



**Qatargas OPCO - North Operations**  
**Onshore Operations Support - Laboratory**

**CORRELATION TEST - COMPARISON OF RESULTS**

|                           |   |
|---------------------------|---|
| Sample                    | : QG-CPC CORRERATION TEST 2023 - PART - A |
| Correlation Test Cyl. No. | : DL 6110 & X22111                        |
| Location                  | : Qatargas - North Laboratory             |
| Analysis Date             | : 20-Sep-2023                             |
| Analyst                   | : Teguh Karya                             |
| Analysis Method           | : GC, GPA 2261                            |

*TK* *OG* *20/9/23* *CPC* *recheck / change*

**Intertek** *SEPT. 20, 2023*  
 Global LNG

| COMPONENT    | Unit         | QG North Lab Gas Chromatographs |               |               | Max-Min | Conclusion | Correlation Limit<br>[nGPA 2261-64] |
|--------------|--------------|---------------------------------|---------------|---------------|---------|------------|-------------------------------------|
|              |              | GC#42                           | GC#48         | GC#49         |         |            |                                     |
|              |              | DL 6110                         | X22111        | X22111        |         |            |                                     |
| CH4          | % MOL        | 92.97                           | 92.98         | 92.97         | 0.01    | OK         | 0.30                                |
| C2H6         | % MOL        | 6.33                            | 6.32          | 6.33          | 0.01    | OK         | 0.10                                |
| C3H8         | % MOL        | 0.09                            | 0.09          | 0.09          | 0.00    | OK         | 0.05                                |
| I-C4H10      | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| N-C4H10      | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| I-C5H12      | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| N-C5H12      | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| C6H14        | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| N2           | % MOL        | 0.61                            | 0.61          | 0.61          | 0.00    | OK         | 0.03                                |
| CO2          | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| O2           | % MOL        | 0.00                            | 0.00          | 0.00          | 0.00    | OK         | 0.03                                |
| <b>TOTAL</b> | <b>% MOL</b> | <b>100.00</b>                   | <b>100.00</b> | <b>100.00</b> |         |            |                                     |

QATARGAS OPERATING COMPANY LIMITED - LABORATORY DIVISION

**LNG CARGO CALCULATION SHEET**

EQUIPMENT: GC-42

|             |                           |
|-------------|---------------------------|
| LNG vessel  | QG CPC CORRELATION SAMPLE |
| Destination | N/A                       |
| Consignee   | N/A                       |

|                 |         |
|-----------------|---------|
| Cargo # :       | DL6110  |
| Loading ex Tank | LNG S&L |
| Berth No.       | N/A     |

|                            |                |                      |                      |         |            |
|----------------------------|----------------|----------------------|----------------------|---------|------------|
| Sampling Date: 14-09-23    |                | Sampling Time: 12:50 |                      |         |            |
| <b>LNG SHIPMENT SAMPLE</b> |                |                      |                      |         |            |
| Component                  | Run 1          |                      | Run 2                |         | Mean<br>%N |
|                            | ESTD           | %N                   | ESTD                 | %N      |            |
|                            | N <sub>2</sub> | 0.603                | 0.605                | 0.603   | 0.605      |
| C <sub>1</sub>             | 92.588         | 92.972               | 92.635               | 92.975  | 92.973     |
| C <sub>2</sub>             | 6.308          | 6.334                | 6.308                | 6.331   | 6.333      |
| C <sub>3</sub>             | 0.089          | 0.089                | 0.089                | 0.089   | 0.089      |
| i-C <sub>4</sub>           | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| n-C <sub>4</sub>           | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| i-C <sub>5</sub>           | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| n-C <sub>5</sub>           | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| C <sub>6+</sub>            | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| CO <sub>2</sub>            | 0.000          | 0.000                | 0.000                | 0.000   | 0.000      |
| Total                      | 99.587         | 100.000              | 99.636               | 100.000 | 100.000    |
| Analyzed by:               |                | TK                   | <i>Cheng</i> 20/9/23 |         |            |

| Component        | FINAL RESULT |
|------------------|--------------|
|                  | MOL %        |
| N <sub>2</sub>   | 0.61         |
| C <sub>1</sub>   | 92.97        |
| C <sub>2</sub>   | 6.33         |
| C <sub>3</sub>   | 0.09         |
| i-C <sub>4</sub> | 0.00         |
| n-C <sub>4</sub> | 0.00         |
| i-C <sub>5</sub> | 0.00         |
| n-C <sub>5</sub> | 0.00         |
| C <sub>6+</sub>  | 0.00         |
| CO <sub>2</sub>  | 0.00         |
| Total            | 100.00       |

Remark:

ESTD means concentration in external standard mode

% N means concentration in normalized mode to 100%

C1 is balance which is calculated from 100 subtracted by other components

C6+ and CO2 are calibrated separately (if required)

**Intertek**  
Global LNG  
*Cheng*

|                  |     |                   |
|------------------|-----|-------------------|
| Total Sulfur     | N/A | mg/M <sup>3</sup> |
| H <sub>2</sub> S | N/A | ppm mole          |

Approved by (Shift Chemist):

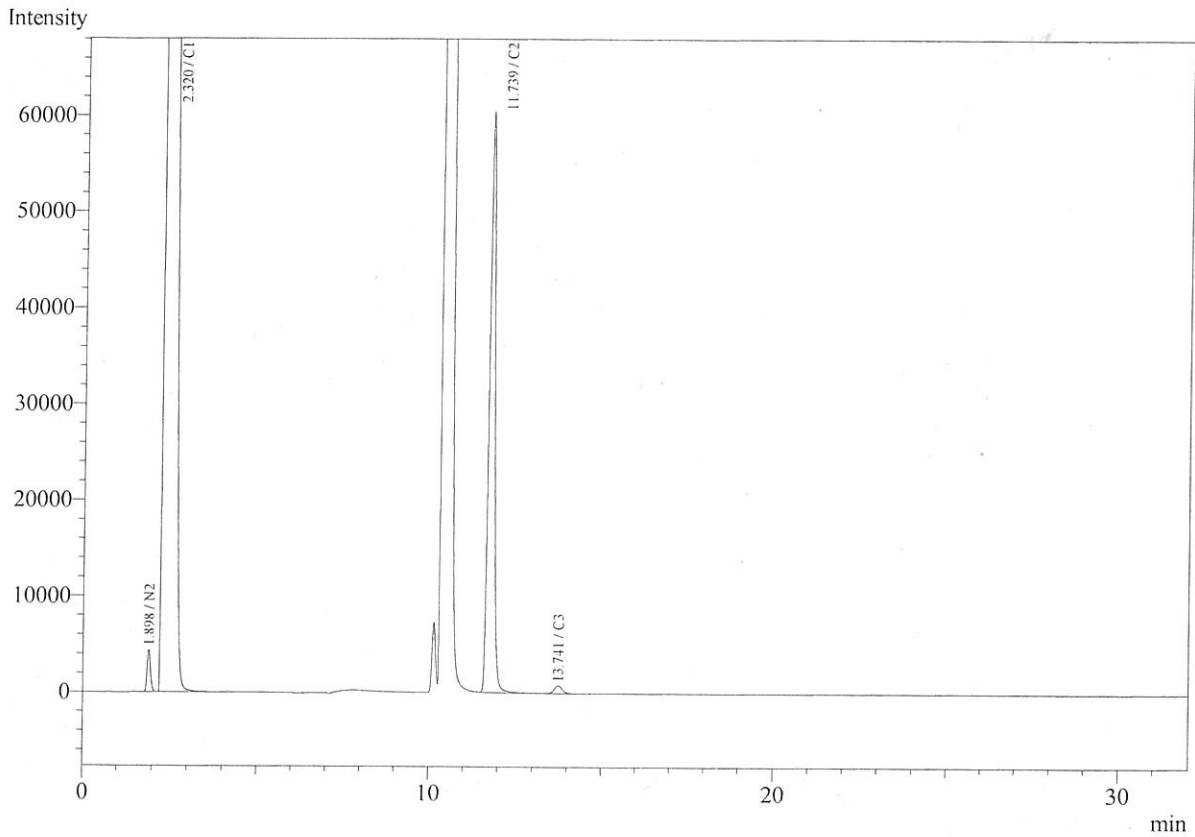


# Qatargas Operating Company Ltd.

## OPCO LABORATORY

GC # 42

Analysis Date & Time : 20/09/2023 10:14:46 AM  
User Name : Admin  
Sample Name : QG CPC CORRELATION SAMPLE  
Sample ID : DL 6110  
Sample Type : Unknown  
Data Name : C:\GCsolution\Data\09-2023\20092023-002.gcd  
Method Name : C:\GCsolution\Data\09-2023\LNG Loading.gcm  
Operator :TK



| Peak# | Ret. Time | Area    | Conc.   | Unit | Cmpd Name |
|-------|-----------|---------|---------|------|-----------|
| 1     | 1.898     | 30046   | 0.6027  | %    | N2        |
| 2     | 2.320     | 3841098 | 92.5879 | %    | C1        |
| 3     | 11.739    | 696049  | 6.3078  | %    | C2        |
| 4     | 13.741    | 12223   | 0.0889  | %    | C3        |
| Total |           | 4579416 | 99.5873 |      |           |

06  
TK 20/23  
19

Intertek  
Global LNG

CPC  
Cheng

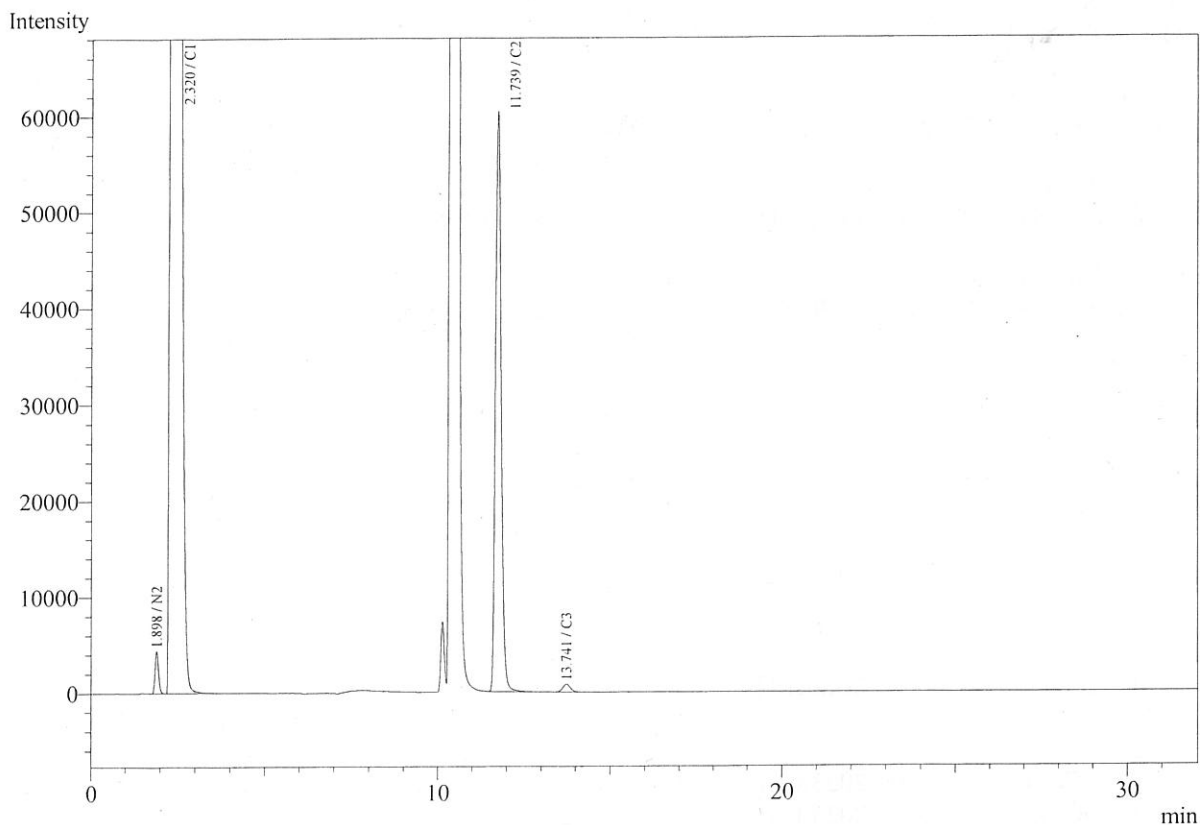


# Qatargas Operating Company Ltd.

## OPCO LABORATORY

GC # 42

Analysis Date & Time : 20/09/2023 10:49:03 AM  
User Name : Admin  
Sample Name : QG CPC CORRELATION SAMPLE  
Sample ID : DL 6110  
Sample Type : Unknown  
Data Name : C:\GCsolution\Data\09-2023\20092023-003.gcd  
Method Name : C:\GCsolution\Data\09-2023\LNG Loading.gcm  
Operator :TK



| Peak# | Ret.Time | Area    | Conc.   | Unit | Cmpd Name |
|-------|----------|---------|---------|------|-----------|
| 1     | 1.898    | 30067   | 0.6031  | %    | N2        |
| 2     | 2.320    | 3843068 | 92.6354 | %    | C1        |
| 3     | 11.739   | 696085  | 6.3082  | %    | C2        |
| 4     | 13.741   | 12214   | 0.0888  | %    | C3        |
| Total |          | 4581434 | 99.6355 |      |           |

95  
TK 20/9/23



CPC  
Cheng

QATARGAS OPERATING COMPANY LIMITED - LABORATORY DIVISION

**LNG CARGO CALCULATION SHEET**

EQUIPMENT: GC-48

|             |                           |
|-------------|---------------------------|
| LNG vessel  | QG CPC CORRELATION SAMPLE |
| Destination | N/A                       |
| Consignee   | N/A                       |

|                 |         |
|-----------------|---------|
| Cargo # :       | X22111  |
| Loading ex Tank | LNG S&L |
| Berth No.       | N/A     |

|                  |                            |                      |                   |                |                |
|------------------|----------------------------|----------------------|-------------------|----------------|----------------|
|                  | Sampling Date: 14-09-23    | Sampling Time: 12:50 |                   |                |                |
|                  | <b>LNG SHIPMENT SAMPLE</b> |                      |                   |                |                |
| Component        | Run 1                      |                      | Run 2             |                | Mean %N        |
|                  | ESTD                       | %N                   | ESTD              | %N             |                |
| N <sub>2</sub>   | 0.603                      | 0.605                | 0.603             | 0.606          | 0.606          |
| C <sub>1</sub>   | 92.639                     | 92.989               | 92.595            | 92.985         | 92.986         |
| C <sub>2</sub>   | 6.293                      | 6.317                | 6.293             | 6.320          | 6.319          |
| C <sub>3</sub>   | 0.089                      | 0.089                | 0.089             | 0.089          | 0.089          |
| i-C <sub>4</sub> | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| n-C <sub>4</sub> | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| i-C <sub>5</sub> | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| n-C <sub>5</sub> | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| C <sub>6</sub> + | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| CO <sub>2</sub>  | 0.000                      | 0.000                | 0.000             | 0.000          | 0.000          |
| <b>Total</b>     | <b>99.624</b>              | <b>100.000</b>       | <b>99.580</b>     | <b>100.000</b> | <b>100.000</b> |
|                  | Analyzed by:               | TK                   | <i>TK 20/9/23</i> |                |                |

| Component        | FINAL RESULT  |
|------------------|---------------|
|                  | MOL %         |
| N <sub>2</sub>   | 0.61          |
| C <sub>1</sub>   | 92.98         |
| C <sub>2</sub>   | 6.32          |
| C <sub>3</sub>   | 0.09          |
| i-C <sub>4</sub> | 0.00          |
| n-C <sub>4</sub> | 0.00          |
| i-C <sub>5</sub> | 0.00          |
| n-C <sub>5</sub> | 0.00          |
| C <sub>6</sub> + | 0.00          |
| CO <sub>2</sub>  | 0.00          |
| <b>Total</b>     | <b>100.00</b> |

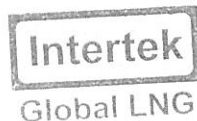
Remark:

ESTD means concentration in external standard mode

% N means concentration in normalized mode to 100%

C1 is balance which is calculated from 100 subtracted by other components

C6+ and CO2 are calibrated separately (if required)



|                  |     |                   |
|------------------|-----|-------------------|
| Total Sulfur     | N/A | mg/M <sup>3</sup> |
| H <sub>2</sub> S | N/A | ppm mole          |

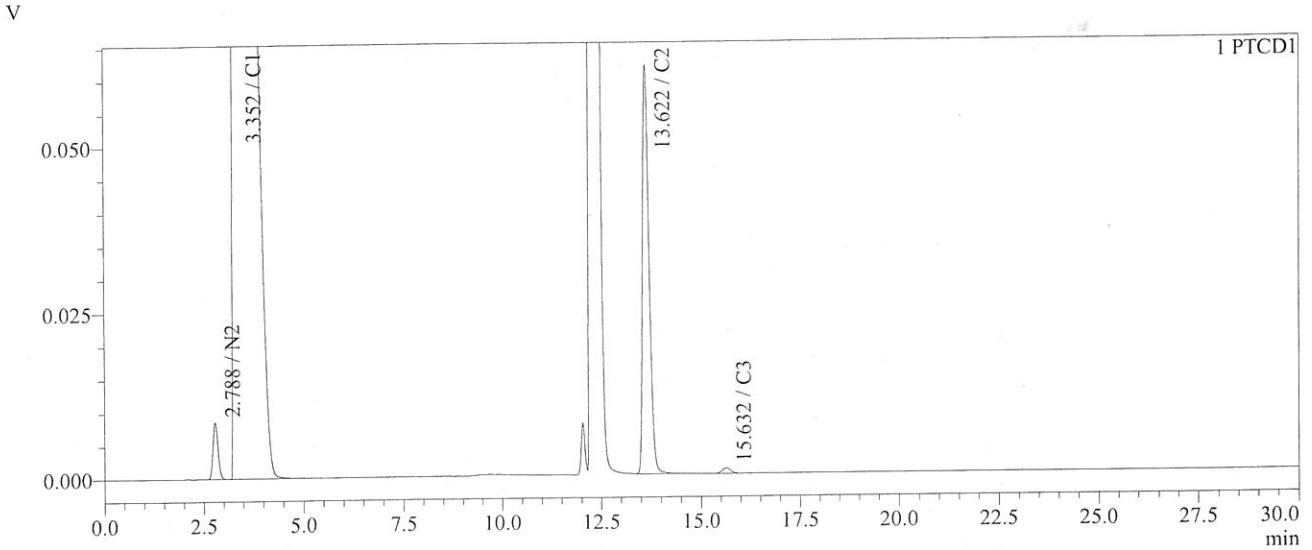
Approved by (Shift Chemist):

*EPC*  
*20/09/23 / i.kang*

Sample Information

Sample Name : QG CPC CORREALATION SAMPLE  
 Sample ID : X22111  
 Data Filename : 2092023-001.gcd  
 Method Filename : LNG Loading.gcm  
 Analysis Date : 20/09/2023 11:44:23 AM  
 Operator : TK

Chromatogram



Peak Table

| Peak# | Ret. Time | Name | Area    | Conc.   | Unit |
|-------|-----------|------|---------|---------|------|
| 1     | 2.788     | N2   | 76649   | 0.6032  | %    |
| 2     | 3.352     | C1   | 8657761 | 92.6388 | %    |
| 3     | 13.622    | C2   | 698985  | 6.2930  | %    |
| 4     | 15.632    | C3   | 12353   | 0.0888  | %    |
| Total |           |      | 9445748 | 99.6237 |      |

QG  
TK 20/9/23

**Intertek**  
Global LNG

CPC  
20/9/23  
cheng

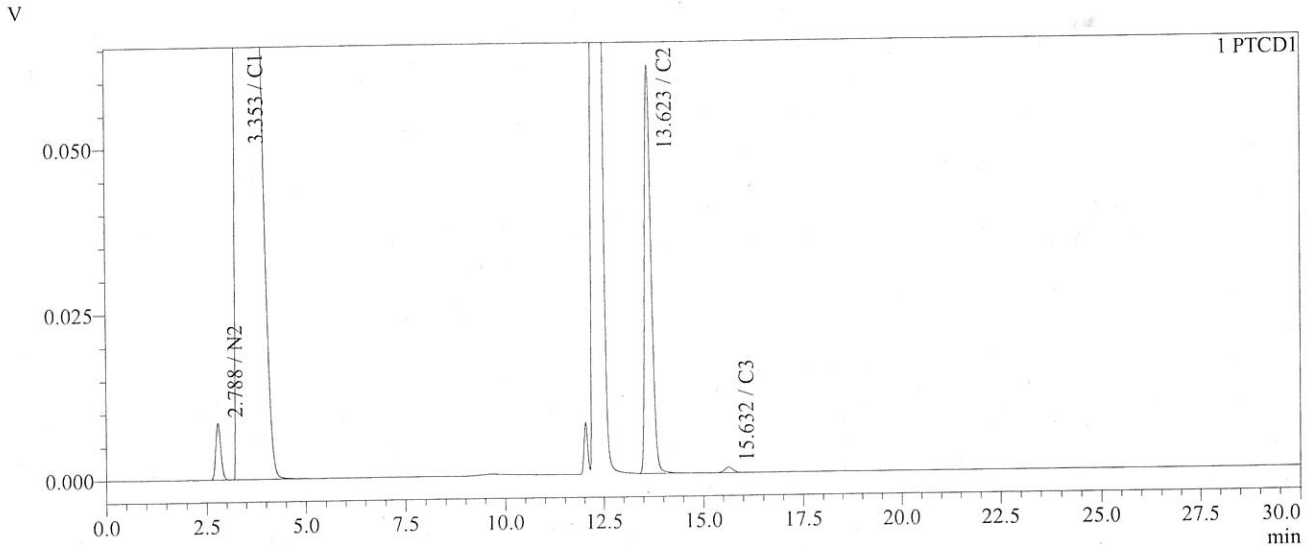


Qatargas Operating Company Ltd.  
Laboratory Division - North Lab  
GC#48

Sample Information

Sample Name : QG CPC CORREALATION SAMPLE  
Sample ID : X22111  
Data Filename : 2092023-002.gcd  
Method Filename : LNG Loading.gcm  
Analysis Date : 20/09/2023 12:15:52 PM  
Operator : TK

Chromatogram



Peak Table

| Peak# | Ret. Time | Name | Area    | Conc.   | Unit |
|-------|-----------|------|---------|---------|------|
| 1     | 2.788     | N2   | 76639   | 0.6031  | %    |
| 2     | 3.353     | C1   | 8653701 | 92.5953 | %    |
| 3     | 13.623    | C2   | 698985  | 6.2930  | %    |
| 4     | 15.632    | C3   | 12353   | 0.0888  | %    |
| Total |           |      | 9441679 | 99.5802 |      |

QG  
TK 20/9/23

Intertek  
Global LNG

CPC

iqbal / cheng

QATARGAS OPERATING COMPANY LIMITED - LABORATORY DIVISION

**LNG CARGO CALCULATION SHEET**

EQUIPMENT: GC-49

|             |                           |
|-------------|---------------------------|
| LNG vessel  | QG CPC CORRELATION SAMPLE |
| Destination | N/A                       |
| Consignee   | N/A                       |

|                 |         |
|-----------------|---------|
| Cargo # :       | X22111  |
| Loading ex Tank | LNG S&L |
| Berth No.       | N/A     |

|                            |                |                               |               |                |                |
|----------------------------|----------------|-------------------------------|---------------|----------------|----------------|
| Sampling Date: 14-09-23    |                | Sampling Time: 12:50          |               |                |                |
| <b>LNG SHIPMENT SAMPLE</b> |                |                               |               |                |                |
| Component                  | Run 1          |                               | Run 2         |                | Mean %N        |
|                            | ESTD           | %N                            | ESTD          | %N             |                |
|                            | N <sub>2</sub> | 0.605                         | 0.606         | 0.605          | 0.606          |
| C <sub>1</sub>             | 92.815         | 92.976                        | 92.817        | 92.976         | 92.976         |
| C <sub>2</sub>             | 6.318          | 6.329                         | 6.318         | 6.329          | 6.329          |
| C <sub>3</sub>             | 0.089          | 0.089                         | 0.089         | 0.089          | 0.089          |
| i-C <sub>4</sub>           | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| n-C <sub>4</sub>           | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| i-C <sub>5</sub>           | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| n-C <sub>5</sub>           | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| C <sub>6+</sub>            | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| CO <sub>2</sub>            | 0.000          | 0.000                         | 0.000         | 0.000          | 0.000          |
| <b>Total</b>               | <b>99.827</b>  | <b>100.000</b>                | <b>99.829</b> | <b>100.000</b> | <b>100.000</b> |
| Analyzed by:               |                | TK <i>[Signature]</i> 20/9/23 |               |                |                |

| Component        | FINAL RESULT  |
|------------------|---------------|
|                  | MOL %         |
| N <sub>2</sub>   | 0.61          |
| C <sub>1</sub>   | 92.97         |
| C <sub>2</sub>   | 6.33          |
| C <sub>3</sub>   | 0.09          |
| i-C <sub>4</sub> | 0.00          |
| n-C <sub>4</sub> | 0.00          |
| i-C <sub>5</sub> | 0.00          |
| n-C <sub>5</sub> | 0.00          |
| C <sub>6+</sub>  | 0.00          |
| CO <sub>2</sub>  | 0.00          |
| <b>Total</b>     | <b>100.00</b> |

Remark:

ESTD means concentration in external standard mode

% N means concentration in normalized mode to 100%

C1 is balance which is calculated from 100 subtracted by other components

C6+ and CO2 are calibrated separately (if required)



|                  |     |                   |
|------------------|-----|-------------------|
| Total Sulfur     | N/A | mg/M <sup>3</sup> |
| H <sub>2</sub> S | N/A | ppm mole          |

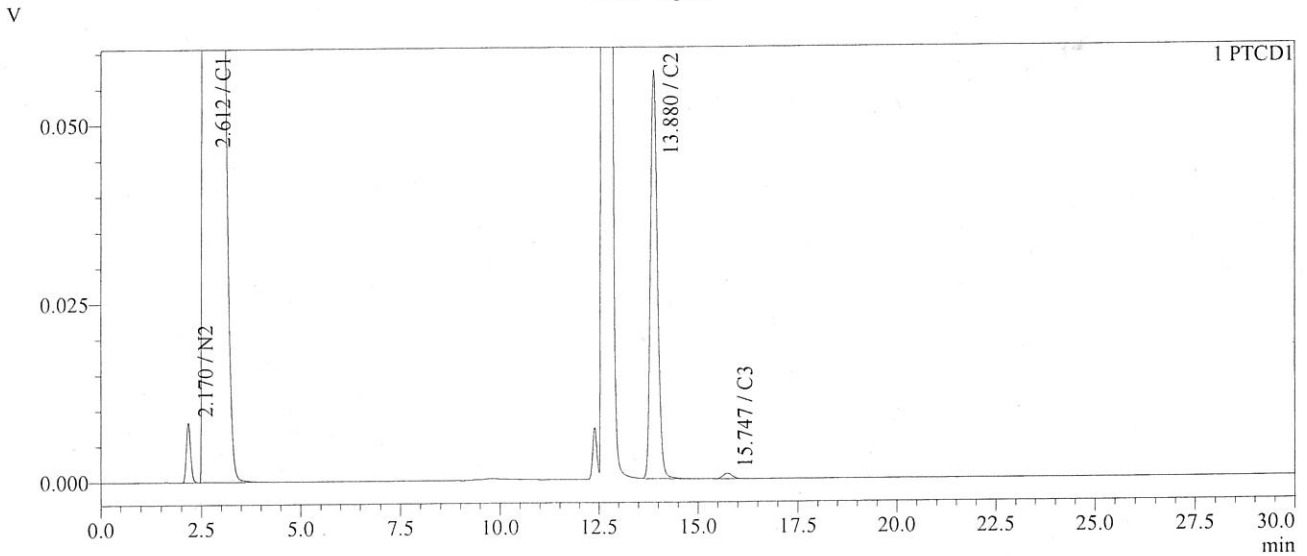
Approved by (Shift Chemist):



Sample Information

Sample Name : QG CPC CORRELATION SAMPLE  
 Sample ID : X22111  
 Data Filename : 20092023-002.gcd  
 Method Filename : LNG Loading.gcm  
 Analysis Date : 20/09/2023 10:19:34 AM  
 Oprator : TK

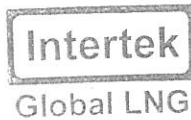
Chromatogram



Peak Table

| Peak# | Ret. Time | Name | Area    | Conc.   | Unit |
|-------|-----------|------|---------|---------|------|
| 1     | 2.170     | N2   | 62163   | 0.6054  | %    |
| 2     | 2.612     | C1   | 7898335 | 92.8145 | %    |
| 3     | 13.880    | C2   | 709109  | 6.3183  | %    |
| 4     | 15.747    | C3   | 12513   | 0.0889  | %    |
| Total |           |      | 8682119 | 99.8271 |      |

QG  
TK 20/9/23



*[Handwritten signature]*

QC  
Johar / Cheng

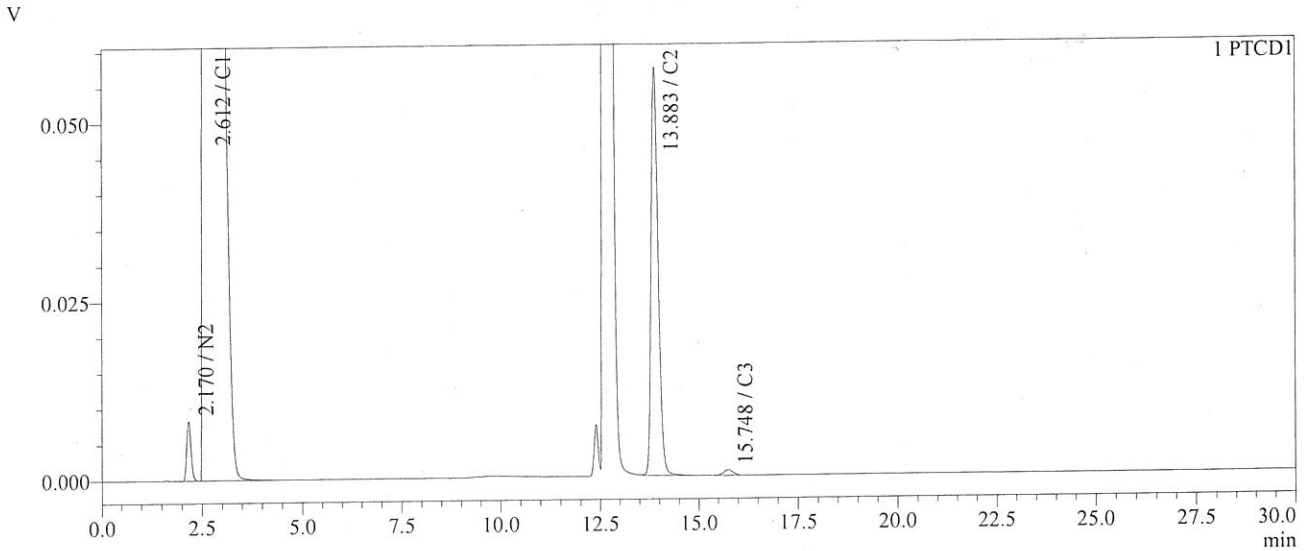


**Qatargas Operating Company Ltd.**  
**Labortory Division - North Lab**  
**GC#49**

Sample Information

Sample Name : QG CPC CORRELATION SAMPLE  
 Sample ID : X22111  
 Data Filename : 20092023-003.gcd  
 Method Filename : LNG Loading.gcm  
 Analysis Date : 20/09/2023 10:52:05 AM  
 Oprator : TK

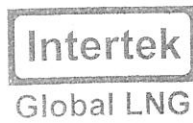
Chromatogram



Peak Table

| Peak# | Ret. Time | Name | Area    | Conc.   | Unit |
|-------|-----------|------|---------|---------|------|
| 1     | 2.170     | N2   | 62149   | 0.6052  | %    |
| 2     | 2.612     | C1   | 7898539 | 92.8169 | %    |
| 3     | 13.883    | C2   | 709038  | 6.3177  | %    |
| 4     | 15.748    | C3   | 12503   | 0.0889  | %    |
| Total |           |      | 8682229 | 99.8287 |      |

OG  
 TK 20/9/23



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cpc  
 J. Chen / Cheng



**ISO/IEC 17025 - Calibration Certificate**  
**Certified gaseous reference material**

Certificate Number: 20-25555-003-5701578 Rev-00

Page 1 of 2

Client: Name: QATARGAS OPERATING COMPANY LTD.  
attn: (for Qatar Liq.Gas.Co.LTD)  
Address: North main warehouse  
PO BOX 22666  
DOHA  
STATE OF QATAR

**COPY**

Product: Certified gaseous reference material intended as calibration standard in natural gas analysis.

Cylinder number: 5701578      Cylinder size: 10 Liter  
Cylinder pressure: 15 MPa      Valve connection: DIN-1

Calibration method: The composition is determined in conformance with ISO 6143.

Traceability: This gas mixture is calibrated within ISO/IEC 17025 scope of accreditation K064 and traceable by direct analytical comparison to a Primary Reference Material.

Calibration result:

| Component   | Mol fraction<br>mol/mol  | Expanded uncertainty (k=2)<br>mol/mol | Calibration date |
|-------------|--------------------------|---------------------------------------|------------------|
| Nitrogen    | 0,722 x 10 <sup>-2</sup> | 0,007 x 10 <sup>-2</sup>              | 23 October 2020  |
| Methane     | 92,36 x 10 <sup>-2</sup> | 0,09 x 10 <sup>-2</sup>               | 23 October 2020  |
| Ethane      | 6,27 x 10 <sup>-2</sup>  | 0,06 x 10 <sup>-2</sup>               | 23 October 2020  |
| Propane     | 0,505 x 10 <sup>-2</sup> | 0,005 x 10 <sup>-2</sup>              | 23 October 2020  |
| Iso-Butane  | 523 x 10 <sup>-6</sup>   | 5 x 10 <sup>-6</sup>                  | 23 October 2020  |
| N-Butane    | 508 x 10 <sup>-6</sup>   | 5 x 10 <sup>-6</sup>                  | 23 October 2020  |
| Iso-Pentane | 198,0 x 10 <sup>-6</sup> | 2,0 x 10 <sup>-6</sup>                | 23 October 2020  |
| N-Pentane   | 199,9 x 10 <sup>-6</sup> | 2,0 x 10 <sup>-6</sup>                | 23 October 2020  |

Uncertainty: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with Publication EA-4/02.

Product handling: Refer to ISO 16664 for product handling guidelines.  
Minimum utilisation pressure is 0,5 MPa.  
Use and store the gas cylinder between 0°C and 40°C.

Expiry date: This certificate is valid until 22 October 2023.

The Dutch Accreditation Council is a member of the European Co-operation for Accreditation and is one of the signatories to the EA multilateral agreement, and to the ILAC Mutual Recognition Arrangement(MRA) for the mutual recognition of calibration certificates. The MRA is held by ILAC.

|  |  |   |
|--|--|---|
| Scott Specialty Gases Netherlands B.V.<br>Calibration Laboratory<br>Debijsters 48<br>4317 BL Breda, The Netherlands<br>ExpertiseCenter.North-West@airliquide.com<br>Chamber of Commerce Number: 20134663 | This certificate is issued provided that neither Scott Specialty Gases Netherlands B.V. nor the Dutch Accreditation Council (RvA) assumes any liability. | Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced with written approval of the Calibration Laboratory. |
|--|--|---|