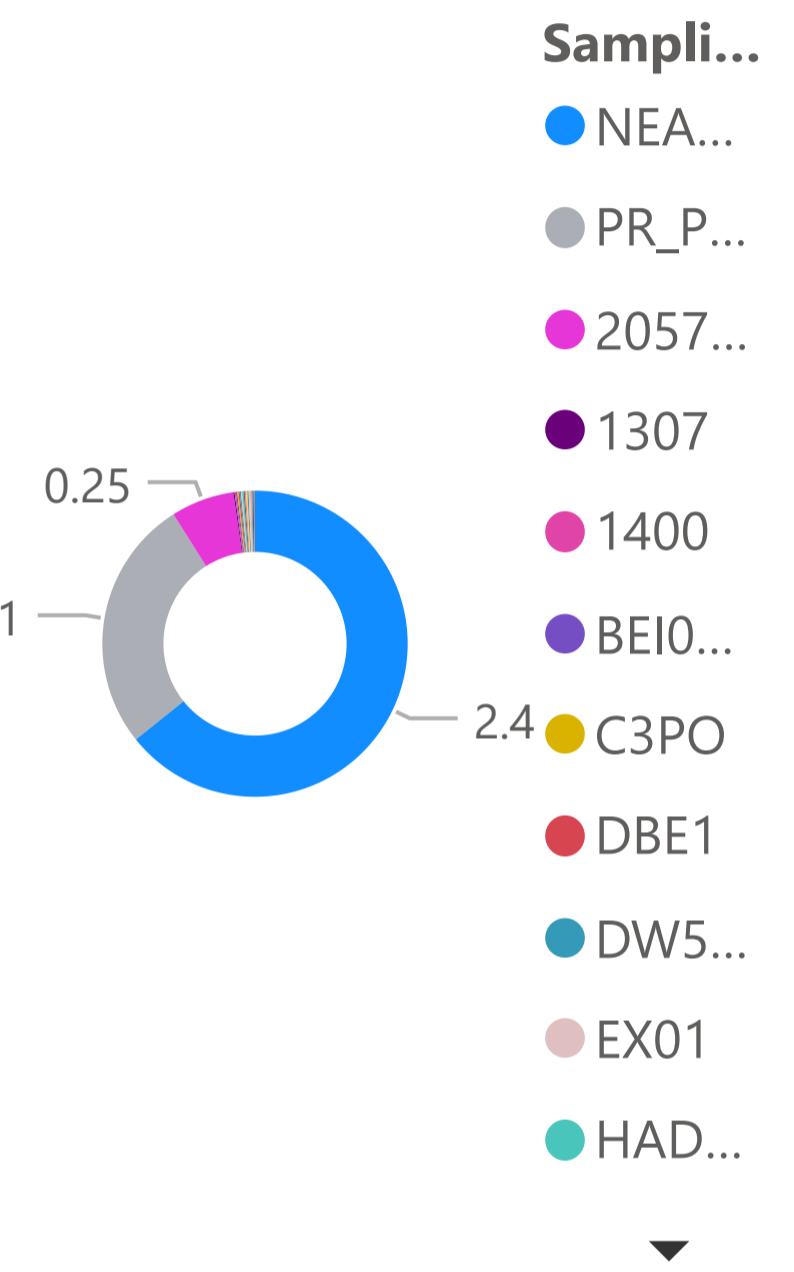
- Select all
- 1307
- 1400
- 2057A (well)
- BEI02 (A)
- C3PO
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- DW54403
- EX01
- HADV01
- HDR01 (1)



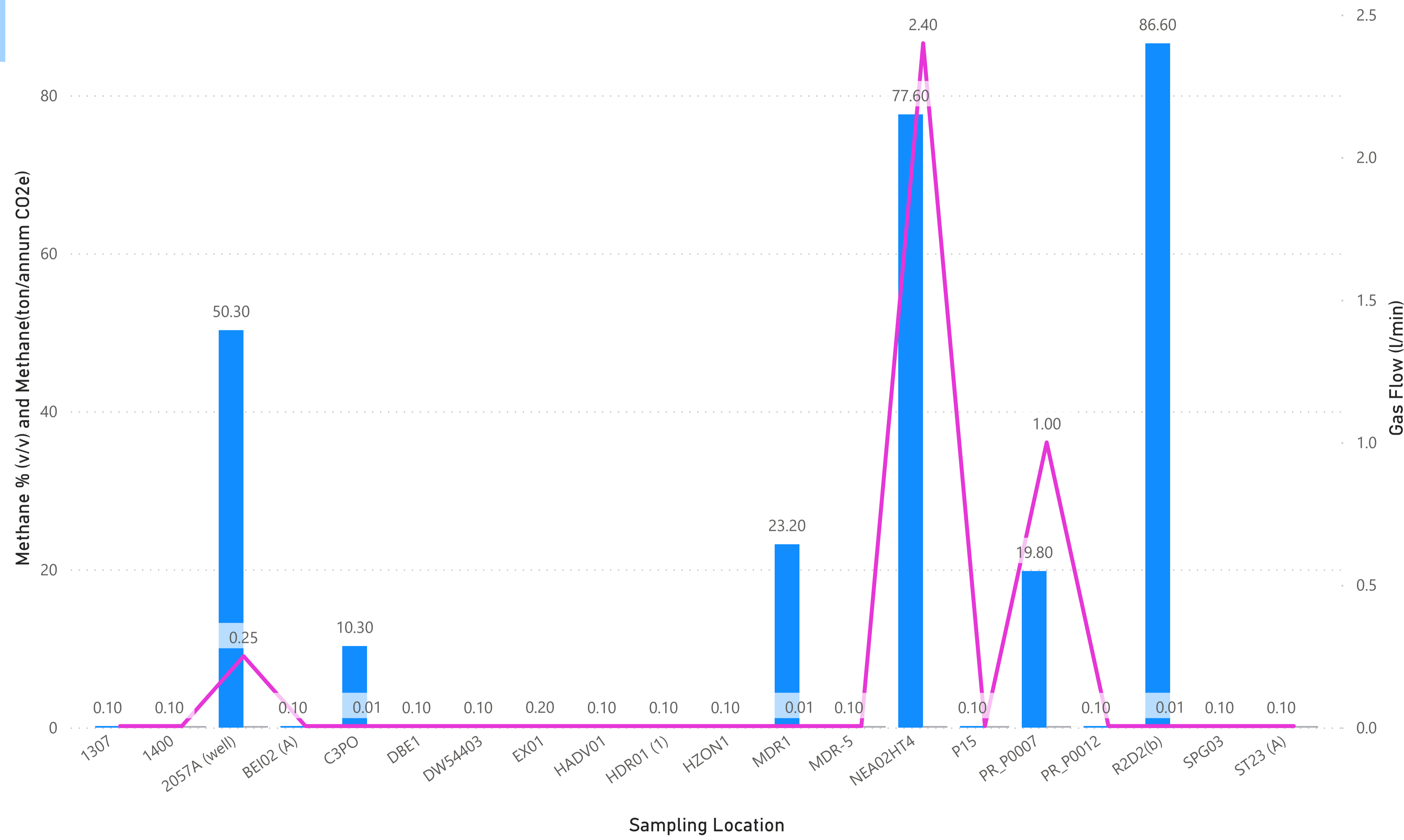
# FUGITIVE EMISSIONS CHART

● Methane % (v/v) ● Methane(ton/annum CO2e) ● Gas Flow (l/min)

## Flow meter



Reporting Period  
■ Y4Q1





# FUGITIVE EMISSIONS CORRELATION CHART

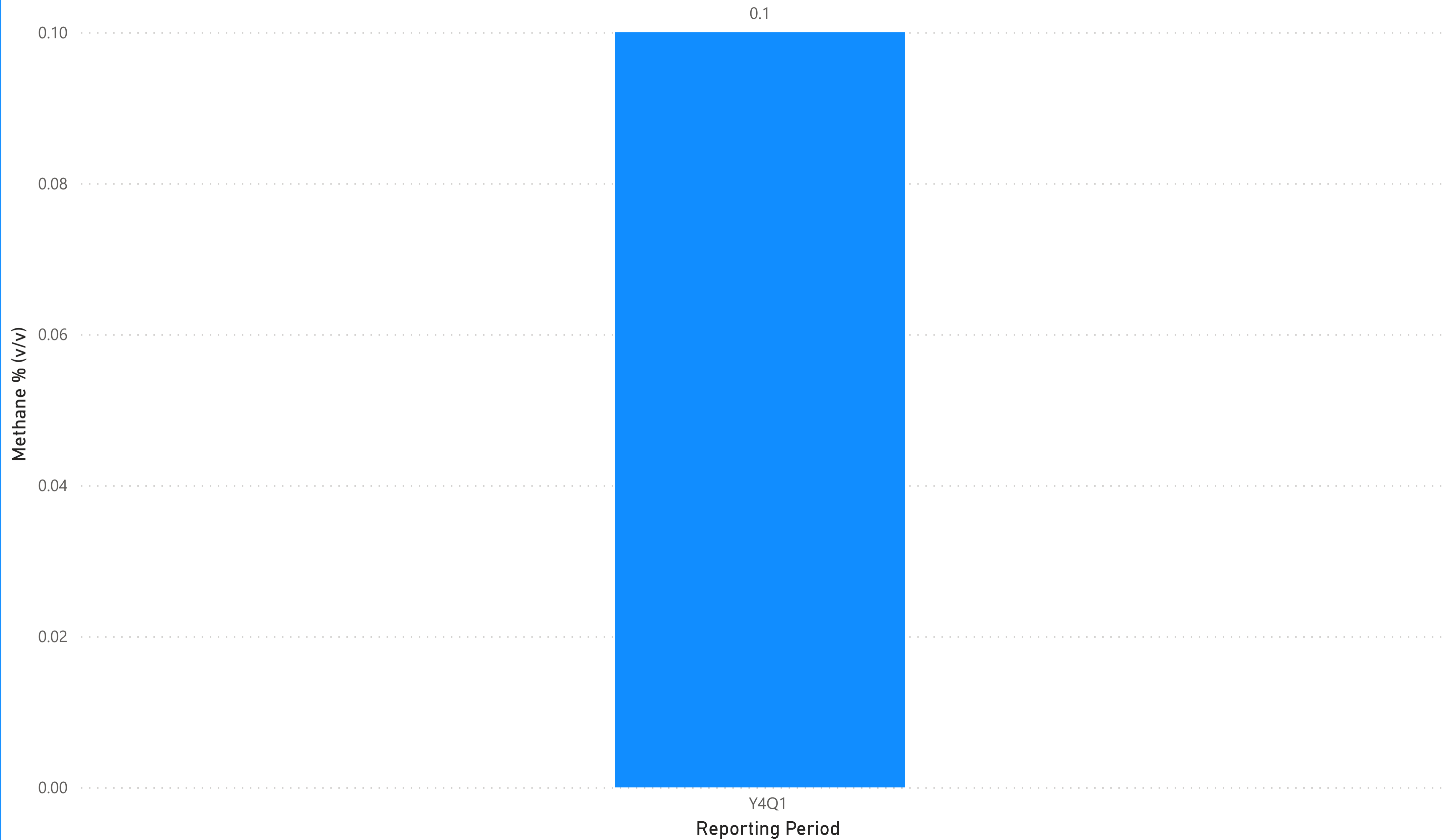
Sampling Location ● PR\_P0012

Sampling Location

PR\_P0012

Reporting Period

- Select all
- Y3Q4
- Y4Q1
- Y3Q2
- Y3Q3





# METHANE EMISSION (PROJECTED TPA CO<sub>2</sub>eq) TREEMAP

NEA02HT4

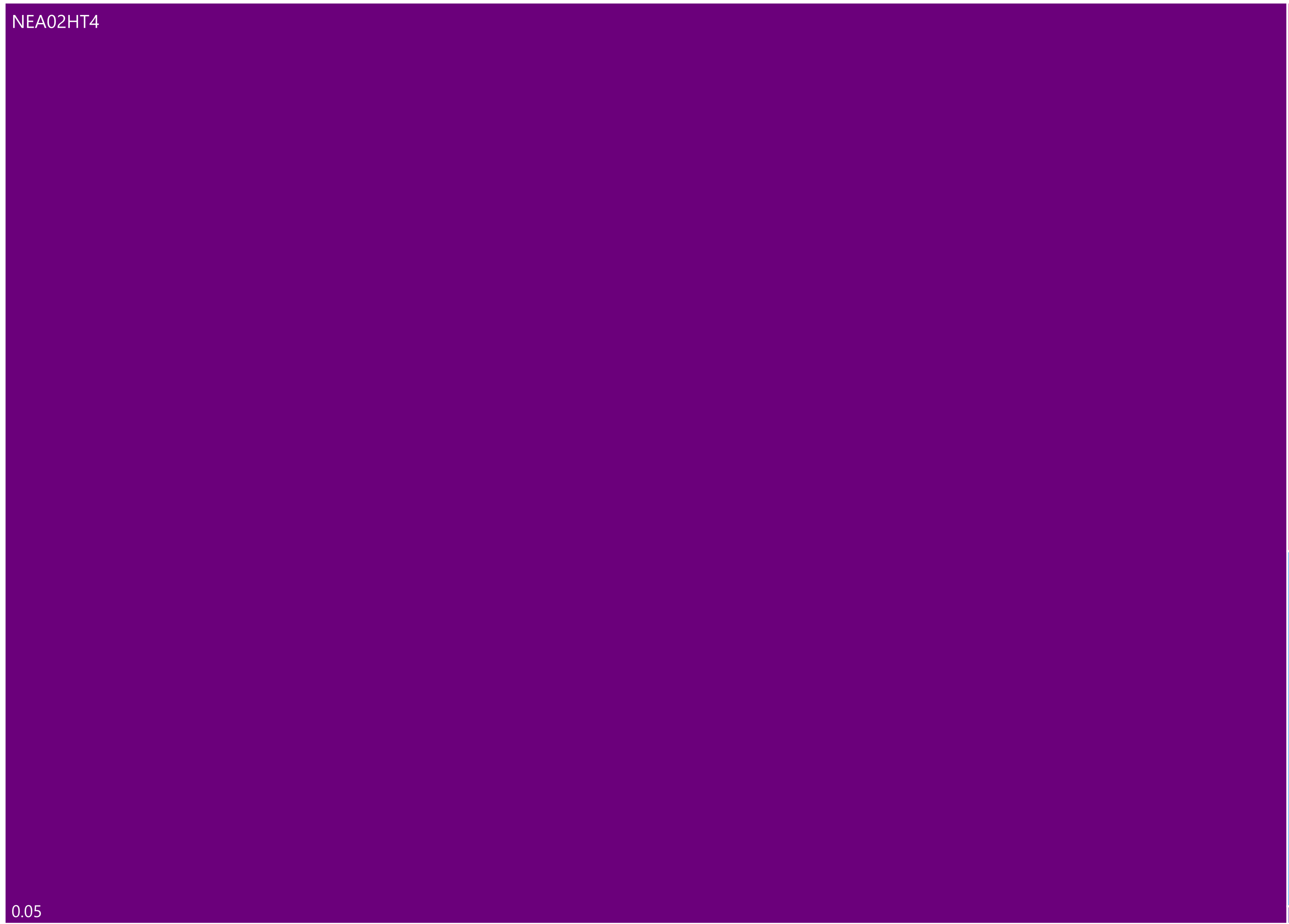
PR\_P0007

0.00

2057A (well)

0.00

0.05

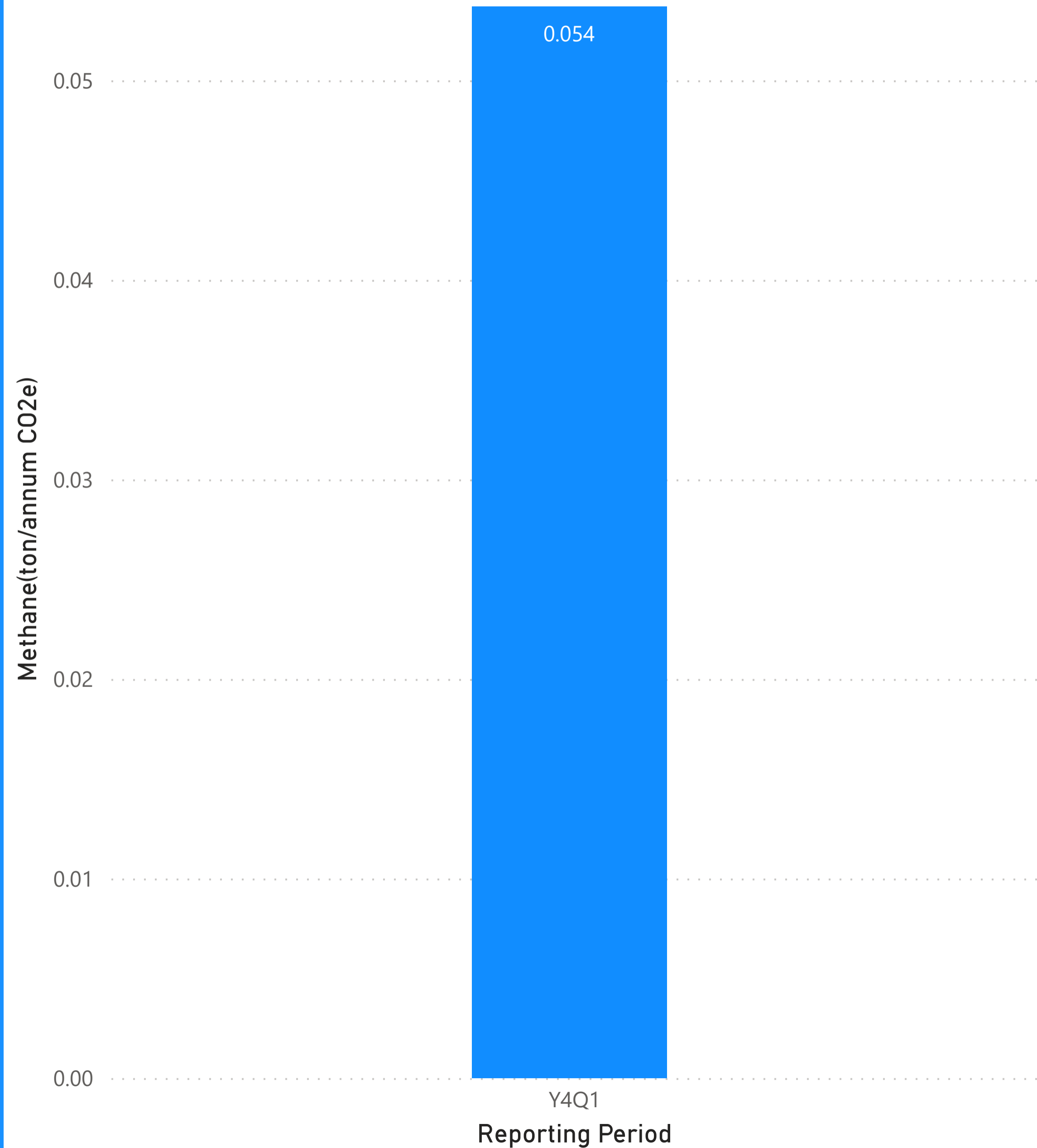




# METHANE EMISSION (PROJECTED TPA CO2eq)

Sampling Location

All



Reporting Period ● Y4Q1





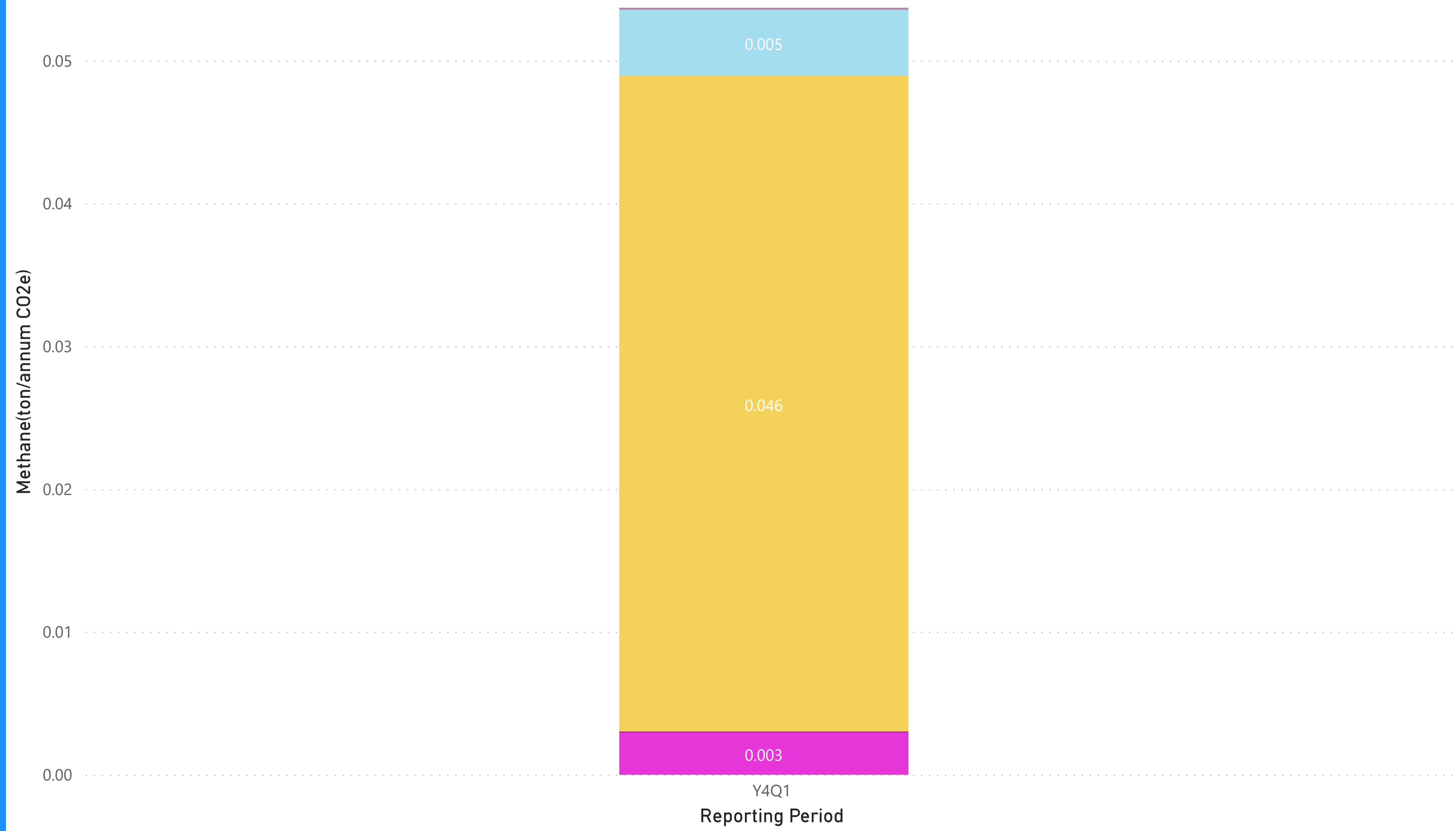


# METHANE EMISSION (PROJECTED TPA CO<sub>2</sub>eq) PER WELL

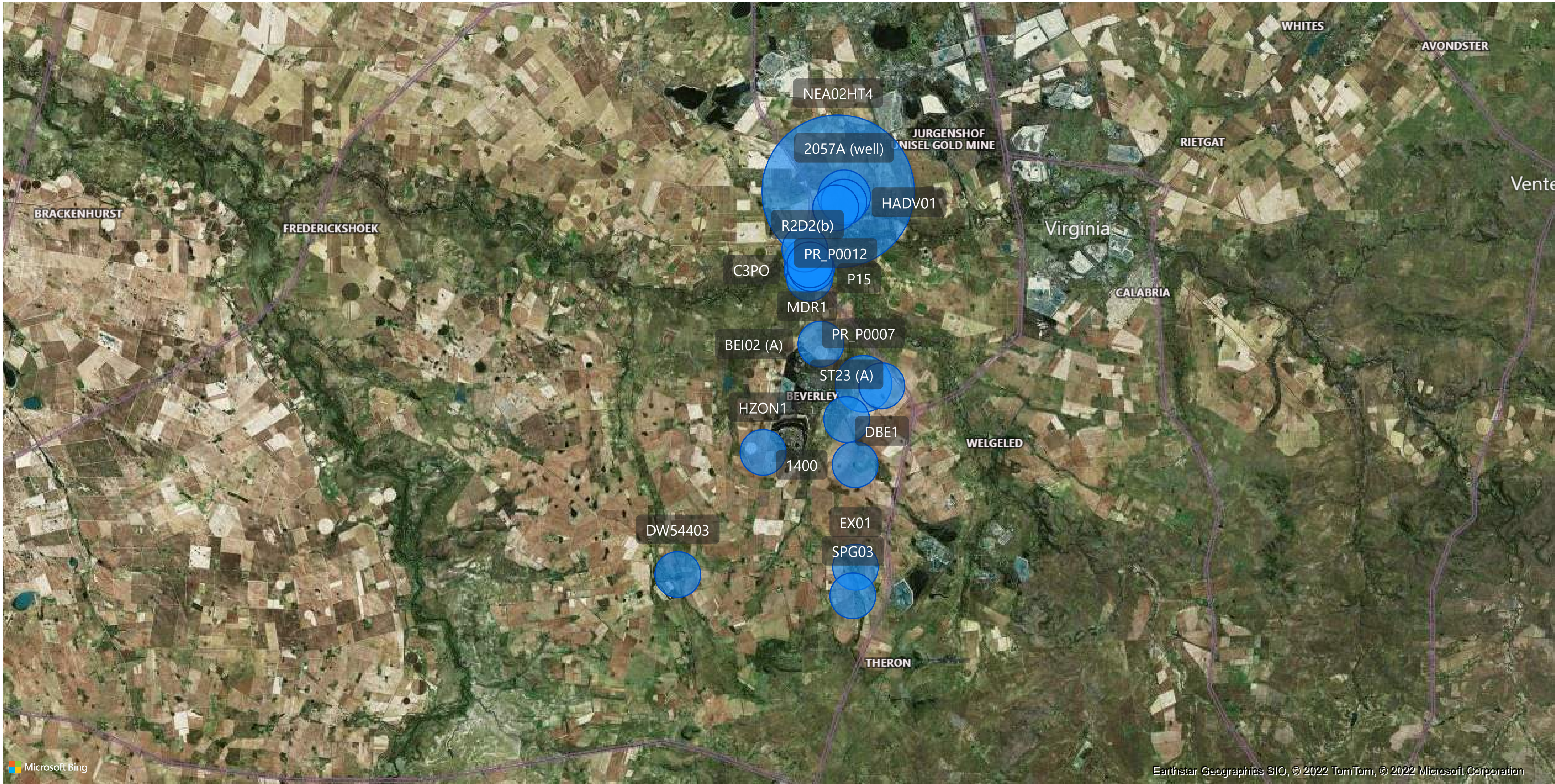
Sampling Location ● 1307 ● 1400 ● 2057A (well) ● BEI02 (A) ● C3PO ● DBE1 ● DW54403 ● EX01 ● HADV01 ● HDR01 (1) ● HZON1 ● MDR1 ● MDR-5 ● NEA02HT4 ● P15 ▶

**Sampling Location**

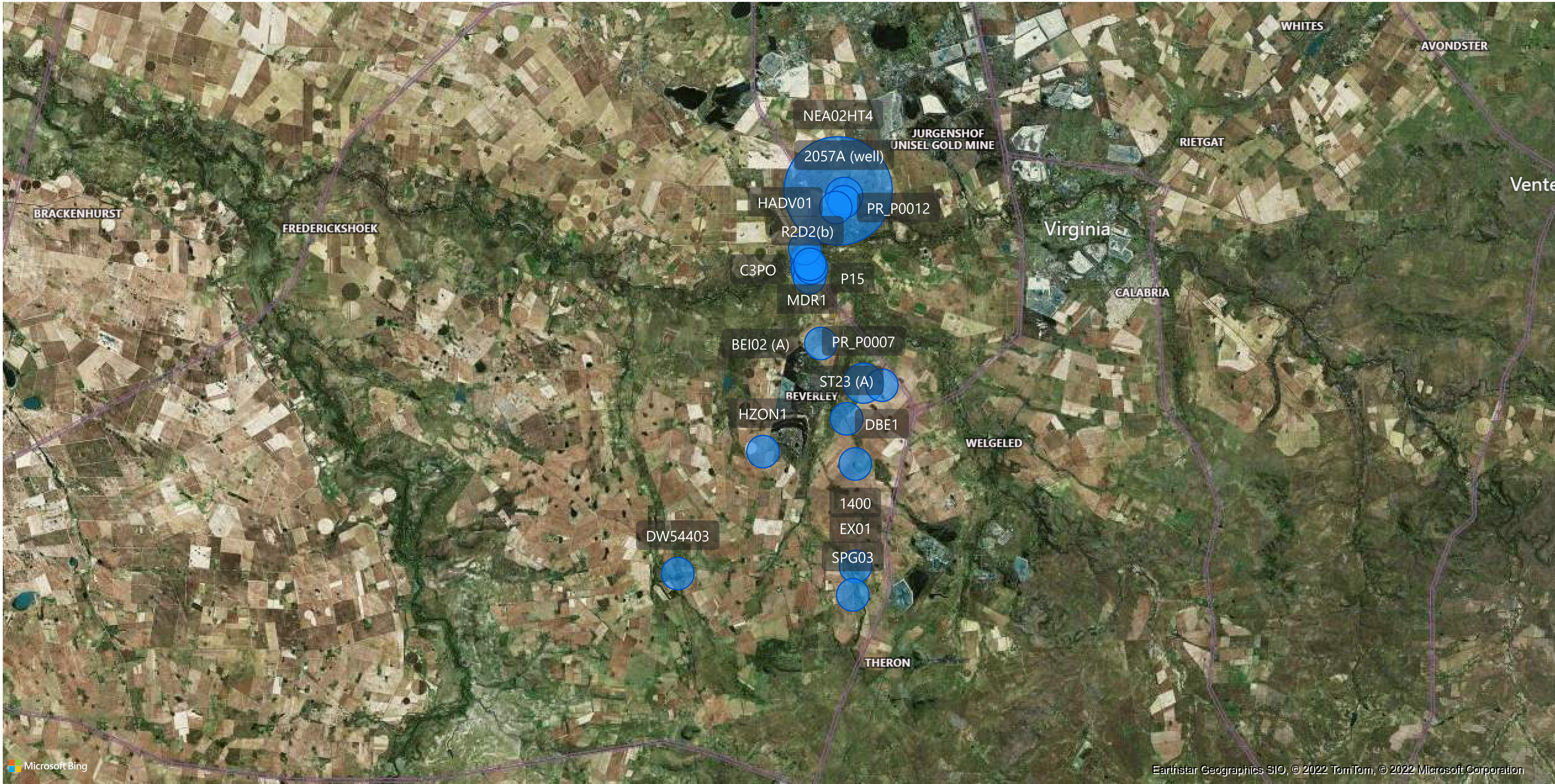
- Select all
- 1307
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- HDR01 (1)



Reporting Period ● Y4Q1



Reporting Year ● 2022





**C3PO**



**P15**



**R2D2**

**These are new wells added to the monitoring programme**



**2057**

Fugitive emissions were detected here (50.3 %). A leak flow rate of 0.25 l/min was observed. The measured oxygen concentration was 9.9 %. Fugitive emissions found here is higher than that found in the previous quarter (Y3Q4). The leak was found to be around the base of the well.



**C3PO**

Fugitive emissions were detected at this new addition (10.3%) even though the leak flow rate was below detection. The measured oxygen concentration was 17.7 %. The leak was found to be around the well head.



**EX01**

Low fugitive emissions were detected here (0.2 %), even though the leak flow rate was below detection. The measured oxygen concentration was found to be ambient (20.9 %). No leak was found during the previous quarter (Y3Q4). The leak was found around the well head.



**NEA02HT4**

Fugitive emissions were detected here (77.6%) and a leak flow rate of 2.4 l/min was observed. The measured oxygen concentration was 1.8 %. Fugitive emissions found here is higher than that found in the previous quarter (33.4%) (Y3Q4). The leak was found to be around the base of the well.



**PR\_P0007**

Fugitive emissions were detected here (19.8 %). A leak flowrate of <math><1\text{ l/min}</math> was detected. The measured oxygen concentration was found to be 15.4 %. Fugitive emissions found here is higher than that found in the previous quarter (10.6%) (Y3Q4). The leak was found around the flange connection.



**P15**

Low fugitive emissions were detected at this new addition (0.1%) even though the leak flow rate was below detection. The measured oxygen concentration was 20.8%. The leak was found to be around the base of the well



### MDR1

Fugitive emissions were detected here (23.2 %) even though the leak flow rate was below detection. The measured oxygen concentration was 14.2 %.

Fugitive emissions found here is lower than that found in the previous quarter (83.3%) (Y3Q4). The leak was found to be around the well connection head.



### R2D2

Fugitive emissions were detected at this new addition (86.6%) even though the leak flow rate was below detection. The measured oxygen concentration was 1.4 %. The leak was found to be around the well head.