SCHEDULE-5 (PART-A)

LNG MEASUREMENT, SAMPLING AND TESTING

References

Schedule-5 (Part-A) is intended to give basic requirements that are in general compliance with LNG international standards and practice. Primary references are:

- ISO 13398 – Refrigerated light hydrocarbon fluids — Liquefied natural gas — Procedure for custody transfer on board ship;
- ISO 8943-Refrigerated light hydrocarbon fluids — Sampling of liquefied natural gas — Continuous and intermittent methods;
- ISO 6142 – Gas analysis — Preparation of calibration gas mixtures -- Gravimetric method;
- ISO 10723 – Natural gas — Performance evaluation for on-line analytical systems;
- Institute of Petroleum Measurement Manual, Part XII, Static & Dynamic Measurement of Light Hydrocarbon Liquids, SECTION 1, CALCULATION PROCEDURES;
- GPA 2145 – Table of Physical Constants for Hydrocarbons & Other Compounds of Interest to the Natural Gas Industry;
- GPA 2172 – Calculation of Gross Heating Value, Relative Density, and Compressibility of Natural Gas Mixtures from Compositional Analysis;
- GPA 2261 – Analysis for Natural Gas & Similar Gaseous Mixtures by Gas Chromatography;
- ASTM D 3246 – Standard Test Method for Sulphur in Petroleum Gas by Oxidative Microcoulometry;
- ASTM D 5504 Standard Test Method for Determination of Sulphur Compounds in Natural Gas and Gaseous Fuel by Gas Chromatography and Chemiluminescence;
- National Bureau of Standards Interagency Report 77-867: A COMPARISON OF MATHEMATICAL MODELS FOR THE PREDICTION OF LNG DENSITIES; and
- GIIGNL LNG CUSTODY TRANSFER HANDBOOK.

The latest editions of the above references shall be considered as the generally industry-accepted criteria for any item not specifically addressed herein. The latest version of the standards referred to in this Schedule 5 shall be considered as the official version.

1 GENERAL

PLL or the Customer may request changes to the methods of measurement and procedures contained in this Schedule 5. When such a request is made, PLL and the Customer shall promptly meet to discuss in good faith the proposed revisions to methods and procedures. Similarly, if referenced standards are updated, the Parties shall meet to agree the incorporation of the revised standards into the methodology herein.

2 TANK GAUGE TABLES

2.1 Calibration of LNG Tanks

During or immediately following the completion of construction, or immediately prior to entry into service hereunder, of any LNG carrier that the Customer intends to use as the LNG Carrier, the Customer shall ensure that each LNG tank of that LNG Carrier has been calibrated for volume against level by a qualified independent surveyor. The Customer shall furnish to PLL, or cause PLL to be provided, evidence of any calibration conducted pursuant to this Schedule 5.

2.2 Preparation of Tank Gauge Tables

The Customer shall have a qualified independent surveyor prepare tank gauge tables for each LNG tank of an LNG carrier the Customer intends to use as the LNG Carrier. Such tank gauge tables shall include sounding tables, correction tables for list and trim, volume corrections to tank service temperature, and other corrections if necessary.

2.3 Precision of Tank Gauge Tables

Tank gauge tables prepared pursuant to paragraph 2.2 of this Schedule 5 shall, in the relevant loading and discharging range of the LNG Carrier's tanks, indicate volumes in cubic metres expressed to the nearest thousandth (1/1000), with LNG tank depths expressed in metres to the nearest thousandth (1/1000). The Customer shall enable PLL or its representative to audit the LNG Carrier's tables upon notice at commercially reasonable times.

2.4 Witnessing of Tank Calibration

2.4.1 Where applicable, PLL shall have the right to have its representative witness the tank calibrations referred to in paragraph 2.1 of this Schedule 5.

2.4.2 The Customer shall give reasonable advance notice to PLL of the timing and location of such LNG tank calibrations.

2.5 Recalibration of LNG Tanks in case of Distortion and Modification

In the event that any LNG tank of the LNG Carrier suffers distortion of such a nature as to cause either Party reasonably to question the validity of the tank gauge tables referred to in paragraph 2.2 of this Schedule 5, or in the event of modification to any of the LNG tanks, Seller, subject to Buyer's consent, shall arrange for such LNG tank to be recalibrated in the same manner as set forth in paragraphs 2.1 and 2.2 of this Schedule 5 during any period when that LNG Carrier is out of service for inspection and/or repairs. The Customer shall bear the costs of recalibration, unless such recalibration was done at PLL'S request and did not demonstrate any inaccuracy in the tank gauge tables, in which case PLL shall pay the costs of recalibration. Except as provided in this paragraph 2.5, no other recalibration of any LNG tank of the LNG Carrier shall be required. If mutually agreed between the Parties, recalibration of distorted tanks can be deferred until the next time when such tanks are warmed for any reason, and any corrections to the prior tank gauge tables will be made from the time the distortion occurred. If the time of the distortion cannot be ascertained, the Parties shall mutually agree on the time period for retrospective adjustments.

3 SELECTION OF GAUGING DEVICES

3.1 General

3.1.1 All devices provided for in paragraphs 3 and 4 of this Schedule 5 shall be approved by the Customer. The required degree of accuracy (which shall in any case be within the permissible tolerances defined herein and in the applicable standards referenced herein) of such devices

selected shall be mutually agreed upon by the Parties. In advance of the use of any device, the Party providing such device shall cause tests to be carried out to verify that such device has the required degree of accuracy.

3.1.2 All custody transfer gauging devices and systems shall be installed, operated and maintained according to the manufacturers' specification and standards used in the LNG industry.

3.2 Liquid Level Gauging Devices

3.2.1 Each LNG tank of the LNG Carrier shall be equipped with independent main and auxiliary liquid level gauging devices that preferably utilise different technologies. All liquid level gauging devices shall be installed, operated and maintained according to the manufacturers' specification and standards used in the LNG industry. PLL shall identify the main and auxiliary liquid level gauging devices for the LNG Carrier.

3.2.2 The measurement accuracy of the main and auxiliary liquid level gauging devices shall be better than plus or minus seven decimal five (±7.5) millimetres. Indications from the two (2) systems shall be routinely compared to ensure they are performing normally.

3.2.3 The liquid level from the main and auxiliary gauging devices in each LNG tank shall be logged and printed.

3.3 Temperature Gauging Devices

3.3.1 The LNG tank (or each LNG tank, if more than one) of the LNG Carrier shall be equipped with a minimum of five (5) pairs of temperature gauging devices located on or near the vertical axis of such LNG tank, in such a way as not to be affected by the spray of LNG when the spray pumps are in operation.

3.3.2 Primary and redundant temperature gauges are required, and indications from the two systems shall be routinely compared to ensure they are performing normally. Such temperature gauging devices shall be installed at various locations from the top to bottom of each tank to provide temperature measurements at various levels in the tank. The topmost temperature device shall be located in the vapour space at all times, and the bottom temperature device shall be located in the heel.

3.3.3 In the temperature range of minus one hundred sixty-five (-165) degree Celsius to minus one hundred forty-five (-145) degree Celsius, the accuracy shall be plus or minus zero decimal two (± 0.2) degree Celsius. In the temperature range of minus one hundred forty-five (-145) degree Celsius to plus forty (+40) degree Celsius, the accuracy shall be plus or minus one decimal five (± 1.5) degree Celsius.

3.3.4 The temperature in each LNG tank shall be logged and printed.

3.4 Pressure Gauging Devices

3.4.1 The LNG tank (or each LNG tank, if more than one) of the LNG Carrier shall have one (1) absolute vapour pressure gauging device.

3.4.2 The measurement accuracy of each pressure gauging device shall be plus or minus one percent (± 1%) of full scale.

3.4.3 The pressure in the LNG tank (or in each LNG tank, if more than one) shall be logged and printed.

3.5 List and Trim Gauging Devices

3.5.1 A list gauging device and a trim gauging device shall be installed on the LNG Carrier. These shall be interfaced with the custody transfer system.

3.5.2 List and trim corrections shall be made using devices whose accuracy is better than plus zero decimal zero five (0.05) degrees Celsius for list and plus zero decimal zero one (0.01) metres for trim.

3.5.3 The list and trim in each LNG tank shall be logged and printed.

3.6 Verification of Accuracy of Gauging Devices

Gauging devices shall be verified for accuracy and corrected for error in accordance with the terms of Clause 13 of the Master Agreement.

3.7 Measurement Equipment Maintenance, Calibration and Testing

3.7.1 The Customer shall cause or shall have caused, tests for the accuracy of the Custody Transfer Measurement System equipment and devices installed in the LNG Carrier prior to the LNG Carrier being brought into service in order to ensure that the equipment and devices comply with these measurement requirements.

3.7.2 Thereafter, the Customer shall carry out or cause to be carried out tests to ensure the accuracy of the CTMS equipment, excluding the volumetric calibration of the cargo tanks in the LNG Carrier. Such tests will be carried out as follows:

(a) when the LNG Carrier is out of service for scheduled inspection and/or repairs;

(b) when PLL requests such verification due to the changes in accuracy of custody transfer measurements related to the specific LNG Carrier in question;

(c) when such tests are considered necessary by Customer, in which case Customer shall so notify PLL and that notice shall be acknowledged by PLL; or

(d) periodic, scheduled calibration tests as agreed by the Parties, in conjunction with the vendor equipment recommendations, as part of the regular scheduled CTMS servicing.

3.7.3 The tests referred to above shall be witnessed and verified, by the Independent Surveyor. Customer shall give notice to PLL reasonably in advance of such tests and PLL shall have the right to be present at such tests.

3.7.4 The Customer shall maintain or cause to have maintained for the CTMS, which shall be agreed by the Parties:

(a) a CTMS maintenance procedure;

(b) a schedule of maintenance;

(c) a log of the maintenance carried out, which is verified by the master of the LNG Carrier or his designate, which shall be retained on board for inspection or audit, as requested by PLL, the Customer (or its representative) or the Independent Surveyor; and

(d) calibration, testing and defect correction procedures.

3.7.5 If the LNG Carrier's CTMS equipment or devices are found to be outside the allowable limits, or are inoperable, then they shall be rectified or replaced without unreasonable delay, and the Parties shall apply such provisions as are set out in this Schedule 5. Any discrepancies in invoices which are caused by the inaccuracy of any measuring equipment or device shall be corrected and agreed upon by the Parties accordingly. Historical corrections to invoices shall be limited to a period of three (3) years or to the last time an adjustment was made, whichever is shorter.

4. MEASUREMENT PROCEDURES

4.1 Conditions at Custody Transfer

The condition of the LNG Carrier at the time of custody transfer shall be as described in clause 5.6 of ISO 13398.

4.2 Liquid level

4.2.1 Liquid levels in each LNG tank of the LNG Carrier shall be determined in accordance with clause 6.2 of ISO 13398. Measurement of the liquid level in each LNG tank of an LNG Carrier shall be made in metres, accurate to the nearest millimetre by using the main liquid level gauging devices referred to in paragraph 3.2 of this Schedule 5.

4.2.2 The same liquid level gauging device must be used for both the initial and final measurements during unloading. If the main level gauging device is inoperative at the time of commencement of unloading, necessitating use of the auxiliary level gauging device, the auxiliary level gauging device shall be used at the time of cessation of unloading, even if the main level gauging device has subsequently become operative. Trim and list of the LNG Carrier shall be kept unchanged while the referenced measurements are performed.

4.2.3 At least five (5) readings shall be made following manufacturer's recommendations on reading interval. The arithmetic average of the readings shall be deemed the liquid level.

4.2.4 Such arithmetic average shall be calculated to the nearest zero decimal one (0.1) millimetre and shall be rounded to the nearest millimetre.

4.2.5 Any necessary corrections for trim, list, temperature or other adjustment as defined in the tank gauge tables as called for in paragraph 2.2 of this Schedule 5 must be applied to the arithmetic reading to get the true level reading.

4.2.6 The liquid level shall be logged and printed.

4.3 Temperature

4.3.1 The average temperature of the LNG Cargo in the LNG Carrier's cargo tank (or in each cargo tank, if more than one) shall be determined immediately before unloading by means of the temperature measuring instruments which are fully immersed in the liquid. This determination shall be made by taking the temperature readings of the LNG to the nearest zero decimal zero one (0.01) degree Celsius. If more than one of the instruments is immersed in the liquid, the arithmetic average of these readings will be used. Such arithmetic average shall be calculated to the nearest zero decimal zero one (0.01) degree Celsius and shall be rounded to the nearest zero decimal one (0.1) degree Celsius.

4.3.2 The average temperature of the vapour in the LNG Carrier's cargo tank (or in each cargo tank, if more than one) shall be determined immediately after unloading and before loading by means of such temperature measuring instruments which are fully surrounded by vapour. This determination shall be made by taking the temperature readings of the vapour to the nearest zero

decimal zero one (0.01) degree Celsius, and if more than one are fully surrounded by the vapour, the arithmetic average of these readings will be used. Such arithmetic average shall be calculated to the nearest zero decimal zero one (0.01) degree Celsius and shall be rounded to the nearest zero decimal one (0.1) degree Celsius.

4.3.3 The temperature in the LNG tank (or in each LNG tank, if more than one) shall be logged and printed.

4.4 Pressure

4.4.1 At the same time the liquid level is measured, the absolute pressure in the LNG tank (or in each LNG tank, if more than one) shall be measured to the nearest one (1) millibar by using the pressure gauging device referred to in paragraph 3.4 of this Schedule 5.

4.4.2 The determination of the absolute pressure in the LNG tank(s) of the relevant LNG Carrier shall be made by taking one (1) reading of the pressure gauging device in the LNG tank (or in each LNG tank, if more than one), and then by taking an arithmetic average of all such readings.

4.4.3 Such arithmetic average shall be rounded to the nearest one (1) millibar.

4.4.4 If the LNG tank pressure cannot be obtained by the absolute vapour pressure gauging device, the tank pressure may be read from a normal pressure gauge, provided a barometric pressure reading, accurate to zero decimal one (0.1) millibar must also be taken and recorded to correct such reading to absolute pressure.

4.4.5 The pressure in the LNG tank (or each LNG tank, if more than one) shall be logged and printed.

4.5 List and Trim

4.5.1 The list and trim of the LNG Carrier shall be measured at the same time as the liquid level and temperature of LNG in the LNG tank (or each LNG tank, if more than one) are measured by using the list gauging device and trim gauging device referred to in paragraph 3.5 of this Schedule 5.

4.5.2 The measurement of the list and of the trim shall be conducted to the nearest zero decimal zero one (0.01) degree Celsius for list and the nearest zero decimal zero one (0.01) metre for trim.

4.5.3 The determination of the list and of the trim of the LNG Carrier shall be made by taking one (1) reading of the list and trim gauging devices.

4.5.4 The list and trim of the LNG Carrier shall be logged and printed.

4.6 Procedure in case of Gauging Device Failure

Should the measurements referred to in this paragraph 4 become impossible to perform due to a failure of gauging devices, alternative gauging procedures shall be determined by mutual agreement between the Parties in consultation with the Independent Surveyor appointed pursuant to Clause 13 of the Master Agreement. The alternative gauging procedures shall be documented and recorded.

4.7 Determination of Volume of LNG Unloaded

4.7.1 The measurements referred to in paragraphs 4.2, 4.3, 4.4 and 4.5 of this Schedule 5 shall be made at the same time. Measurements shall first be made immediately before unloading commences. Accordingly, immediately before opening the manifold emergency shut down valves of the LNG Carrier, the initial gauging shall be conducted upon the confirmation of stoppage of all spray

pumps and compressors and shut-off of the gas master valve to the LNG Carrier's boilers. The gas master valve to the LNG Carrier's boilers shall remain closed until after the second gauging. A second gauging shall be made immediately after unloading is completed. Accordingly, the second gauging shall be conducted upon the confirmation of shut-off of the manifold emergency shut down valve, with transfer pumps off and allowing sufficient time for the liquid level to stabilize. Measurements prior to unloading and after unloading will be carried out based on the condition of the LNG Carrier's lines upon arrival at the berth. Since significant volumes of LNG may remain in the LNG Carrier's manifold and crossover, gauging will be performed with these lines in the same condition prior to unloading and after unloading. If the LNG Carrier's manifold and crossover lines are empty (warm) when measurement is taken before unloading commences, they will be emptied prior to measurement following the completion of unloading. If the crossover lines are liquid filled (cold) when measurement is taken before unloading commences, they will remain full (cold) until measurement is taken following the completion of unloading. The volume of LNG, stated in cubic metres to the nearest zero decimal zero zero one (0.001) cubic metre, shall be determined by using the tank gauge tables referred to in paragraph 2.2 of this Schedule 5 and by applying the volume corrections set forth therein.

4.7.2 The volume of LNG unloaded shall be determined by deducting the total volume of LNG in all LNG tanks (if more than one) immediately after unloading is completed from the total volume of LNG in those LNG tanks immediately before unloading commences. This volume of LNG unloaded is then rounded to the nearest cubic metre.

4.8 LNG Carrier Gas consumption during operation

In case of consumption of gas on the LNG Carrier during discharge operations, the Parties agree to meet and agree upon the impact on the final energy delivered to PLL.

5 DETERMINATION OF COMPOSITION OF LNG AND VAPOUR

5.1 Sampling Procedures

5.1.1

(a)

(i) PLL shall cause the operator of the Terminal to continuously sample and analyse the LNG during unloading using an on-line gas chromatograph in accordance with the provisions of this paragraph 5.1.1(a)(i). A properly designed and maintained sample delivery and conditioning system shall be utilised. A sample shall be taken and analysed at least once every twenty (20) minutes by an on-line chromatograph during the period starting immediately after a stable flow rate has commenced and ending immediately prior to the completion of the stable flow rate, which excludes the initial start-up upsurge in the flow rate and the decreased flow rate before stopping. The results of each analysis, excluding those results deemed to be erroneous by the Independent Surveyor, shall be averaged to determine the final LNG Cargo composition. All the results including those results deemed to be erroneous by the Independent Surveyor shall be reported to the Customer and PLL.

(ii) PLL shall cause the operator of the Terminal to obtain representative samples of LNG using a sampling system, designed, installed and operated in accordance with the latest version of ISO 8943 and in accordance with this paragraph 5.1.1(a)(ii). The method used shall be the method described in the latest version of ISO 8943 current at the time of analysis or any other method agreed upon by the Customer and PLL. Should the on-line gas chromatograph

fail, samples will be obtained continuously and at an even rate during the period starting one (1) hour after continuous unloading at the normal flow rate (after ramp up) has commenced and ending one (1) hour prior to the suspension of continuous unloading at normal flow rate (before ramp down); otherwise, the frequency specified in paragraph 5.1.2 of this Schedule 5 shall be sufficient.

(b) PLL shall cause the operator of the Terminal to analyse the LNG unloaded, for invoicing purposes, using the on-line gas chromatograph. The arithmetic average of the analyses from the on-line gas chromatograph, excluding those results deemed to be erroneous by the Independent Surveyor shall be reported to the Customer. All the results including those results deemed to be erroneous by the Independent Surveyor shall be reported to the Customer and PLL. The sampling system and laboratory analyses shall be considered for invoicing should the on-line gas chromatograph system fail.

5.1.2 In absence of a continuous sampling system, three (3) sets of spot samples shall be collected at the following intervals during the unloading, one (1) hour after the full pumping rate has been achieved, when unloading is twenty-five percent (25%), fifty percent (50%), and seventy-five percent (75%) complete and one (1) hour prior to the first pump shutdown. The Independent Surveyor who witnessed such sampling shall seal such sample bottles. The samples shall be distributed as specified in paragraph 5.1.3 of this Schedule 5. However, when a continuous sampling method is used, an adequate portion of the sample collected in paragraph 5.1.1(a) of this Schedule 5 shall be transferred to at least three (3) sample cylinders, obtaining a portion of the gaseous sample during a stable period of an unloading using a dome type sampler.

5.1.3 PLL shall use one (1) sample cylinder for the purpose of analysis in paragraph 5.2 of this Schedule 5. One (1) cylinder containing a gaseous sample of the LNG unloaded shall be made available for analysis by the Customer or the Customer's designee. At least one (1) other cylinder(s) containing a gaseous sample of each unloading shall be sealed and signed by PLL and the Customer (or their representatives) and retained by PLL for at least thirty (30) days. In case of any dispute as to the accuracy of any analysis, the sample(s) shall be further retained until the Customer and PLL agree to retain it no longer. Sample cylinders shall be provided by PLL.

5.1.4 If the Independent Surveyor determines that, as a result of the failure of one or both of the continuous sampling procedure or analysis, accurate results as to the composition of the unloaded LNG are not able to be determined as prescribed in paragraph 5.1.1(a)(i) of this Schedule 5, then the arithmetic average of the analysis results of the periodic samples, excluding those results deemed to be erroneous by the Independent Surveyor, shall be deemed to be the composition of the LNG. All the results including those results deemed to be erroneous by the Independent Surveyor shall be reported to the Customer and PLL. If neither continuous nor periodic samples are available, or if analysis fails, then the normalised arithmetic average of analysis results of the five (5) immediately preceding cargoes from the same Loading Port (or the total cargoes delivered if less than five (5)) from the same Loading Port shall be deemed to be the composition of the LNG. If both PLL and the Customer agree that the result of the arithmetic average does not give a fair representation of the composition of the LNG, both Parties shall meet and decide in good faith the appropriate method to determine the composition of LNG.

5.2 Analysis Procedures

5.2.1 PLL shall cause the operator of the Terminal to analyse the LNG unloaded to determine, by an on-line gas chromatograph, the molar fractions of hydrocarbons, carbon dioxide, nitrogen and oxygen in the sample. Should the on-line gas chromatograph fail, the method used shall be the method described in the latest version of GPA 2261 current at the time of analysis or any other method agreed upon by the Customer and PLL. Duplicate runs shall be made on each sample to determine that the repeatability of peak areas are within acceptable limits. The calculated results of such duplicate runs shall be averaged.

5.2.2 ASTM D 3246 (latest edition) shall be used to determine the total sulphur content of the samples, unless PLL and the Customer mutually agree that some other method should be used. If the total sulphur content is less than five (5) milligram per Normal cubic metre, it is not necessary to analyse the sample for hydrogen sulphide.

5.2.3 ASTM D 5504 (latest edition) shall be used to determine the hydrogen sulphide content of the LNG unloaded, unless PLL and the Customer mutually agree that some other method should be used.

5.2.4 Mercury may be analysed using the latest version of ISO 6978 current at the time of analysis, unless PLL and the Customer mutually agree that some other method should be used.

5.2.5 The gas chromatography used for custody transfer shall be calibrated by PLL (witnessed by the Independent Surveyor and/or the Customer or its representative) prior to the start, and after the completion, of the bulk unloading using a standard gas supplied by a reliable and reputable manufacturer with known accuracy and traceability. The quality of the standard gas shall either be in accordance with the latest version of ISO 6142 or be in accordance with the customary practices and procedures at the Receiving Facilities which shall be certified traceable to International Standards. The composition of the standard gas shall be similar to the sample composition of the LNG. Validation of the gas chromatograph analysers shall be done by the Customer in accordance with the latest version of GPA 2261 for off-line gas chromatograph analysers and ISO 10723 for on-line gas chromatograph analysers current at the time of validation or in any other way in accordance with the customary procedures of the Receiving Facilities.

5.3 Correlation Test of Analytical Equipment and Devices

5.3.1 Prior to the use of such equipment, the Customer shall be entitled to perform a calibration of the gas chromatograph using standard gas in order to properly maintain the accuracy of the PLL's and the Terminal operator's equipment and devices.

5.3.2 During normal operation, PLL shall cause the operator of the Terminal to provide chromatograph calibration gasses with composition certified by an independent third party or the relevant Competent Authority. At least once annually (unless the Parties agree to a different period), PLL and the Customer shall cooperatively conduct deviation checks to verify the accuracy of the gas composition mole percentages and resulting calculated physical properties. PLL and the Customer shall mutually agree on test protocol and test gas supplier and compositions to be utilised. When procedures that are in accordance with the above mentioned standards have been applied, test data will be considered as acceptable, if the resulting analyses are within the "Reproducibility" and "Repeatability" tolerances of GPA 2261 and calculated Gross Heating Value is within plus or minus five Btu per Standard Cubic Foot (± 5 Btu/SCF), or 0.185 Megajoules per Standard Cubic Metre (±0.185 MJ/Sm^3), of the known Gross Heating Value of the test gas samples.

6 CALCULATION OF QUANTITY UNLOADED

6.1 Calculation and calculation notations

6.1.1 The calculations to be made in accordance with this Schedule 5 for Gross Heating Value (Volume Based) and Gross Heating Value (Mass Based) shall be carried out according to GPA 2172 (1996), using the constants as given in GPA 2145 (2009), using the Reference Condition, where the conversion from fourteen decimal six nine six (14.696) psia to fourteen decimal seven three (14.73) psia is linear. The Gross Heating Value (Volume Based) of the LNG unloaded shall be expressed in British Thermal Unit per Standard Cubic Foot and rounded to one (1) decimal place. The Gross Heating Value (Mass Based) of the LNG unloaded shall be expressed in Megajoule per kilogram, rounded to four (4) decimal places.

6.1.2 The calculations to be made in accordance with this Schedule 5 to determine the density of the unloaded LNG, shall be carried out in accordance with ISO 6578 (1991) or the National Bureau of Standards Interagency Report 77-867. The density of the LNG unloaded at the prevailing composition and temperature shall be expressed in kilogram per cubic metre, rounded to two (2) decimal places.

6.1.3 In this paragraph 6 of this Schedule 5, each of the following notations has the following meaning:

(a) d = density of the LNG unloaded at the prevailing composition and temperature T_L, in kg/cubic metre, calculated in accordance with the method specified in paragraph 6.1.2 of this Schedule 5, rounded to two (2) decimal places;

(b) Hm = Gross Heating Value (Mass Based) of the LNG unloaded, in MJ/kg, calculated in accordance with the method specified in paragraph 6.1.1 of this Schedule 5 at the Reference Condition, rounded to four (4) decimal places;

(c) P = the average absolute pressure of vapour in the LNG Carrier in the LNG tank(s) immediately after unloading in whole millibar as specified in paragraph 4.4 of this Schedule 5;

(d) Q = the Quantity Delivered in MMBtu, rounded to the nearest ten (10) MMBtu;

(e) T_L = average temperature of the LNG in the LNG Carrier immediately before unloading, in degrees Celsius, rounded to one (1) decimal place, as specified in paragraph 4.3.1 of this Schedule 5;

(f) T_V = average temperature of the vapour in the LNG tank(s) in the LNG Carrier immediately after unloading, in degrees Celsius, rounded to one (1) decimal place, as specified in paragraph 4.3.2 of this Schedule 5;

(g) Vb = the volume of the LNG in the LNG Carrier immediately before unloading, in cubic metres, rounded to three (3) decimal places, as specified in paragraph 4.7 of this Schedule 5;

(h) Vh = the volume of the LNG in the LNG Carrier immediately after unloading, in cubic metres, rounded to three (3) decimal places, as specified in paragraph 4.7 of this Schedule 5; and

(i) V = the total volume of the LNG unloaded, in cubic metres, as specified in paragraph 4.7 of this Schedule 5.

6.2 Calculation of the Quantity Delivered in BTU

6.2.1 The Quantity Delivered shall be calculated using the following formula:

$$\boldsymbol{Q = \frac{1}{1055.056} \times \left[V \times d \times Hm - \left(V \times \frac{288.60}{273.15 + Tv} \times \frac{P}{1015.60} \times 37.4\right)\right] - Egas}$$

Where

Egas = the energy of the gas consumed in the LNG carrier's engine room (also including all gas burnt by the ship for any other use/ boil off (including temperature/ pressure management)) during the time between opening and closing custody transfer surveys.

SCHEDULE-5 (PART-B)

RLNG MEASUREMENT, SAMPLING AND TESTING

As PLL will be delivering Customer's RLNG at the RLNG Delivery Point, for measurement purposes, the metering data agreed between PLL, PLTL, SNGPL, SSGC and the operator of the Terminal shall be used to compute the energy delivered equivalent to the volume of RLNG delivered to the Customer by PLL. The daily metering data will be used for tentative calculations whereas the metering data will be finalized at the end of each month and the same will be shared by PLL with the Customer for reference.

A list of major equipment installed at the RLNG Delivery Point used for fiscal metering are listed as under:

- Ultrasonic Meter
- Flow Computer
- Gas Chromatograph
- Moisture Analyser
- Hydrocarbon Dew Point Analyser.
- H_2S & Total Sulphur Analyser.