Report Title: Grain LNG Terminal MP Main Export Meter - Meter Error Report

Document Number: KBEL R0003

Issue Date: 23rd November 2020

Revision	Date	Purpose of Issue	Author	Check	Approved
D1	October 2020	Initial Draft for GLNG Comment	K Bradley		
A	23rd Nov. 2020	Client Acceptance	K Bradley		

Contents

INPUTS		
Document or File Reference	Title	Status / Revision
Penspen Report 12439-10095	Re-validation of MP Export, Export Gas Fiscal Metering Systems February 2018.	Post Validation Issue March 2018
Penspen Report 12439-10105	Re-validation of MP Export, Export Gas Fiscal Metering Systems February / March 2019.	Post Validation Issue 14th March 2019
Metering Data 201806.xlsx	MP Main export meter reconciliation data for June 2018	Issued 28/07/2020
Metering Data 201807.xlsx	MP Main export meter reconciliation data for July 2018	Issued 28/07/2020
Metering Data 201808.xlsx	MP Main export meter reconciliation data for August 2018	Issued 28/07/2020
Metering Data 201809.xlsx	MP Main export meter reconciliation data for Sept. 2018	Issued 28/07/2020
Metering Data 201810.xlsx	MP Main export meter reconciliation data for Oct. 2018	Issued 28/07/2020
Metering Data 201811.xlsx	MP Main export meter reconciliation data for Nov. 2018	Issued 28/07/2020
Metering Data 201812.xlsx	MP Main export meter reconciliation data for Dec.2018	Issued 28/07/2020
Metering Data 201901.xlsx	MP Main export meter reconciliation data for Jan. 2019	Issued 28/07/2020
Metering Data 201902.xlsx	MP Main export meter reconciliation data for Feb. 2019	Issued 28/07/2020
GIN data.xls	Reported Terminal Sendout (e-mail attachment from Mr M MacKenny dated 23rd July 2020	Issued 23/07/2020
Isle of Grain LNG Importation Facility - Electrical Inspection Hazardous Area Checksheet	MP Export Flow Temperature, tag No. TT201A Initial Inspection.	14th Feb. 2019
Terminal Export Report for gas day 6th Feb. 2019	Grain LNG 24Hour Export Report	07/02/2019
Terminal Export Report for gas day 7th Feb. 2019	Grain LNG 24Hour Export Report	08/02/2019
Terminal Export Report for gas day 11th Feb. 2019	Grain LNG 24Hour Export Report	12/02/2019
Terminal Export Report for gas day 12th Feb. 2019	Grain LNG 24Hour Export Report	13/02/2019
Terminal Export Report for gas day 13th Feb. 2019	Grain LNG 24Hour Export Report	14/02/2019
Terminal Export Report for gas day 14th Feb. 2019	Grain LNG 24Hour Export Report	15/02/2019

1 EXECUTIVE SUMMARY

In June 2018 the MP Main (38 Barg) export metering system at the Grain LNG terminal which meters the energy flow from the Grain Terminal to Scotia Gas Networks 38 BarG Local Distribution Zone developed a fault which resulted in the MP Main meter suspect alarm toggling on and off for some two and a half weeks between the 19th June 2018 and the 6th July 2018.

In order to clear the meter suspect alarm, at around 11:00 AM on the 6th July the site maintenance team replaced the faulty MP Main meter temperature transmitter tagged TT-210A. However the replacement temperature transmitter had its 4 to 20mA output ranged from (minus) -20 to +50 deg.C, which differed to that of the faulty temperature transmitter and also MP Main Omni flow computer temperature input which had an input span of -10 to +40 deg. C.

The mis-match between the replacement temperature transmitter output and the Omni flow computer temperature input introduced a mis-measurement into the MP Main (38 BarG) export metering system (denoted FIQ210SC) which persisted for over 7 months until the mis-measurement was discovered and rectified on the 12th February 2019 during the 2019 MP Main meter validation.

The impact of the temperature transmitter fault and the subsequent meter temperature mis-measurement that occurred between the 19th June 2018 and the 12th February 2019 has been determined to equate to an energy under delivery from the Grain LNG Terminal to the SGN LDZ of 85,630,482 KWh.

Site Name	Grain LNG (38 BarG) MP Main
Local Distribution Zone (LDZ)	SE (South East - Scotia Gas Networks)
START DATE (actual)	19th June 2018 The MP Main meter suspect alarm is raised.
LAST GOOD DATE	18th June 2018
END DATE	12th Feb 2019 When the temporary transmitter was re-ranged to achieve an ME/2 Pt 3 CP12 PASS.
SIZE OF ERROR (Reconciliation is not normally required if the overall error is under 0.1%)	The size of the error is calculated to be a1.1756% over report, an under delivery of 85.630 GWh against a reported MP Main delivery of 7283.859 over the meter suspect alarm and temperature transmitter mis-measurement period.
ESTIMATE (Y/N)	N
ROOT CAUSE	The installation of a temporary replacement temperature transmitter to resolve the re-occurring MP Main meter suspect alarm.
ANALYSIS	Reconciliation data (with 1 minute resolution) for the MP Main meter system, covering a gas day period from the 1st June 2018 through to the 14th February 2019 was analysed and used to reconstruct the MP Main daily export energy flows to determine the error.
METER TYPE	Turbine
AUTHOR	Kevin Bradley

CHECKED BY		
ACCEPTED BY SCOTIA GAS NETWORKS		
RECONCILATION	Distribution	Transportation

The calculation for the overall error is taken as the aggregated daily difference in delivered energy caused initially by temperature transmitter serial number 802517/2000 developing a fault, then by the introduction of the temporary replacement temperature transmitter serial number 801699/2000 divided by the reported energy quantity over the transmitter fault and subsequent mis-measurement period.
The overall calculated error is 1.1756% which equates to an energy under delivery of 85.630 GWh) for the period 19th June 2018 to 12th February 2019) against the original reported energy quantity values, refer to Appendix A for full details.

2 INTRODUCTION

The Grain LNG Terminal is located on the Isle of Grain peninsular in Kent. The terminal has facilities to unload Liquified Natural Gas (LNG) from LNG carriers berthed at either of its two jetties on the river Medway. The unloaded LNG is stored in large cryogenic tanks until it is required to be re-gasified and exported to either the National Gas Transmission System (NGTS) that is owned and operated by National Grid Gas Transmission (NGGT) or the Local Distribution Zone (LDZ) that is owned and operated by Scotia Gas Networks (SGN). The stored LNG can also be loaded on to LNG trucks for export by road tanker or be reloaded be back onto LNG carriers for re-export by ship.

The terminal has four principle gas export pipelines, two of which connect Grain Terminal to the NGTS and the other two connect Grain Terminal to the SGN LDZ.

Gas flows from the Grain terminal to the SGN LDZ are metered by two independent metering systems one tagged FIQ210SC which meters the gas flow to the MP Main (38barG) and the other tagged FIQ215 meters the gas flow to the LP Main (2barG).

The gas flows from the Grain LNG Terminal to the SGN LDZ are captured by the Gas (Calculation of Thermal Energy) Regulations G(CoTE)R and as such are regulated by the Office for Gas and Electricity Markets (OFGEM).

The MP and LP metering assets that collectively form the MP and LP export metering systems are collectively owned operated by Grain LNG and SGN, where Grain LNG own the primary turbine meter, secondary instrumentation and Omni flow computer and SGN own the OFGEM directed gas chromatograph and the associated G(CoTE)R determination and compliance system denoted the FWACV system.

Being captured by G(CoTE)R the MP and LP metering system are required to be validated in accordance with Joint Office of Gas Transporters procedure reference T/PR/ME/2 Part 3.

The output signals from the meter secondary instrumentation (the meter pressure and meter temperature measurements) on both the LDZ metering systems are transferred to the respective Omni flow computer via 4-20mA analogue signals.

When the importation terminal was commissioned in 2005 the MP Main metering system comprised of both high and low range meters and a single Omni flow computer which summated the flows from the high and low range meters, however as the low range meter was not used (was only subjected to validation flow) the meter was subsequently isolated and removed, this is why the reconciliation data for the MP Main meter is assigned an A suffix to denote it relates to the high range meter.

The terminal utilises a gas export reporting system denoted “GIN” (Gas Inventory Nomination) to report daily terminal energy export and this system reports the combined end of gas day figures from both the MP Main and the LP Main as a single value, consequently the ‘Reported LDZ Allocation’ values presented in Table 1 within Appendix A of this report relates to the combined end of gas day energy quantity delivered by both the terminals MP and LP export gas systems.

3 BACKGROUND

During the 2019 annual validation of the MP export metering system (system tag FIQ210SC) which commenced on the 12th February 2019, a mis-match between the range of MP Main meter temperature transmitter tag No. TT-210A, serial No. 801699/2000 and the MP Main Omni flow computer (FIQ210SC) 4 to 20 mA, meter temperature input was found.

The 'As Found' temperature transmitter serial No. 801699/2000 was subsequently re-calibrated on the 12th Feb. 2018 to achieve an ME/2 Pt3 CP12 PASS, refer to Penspen MP Validation report 12439-10105 'As Left' record sheet.

The 2018 MP Main meter validation report identified that in February 2018 the 'As Left' serial number of temperature transmitter tagged TT-210A was 802517/2000, yet by February 2019 the serial number of temperature transmitter tagged TT-201A has changed to 801699/2000.

In June 2018 temperature transmitter tagged TT-210A, serial number 802517/2000 developed a fault which caused the MP Main meter suspect alarm to toggle on and off for some two and a half weeks.

To clear the meter suspect alarm the terminal maintenance team replaced faulty temperature transmitter TT-210A, serial number 802517/2000 with a temporary temperature transmitter, serial number 801699/2000 then ordered a new replacement temperature transmitter.

The temporary temperature transmitter, serial number 801699/2000 was configured for a range of -20 to +50 deg. C which differed to the original unit which was ranged -10 to +40 deg. C and resulted in the Omni flow computer temperature input range not aligning with the output from the temporary temperature transmitter. This mis-match between the temperature transmitter output and Omni input range introduced a mis-measurement error into the MP Main export flow measurement system that persisted for over 7 months until revealed and subsequently corrected on the 12th February 2019 during the 2019 MP Main meter validation.

Following completion of the 2019 MP Main measurement system validation on the 13th February 2019, on the 14th February 2019 temperature transmitter TT-210A serial number 801699/2000 was replaced with a new temperature transmitter serial number 5120354 having an output range of -10 to +40 deg. C.

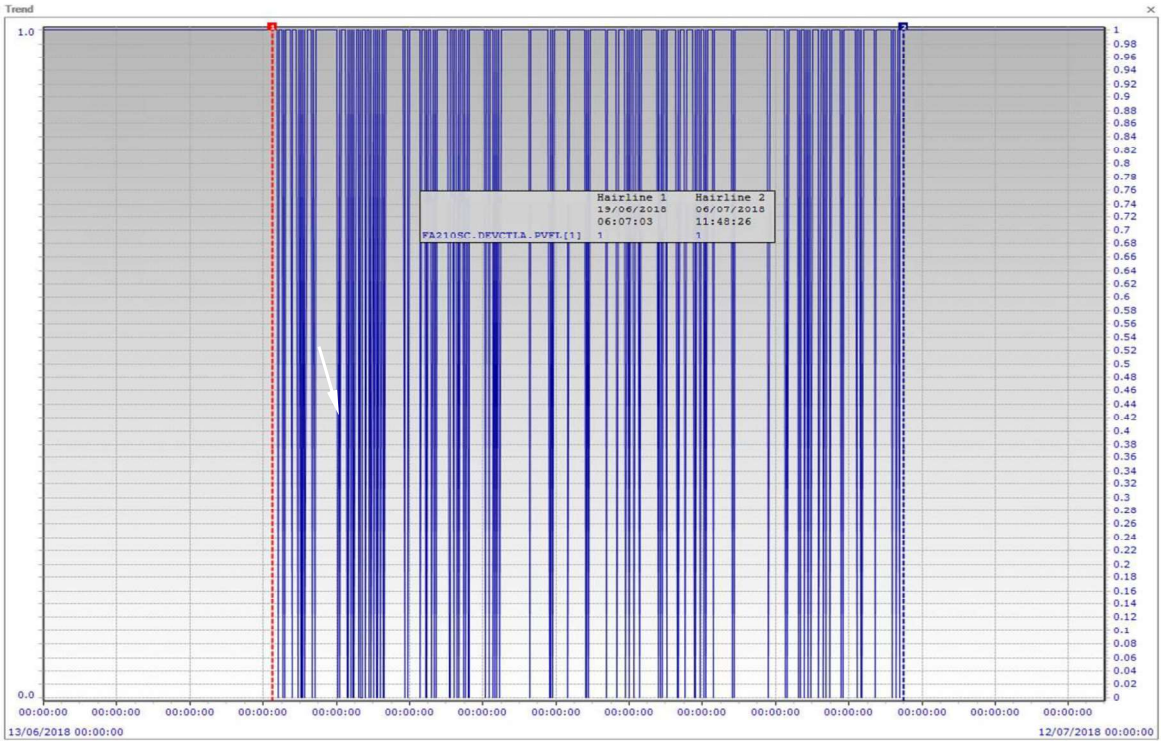
Later that gas day, (following completion of the 2019 MP meter validation and following the replacement of the temporary transmitter serial number 801699/2000) gas flow to the MP Main was re-established at 22:10 hrs on the 14th February 2019.

Penspen then returned to Grain a month later on the 14th March 2019 to validate temperature transmitter serial No. 5120354 (that had been installed by the terminal maintenance team following completion of the 2019 MP Main validation on the 13th February 2019).

Temperature transmitter serial number 5120354 achieved an ME/2 Pt3 CP12 'As Found / As Left' PASS, refer to Penspen MP Validation report 12439-10105 so had no impact upon the validity and performance of the MP Main measurement system.

3.1 Determination of the Last Good MP Main Meter Reading

Inspection of the MP Main meter suspect alarm history (tag No. FA210SC.DEVCTLA.PVFL[1]) identifies that the alarm started toggling on and off after 06:07 hrs on gas day 19th June and the last time it cleared was just before 11:48 hrs on gas day 6th July.



Inspection of the 1 minute reconciliation data file identifies the time stamp when the MP Main meter temperature transmitter first went over range to be at 00:31 hrs on the 20th June 2018, during gas day 19th June 2018.

Consequently, the last good meter reading is deemed as the end of gas day meter reading for gas day dated 18th June 2018 that was recorded at 05:00hrs on 19th June 2018.

3.2 When Did Transmitter S/No. 801699/2000 Enter Service

The actual time and date when the original temperature transmitter (S/No. 802517/2000 was replaced by transmitter S/No. 801699/2000 is not available, this has resulted in the need to determine when temperature transmitter TT-210A was replaced.

Inspection of the 1 minute reconciliation data files for June and July 2018 identifies the that there were three isolated instances when the MP Main meter temperature transmitter went under range.

The first was on the 23rd June 2018 at 17:29 hrs (recorded temperature -10.316 deg.C) however the temperature data either side of this single below range event was dynamic and within the expected range.

The second was on the 24th June 2018 at 16:22 hrs (recorded temperature -10.3129 deg.C) however the temperature data for the preceding hour and a half prior to the below range event was predominantly overrange with the largest single block of over range reading persisting for 12 minutes.

The third under range event occurred at 11:19 hrs on the 6th July 2018 only this time the temperature data for the preceding 33 minutes was static, suggesting that the Onmi flow computer had held the 'last good value' while the transmitter loop could have been open circuit.

Detailed inspection of the 1 minute resolution reconciliation data file for the 6th July 2018 between 10:20 hrs and 11:50 hrs, identifies the following:

- At 10:30 the flow is ramped down from 85,500 Sm3/hr to zero some 3 minutes later. The meter temperature is circa 31.5 deg. C
- At 10:46 the export flow is zero and the meter temperature is 34 .4889 deg. C.
- At 11:18 the meter temperature is still 34 .4889 deg. C having flat lined for 33 minutes.
- At 11:19 the meter the meter temperature decays to -10.8538 deg. C.
- At 11:20 the meter the meter temperature returns to 34.3237 deg. C.
- At 11:21 the meter the meter temperature step changes to 28.5530 deg. C.
- At 12.21 the meter temperature increases to 28.8112 deg. C.
- At 12:28 flow to the MP Main is re-established.

The Omni flow computer is configured to hold the last good value should one or both the inputs from the meter temperature or pressure transmitters be lost.

The combination of 33 minutes of static data plus an under range reading is synonymous with the temperature transmitter circuit being disconnected (open circuit) to enable the transmitter to be changed.

Inspection of the dynamic flow temperature data during the 15 minutes immediately prior to the 33 minutes of static data identifies the MP Main flow temperature was circa 31 deg. C. Two minutes after the under range event, the Omni read the MP Main meter flow temperature as circa 28.5 deg. C a difference of some 2.5 deg. C.

The point at which the temperature transmitter serial number 801699/2000 ranged -20 to +50 deg. C entered service is therefore concluded to be 11:21 hrs on gas day 6th July 2018.

3.3 When Was The Temperature Mis-measurement Rectified

The Summary of Actions and Observations within Penspen report 12439-10105 relating to the 2019 MP Main meter validation identifies that when Penspen arrived on site on the 12th February 2019, on collecting their Permit to Work they were advised that the MP main was in service and was not due to be isolated until 10:00 hrs, so Penspen visited the SGN site (within the Grain terminal) to organise the Gas Chromatograph data transfer check validation element. By the time Penspen had set up for the GC data transfer check, flow to the MP Main had been stopped and Penspen were given clearance to commence the MP Main validation.

Inspection of the meter reconciliation data identifies that flow to the MP Main was curtailed at 09:32 hrs on the 12th Feb. 2019. The serial data links which transfers data from the MP Main Omni flow computer to the terminal control system were isolated around 11:30 hrs on 12th Feb. 2019.

After the serial links had been isolated Penspen then commenced with the validation undertaking the AGA8 check followed by the pressure transmitter check then the temperature transmitter check which resulted in an 'As Found' Fail. Penspen noted that the transmitter serial number had changed so reset the transmitter range from -20 to +50 deg. C to -10 to +40 deg. C, the transmitter then obtained an ME/2 validation 'Pass'.

It is concluded that the temperature transmitter error was rectified during the afternoon on 12th February 2019.
Penspen completed the MP Main validation before midday on the 13th February 2019 and reinstated the serial links between the Omni flow computer and the terminal control system, at 11:38 hrs when the energy counter value (tag No. FIQ_210SC_A_EFC) step changed from 398056512 to 398311520.

3.4 Second Replacement Temperature Transmitter S/No. 5120354

The Electrical Inspection Hazardous Area Checksheet for instrument tagged TT-210A identifies that the temporary temperature transmitter S/No. 801699/2000 was replaced by a new temperature transmitter serial number 5120354 on the 14th February 2019.

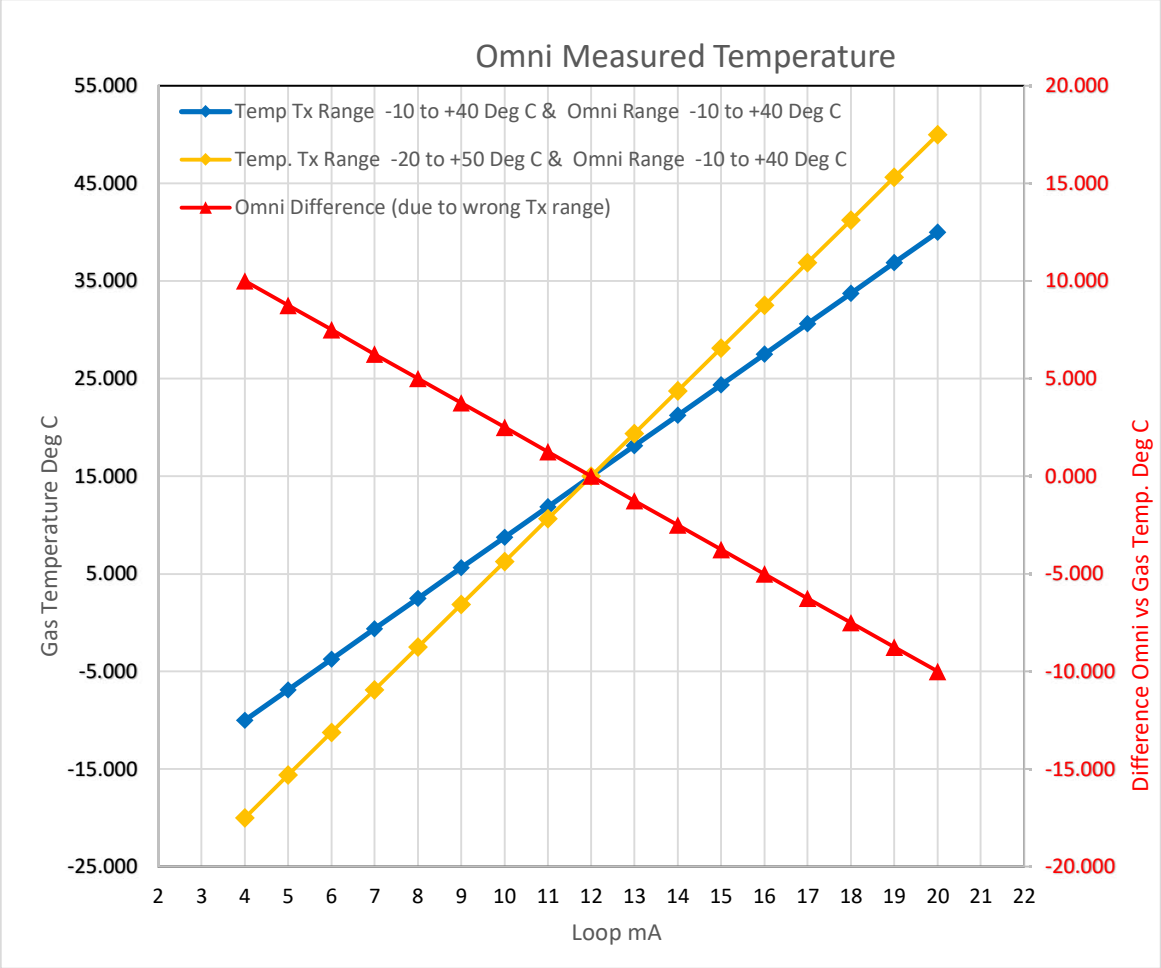
Inspection of the '1 minute' resolution reconciliation data files for Feb. 2019 identifies that the meter temperature flat lined for a period of 37 minutes between 11:49 hrs and 12:26 hrs.

It is therefore concluded that temperature transmitter serial number 5120354 entered service at 12:26 hrs on the 14th February 2019 after Penspen had completed the MP Main validation on the 13th February 2019.

This further transmitter change which was implemented after Penspen had completed the MP Main meter validation on the 13th February had no impact upon the validity of the MP Main measurement system as the output from transmitter serial No. 5120354 was ranged minus 10 to +40 deg. C and was validated by Penspen on the 14th March 2019. Refer to the Penspen MP Validation report 12439-10105.

4 IMPACT UPON THE OMNI MEASURED TEMPERATURE

The mis-match in the calibrated range of temperature transmitter TT-210A, serial No. 5120354 range -20 to +50 deg. C and the MP Omni analogue temperature input -10 to +40 deg. C would give rise to the following temperature mis-measurement profile.



As the two calibration curves intersect at a gas temperature of 15 deg. C and a loop current of 12mA, when the actual gas temperature is below 15 deg. C, the Omni would register a higher temperature than the actual gas temperature, as a result the Omni calculated line density would then be lower than expected, and result in the mass, volume and energy flow rates would being less than expected.

When the actual gas temperature is above 15 deg. C, the Omni would register a lower than actual gas temperature, as a result the Omni calculated line density would then be higher than expected, and result in the mass, volume and energy flow rates being higher than expected.

This is consistent with the observed step change to the recorded meter temperature either side of the recorded static data between 10:45 and 11:25 hrs on the 6th July 2018.

5 ERROR QUANTIFICATION AND IMPACT

Given that a meter temperature mis-measurement will impact upon the Omni calculated (AGA8) line density, calculated volumetric flow and ultimately the calculated energy flow, in order to quantify the impact of the temperature mis-measurement on the reported daily energy values it will be necessary to reconstruct the daily energy flows from the meter reconciliation data.

Grain LNG provided reconciliation data with 1 minute resolution for the MP Main meter (refer to Excel data files denoted Metering Data 2018**.xlsx and Metering Data 2019**.xlsx identified in the report input section). These data files comprise of the following time stamped data sets:

Parameter	Data Tag	Data Units
Meter (High range) output frequency	FIQ_210A_S	HZ
Meter (High range) Temperature	FIQ_210SC_A_TMP	Deg C
Meter (High range) Pressure	FIQ_210SC_A_PRS	BARG
Gas composition methane content	FIQ_210SC_C1	mol%
Gas composition ethane content	FIQ_210SC_C2	mol%
Gas composition propane content	FIQ_210SC_C3	mol%
Gas composition i-butane content	FIQ_210SC_iC4	mol%
Gas composition n-butane content	FIQ_210SC_nC4	mol%
Gas composition i-pentane content	FIQ_210SC_iC5	mol%
Gas composition n-pentane content	FIQ_210SC_nC5	mol%
Gas composition Hexane	FIQ_210SC_C6	mol%
Gas composition carbon dioxide content	FIQ_210SC_CO2	mol%
Gas composition nitrogen content	FIQ_210SC_N2	mol%
Export gas calorific value	FIQ_210SC_CV	mol%
Meter (High range) applied K factor	FIQ_210A_MF	Pul/m3
Export gas standard density	FIQ_210SC_A_BDN	Kg/m3
Export gas line density	FIQ_210SC_A_DEN	Kg/m3
Export gas volumetric flow rate	FIQ_210SC_F	Sm3/hr
Export gas energy flow rate	FIQ_210SC_EF	MMJ/hr
Export energy counter	FIQ_210SC_EFC	MMJ

5.1 Verification and Analysis of Reconciliation Data

Before utilising the reconciliation data to reconstruct the daily energy export flows based on the corrected temperature and recalculated line density (using Gas VLE AGA8 Gas), the data was validated by:

- Filtering out all meter temperature data points that were outside of the expected range (below -10 deg. C and above +40 deg. C). This identified a total of 256 data points (3 data points being below -10 deg. C and 253 data points being over +40 deg. C) from the 20th June up to the 6th July ranging from a single minute up to 12 consecutive minutes. Data remediation was applied using the average of the within range values either side of the out of ranges values.
- Confirmation that the gas composition portion of a data set added up to 100%.

- Validation of the original Omni calculated line density against GasVLE running an AGA8 Gas calculation applied to the original meter temperature, meter pressure and gas composition and comparison of the GasVLE result with the recorded Omni result. This identified the Line density tallied to at least 2 decimal places.
- A check of the reconciliation data energy counter against the energy export as recorded within "GIN".

The MP Main meter reconciliation data contained a short period of missing data, 41 consecutive minutes on gas day 26th June 2018. This was reconciled by applying a correction factor equating to 1.02847 (1+(41/1440)) to the reconciled energy quantity for the portion ((1440 – 41) / 1440) of the gas day where reconciliation data was unavailable.

Also due to the change from British Summer Time to Greenwich Mean Time, gas day dated the 27th October was a 25 hour gas day, however the reconciliation data for gas day the 27th October only contained 1440 1 minute records equating to a 24 hour period. To correct for the missing 1 hour of reconciliation data a correction factor of 25/24 (1.04166) was applied to the 24hours of reconciled energy flow to compensate for the missing 1 hour of reconciliation data.

5.2 Reconstructed Export Flow Rate and New Daily Energy Totals

As the reconciliation data for June and the early part of July identified that the meter temperature had gone out of range, corrections were applied to bring the temperature within range by averaging corresponding within range values either side of the out of range value.

As temperature transmitter S/No. 801699/2000 is deemed to have entered service at 11:21 on 6th July a correction equating to ((the recorded temperature minus -10) / 50 * 70) - 20 to rescale the recorded temperature as the calibrated range of transmitter S/No. 801699/2000 was then applied to produce the time stamped Corrected Temperature.

The corrected temperature, the recorded pressure and the recorded gas composition was then fed into a AGA8 calculation (GasVLE, AGA8, Gas) to determine the corrected line density.

To preserve the meter low flow cut off conditional logic was applied to only calculate the corrected volume flow if the recorded volume flow was above zero.

The corrected volume flow calculation comprised of:

FIQ_210A_S / FIQ_210A_MF * 3600 / FIQ_210SC_A_BDN * GasVLE Corrected line density (to produce Sm3/hr).

The corrected energy flow calculation comprised of:

The corrected volume flow * FIQ_210SC_CV / 1000 (to produce GJ/hr).

The 1440, 1 minute instantaneous flows were then summated to produce the daily energy flow which was then converted to KWh by multiplying by 1000 / 3.6 and rounded to an integer.

The Corrected daily energy flows were then compared to the daily reported (via GIN) delivered energy quantity and the difference in KWh and % established.

Refer to the 3 master analysis Excel spreadsheets denoted:

MP Meter Reconciliation Jun Jul Aug 2018 Master File.

MP Meter Reconciliation Sept Oct Nov Aug 2018 Master File.

MP Meter Reconciliation Dec Jan Feb 2018-19 Master File.

APPENDIX A

Table 1 below identifies:

- The reconstructed exported energy quantity based on the corrected meter temperature between the 19th June 2018 and the 14th February 2019.
- The daily difference in KWh's and % (of export), between the previously reported end of gas day delivered energy and the reconstructed end of gas day delivered energy between the 19th June 2018 and the 14th February 2019.

Table 2 below identifies:

- The overall impact of temperature transmitter TT-210A fault and the subsequent MP Main meter temperature mis-measurement on the previously reported daily energy quantities delivered from Grain terminal to SGN via the MP Main between the 19th June 2018 and the 14th February 2019.

Table 1 - Daily Difference between reported MP export and reconstructed MP export following correction for the temperature fault and temperature mis-measurement.

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
18-Jun-2018	**27,662,222**					Last Good Meter Reading
19-Jun-2018	**28,551,112**	**28,560,000**	28,633,793	**-82,681**	-0.2896	TT-210A fault - Meter Suspect active
20-Jun-2018	**28,275,555**	**28,266,667**	28,277,341	**-1,786**	-0.0063	TT-210A fault - Meter Suspect active
21-Jun-2018	**28,337,778**	**28,346,667**	28,372,132	**-34,354**	-0.1212	TT-210A fault - Meter Suspect active
22-Jun-2018	**28,257,778**	**28,248,889**	28,253,689	**4,089**	0.0145	TT-210A fault - Meter Suspect active
23-Jun-2018	**28,515,555**	**28,524,444**	28,533,122	**-17,567**	-0.0616	TT-210A fault - Meter Suspect active
24-Jun-2018	**27,875,556**	**27,866,667**	27,953,690	**-78,134**	-0.2803	TT-210A fault - Meter Suspect active
25-Jun-2018	**28,115,555**	**28,115,556**	28,135,807	**-20,252**	-0.0720	TT-210A fault - Meter Suspect active
26-Jun-2018	**28,106,667**	**28,106,667**	28,107,649	**-982**	-0.0035	TT-210A fault - Meter Suspect active
27-Jun-2018	**28,524,444**	**28,524,444**	28,538,433	**-13,989**	-0.0490	TT-210A fault - Meter Suspect active
28-Jun-2018	**29,386,667**	**29,386,667**	29,413,733	**-27,066**	-0.0921	TT-210A fault - Meter Suspect active
29-Jun-2018	**28,062,222**	**28,062,222**	28,076,491	**-14,269**	-0.0508	TT-210A fault - Meter Suspect active
30-Jun-2018	**28,373,334**	**28,373,333**	28,374,338	**-1,004**	-0.0035	TT-210A fault - Meter Suspect active
01-Jul-2018	**28,693,333**	**28,693,333**	28,688,566	**4,767**	0.0166	TT-210A fault - Meter Suspect active
02-Jul-2018	**27,226,667**	**27,226,667**	27,223,204	**3,463**	0.0127	TT-210A fault - Meter Suspect active
03-Jul-2018	**28,533,333**	**28,533,333**	28,557,863	**-24,530**	-0.0860	TT-210A fault - Meter Suspect active
04-Jul-2018	**28,497,778**	**28,497,778**	28,497,730	**48**	0.0002	TT-210A fault - Meter Suspect active
05-Jul-2018	**28,204,444**	**28,213,333**	28,211,345	**-6,901**	-0.0245	TT-210A fault - Meter Suspect active
Period Totals	**481,537,778**	481,546,667	**481,848,926**	**-311,148**	**-0.0646**	Overall impact on reported export energy when the Meter Suspect Alarm was active is below the 0.1% threshold which would not warrant reconciliation on it's own.
06-Jul-2018	**27,155,556**	27,146,667	26,825,823	**329,733**	1.2142	TT-210A changed range now -20 to +50 deg. C

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
07-Jul-2018	26,391,111	26,391,111	25,957,006	434,105	1.6449	TT-210A incorrectly ranged
08-Jul-2018	26,515,555	26,524,444	26,069,841	445,714	1.6810	TT-210A incorrectly ranged
09-Jul-2018	26,844,445	26,844,444	26,407,583	436,862	1.6274	TT-210A incorrectly ranged
10-Jul-2018	28,302,222	28,302,222	27,841,115	461,107	1.6292	TT-210A incorrectly ranged
11-Jul-2018	28,631,111	28,622,222	28,142,603	488,508	1.7062	TT-210A incorrectly ranged
12-Jul-2018	32,515,556	32,515,556	31,971,953	543,603	1.6718	TT-210A incorrectly ranged
13-Jul-2018	32,542,222	32,542,222	32,007,222	535,000	1.6440	TT-210A incorrectly ranged
14-Jul-2018	32,488,889	32,488,889	31,921,582	567,307	1.7462	TT-210A incorrectly ranged
15-Jul-2018	31,608,889	31,608,889	31,065,778	543,111	1.7182	TT-210A incorrectly ranged
16-Jul-2018	31,991,111	31,991,111	31,423,880	567,231	1.7731	TT-210A incorrectly ranged
17-Jul-2018	32,462,222	32,462,222	31,892,748	569,474	1.7543	TT-210A incorrectly ranged
18-Jul-2018	29,768,889	29,777,778	29,425,123	343,766	1.1548	TT-210A incorrectly ranged
19-Jul-2018	29,608,889	29,600,000	29,423,998	184,891	0.6244	TT-210A incorrectly ranged
20-Jul-2018	29,404,444	29,404,444	29,208,059	196,385	0.6679	TT-210A incorrectly ranged
21-Jul-2018	26,106,667	26,106,667	25,737,217	369,450	1.4152	TT-210A incorrectly ranged
22-Jul-2018	26,168,889	26,168,889	25,753,899	414,990	1.5858	TT-210A incorrectly ranged
23-Jul-2018	26,515,555	26,524,444	26,436,964	78,591	0.2964	TT-210A incorrectly ranged
24-Jul-2018	25,608,889	25,600,000	25,209,093	399,796	1.5612	TT-210A incorrectly ranged
25-Jul-2018	26,062,223	26,062,222	25,629,890	432,333	1.6588	TT-210A incorrectly ranged
26-Jul-2018	26,124,444	26,133,333	25,682,166	442,278	1.6930	TT-210A incorrectly ranged
27-Jul-2018	26,195,556	26,195,556	25,769,778	425,778	1.6254	TT-210A incorrectly ranged
28-Jul-2018	26,515,555	26,506,667	26,108,366	407,189	1.5357	TT-210A incorrectly ranged
29-Jul-2018	27,120,000	27,120,000	26,714,469	405,531	1.4953	TT-210A incorrectly ranged
30-Jul-2018	27,235,556	27,235,556	26,778,388	457,168	1.6786	TT-210A incorrectly ranged
31-Jul-2018	26,968,889	26,977,778	26,706,990	261,899	0.9711	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
Period Totals	**736,853,334**	**736,853,333**	**726,111,534**	**10,741,800**	**1.4578**	
01-Aug-2018	**27,697,777**	**27,688,889**	27,230,029	**467,748**	1.6888	TT-210A incorrectly ranged
02-Aug-2018	**27,031,111**	**27,031,111**	26,593,715	**437,396**	1.6181	TT-210A incorrectly ranged
03-Aug-2018	**28,222,223**	**28,222,222**	27,760,692	**461,531**	1.6353	TT-210A incorrectly ranged
04-Aug-2018	**34,986,666**	**34,986,667**	34,375,571	**611,095**	1.7467	TT-210A incorrectly ranged
05-Aug-2018	**28,640,000**	**28,640,000**	28,171,803	**468,197**	1.6348	TT-210A incorrectly ranged
06-Aug-2018	**30,506,667**	**30,506,667**	29,984,174	**522,493**	1.7127	TT-210A incorrectly ranged
07-Aug-2018	**31,040,000**	**31,040,000**	30,504,913	**535,087**	1.7239	TT-210A incorrectly ranged
08-Aug-2018	**29,324,444**	**29,333,333**	28,833,807	**490,637**	1.6731	TT-210A incorrectly ranged
09-Aug-2018	**29,200,000**	**29,191,111**	28,746,930	**453,070**	1.5516	TT-210A incorrectly ranged
10-Aug-2018	**26,880,000**	**26,888,889**	26,489,643	**390,357**	1.4522	TT-210A incorrectly ranged
11-Aug-2018	**26,693,334**	**26,684,444**	26,269,021	**424,313**	1.5896	TT-210A incorrectly ranged
12-Aug-2018	**28,657,778**	**28,657,778**	28,195,479	**462,299**	1.6132	TT-210A incorrectly ranged
13-Aug-2018	**27,653,589**	**27,653,333**	27,203,089	**450,500**	1.6291	TT-210A incorrectly ranged
14-Aug-2018	**26,977,778**	**26,977,778**	26,549,691	**428,087**	1.5868	TT-210A incorrectly ranged
15-Aug-2018	**29,022,222**	**29,022,222**	28,588,605	**433,617**	1.4941	TT-210A incorrectly ranged
16-Aug-2018	**26,764,444**	**26,773,333**	26,387,853	**376,591**	1.4071	TT-210A incorrectly ranged
17-Aug-2018	**27,707,435**	**27,697,778**	27,297,649	**409,786**	1.4790	TT-210A incorrectly ranged
18-Aug-2018	**28,542,222**	**28,542,222**	28,135,183	**407,039**	1.4261	TT-210A incorrectly ranged
19-Aug-2018	**28,480,000**	**28,480,000**	28,066,784	**413,216**	1.4509	TT-210A incorrectly ranged
20-Aug-2018	**27,013,334**	**27,013,333**	26,607,919	**405,415**	1.5008	TT-210A incorrectly ranged
21-Aug-2018	**27,751,111**	**27,751,111**	27,293,786	**457,325**	1.6480	TT-210A incorrectly ranged
22-Aug-2018	**27,493,333**	**27,493,333**	27,140,142	**353,191**	1.2846	TT-210A incorrectly ranged
23-Aug-2018	**27,306,667**	**27,306,667**	26,968,466	**338,201**	1.2385	TT-210A incorrectly ranged
24-Aug-2018	**27,022,222**	**27,022,222**	26,718,965	**303,257**	1.1223	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
25-Aug-2018	**27,617,778**	**27,617,778**	27,312,417	**305,361**	1.1057	TT-210A incorrectly ranged
26-Aug-2018	**26,204,444**	**26,204,444**	25,938,347	**266,097**	1.0155	TT-210A incorrectly ranged
27-Aug-2018	**26,435,556**	**26,435,556**	26,114,270	**321,286**	1.2154	TT-210A incorrectly ranged
28-Aug-2018	**26,426,666**	**26,435,556**	26,124,566	**302,100**	1.1432	TT-210A incorrectly ranged
29-Aug-2018	**26,613,334**	**26,604,444**	26,300,258	**313,076**	1.1764	TT-210A incorrectly ranged
30-Aug-2018	**26,168,889**	**26,168,889**	25,857,737	**311,152**	1.1890	TT-210A incorrectly ranged
31-Aug-2018	**26,835,555**	26,844,444	26,511,738	**323,817**	1.2067	TT-210A incorrectly ranged
Period Totals	**866,916,579**	**866,915,554**	**854,273,242**	**12,643,337**	**1.4584**	
01-Sep-2018	**26,480,000**	**26,471,111**	26,138,161	**341,839**	1.2909	TT-210A incorrectly ranged
02-Sep-2018	**26,844,445**	**26,844,444**	26,499,681	**344,764**	1.2843	TT-210A incorrectly ranged
03-Sep-2018	**28,257,777**	**28,257,778**	27,870,379	**387,398**	1.3709	TT-210A incorrectly ranged
04-Sep-2018	**28,248,889**	**28,248,889**	27,870,146	**378,743**	1.3407	TT-210A incorrectly ranged
05-Sep-2018	**26,311,111**	**26,320,000**	25,982,401	**328,710**	1.2493	TT-210A incorrectly ranged
06-Sep-2018	**28,826,667**	**28,817,778**	28,431,556	**395,111**	1.3706	TT-210A incorrectly ranged
07-Sep-2018	**28,764,444**	**28,764,444**	28,352,987	**411,457**	1.4304	TT-210A incorrectly ranged
08-Sep-2018	**28,453,334**	**28,453,333**	28,041,996	**411,338**	1.4457	TT-210A incorrectly ranged
09-Sep-2018	**27,555,555**	**27,555,556**	27,148,500	**407,055**	1.4772	TT-210A incorrectly ranged
10-Sep-2018	**29,066,667**	**29,066,667**	28,653,214	**413,453**	1.4224	TT-210A incorrectly ranged
11-Sep-2018	**27,520,000**	**27,520,000**	27,111,438	**408,562**	1.4846	TT-210A incorrectly ranged
12-Sep-2018	**28,462,222**	**28,462,222**	28,031,765	**430,457**	1.5124	TT-210A incorrectly ranged
13-Sep-2018	**28,408,889**	**28,408,889**	28,075,532	**333,357**	1.1734	TT-210A incorrectly ranged
14-Sep-2018	**28,337,778**	**28,337,778**	27,965,214	**372,564**	1.3147	TT-210A incorrectly ranged
15-Sep-2018	**29,395,555**	**29,395,556**	29,009,993	**385,562**	1.3116	TT-210A incorrectly ranged
16-Sep-2018	**29,200,000**	**29,200,000**	28,764,745	**435,255**	1.4906	TT-210A incorrectly ranged
17-Sep-2018	**28,622,223**	**28,622,222**	28,199,000	**423,223**	1.4787	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
18-Sep-2018	**28,471,111**	**28,471,111**	28,081,016	**390,095**	1.3701	TT-210A incorrectly ranged
19-Sep-2018	**28,497,778**	**28,497,778**	28,087,450	**410,328**	1.4399	TT-210A incorrectly ranged
20-Sep-2018	**28,417,777**	**28,417,778**	28,026,831	**390,946**	1.3757	TT-210A incorrectly ranged
21-Sep-2018	**28,542,223**	**28,542,222**	28,223,311	**318,912**	1.1173	TT-210A incorrectly ranged
22-Sep-2018	**28,862,222**	**28,871,111**	28,647,458	**214,764**	0.7441	TT-210A incorrectly ranged
23-Sep-2018	**28,480,000**	**28,471,111**	28,269,497	**210,503**	0.7391	TT-210A incorrectly ranged
24-Sep-2018	**28,595,555**	**28,604,444**	28,347,506	**248,049**	0.8674	TT-210A incorrectly ranged
25-Sep-2018	**28,506,667**	**28,497,778**	28,276,953	**229,714**	0.8058	TT-210A incorrectly ranged
26-Sep-2018	**28,702,222**	**28,702,222**	28,423,888	**278,334**	0.9697	TT-210A incorrectly ranged
27-Sep-2018	**33,235,556**	**33,235,556**	32,899,729	**335,827**	1.0104	TT-210A incorrectly ranged
28-Sep-2018	**33,751,111**	**33,751,111**	33,441,171	**309,940**	0.9183	TT-210A incorrectly ranged
29-Sep-2018	**28,666,667**	**28,666,667**	28,374,736	**291,931**	1.0184	TT-210A incorrectly ranged
30-Sep-2018	**31,048,888**	**31,048,889**	30,757,275	**291,613**	0.9392	TT-210A incorrectly ranged
Period Totals	**862,533,333**	**862,524,445**	**852,003,529**	**10,529,804**	**1.2208**	
01-Oct-2018	**28,151,112**	**28,151,111**	27,879,186	**271,926**	0.9660	TT-210A incorrectly ranged
02-Oct-2018	**33,511,111**	**33,511,111**	33,174,456	**336,655**	1.0046	TT-210A incorrectly ranged
03-Oct-2018	**31,742,222**	**31,742,222**	31,406,233	**335,989**	1.0585	TT-210A incorrectly ranged
04-Oct-2018	**34,506,667**	**34,506,667**	34,179,244	**327,423**	0.9489	TT-210A incorrectly ranged
05-Oct-2018	**29,715,555**	**29,715,556**	29,373,485	**342,070**	1.1511	TT-210A incorrectly ranged
06-Oct-2018	**28,924,445**	**28,924,444**	28,617,354	**307,091**	1.0617	TT-210A incorrectly ranged
07-Oct-2018	**28,488,888**	**28,488,889**	28,180,722	**308,166**	1.0817	TT-210A incorrectly ranged
08-Oct-2018	**29,546,667**	**29,546,667**	29,240,056	**306,611**	1.0377	TT-210A incorrectly ranged
09-Oct-2018	**32,275,556**	**32,284,444**	31,932,734	**342,822**	1.0622	TT-210A incorrectly ranged
10-Oct-2018	**32,044,444**	**32,035,556**	31,707,428	**337,016**	1.0517	TT-210A incorrectly ranged
11-Oct-2018	**29,306,667**	**29,306,667**	28,989,959	**316,708**	1.0807	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
12-Oct-2018	**32,302,222**	**32,302,222**	31,960,728	**341,494**	1.0572	TT-210A incorrectly ranged
13-Oct-2018	**28,266,667**	**28,266,667**	27,921,972	**344,695**	1.2194	TT-210A incorrectly ranged
14-Oct-2018	**28,648,889**	**28,648,889**	28,331,506	**317,383**	1.1078	TT-210A incorrectly ranged
15-Oct-2018	**35,715,555**	**35,715,556**	35,304,877	**410,678**	1.1499	TT-210A incorrectly ranged
16-Oct-2018	**34,871,111**	**34,871,111**	34,465,064	**406,047**	1.1644	TT-210A incorrectly ranged
17-Oct-2018	**34,168,889**	**34,177,778**	33,788,577	**380,312**	1.1130	TT-210A incorrectly ranged
18-Oct-2018	**33,013,333**	**33,004,444**	32,773,271	**240,062**	0.7272	TT-210A incorrectly ranged
19-Oct-2018	**31,031,112**	**31,040,000**	30,853,962	**177,150**	0.5709	TT-210A incorrectly ranged
20-Oct-2018	**29,004,444**	**28,995,556**	28,594,946	**409,498**	1.4118	TT-210A incorrectly ranged
21-Oct-2018	**28,506,667**	**28,506,667**	28,096,719	**409,948**	1.4381	TT-210A incorrectly ranged
22-Oct-2018	**28,506,666**	**28,506,667**	28,123,592	**383,074**	1.3438	TT-210A incorrectly ranged
23-Oct-2018	**28,488,889**	**28,497,778**	28,112,194	**376,695**	1.3223	TT-210A incorrectly ranged
24-Oct-2018	**28,533,334**	**28,524,444**	28,131,736	**401,598**	1.4075	TT-210A incorrectly ranged
25-Oct-2018	**31,733,333**	**31,733,333**	31,270,914	**462,419**	1.4572	TT-210A incorrectly ranged
26-Oct-2018	**32,195,555**	**32,195,556**	31,751,356	**444,199**	1.3797	TT-210A incorrectly ranged
27-Oct-2018	**33,164,445**	**33,164,444**	32,719,241	**445,204**	1.3424	TT-210A incorrectly ranged
28-Oct-2018	**34,053,333**	**34,053,333**	33,589,609	**463,724**	1.3618	TT-210A incorrectly ranged
29-Oct-2018	**34,008,889**	**34,008,889**	33,560,991	**447,898**	1.3170	TT-210A incorrectly ranged
30-Oct-2018	**41,964,445**	**41,964,444**	41,363,370	**601,075**	1.4323	TT-210A incorrectly ranged
31-Oct-2018	**28,551,111**	**28,551,111**	28,277,098	**274,013**	0.9597	TT-210A incorrectly ranged
Period Totals	**974,942,223**	**974,942,223**	**963,672,580**	**11,269,643**	**1.1559**	
01-Nov-2018	**28,471,111**	**28,471,111**	28,089,981	**381,130**	1.3387	TT-210A incorrectly ranged
02-Nov-2018	**28,506,666**	**28,506,667**	28,180,687	**325,979**	1.1435	TT-210A incorrectly ranged
03-Nov-2018	**27,466,667**	**27,466,667**	27,125,902	**340,765**	1.2406	TT-210A incorrectly ranged
04-Nov-2018	**28,462,222**	**28,462,222**	28,047,548	**414,674**	1.4569	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
05-Nov-2018	28,488,889	28,488,889	28,059,253	429,636	1.5081	TT-210A incorrectly ranged
06-Nov-2018	35,688,889	35,688,889	35,126,249	562,640	1.5765	TT-210A incorrectly ranged
07-Nov-2018	36,471,111	36,471,111	35,933,359	537,752	1.4745	TT-210A incorrectly ranged
08-Nov-2018	33,048,889	33,057,778	32,625,284	423,605	1.2818	TT-210A incorrectly ranged
09-Nov-2018	36,177,778	36,177,778	35,724,100	453,678	1.2540	TT-210A incorrectly ranged
10-Nov-2018	32,151,111	32,142,222	31,743,738	407,373	1.2671	TT-210A incorrectly ranged
11-Nov-2018	32,168,889	32,168,889	31,766,112	402,777	1.2521	TT-210A incorrectly ranged
12-Nov-2018	29,973,333	29,973,333	29,576,803	396,530	1.3229	TT-210A incorrectly ranged
13-Nov-2018	28,533,334	28,533,333	28,102,497	430,837	1.5099	TT-210A incorrectly ranged
14-Nov-2018	28,497,777	28,497,778	28,136,756	361,021	1.2668	TT-210A incorrectly ranged
15-Nov-2018	28,507,467	28,497,778	28,136,756	370,711	1.3004	TT-210A incorrectly ranged
16-Nov-2018	27,724,444	27,724,444	27,348,235	376,209	1.3570	TT-210A incorrectly ranged
17-Nov-2018	28,631,112	28,640,000	28,242,518	388,594	1.3572	TT-210A incorrectly ranged
18-Nov-2018	34,160,000	34,151,111	33,642,102	517,898	1.5161	TT-210A incorrectly ranged
19-Nov-2018	31,004,444	31,013,333	30,598,574	405,870	1.3091	TT-210A incorrectly ranged
20-Nov-2018	34,026,667	34,026,667	33,566,619	460,048	1.3520	TT-210A incorrectly ranged
21-Nov-2018	31,004,444	30,995,556	30,590,305	414,139	1.3357	TT-210A incorrectly ranged
22-Nov-2018	28,515,556	28,524,444	28,148,867	366,689	1.2859	TT-210A incorrectly ranged
23-Nov-2018	29,333,333	29,333,333	28,937,222	396,111	1.3504	TT-210A incorrectly ranged
24-Nov-2018	30,364,444	30,364,444	29,937,651	426,793	1.4056	TT-210A incorrectly ranged
25-Nov-2018	31,715,556	31,715,556	31,307,999	407,557	1.2850	TT-210A incorrectly ranged
26-Nov-2018	30,977,777	30,968,889	30,578,791	398,986	1.2880	TT-210A incorrectly ranged
27-Nov-2018	31,022,222	31,022,222	30,648,443	373,779	1.2049	TT-210A incorrectly ranged
28-Nov-2018	33,582,222	33,591,111	33,152,753	429,469	1.2789	TT-210A incorrectly ranged
29-Nov-2018	35,982,222	35,982,222	35,494,721	487,501	1.3548	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
30-Nov-2018	34,017,778	34,008,889	33,590,366	427,412	1.2564	TT-210A incorrectly ranged
Period Totals	934,676,354	934,666,666	922,160,191	12,516,163	1.3391	
01-Dec-2018	31,991,111	31,991,111	31,552,837	438,274	1.3700	TT-210A incorrectly ranged
02-Dec-2018	31,991,111	32,000,000	31,544,756	446,355	1.3952	TT-210A incorrectly ranged
03-Dec-2018	32,008,889	32,000,000	31,557,828	451,061	1.4092	TT-210A incorrectly ranged
04-Dec-2018	31,182,223	31,191,111	31,060,145	122,078	0.3915	TT-210A incorrectly ranged
05-Dec-2018	31,973,333	31,964,444	31,572,556	400,777	1.2535	TT-210A incorrectly ranged
06-Dec-2018	35,777,778	35,777,778	35,332,659	445,119	1.2441	TT-210A incorrectly ranged
07-Dec-2018	32,000,000	32,000,000	31,580,239	419,761	1.3118	TT-210A incorrectly ranged
08-Dec-2018	33,031,111	33,031,111	32,564,561	466,550	1.4125	TT-210A incorrectly ranged
09-Dec-2018	31,991,111	31,991,111	31,499,037	492,074	1.5382	TT-210A incorrectly ranged
10-Dec-2018	35,244,444	35,244,444	34,838,143	406,301	1.1528	TT-210A incorrectly ranged
11-Dec-2018	39,493,334	39,493,333	38,979,008	514,326	1.3023	TT-210A incorrectly ranged
12-Dec-2018	32,284,444	32,293,333	31,973,807	310,637	0.9622	TT-210A incorrectly ranged
13-Dec-2018	30,133,333	30,124,444	29,802,749	330,584	1.0971	TT-210A incorrectly ranged
14-Dec-2018	36,693,334	36,702,222	36,253,936	439,398	1.1975	TT-210A incorrectly ranged
15-Dec-2018	35,048,889	35,040,000	34,664,432	384,457	1.0969	TT-210A incorrectly ranged
16-Dec-2018	32,026,666	32,026,667	31,652,507	374,159	1.1683	TT-210A incorrectly ranged
17-Dec-2018	35,040,000	35,048,889	34,609,783	430,217	1.2278	TT-210A incorrectly ranged
18-Dec-2018	34,977,778	34,968,889	34,548,674	429,104	1.2268	TT-210A incorrectly ranged
19-Dec-2018	31,004,445	31,004,444	30,627,982	376,463	1.2142	TT-210A incorrectly ranged
20-Dec-2018	32,995,555	33,004,444	32,614,712	380,843	1.1542	TT-210A incorrectly ranged
21-Dec-2018	31,991,111	31,982,222	31,602,331	388,780	1.2153	TT-210A incorrectly ranged
22-Dec-2018	32,755,556	32,755,556	32,339,408	416,148	1.2705	TT-210A incorrectly ranged
23-Dec-2018	34,000,000	34,000,000	33,756,740	243,260	0.7155	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
24-Dec-2018	31,786,666	31,786,667	31,451,227	335,439	1.0553	TT-210A incorrectly ranged
25-Dec-2018	33,004,445	33,004,444	32,597,363	407,082	1.2334	TT-210A incorrectly ranged
26-Dec-2018	32,995,555	32,995,556	32,591,064	404,491	1.2259	TT-210A incorrectly ranged
27-Dec-2018	33,004,445	33,013,333	32,589,920	414,525	1.2560	TT-210A incorrectly ranged
28-Dec-2018	30,168,889	30,160,000	29,773,935	394,954	1.3091	TT-210A incorrectly ranged
29-Dec-2018	30,044,444	30,044,444	29,675,004	369,440	1.2296	TT-210A incorrectly ranged
30-Dec-2018	33,040,000	33,040,000	32,637,604	402,396	1.2179	TT-210A incorrectly ranged
31-Dec-2018	30,702,222	30,702,222	30,398,043	304,179	0.9907	TT-210A incorrectly ranged
Period Totals	**1,020,382,222**	**1,020,382,219**	**1,008,242,990**	**12,139,232**	**1.1897**	
01-Jan-2019	34,435,556	34,435,556	34,035,867	399,689	1.1607	TT-210A incorrectly ranged
02-Jan-2019	36,177,778	36,177,778	35,769,866	407,912	1.1275	TT-210A incorrectly ranged
03-Jan-2019	34,026,666	34,035,556	33,691,298	335,368	0.9856	TT-210A incorrectly ranged
04-Jan-2019	33,200,000	33,191,111	33,032,932	167,068	0.5032	TT-210A incorrectly ranged
05-Jan-2019	31,555,556	31,555,556	31,273,960	281,596	0.8924	TT-210A incorrectly ranged
06-Jan-2019	31,440,000	31,448,889	31,123,870	316,130	1.0055	TT-210A incorrectly ranged
07-Jan-2019	28,035,556	28,026,667	27,779,688	255,868	0.9127	TT-210A incorrectly ranged
08-Jan-2019	35,377,777	35,377,778	35,130,338	247,439	0.6994	TT-210A incorrectly ranged
09-Jan-2019	32,613,334	32,613,333	32,370,177	243,157	0.7456	TT-210A incorrectly ranged
10-Jan-2019	40,986,666	40,986,667	40,613,768	372,898	0.9098	TT-210A incorrectly ranged
11-Jan-2019	34,008,889	34,008,889	33,731,981	276,908	0.8142	TT-210A incorrectly ranged
12-Jan-2019	28,506,667	28,506,667	28,198,413	308,254	1.0813	TT-210A incorrectly ranged
13-Jan-2019	28,488,889	28,488,889	28,183,703	305,186	1.0712	TT-210A incorrectly ranged
14-Jan-2019	30,071,111	30,080,000	29,746,987	324,124	1.0779	TT-210A incorrectly ranged
15-Jan-2019	29,973,333	29,964,444	29,635,704	337,629	1.1264	TT-210A incorrectly ranged
16-Jan-2019	34,000,000	34,000,000	33,636,490	363,510	1.0691	TT-210A incorrectly ranged

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
17-Jan-2019	**34,026,667**	**34,026,667**	33,639,855	**386,812**	1.1368	TT-210A incorrectly ranged
18-Jan-2019	**34,000,000**	**34,008,889**	33,647,958	**352,042**	1.0354	TT-210A incorrectly ranged
19-Jan-2019	**38,337,778**	**38,328,889**	37,838,311	**499,467**	1.3028	TT-210A incorrectly ranged
20-Jan-2019	**34,008,889**	**34,008,889**	33,667,273	**341,616**	1.0045	TT-210A incorrectly ranged
21-Jan-2019	**34,026,666**	**34,035,556**	33,647,753	**378,913**	1.1136	TT-210A incorrectly ranged
22-Jan-2019	**34,995,556**	**34,986,667**	34,597,605	**397,951**	1.1371	TT-210A incorrectly ranged
23-Jan-2019	**34,000,000**	**34,000,000**	33,657,400	**342,600**	1.0076	TT-210A incorrectly ranged
24-Jan-2019	**32,995,555**	**32,995,556**	32,624,518	**371,037**	1.1245	TT-210A incorrectly ranged
25-Jan-2019	**33,013,334**	**33,013,333**	32,699,321	**314,013**	0.9512	TT-210A incorrectly ranged
26-Jan-2019	**33,991,111**	**33,991,111**	33,645,377	**345,734**	1.0171	TT-210A incorrectly ranged
27-Jan-2019	**34,017,778**	**34,017,778**	33,667,112	**350,666**	1.0308	TT-210A incorrectly ranged
28-Jan-2019	**26,284,444**	**26,284,444**	25,972,051	**312,393**	1.1885	TT-210A incorrectly ranged
29-Jan-2019	**34,071,111**	**34,071,111**	33,668,035	**403,076**	1.1830	TT-210A incorrectly ranged
30-Jan-2019	**34,008,889**	**34,017,778**	33,538,132	**470,757**	1.3842	TT-210A incorrectly ranged
31-Jan-2019	**33,991,111**	**33,982,222**	33,524,309	**466,802**	1.3733	TT-210A incorrectly ranged
Period Totals	**1,028,666,667**	**1,028,666,670**	**1,017,990,052**	**10,676,615**	**1.0379**	
01-Feb-2019	**33,920,000**	**33,920,000**	33,460,318	**459,682**	1.3552	TT-210A incorrectly ranged
02-Feb-2019	**33,991,111**	**33,991,111**	33,504,330	**486,781**	1.4321	TT-210A incorrectly ranged
03-Feb-2019	**33,964,445**	**33,964,444**	33,491,874	**472,571**	1.3914	TT-210A incorrectly ranged
04-Feb-2019	**34,000,000**	**34,008,889**	33,519,560	**480,440**	1.4131	TT-210A incorrectly ranged
05-Feb-2019	**34,000,000**	**33,991,111**	33,496,433	**503,567**	1.4811	TT-incorrectly ranged
06-Feb-2019	**29,079,296**[1]	**28,960,000**	28,548,662	**411,338**	1.4145	TT-210A incorrectly ranged
LP export KWh	119,296	28,960,000	MP export KWh			Both export routes to SGN were used

[1] The Grain LNG 24 Hour Export Report (05:00 to 05:00) for gas day 6th Feb. 2019 recorded a Flow of 119,296 KWh to the LP Main.

Gas Day	Reported LDZ Allocation (MP + LP) KWh	Increment from reconciliation data (FIQ_210SC_A_EFC) KWh	Reconstructed MP Sendout KWh	Difference (Reported minus Reconstructed) KWh	Diff %	Commentary
07-Feb-2019	**34,064,938**[2]	**33,626,667**	33,170,407	**456,260**	1.3394	TT-210A incorrectly ranged
LP export KWh	438,272	33,626,667	MP export KWh			
08-Feb-2019	**34,026,667**	**34,017,778**	33,546,667	**480,000**	1.4107	TT-210A incorrectly ranged
09-Feb-2019	**34,044,444**	**34,044,444**	33,519,372	**525,072**	1.5423	TT-210A incorrectly ranged
10-Feb-2019	**34,008,889**	**34,008,889**	33,495,842	**513,047**	1.5086	TT-210A incorrectly ranged
11-Feb-2019	**37,492,082**[3]	**37,457,778**	36,896,089	**561,689**	1.4982	TT-210A incorrectly ranged
LP export KWh	34,304	37,457,778	MP export KWh			
12-Feb-2019	**7,704,590**[4]	**5,342,222**	5,267,633	**74,589**	0.9681	TT-210A incorrectly ranged
LP export KWh	2,362,368	5,342,222	MP export KWh			TT-210A re-ranged -10 to +40 deg.C
Period Totals	**377,342,222**	**377,333,333**	**371,917,187**	**5,425,036**	**KWh**	
13-Feb-2019	2,228,736[5]	**0**	0	**0**	0.0000	
14-Feb-2019	**10,948,224**[6]	**8,720,000**	8,720,000	**0**	0.0000	TT-210A replace again. New Tx S/N 5120354
LP export KWh	2,228,224	8,720,000	MP export KWh			Validated on 14th March 2019

[2] The Grain LNG 24 Hour Export Report (05:00 to 05:00) for gas day 7th Feb. 2019 recorded a Flow of 438,272 KWh to the LP Main.
[3] The Grain LNG 24 Hour Export Report for gas day 11th Feb. 2019 recorded a Flow of 34,304 KWh to the LP Main.
[4] The Grain LNG 24 Hour Export Report for gas day 12th Feb. 2019 recorded a Flow of 2,362,368 KWh to the LP Main.
[5] The Grain LNG 24 Hour Export Report for gas day 13th Feb. 2019 recorded a Flow of 2,228,736 KWh to the LP Main and zero flow to the MP Main.
[6] The Grain LNG 24 Hour Export Report for gas day 14th Feb. 2019 recorded a Flow of 2,228,224 KWh to the LP Main.

Table 2 – Overall impact of the meter temperature transmitter event.

	KWh		KWh
Reported MP Sendout June & part July	**481,546,667**	Under read during June/part July	**-311,148**
Reported MP Sendout July	**736,853,334**	Over read during July	**10,741,800**
Reported MP Sendout August	**866,916,579**	Over read during August	**12,643,337**
Reported MP Sendou September	**862,533,333**	Over read during September	**10,529,804**
Reported MP Sendout October	**974,942,223**	Over read during October	**11,269,643**
Reported MP Sendout November	**934,676,354**	Over read during November	**12,516,163**
Reported MP Sendout December	**1,020,382,222**	Over read during December	**12,139,232**
Reported MP Sendout January	**1,028,666,667**	Over read during January	**10,676,615**
Reported MP Sendout February	**377,342,222**	Over read during February	**5,425,036**
Reported MP sendout during MP temperature transmitter fault and temperature mis-measurement period	**7,283,859,601**	**Impact on SGN – an under delivery of:**	**85,630,482**
Overall Impact on the reported MP Main export due to the meter temperature transmitter fault and subsequent temperature mis-measurement from 19th June 2018 until 12th Feb. 2019 equates to an under delivery of:			**1.1756%**