Note: 000064

Overview

Number	**000064**
Description	**ISO 6578 - LNG: Intermediate Parameter Rounding & Display**
Version	**2 from 11.07.2017**
Status	**Released to Customer**
Language	**EN**
Responsible	**Markus Seng**
Product	**BCG**
Category	**Advanced Development**

Symptom

With this note, four advanced developments for MQCI LNG quantity conversions are delivered.

1. ISO 6578 LNG density RHO_l calculation from composition is based on the revised Klosek McKinley model:

$RHO_l = SUM(x_i \times M_i)) / (SUM(x_i \times V_i) - V_c)$

$V_c = [k_1 + (k_2 - k_1)\, x_{N2} / 0.042\,5] \times x_{CH4}$

Depending on the business contracts between buyers and sellers, the intermediate parameters k_1, k_2, V_i (i.e. V_i , $x_i \times V_i$, $SUM(x_i \times V_i)$) and V_c shall be rounded before the final LNG density calculation (as defined in the printed ISO 6578 calculation example) or applied without intermediate rounding. The current QuantityWare MQCI implementation applies intermediate rounding of these parameters as suggested by the ISO 6578 example calculation and is extended with this note to also enable no intermediate rounding for an LNG conversion group density calculation.

Note: ASTM D4784 defines the revised Klosek McKinley model as follows:

$RHO_l = SUM(x_i \times M_i)) / (SUM(x_i \times V_i) - [k_1 + (k_2 - k_1)\, x_{N2} / 0.042\,5] \times x_{CH4})$ i.e. without abbreviating the volume reduction term V_c .

2. ISO 6578 LNG density calculation is based on the revise Klosek McKinley model. Depending on the business contracts between buyers and sellers, the intermediate parameters k_1, k_2 and $SUM(x_i \times V_i)$

(ASTM D4784 formula) / or V_c and SUM($x_i \times V_i$) (ISO 6578 formula) shall be printed in various business documents. The current QuantityWare MQCI implementation does not pass these parameters back to business applications via the SAP QCI and is enhanced with this note to do so.

3. ISO 6578 defines vapor space correction calculations for masses and energies for LNG calculations. So far, an MQCI LNG conversion group can be configured to either apply such calculations or perform the calculation without vapor space corrections. Control via UI reading group parameters to turn the vapor space corrections off - independently from the conversion group vapor space calculation activation - is not available and is made available for a conversion group with this note.

4. ISO 6578 defines vapor space correction calculations for masses and energies for LNG calculations. Within the MQCI LNG conversion, it is also possible to convert an LNG liquid source volume at observed liquid LNG temperature to an alternate liquid LNG volume (at alternate LNG liquid temperature defined for the alternate LNG liquid UoM). Although such alternate values may only have a logistics relevance (never financial, since they do not contain the vapor mass), the calculation model allows the calculation of such alternate LNG liquid volumes after application of this note:

- either via the total mass (liquid mass plus vapor mass and inverted formula 3a/3b, as defined in ISO 6578) – the alternate liquid volume then is the liquid volume that would be observed at that alternate liquid temperature in the tank at identical vapor conditions
- or via the two relevant LNG liquid densities, then considering only the LNG liquid mass, neglecting any tank vapor space mass.

With BCS 3.0, two new LNG template conversion groups (QUCA and QUCB) are delivered which demonstrate these new configuration options. These new template conversion groups are not part of this advanced development. If you apply this advanced development note on top of your BCS 10B CSP03 installation, you may proceed as described in the example configuration steps in the solution part of this note for your existing LNG conversion group configurations.

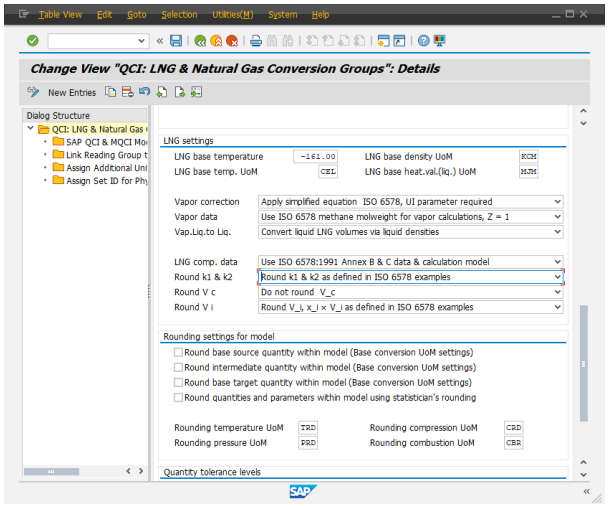
With BCS 3.0 CSP01, a third LNG template conversion group (QUCC) is delivered, which is configured with an additional rounding option for the intermediate parameters described under point 1. In addition, this template conversion group contains ISO 13443 conversion functions to calculate the higher heating value and Wobbe index at 60 °F and 14.696 PSI (metering and combustion reference conditions) from the conversion group reference conditions.

Cause

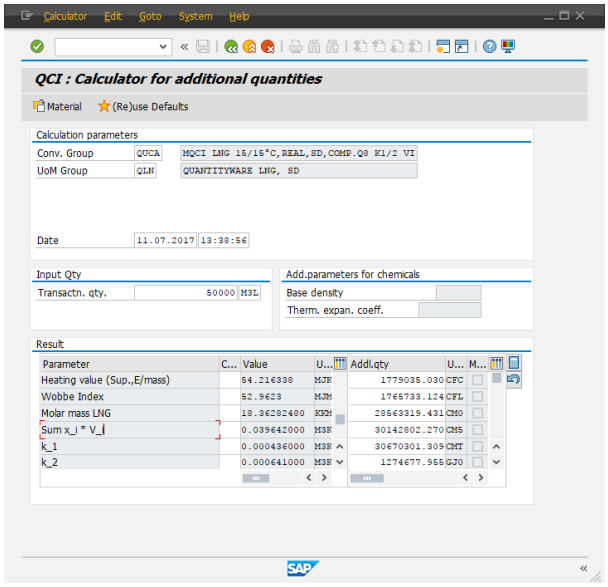
N/A

Solution

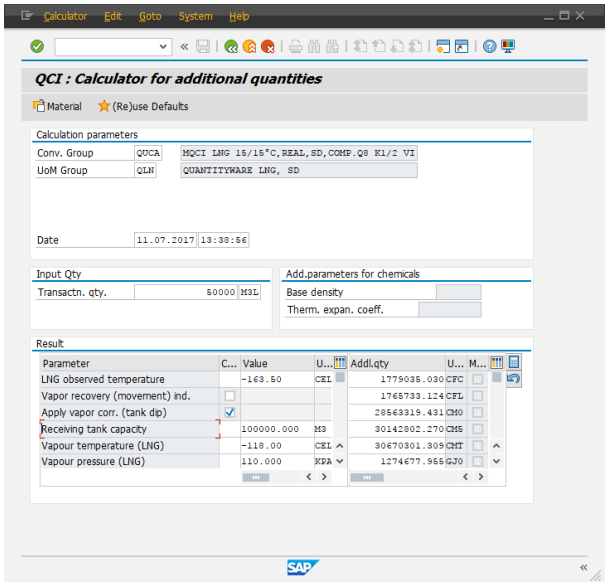
1. New LNG intermediate parameter rounding options:



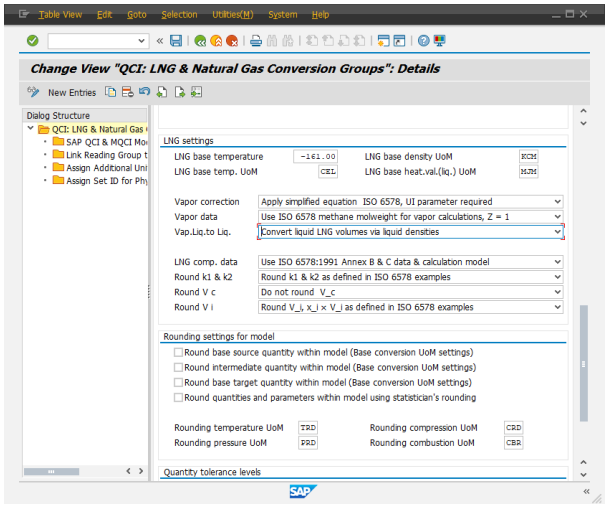
2. Display of intermediate parameters in reading group:



3. Control of tank vapor space via reading group parameters:



4. Control of alternate LNG liquid volume calculation:



Transport Reference

SAP Release	Transport	File Name	Notes
ECC600	QOIK900260	NOTE-00064-600.SAR	

Validity

SAP Release	From SP	To SP	In SP Shipment

ECC600	BCS 10B CSP03	BCS 3.0