



BCG 3.0 Test Manual

Test Cases for BCG Test Installations

Notes

The latest version of this documentation can be found in the QuantityWare [Knowledge Base](#). All documentation is kept current for the combinations of latest BCS release with the latest supported SAP Oil, Gas, & Energy release. For all currently supported combinations see [Note #000086 "Support and Release \(Lifecycle\) details" page 2, "Release Lifecycle"](#).

Your release level can be determined via:

`"/o/QTYW/COCKPIT" -> "Cockpit" -> "Support Package Level"`

Version History

Version	Date	Description
00	2015-06-01	Initial version
01	2017-12-01	Editorial changes
02	2019-06-25	Editorial changes
03	2020-07-14	Usage key terminology
04	2021-04-24	S/4HANA 2020 / 2020_EX validity confirmed - modern QW document style applied. 30A CSP02 / 30B CSP01 changes
05	2023-11-01	30A CSP03 / 30B CSP02 changes
06	2024-04-30	Note 000119 AD Test Scenarios - Screens

Contents

1. Introduction	4
2. Test Cases	7
2.1. Test Case 01 – Run Installation Test - Template	7
2.2. Test Case 02 – Identify & Copy LNG Conversion Group - Template.....	16
2.3. Test Case 03 – Build Transport for LNG Conversion Group - Template	40
2.4. Test Case 04 – Test LNG Conversion Group in Development Client.....	47
2.5. Test Case 05 – Define UoM Rounding - Development	50
2.6. Test Case 06 – Define Ranges for LNG Conversion Group - Development	53
2.7. Test Case 07 – Define Test Scenarios for LNG Conversion Group - Development	59
2.8. Test Case 08 – Assign LNG Conversion Group to Material - Development	81
3. Summary	84

1. Introduction

You have obtained a free-of-charge test usage key(s) for QuantityWare BCG – Bulk Calculations Gas. Your technical team has installed the software package in one of your test systems, following the Technical Installation Guide. In the QuantityWare template client 045, the BCG BC set has been activated. Your task is now to test BCG within the next 4 weeks (possibly with an extension period granted by QuantityWare).

QuantityWare provides three major customizing and configuration documents along with the BCG software package:

- The BCG Project and Implementation Guidelines – BCG PAIG
- The BCG Supported Standards Manual
- The BCG Documentation Reference Manual

If you decide to conclude a usage agreement for BCG, it is strongly recommended that you consider all the above documents - following the PAIG Methodology to implement BCG into your system landscape as well as familiarizing yourself with the BCG Supported Standards Documentation and the BCG Documentation Reference Manual.



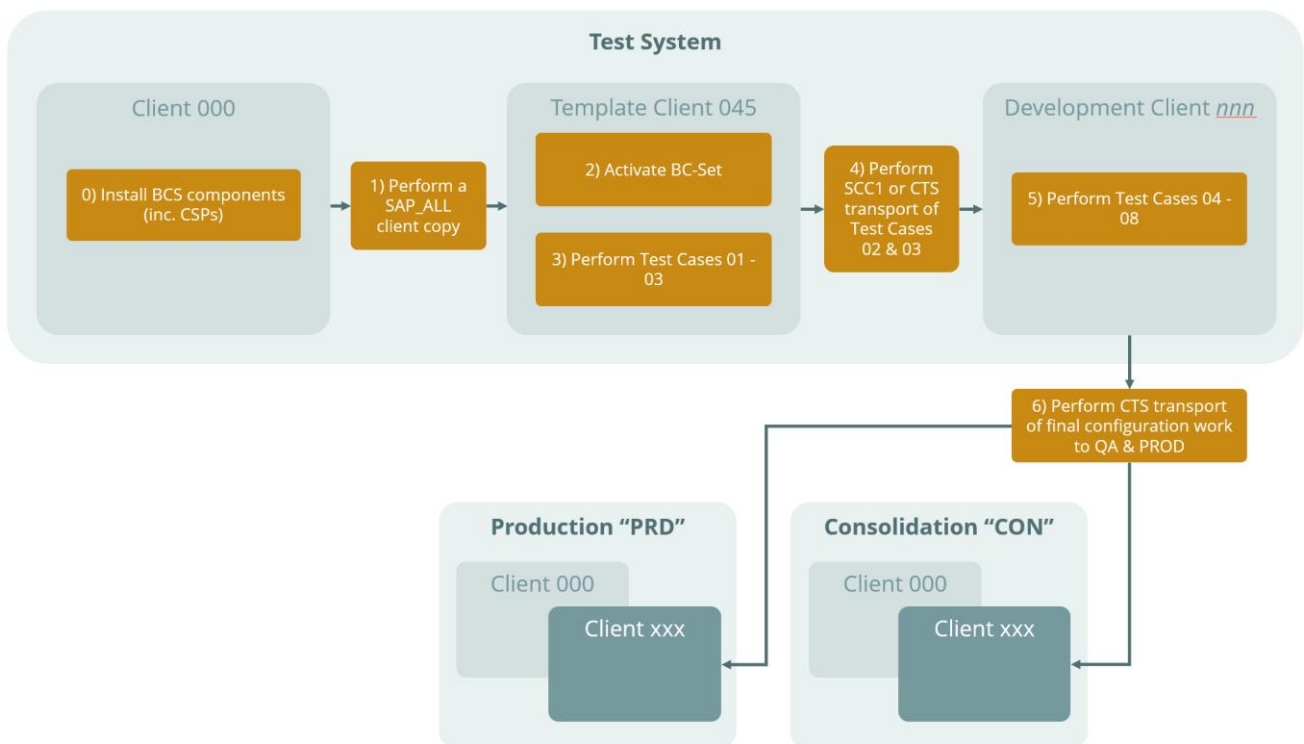
QuantityWare strongly recommends that a certified BCG consultant is employed for the implementation project, or that before implementation, you attend the appropriate BCG certification course.

During the 4-week testing period, you may not have a certified BCG consultant available, and may not have attended a certification course. Typically, testing time budgets are limited and detailed quantity conversions' configuration knowledge is not commonplace; in order to provide detailed guidance for your testing efforts, this document - the BCG Test Manual - provides a sequence **of eight (8) test cases** which you may execute in your system (client 045 and your own development/test client) in order to define a production ready conversion group in your development/test client – including automated test cases - based on the BCG template configuration.

The Gas Measurement Cockpit (GMC) is the central access point to for the configuration and testing of all quantity conversion settings in your system, thus all test cases are executed via the GMC. The only exception to this rule is test case 08, where you require the authority to assign a conversion group and UoM group to a material in the material master.

Each test case contains a sequence of actions to be performed in the BCG Gas Measurement Cockpit, illustrated with screen shots to ensure that you can easily identify all steps and execute the test case.

To execute the test cases in your test system, you require access to the QuantityWare **template client 045** and to your development client (where all your business process' configuration data is available), as illustrated below:



In summary, through execution of the 8 test cases you:

- Learn how to selectively probe the rich BCG template in client 045
- Learn how to copy required conversion group configuration data to your Z* name space
- Transport that data to your development client for additional tests and final configuration.



To execute the test cases, you must be familiar with SAP customizing transactions and have knowledge of working with SAP customizing transports. Additionally, good SAP QCI knowledge is required. To reduce the number of required screen shots for this document, customizing actions such as copying an object typically omit obvious steps.

The total execution time for all 8 test cases – if your user ID is equipped with all required authorizations – is estimated to be **8 hours** if you fulfill the above noted requirements.

If your organization is unfamiliar with the requirements for quantity conversions or has no documentation / experience concerning existing system configuration in this area, QuantityWare strongly recommends using the services of a [QuantityWare certified consultant](#). QuantityWare can provide your organization with a [list of companies and independents](#) offering such consulting. QuantityWare does not offer such consulting services itself and support will not provide remote consulting through the service portal.



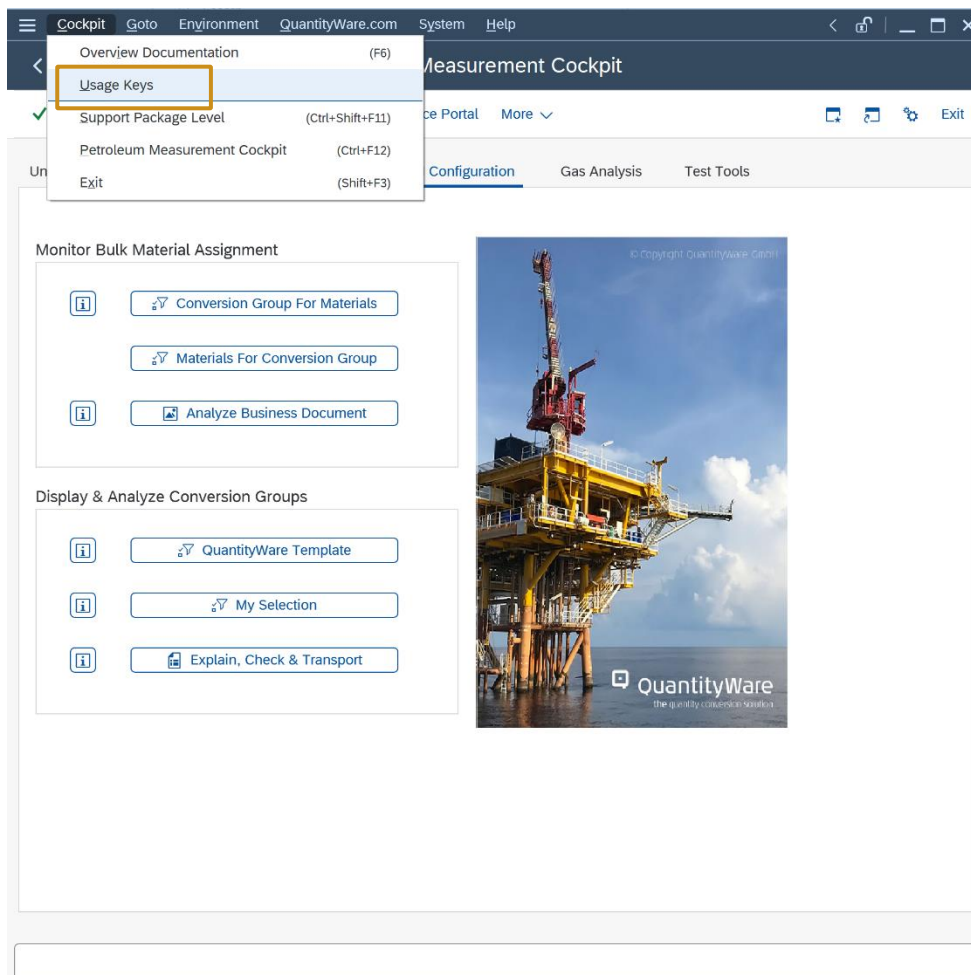
If you are planning to run BCG within your SAP PRA installation, test case 08 is not relevant for you. SAP PRA requires the assignment of a conversion group to a delivery network and is designed for low pressure natural gas quantity conversions – property data entry. Read the QuantityWare working paper "[PRA Measurement System Integration](#)" and QuantityWare [note 000059](#) for additional guidance. From a product point of view, QuantityWare CTG is the solution of choice for SAP PRA installations.

2. Test Cases

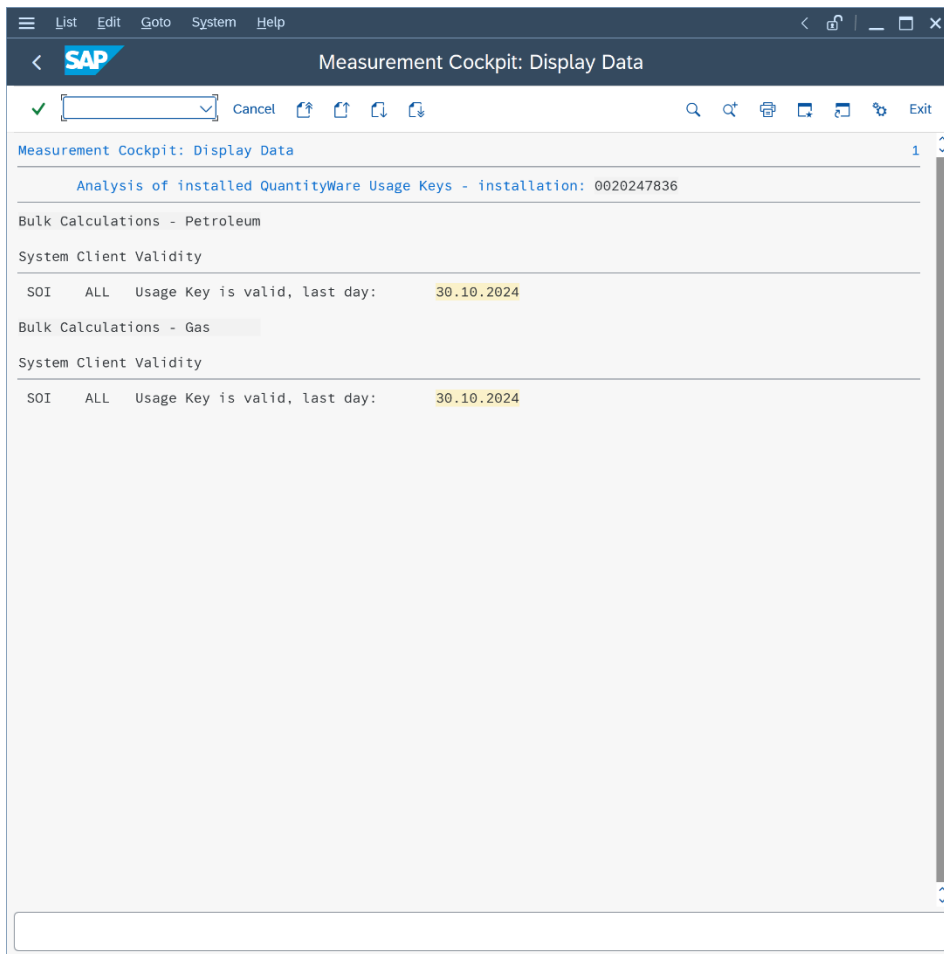
2.1. Test Case 01 – Run Installation Test - Template

Estimated test case execution time: 10 minutes

Part 1 - Log on to your template client 045 and launch the Gas Measurement Cockpit (GMC) – Transaction /n/qtyw/cockpit_gas. You first need to check if your basis team has installed the BCG test usage key. From the Gas Measurement Cockpit (GMC) menu select: Cockpit -> Usage Key. Then, select “Display” and note the list display:

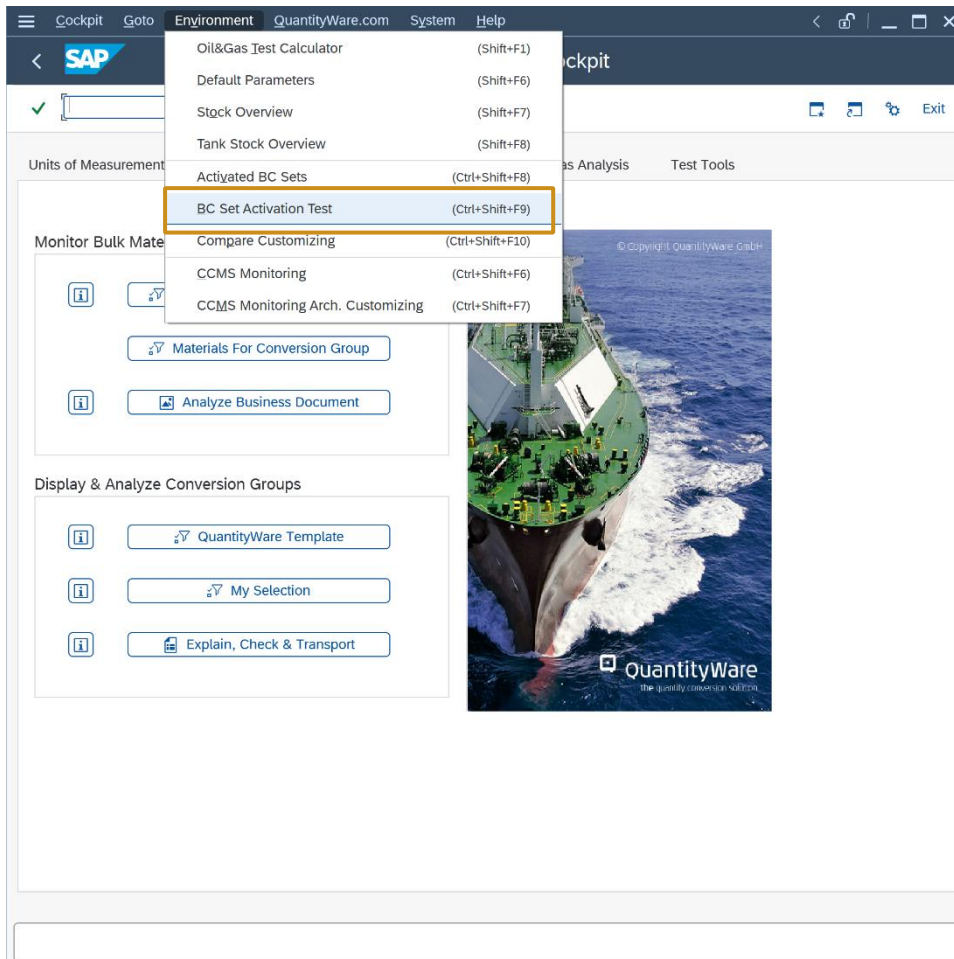


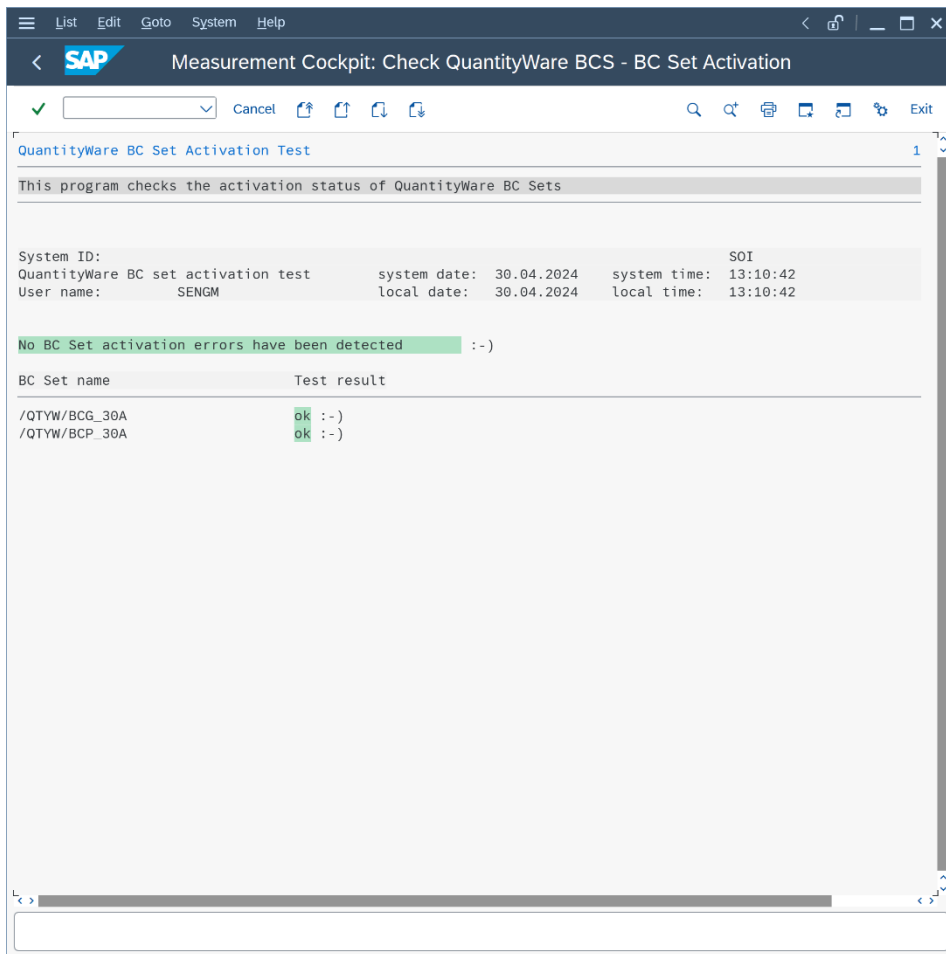
The screenshot shows the SAP Measurement Cockpit interface. At the top, there is a dark blue header with the SAP logo and the text 'SAP'. Below the header, there is a navigation bar with a green checkmark, a dropdown menu, and several icons. The main content area is a light gray background. In the center, there is a dialog box titled 'Measurement Cockpit: Install & Display QuantityWare Usage ...'. The dialog box contains the following text: 'Display installed usage keys: Press - "Display"', 'Install new usage key: Enter the new usage key into the input field below, then: Press - "Install"', and 'New usage key:'. Below the text, there is an input field. At the bottom right of the dialog box, there are three buttons: 'Install', 'Display', and a close button (X). The 'Display' button is highlighted with a yellow box.



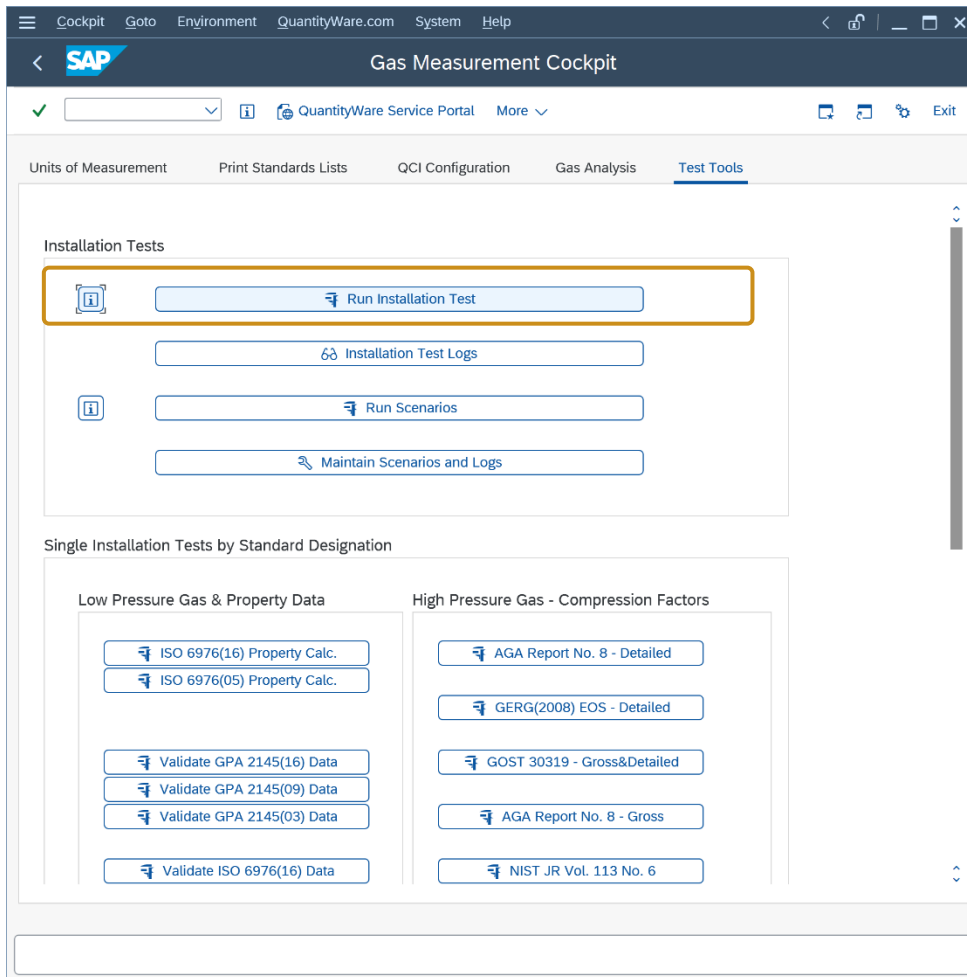
This looks good 😊, a BCG usage key is in place - in our example we also have a BCP usage key installed, which is not required.

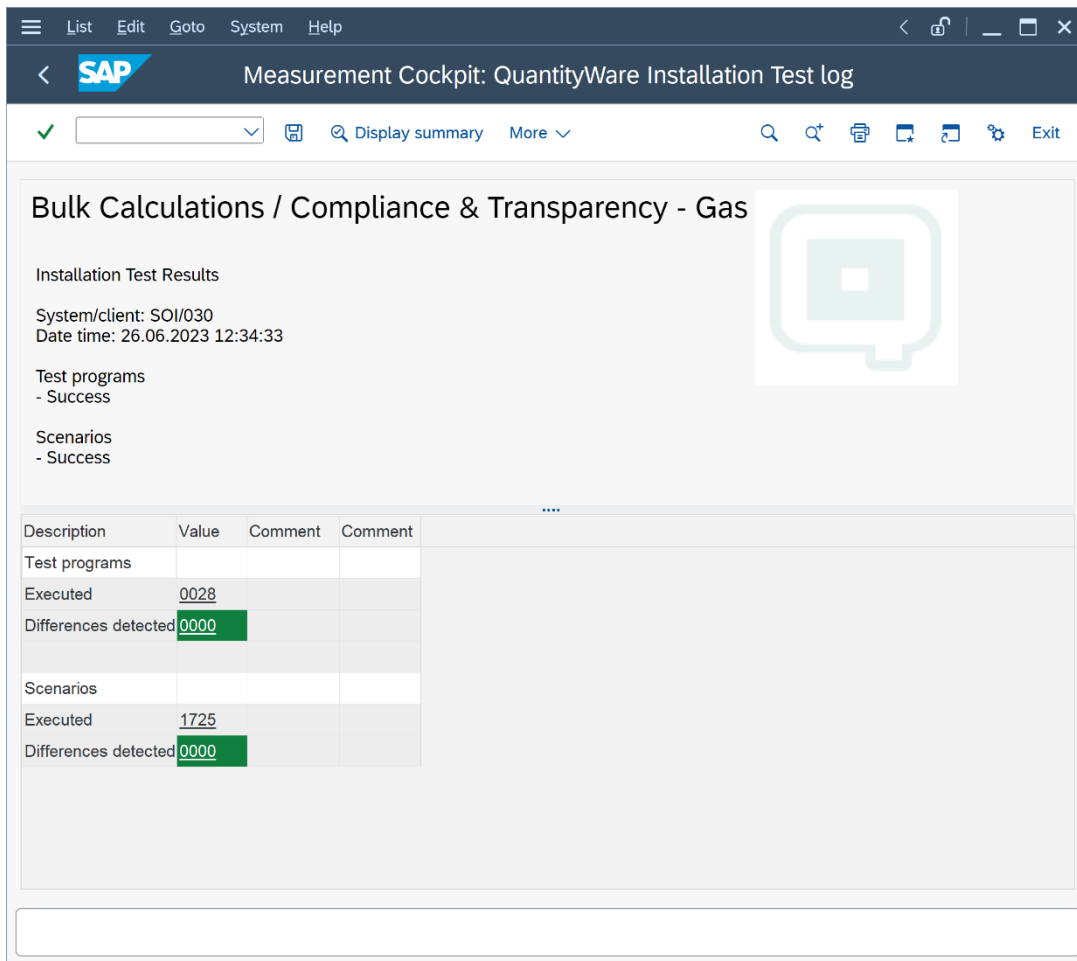
Part 2: From the Gas Measurement Cockpit menu select: Environment -> BC Set Activation Test – is performed by the basis team, but a 4-eyes principle is always good.





Part 3: Now you can run the QuantityWare BCG Installation Test. Select the GMC “Test Tools” tab strip and select the “Run Installation Test” push button.





Bulk Calculations / Compliance & Transparency - Gas

Installation Test Results

System/client: SOI/030
Date time: 26.06.2023 12:34:33

Test programs
- Success

Scenarios
- Success

Description	Value	Comment	Comment
Test programs			
Executed	0028		
Differences detected	0000		
Scenarios			
Executed	1725		
Differences detected	0000		

All test programs and all 1 725 test scenarios must run “green” i.e., without error. By clicking on the result line, you obtain a list detailing all scenarios:

☰ List Edit Goto System Help ◀ 🔒 ▭ ✕


◀ **SAP** Measurement Cockpit: QuantityWare Installation Test log

✓ ℹ Information Cancel 📄 More 🔍 🔍+ 📄 📄 ⚙ Exit

Installation Test Results

Tested scenarios: 1725

Differences: 0000



Scen...	Appl.	Description	Ch...
Q096	BCG	Test scenarios BC...	-)
Q097	BCG	Test scenarios BC...	-)
Q098	BCG	Test scenarios BC...	-)
Q099	BCG	Test scenarios BC...	-)
Q100	BCG	Test scenarios BC...	-)
Q101	BCG	Test scenarios BC...	-)
Q102	BCG	Test scenarios BC...	-)
Q103	BCG	Test scenarios BC...	-)
Q104	BCG	Test scenarios BC...	-)
Q105	BCG	Test scenarios BC...	-)
Q106	BCG	Test scenarios BC...	-)
Q107	BCG	Test scenarios BC...	-)
Q108	BCG	Test scenarios BC...	-)
Q109	BCG	Test scenarios BC...	-)

SAP Measurement Cockpit: Run Scenarios

Information Cancel

Results

Scenario ID: QU0M - BCG 3.0 LNG
 QuantityWare: Bulk Calculations - Gas
 Con.Grp.: QUCB - MQCI LNG 15/15°C,REAL,SD,COMP,Q8 VC VI
 Read.Grp.: QUCB - MQCI LNG, COMPOSITION, DET, ISO6578 VP
 UoM Group: QLN - QUANTITYWARE LNG, SD
 Last changed: JAGERG - 05.04.2024 14:40:31

Test mode: Run red on error

Description	Value	Unit	Measurement unit text	Description of QCI parameter
Propane (C3H8)	2.900000			Propane (C3H8)
n-Butane (n-C4H10)	1.300000			n-Butane (n-C4H10)
2-Methylpropane (i-Butane)	0.400000			2-Methylpropane (i-Butane)
n-Pentane (C5H12)	0.100000			n-Pentane (C5H12)
2-Methylbutane (i-Pentane)	0.000000			2-Methylbutane (i-Pentane)
Hexanes +	0.000000			Hexanes +
Nitrogen (N2)	0.400000			Nitrogen (N2)
Oxygen	0.000000			Oxygen
Impurities: unit of measure		MGQ		Impurities: unit of measure
Hydrogen sulfide	5.000000			Hydrogen sulfide
Tot.sulphur(incl. Mercaptane)	150.000000			Tot.sulphur(incl. Mercaptane)
Transaction quantity:				Transaction quantity
Transaction quantity	67,056.000	M3L	cubic meter - LNG - liquid	Transaction quantity
Expected parameters:				
Expected parameter	462.000000	KGV	kilogram per cubic meter	LNG Base density
Calculated parameter	462.000000	KGV	kilogram per cubic meter	LNG Base density
Expected parameter	469.600000	KGV	kilogram per cubic meter	LNG density at observed temp.
Calculated parameter	469.600000	KGV	kilogram per cubic meter	LNG density at observed temp.
Expected parameter	0.772752	KGV	kilogram per cubic meter	Base density (gas)
Calculated parameter	0.772752	KGV	kilogram per cubic meter	Base density (gas)
Expected parameter	0.630607	RDA	relative density (air) - gas	Base density (gas, relative)

You may select any scenario to inspect its details.



If the BCG installation test (validating the BCP template) does not run “green”, do not proceed with the following 7 test cases. Before continuing with the steps described in this document, the issues causing the “red” test runs must be resolved. In such cases, the experience and multi-customer knowledge of a certified BCG consultant can pay for itself in time and effort saved.

2.2. Test Case 02 – Identify & Copy LNG Conversion Group - Template

Estimated test case execution time: 60 minutes

Introduction:

The QuantityWare BCG template contains more than **270** conversion groups for **dry natural gas, hydrogen & other industrial gases, NGL (Natural Gas Liquids)** and **LNG (Liquefied Natural Gas)** quantity conversions, mapping all meaningful BCG supported measurement standard combinations.



All QuantityWare template conversion groups are defined in the Q* name range.

In the template client, QuantityWare also delivers test UoM groups, allowing you to perform test calculations for each template conversion group in that client without having to perform additional intricate configuration. A complete template of more than 390 UoM definitions (4 languages) is provided as a part of the delivery.

Each **NGL** conversion group is comprised of 4 different measurement standards:

- UoM conversion standards
- Mass-to-weight conversion standards
- CT(P)L standards (“Corrections for the effect of Temperature and Pressure on Liquid”)
- Calculation model standards

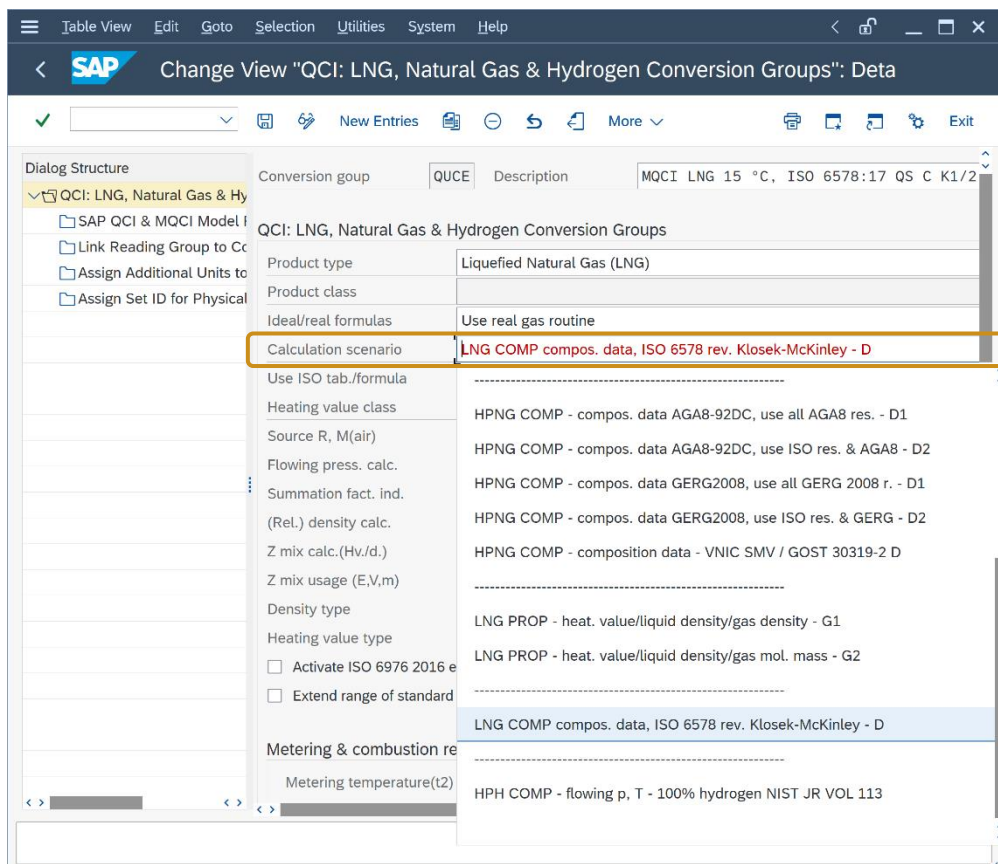
Natural gas conversion groups fall into four main categories:

- Low pressure dry natural gas – LPNG (including natural gas / hydrogen mixtures)
- High pressure dry natural gas – HPNG (including natural gas / hydrogen mixtures & industrial gases)
- Liquefied natural gas – LNG
- High pressure hydrogen – HPH (100 % hydrogen)

For each category, two types of conversion groups are available:

- Conversion groups configured to perform quantity conversions based on **complete chemical composition** and flowing conditions of the dry natural gas (LP/HP)H / NG / LNG - COMP
- Conversion groups configured to perform quantity conversions based on **physical properties** (heating value, density) and **possibly partial** chemical composition and flowing conditions of the dry natural gas (LP/HP)NG / LNG - PROP

The BCG template **MQCI** conversion groups for natural gas (LP/HP) NG and LNG are identified via 17 different calculation scenarios (considering the relevant combinations of natural gas calculation standards):



These 17 calculation scenarios are mapped in the following table to the 7 possible classification combinations (as defined above):

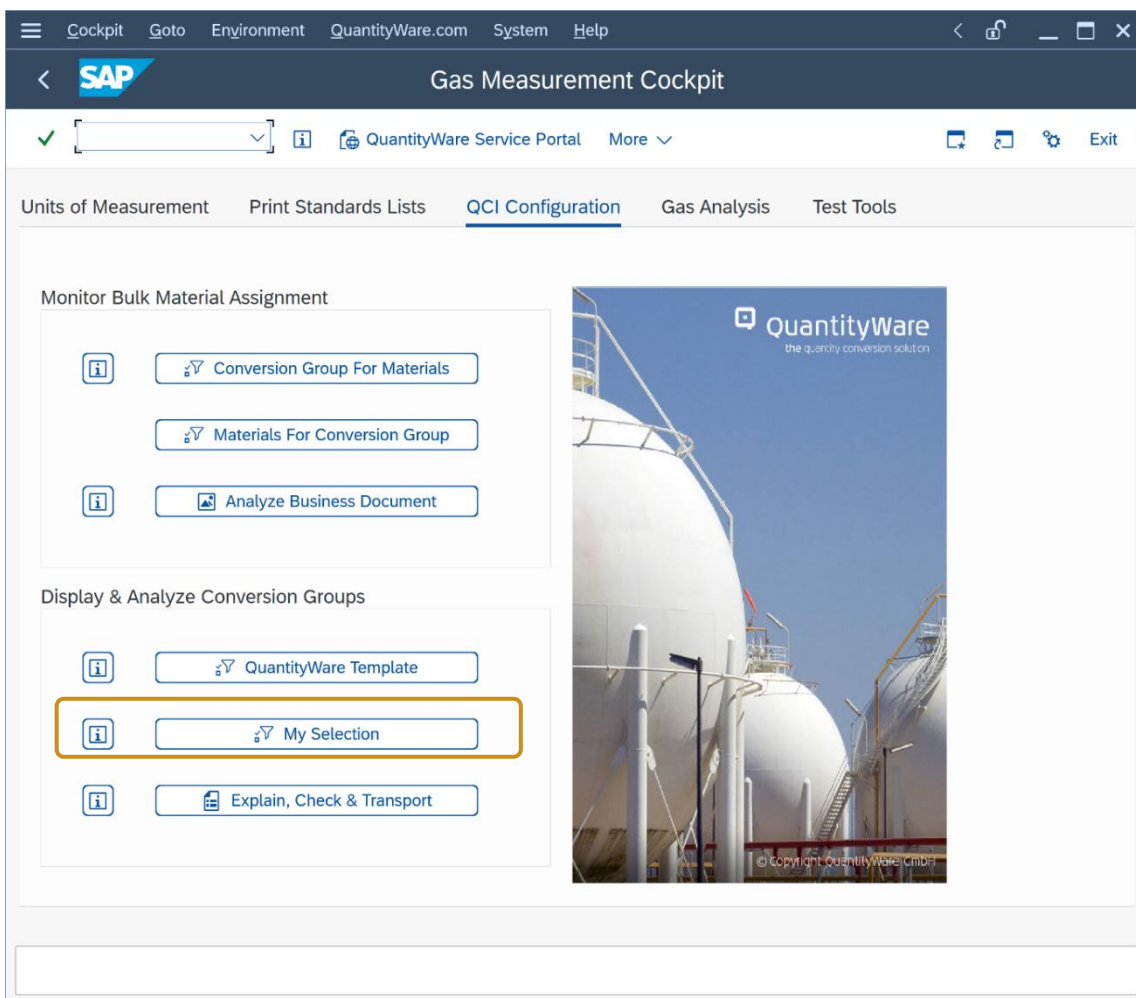
Category	Type	Conversion group calculation scenario
LPNG	COMP	complete composition data
LPNG	PROP	heating value & density
HPNG	COMP	compos. data AGA8-92DC, use all AGA8 res. - D1
HPNG	COMP	compos. data AGA8-92DC, use ISO res. & AGA8 - D2
HPNG	COMP	compos. data GERG2008, use all GERG 2008 r. - D1
HPNG	COMP	compos. data GERG2008, use ISO res. & GERG - D2
HPNG	COMP	composition data - VNIC SMV / GOST 30319-2 D
HPNG	PROP	heating value/density/CO2/H2 - SGERG 88 - G
HPNG	PROP	heating value/density/CO2/H2 - SGERG-mod-H2 - G
HPNG	PROP	heating value/density/CO2/H2 - AGA8 - G1
HPNG	PROP	heating value/density/CO2/CO/H2 - AGA8 - G2
HPNG	PROP	density/N2/CO2 - GERG 91 / GOST 30319-2 G1
HPNG	PROP	density/N2/CO2 - NX19 modified /GOST 30319-2 G2
LNG	COMP	compos. data, ISO 6578 rev. Klosek-McKinley - D
LNG	PROP	heat. value/liquid density/gas density - G1
LNG	PROP	LNG PROP - heat. value/liquid density/gas mol. mass - G2
HPH	COMP	flowing p, T - 100% hydrogen NIST JR VOL 113

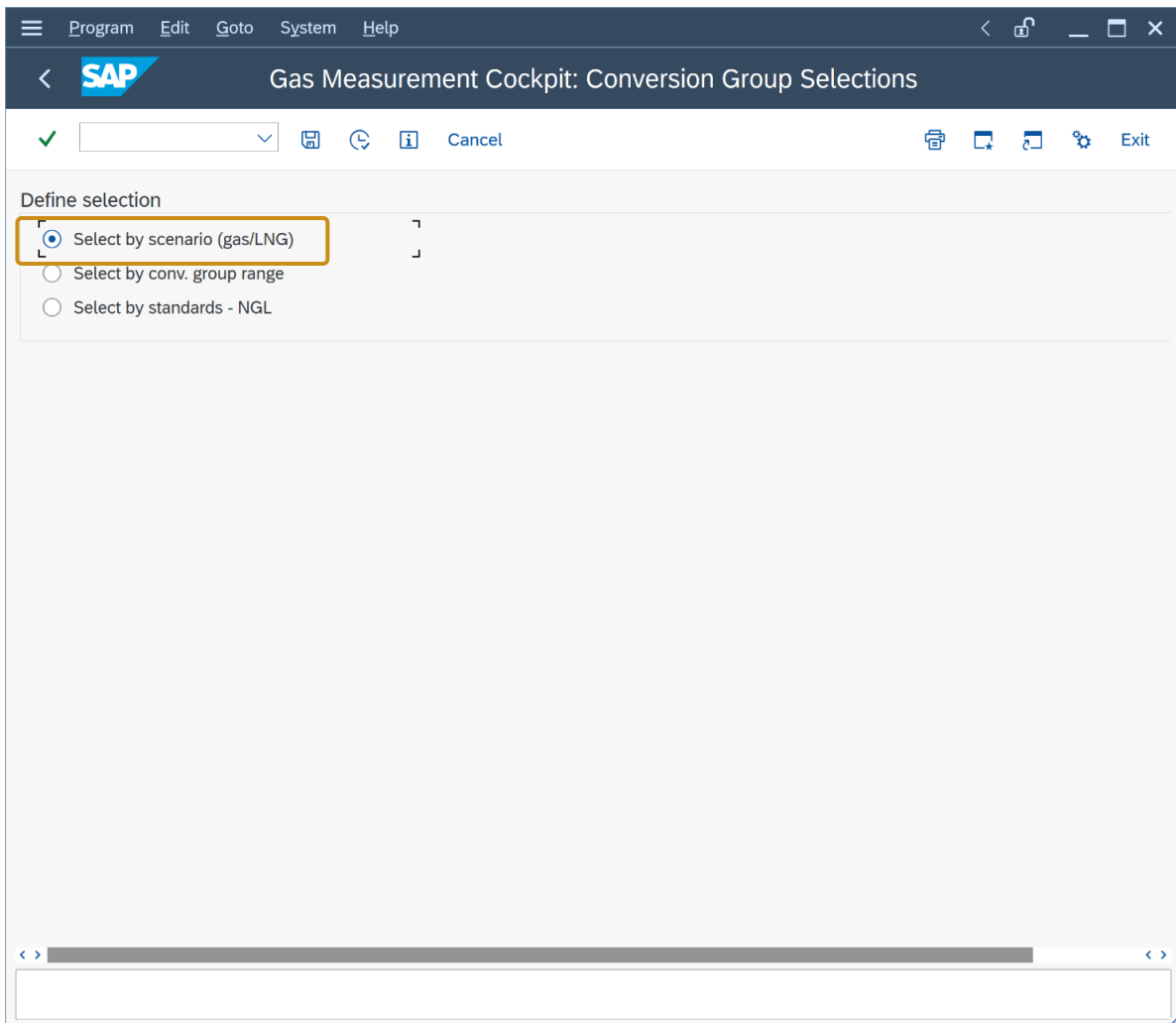


The most challenging task during BCG implementation is the correct choice of a QuantityWare template conversion group for a material (group of materials). Here, [certified BCG consultants](#) bring years of experience to your project.

Once this assignment is made, you simply copy the Q*** template conversion group and associated configuration objects (e.g., reading group) to your Z*** name space in the template client. In this document, we assume that you know exactly which measurement standards are relevant for your materials; if this is not the case, see the BCG PAIG documentation for the required additional time.

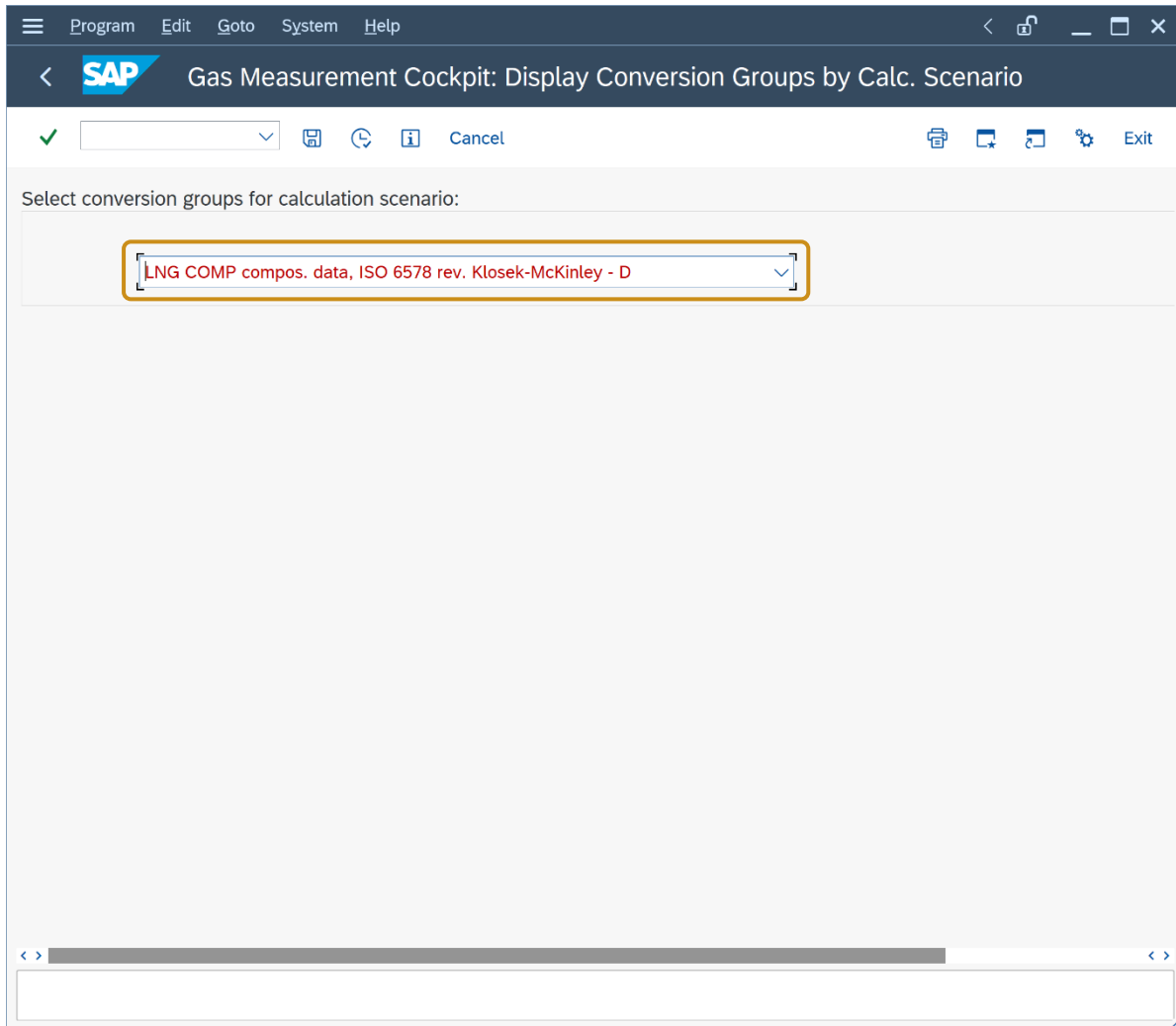
Part 1: Select the GMC “QCI Configuration & Products” tab strip. Three selections are available to display defined subsets of the template conversion groups. Select “My selection”, followed by the selection “Select by scenario (gas/LNG)”:

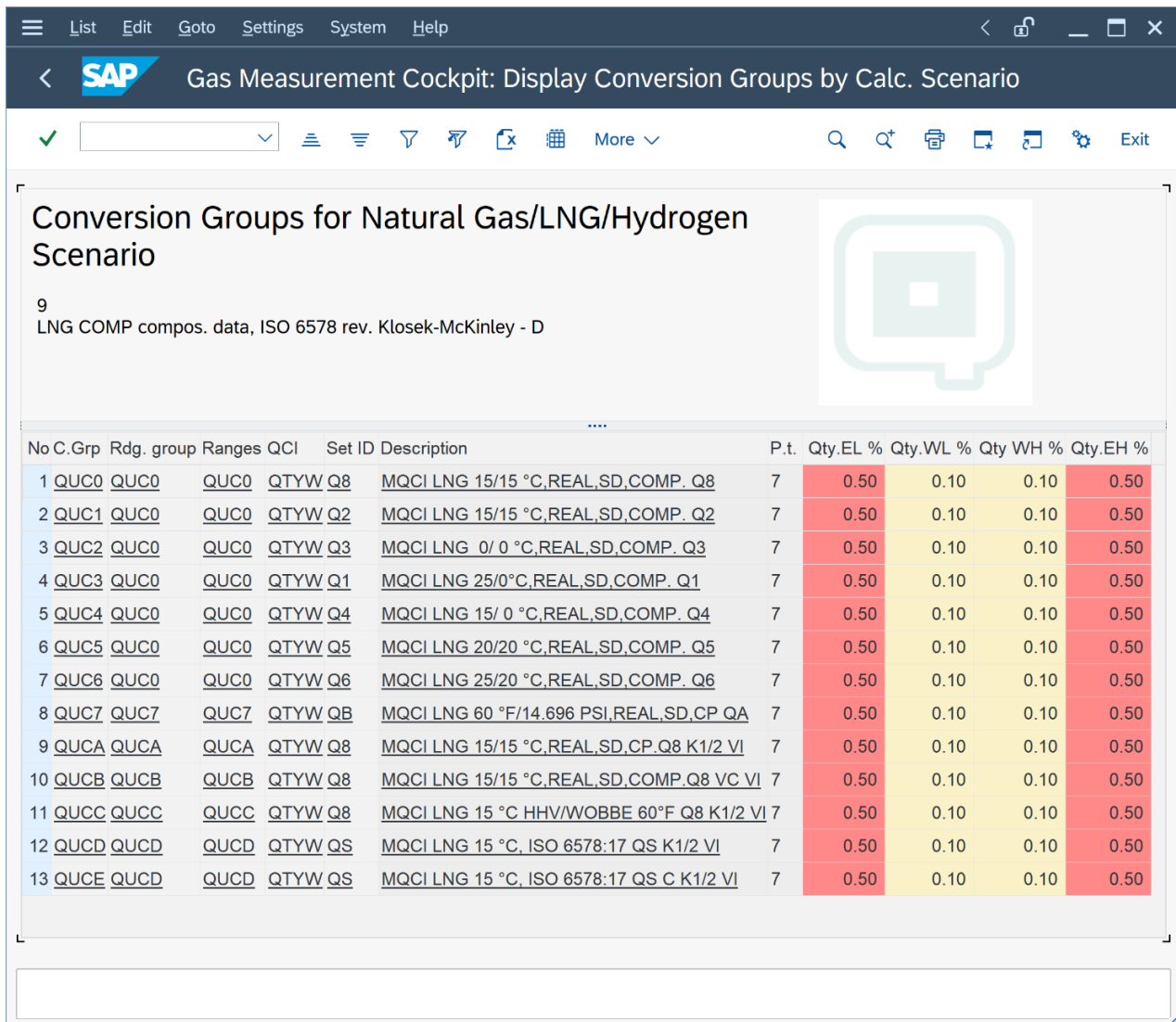




With this selection, you probe the MQCI natural gas template conversion groups by calculation scenario. As described above, 17 calculation scenarios are available.

For this test case, we wish to find an LNG MQCI conversion group at ISO base conditions (15 °C, 101.325 kPa) where we can enter the complete LNG chemical composition for the quantity conversions, and we thus select “LNG COMP compos. Data, ISO 6578 rev. Klosek-McKinley - D” from the list of the 17 calculation scenarios and then “select “Execute” (F8):





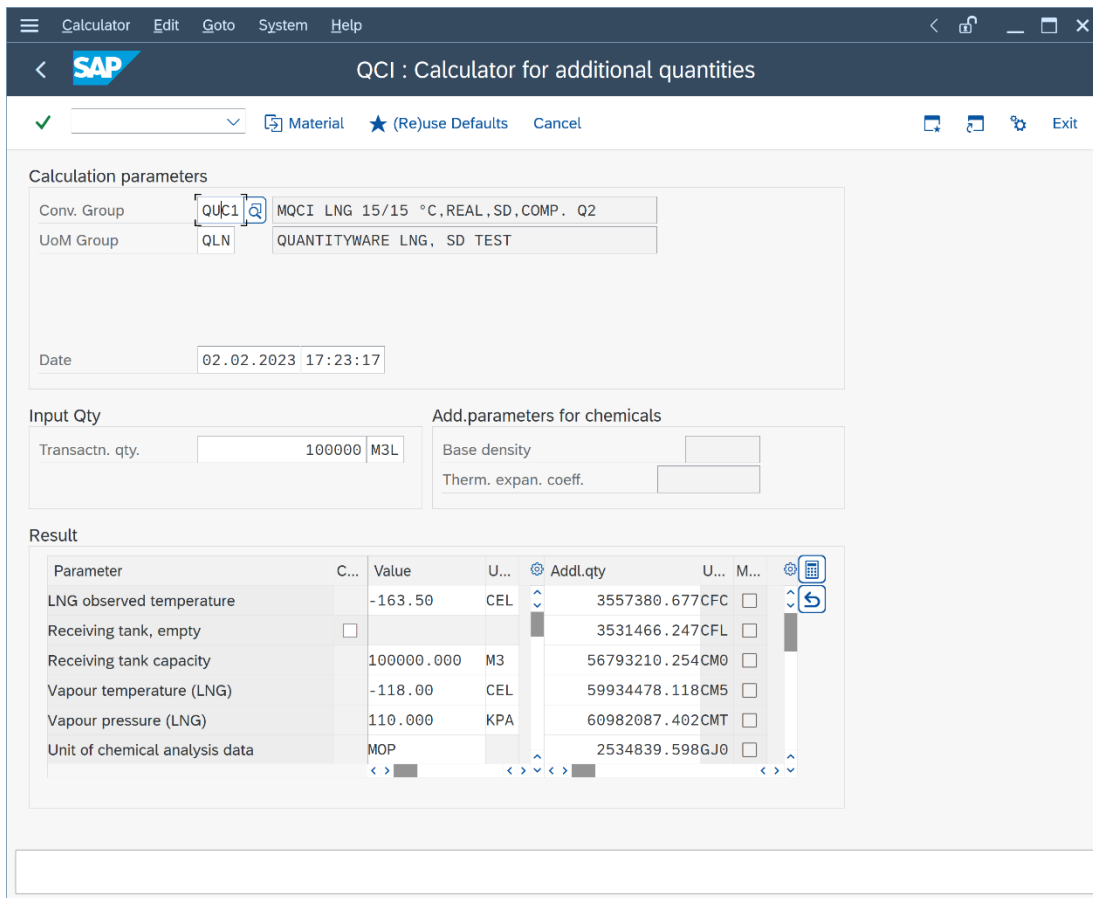
The screenshot shows the SAP Gas Measurement Cockpit interface. The title bar reads "Gas Measurement Cockpit: Display Conversion Groups by Calc. Scenario". The main content area is titled "Conversion Groups for Natural Gas/LNG/Hydrogen Scenario" and includes a sub-header "9 LNG COMP compos. data, ISO 6578 rev. Klosek-McKinley - D". Below this is a table listing 13 conversion groups.

No C.Grp	Rdg. group	Ranges	QCI	Set ID	Description	P.t.	Qty.EL %	Qty.WL %	Qty.WH %	Qty.EH %
1	QUC0	QUC0	QUC0	QTYW Q8	MQCI LNG 15/15 °C,REAL,SD,COMP. Q8	7	0.50	0.10	0.10	0.50
2	QUC1	QUC0	QUC0	QTYW Q2	MQCI LNG 15/15 °C,REAL,SD,COMP. Q2	7	0.50	0.10	0.10	0.50
3	QUC2	QUC0	QUC0	QTYW Q3	MQCI LNG 0/ 0 °C,REAL,SD,COMP. Q3	7	0.50	0.10	0.10	0.50
4	QUC3	QUC0	QUC0	QTYW Q1	MQCI LNG 25/0°C,REAL,SD,COMP. Q1	7	0.50	0.10	0.10	0.50
5	QUC4	QUC0	QUC0	QTYW Q4	MQCI LNG 15/ 0 °C,REAL,SD,COMP. Q4	7	0.50	0.10	0.10	0.50
6	QUC5	QUC0	QUC0	QTYW Q5	MQCI LNG 20/20 °C,REAL,SD,COMP. Q5	7	0.50	0.10	0.10	0.50
7	QUC6	QUC0	QUC0	QTYW Q6	MQCI LNG 25/20 °C,REAL,SD,COMP. Q6	7	0.50	0.10	0.10	0.50
8	QUC7	QUC7	QUC7	QTYW QB	MQCI LNG 60 °F/14.696 PSI,REAL,SD,CP,QA	7	0.50	0.10	0.10	0.50
9	QUCA	QUCA	QUCA	QTYW Q8	MQCI LNG 15/15 °C,REAL,SD,CP,Q8 K1/2 VI	7	0.50	0.10	0.10	0.50
10	QUCB	QUCB	QUCB	QTYW Q8	MQCI LNG 15/15 °C,REAL,SD,COMP,Q8 VC VI	7	0.50	0.10	0.10	0.50
11	QUCC	QUCC	QUCC	QTYW Q8	MQCI LNG 15 °C HHV/WOBBE 60°F Q8 K1/2 VI	7	0.50	0.10	0.10	0.50
12	QUCD	QUCD	QUCD	QTYW QS	MQCI LNG 15 °C, ISO 6578:17 QS K1/2 VI	7	0.50	0.10	0.10	0.50
13	QUCE	QUCD	QUCD	QTYW QS	MQCI LNG 15 °C, ISO 6578:17 QS C K1/2 VI	7	0.50	0.10	0.10	0.50

13 template conversion groups are available for this calculation scenario. By clicking on the description text, a detailed description of the conversion group is displayed. In this case it is informing you that conversion group QUC0, QUC1 and QUCA to QUCE are configured with ISO base conditions (15 °C, 101.325 kPa) for the gas phase. For this test case, we select **QUC1**, which carries physical property data set Q2 and does not require as much configuration data from the template client to be migrated to our development client. In a real-life project, this selection process takes much more time since detailed requirements need to be gathered from several departments, **including contractually defined calculation data for LNG.**

Let's perform a trial conversion using conversion group QUC1. In the GMC, select push button "Oil & Gas Test Calculator".

The screenshot displays the SAP Gas Measurement Cockpit interface. At the top, the browser address bar shows 'QuantityWare.com' and the page title is 'Gas Measurement Cockpit'. The SAP logo is visible in the top left corner. A navigation bar contains the following items: 'QuantityWare Service Portal', 'OilGas Test Calculator' (highlighted with a yellow box), and 'More'. Below this, a secondary menu includes 'Units of Measurement', 'Print Standards Lists', 'QCI Configuration' (underlined), 'Gas Analysis', and 'Test Tools'. The main content area is divided into two sections: 'Monitor Bulk Material Assignment' and 'Display & Analyze Conversion Groups'. The 'Monitor Bulk Material Assignment' section contains three buttons: 'Conversion Group For Materials', 'Materials For Conversion Group', and 'Analyze Business Document'. The 'Display & Analyze Conversion Groups' section contains three buttons: 'QuantityWare Template', 'My Selection', and 'Explain, Check & Transport'. On the right side of the interface, there is a large image of an offshore oil rig with the QuantityWare logo and the tagline 'the quantity conversion solution' overlaid. The bottom of the interface features a search bar.



The screenshot shows the SAP QCI Calculator interface. The title bar reads "QCI : Calculator for additional quantities". The main window contains several sections:

- Calculation parameters:**
 - Conv. Group: QUC1 (selected), MQCI LNG 15/15 °C, REAL, SD, COMP. Q2
 - UoM Group: QLN, QUANTITYWARE LNG, SD TEST
 - Date: 02.02.2023 17:23:17
- Input Qty:**
 - Transactn. qty.: 100000 M3L
- Add.parameters for chemicals:**
 - Base density: [empty]
 - Therm. expan. coeff.: [empty]
- Result:** A table showing calculated values for various parameters.

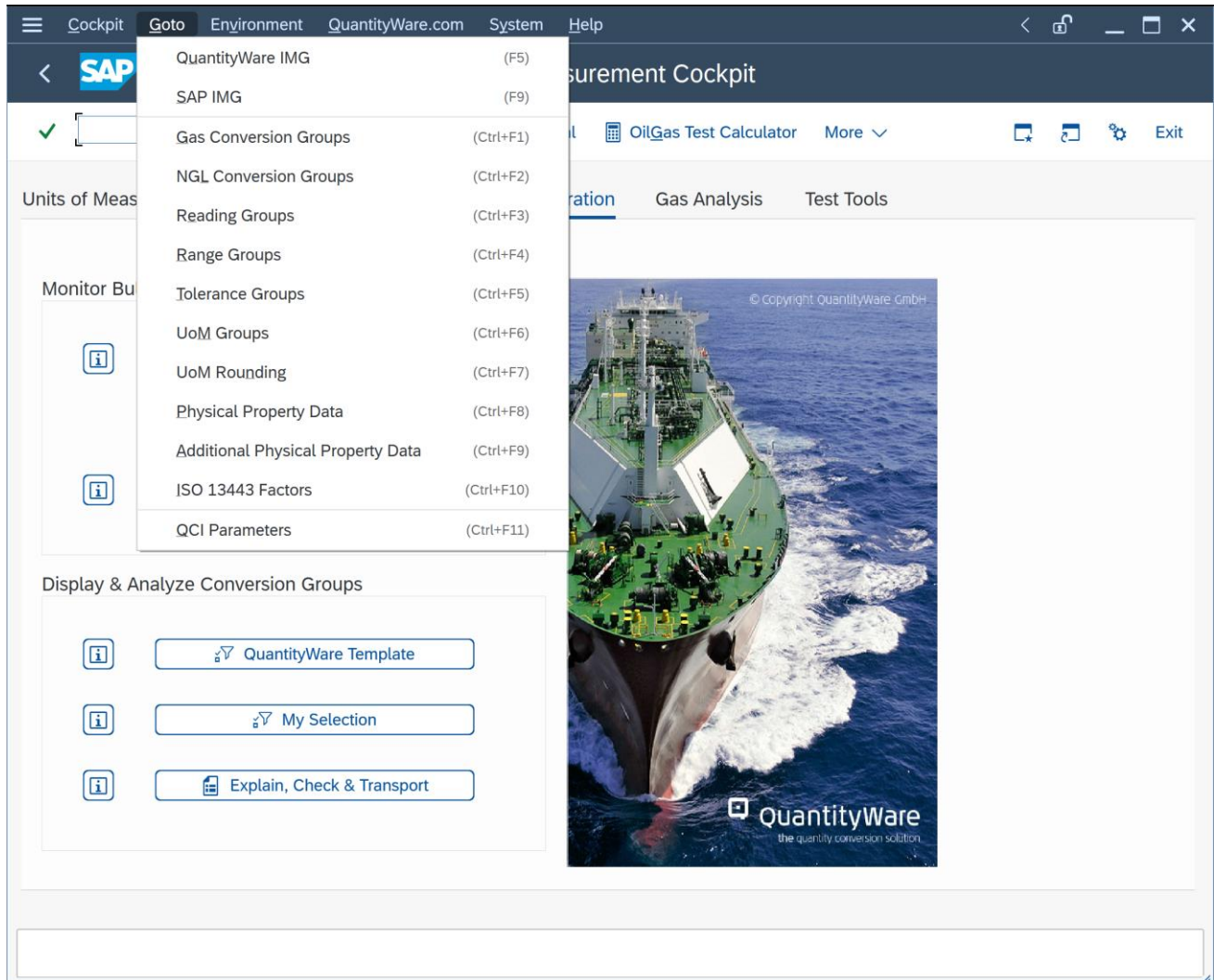
Parameter	C...	Value	U...	Addl.qty	U...	M...
LNG observed temperature		-163.50	CEL	3557380.677	CFC	<input type="checkbox"/>
Receiving tank, empty	<input type="checkbox"/>			3531466.247	CFL	<input type="checkbox"/>
Receiving tank capacity		100000.000	M3	56793210.254	CM0	<input type="checkbox"/>
Vapour temperature (LNG)		-118.00	CEL	59934478.118	CM5	<input type="checkbox"/>
Vapour pressure (LNG)		110.000	KPA	60982087.402	CMT	<input type="checkbox"/>
Unit of chemical analysis data		MOP		2534839.598	GJ0	<input type="checkbox"/>

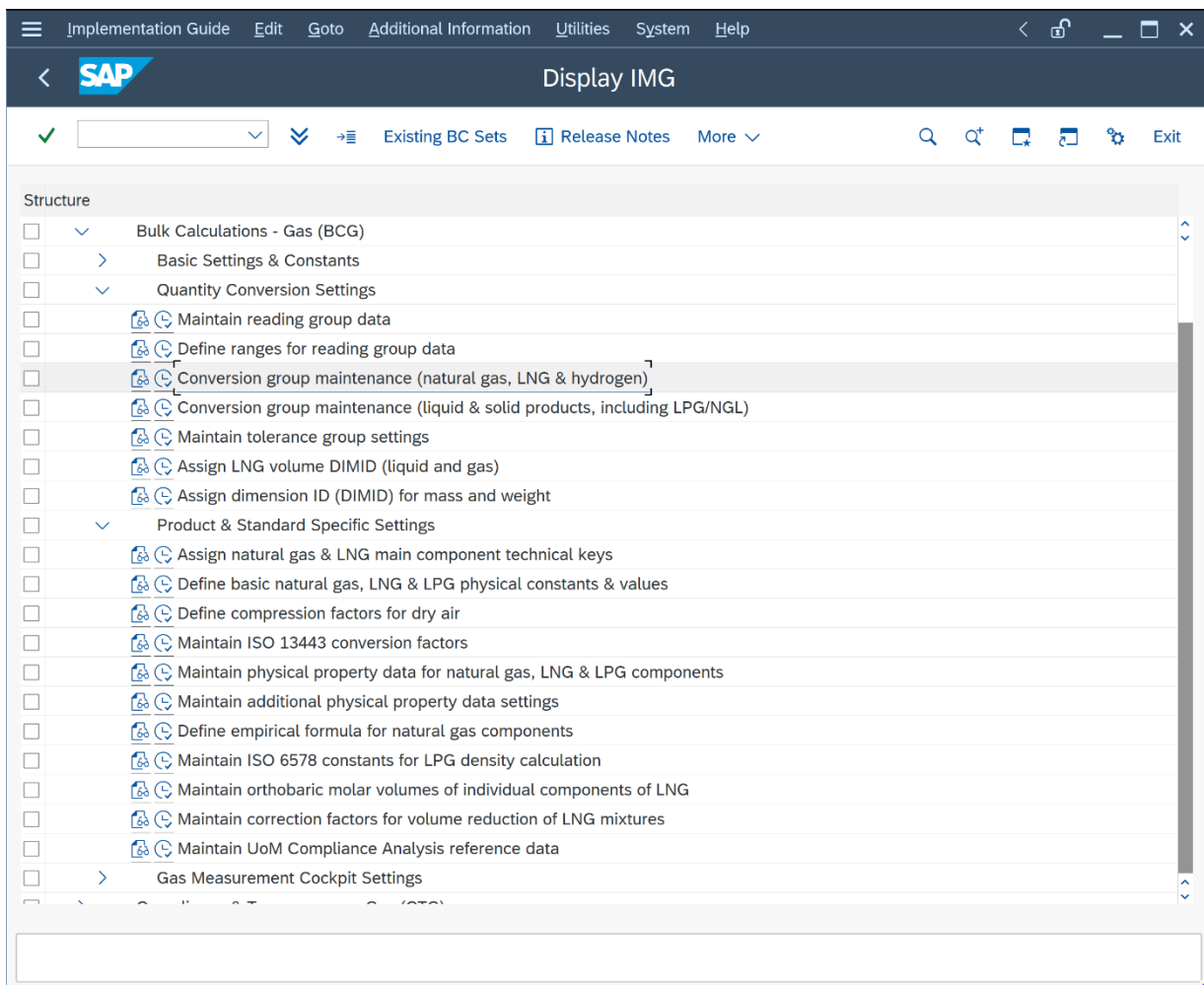
Enter conversion group QUC1 and test UoM group QLN and a transaction quantity of e.g., 100,000 M3L (Cubic meter, liquid phase). The quantity values for all UoM defined in UoM group QLN are readily calculated.



For LNG quantity conversions, UoM quantity values for **four** different SAP Dimensions (quantities) may be calculated: Energies, masses, liquid volumes, and gaseous volumes

Part 2: Now let's copy template conversion group QUC1 in the template client to the customer name range – ZUC1. You have two options. Either navigate to the QuantityWare IMG via menu path: Goto -> QuantityWare IMG:

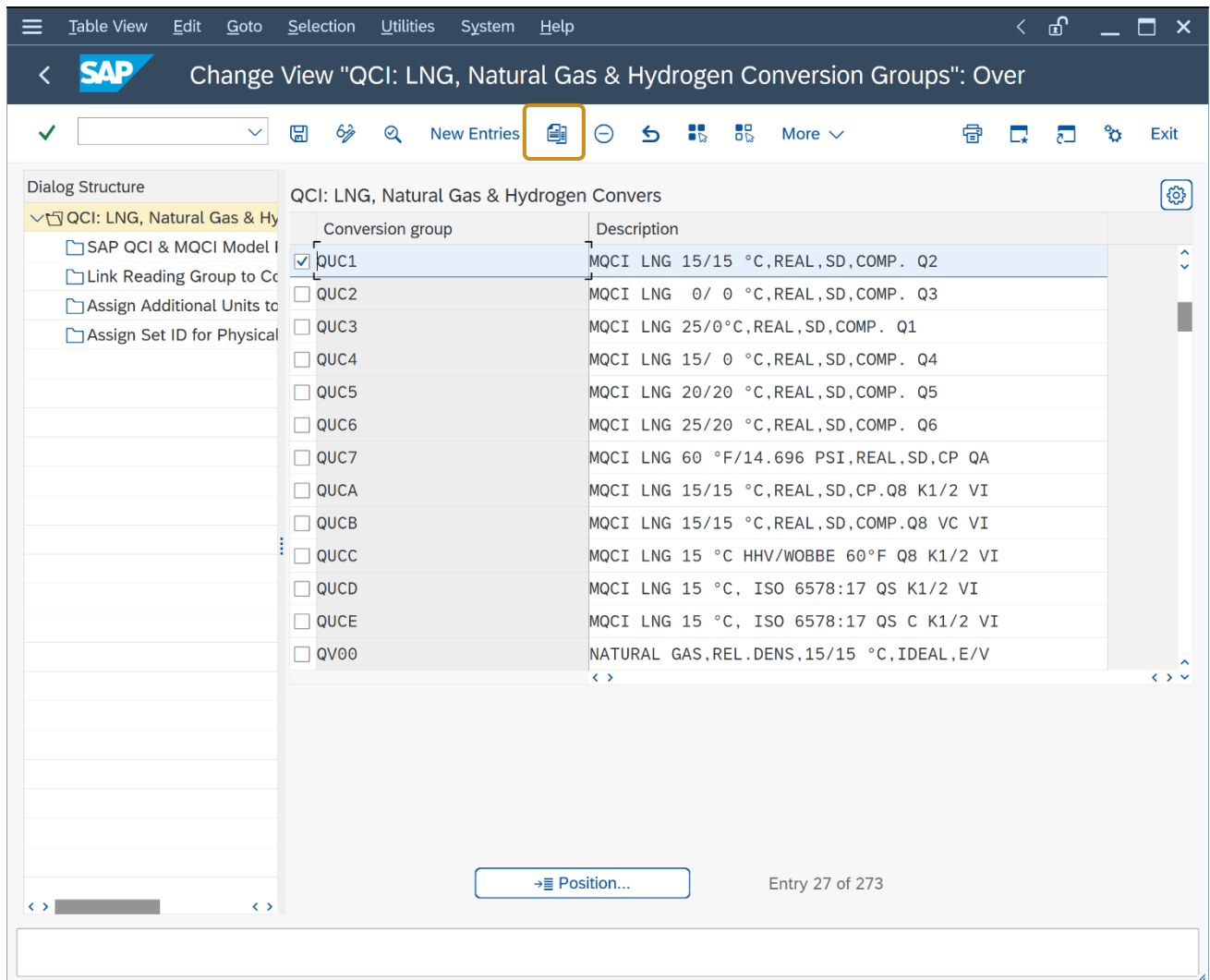




and select the relevant customizing nodes, or directly access the three main nodes via the direct menu path access: **Goto -> Gas Conversion Groups / Reading Groups / Range Groups**. The second option is faster, so here goes 😊

Goto -> Gas Conversion Groups:

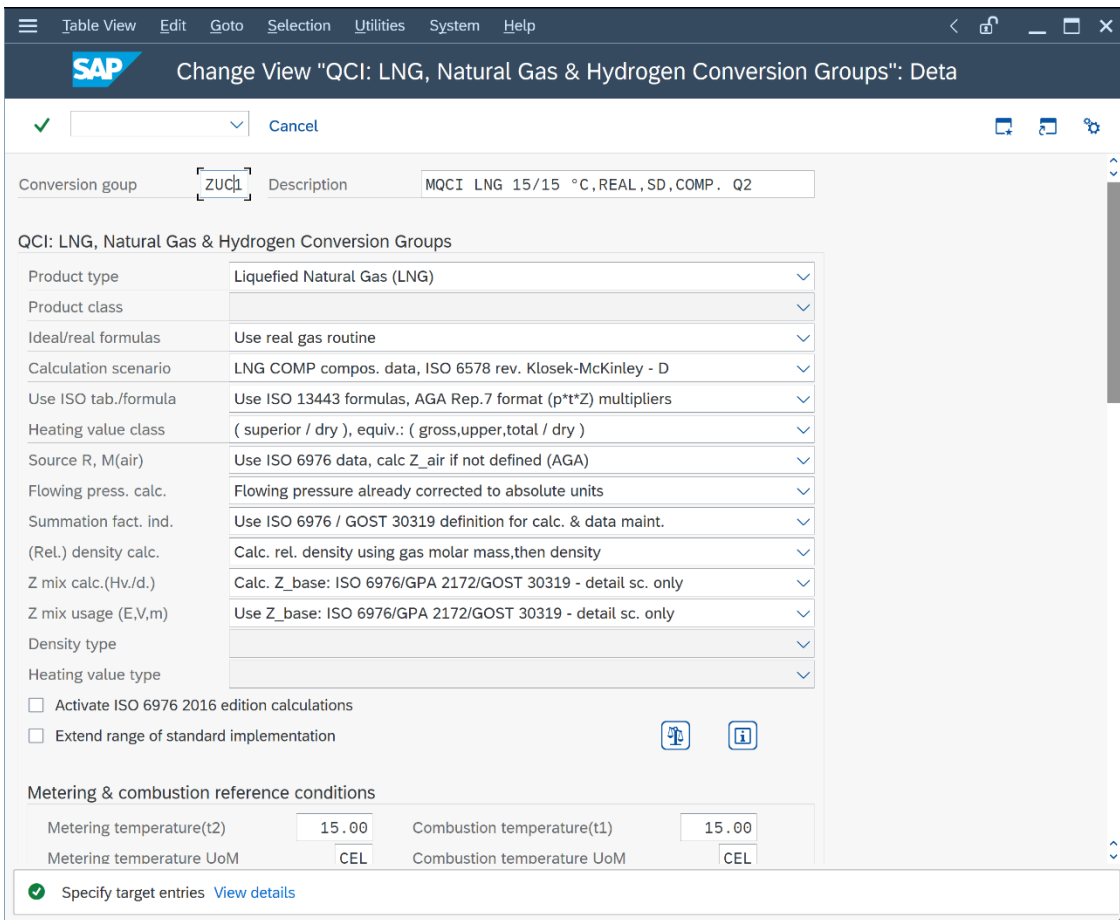
In "Change" mode, select conversion group QUC1 and select "Copy As ... (F6):"



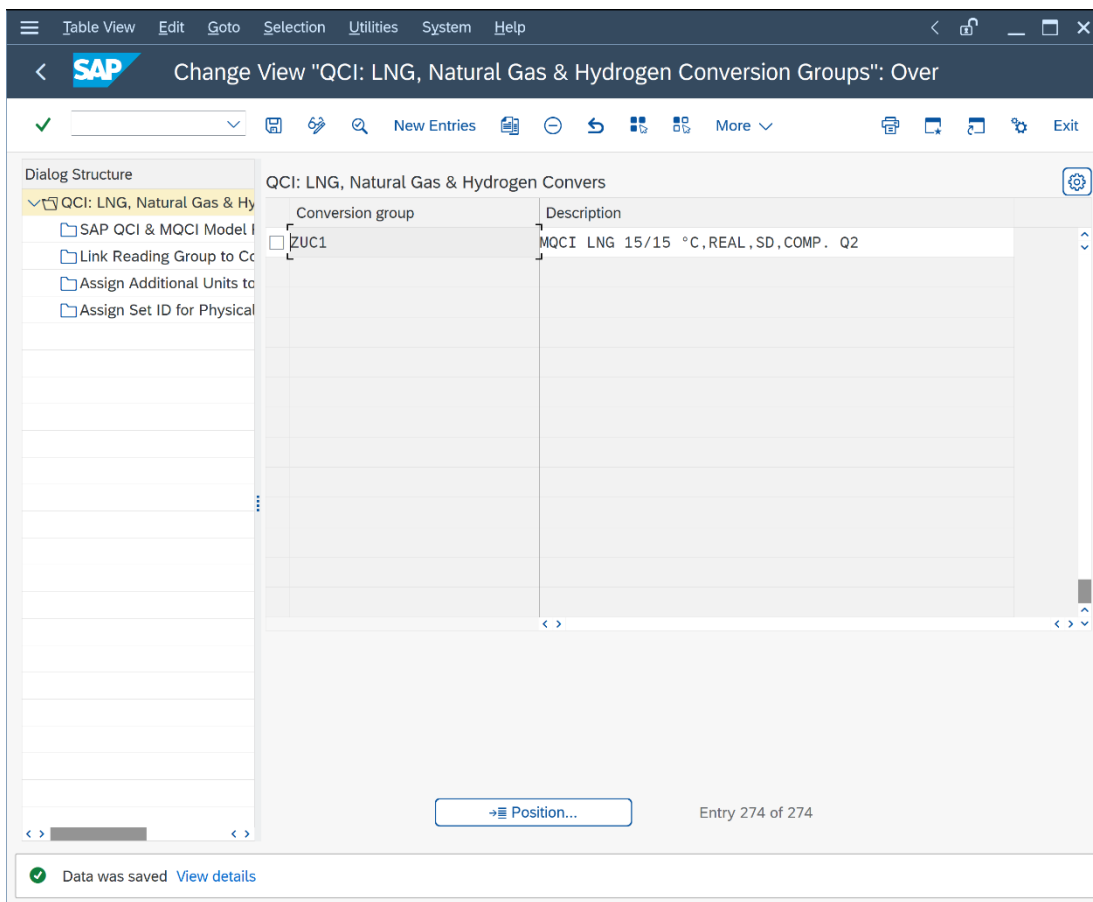
The screenshot shows the SAP 'Change View' dialog for 'QCI: LNG, Natural Gas & Hydrogen Conversion Groups'. The interface includes a menu bar (Table View, Edit, Goto, Selection, Utilities, System, Help), a toolbar with various icons, and a main table. The table has two columns: 'Conversion group' and 'Description'. The 'QUC1' row is selected and highlighted in blue. The 'Copy As ... (F6)' button in the toolbar is highlighted with a yellow box.

Conversion group	Description
<input checked="" type="checkbox"/> QUC1	MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
<input type="checkbox"/> QUC2	MQCI LNG 0/ 0 °C,REAL,SD,COMP. Q3
<input type="checkbox"/> QUC3	MQCI LNG 25/0°C,REAL,SD,COMP. Q1
<input type="checkbox"/> QUC4	MQCI LNG 15/ 0 °C,REAL,SD,COMP. Q4
<input type="checkbox"/> QUC5	MQCI LNG 20/20 °C,REAL,SD,COMP. Q5
<input type="checkbox"/> QUC6	MQCI LNG 25/20 °C,REAL,SD,COMP. Q6
<input type="checkbox"/> QUC7	MQCI LNG 60 °F/14.696 PSI,REAL,SD,CP QA
<input type="checkbox"/> QUCA	MQCI LNG 15/15 °C,REAL,SD,CP.Q8 K1/2 VI
<input type="checkbox"/> QUCC	MQCI LNG 15 °C,REAL,SD,COMP.Q8 VC VI
<input type="checkbox"/> QUCC	MQCI LNG 15 °C HHV/WOBBE 60°F Q8 K1/2 VI
<input type="checkbox"/> QUCD	MQCI LNG 15 °C, ISO 6578:17 QS K1/2 VI
<input type="checkbox"/> QUCE	MQCI LNG 15 °C, ISO 6578:17 QS C K1/2 VI
<input type="checkbox"/> QV00	NATURAL GAS,REL.DENS,15/15 °C,IDEAL,E/V

Position... Entry 27 of 273



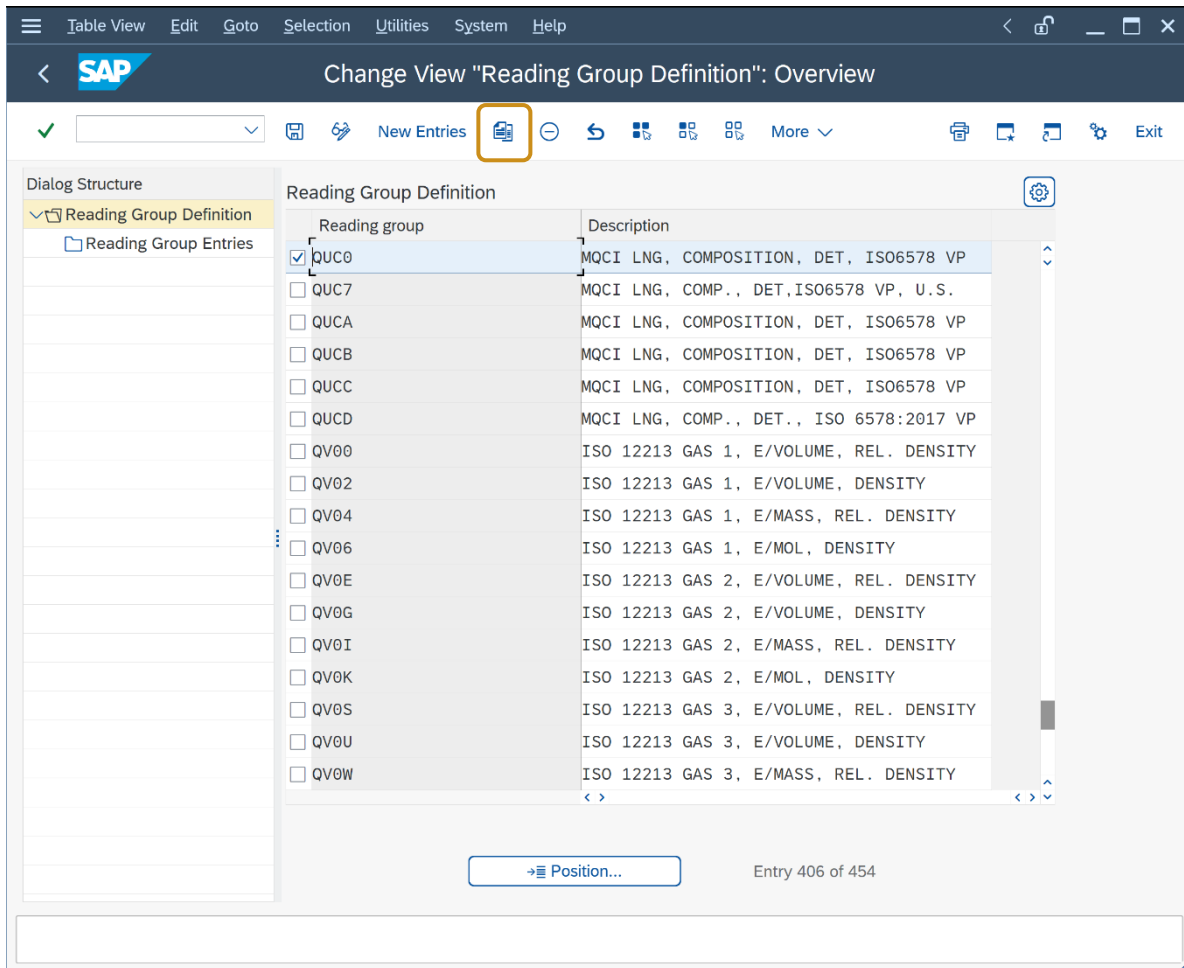
In the details screen, enter ZUC1 as target name and select "copy all" after you press "Return".



Save your actions and select an appropriate customizing transport.

Goto -> Reading Groups:

Repeat the copy procedure as described above and copy reading group QUC0 (Conversion group QUC1 utilizes reading group QUC0!) to ZUC1:



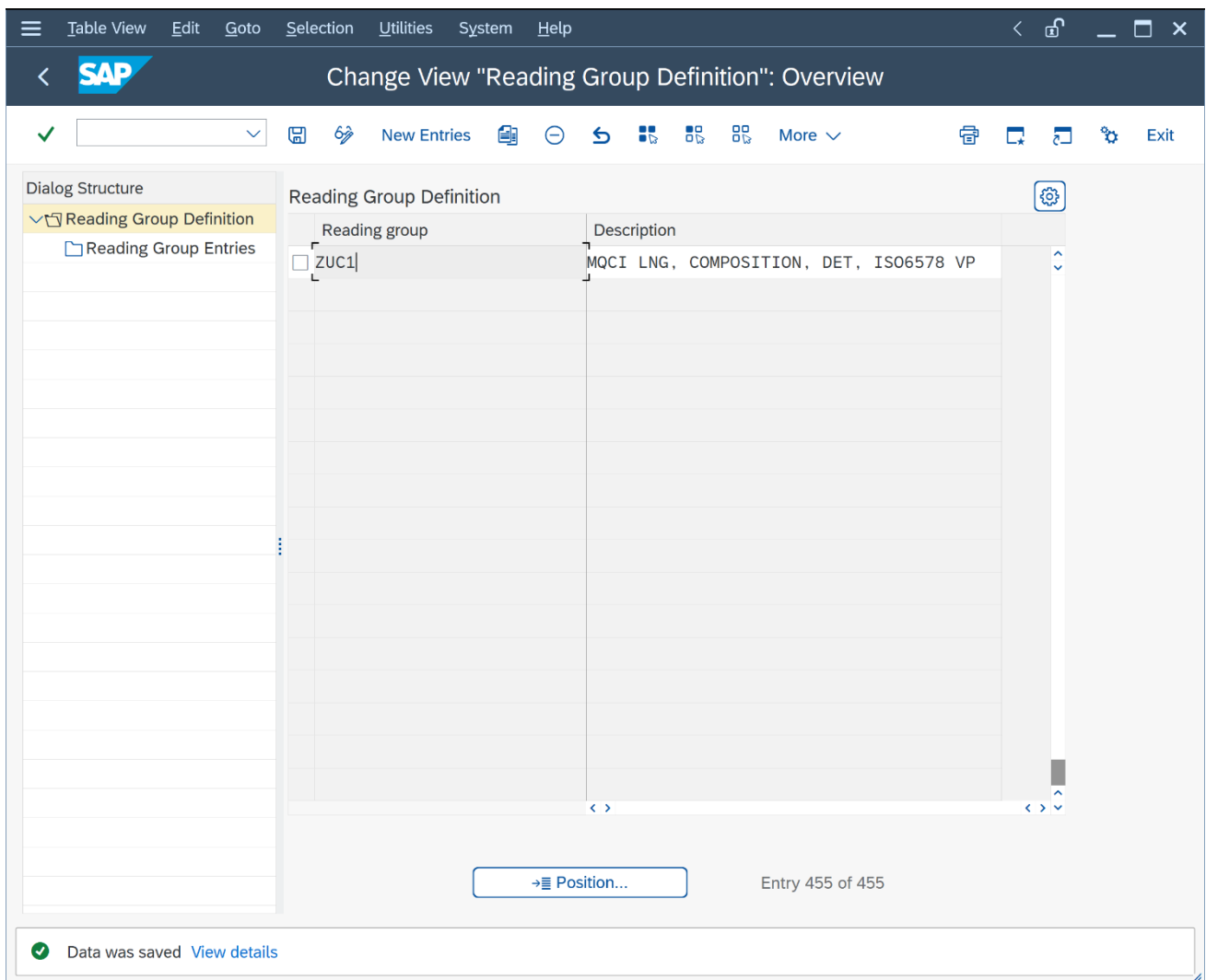
The screenshot shows the SAP 'Change View Reading Group Definition' dialog. The 'Reading Group Definition' table is visible, with the 'QUC0' entry selected. The 'New Entries' button in the toolbar is highlighted with a yellow box.

Reading group	Description
<input checked="" type="checkbox"/> QUC0	MQCI LNG, COMPOSITION, DET, ISO6578 VP
<input type="checkbox"/> QUC7	MQCI LNG, COMP., DET, ISO6578 VP, U.S.
<input type="checkbox"/> QUCA	MQCI LNG, COMPOSITION, DET, ISO6578 VP
<input type="checkbox"/> QUCC	MQCI LNG, COMPOSITION, DET, ISO6578 VP
<input type="checkbox"/> QUCD	MQCI LNG, COMP., DET., ISO 6578:2017 VP
<input type="checkbox"/> QV00	ISO 12213 GAS 1, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV02	ISO 12213 GAS 1, E/VOLUME, DENSITY
<input type="checkbox"/> QV04	ISO 12213 GAS 1, E/MASS, REL. DENSITY
<input type="checkbox"/> QV06	ISO 12213 GAS 1, E/MOL, DENSITY
<input type="checkbox"/> QV0E	ISO 12213 GAS 2, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV0G	ISO 12213 GAS 2, E/VOLUME, DENSITY
<input type="checkbox"/> QV0I	ISO 12213 GAS 2, E/MASS, REL. DENSITY
<input type="checkbox"/> QV0K	ISO 12213 GAS 2, E/MOL, DENSITY
<input type="checkbox"/> QV0S	ISO 12213 GAS 3, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV0U	ISO 12213 GAS 3, E/VOLUME, DENSITY
<input type="checkbox"/> QV0W	ISO 12213 GAS 3, E/MASS, REL. DENSITY

Dialog Structure: Reading Group Definition, Reading Group Entries

Toolbar: New Entries (highlighted), Position...

Entry 406 of 454



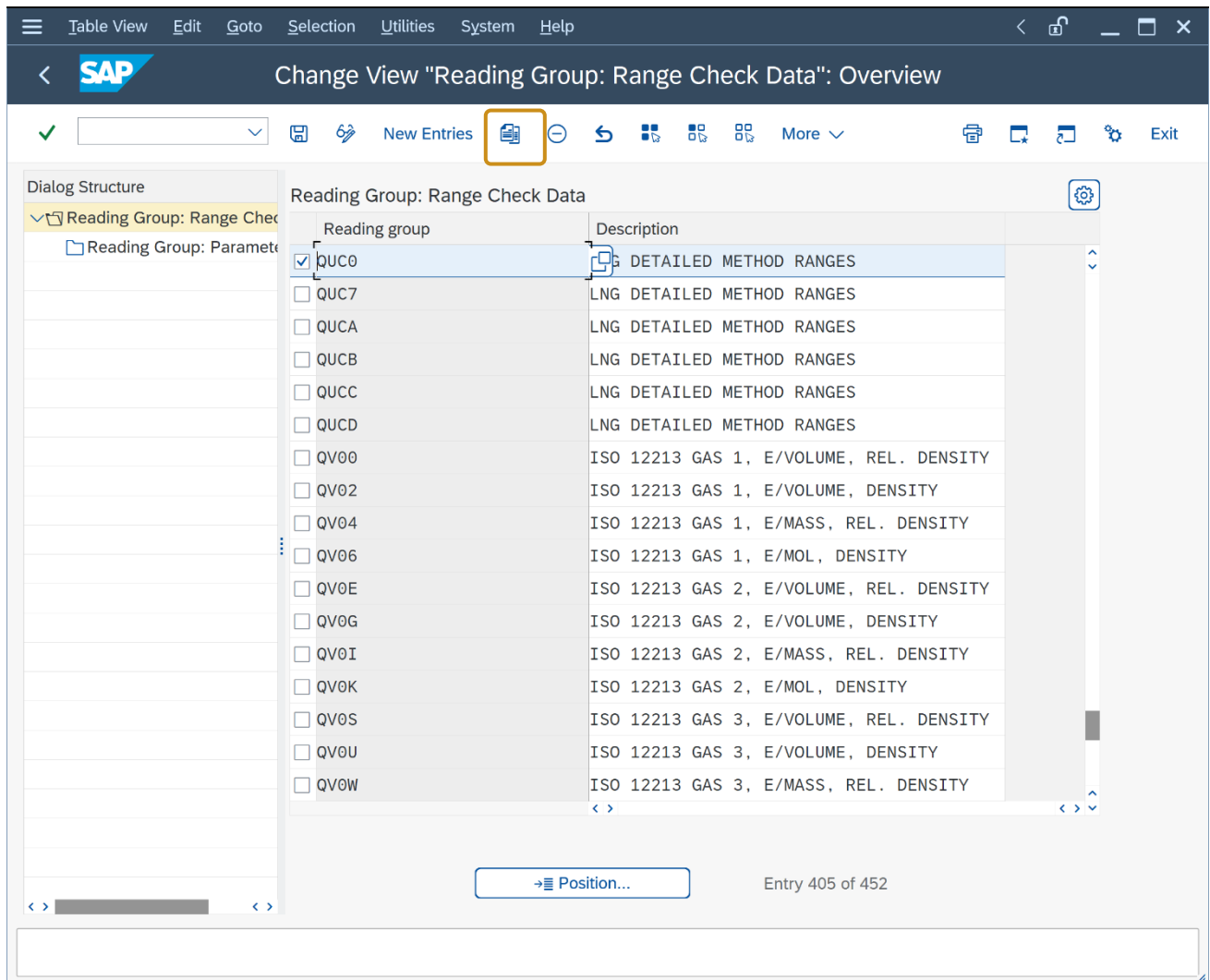
The screenshot shows the SAP Change View 'Reading Group Definition': Overview. The interface includes a menu bar at the top with options like 'Table View', 'Edit', 'Goto', 'Selection', 'Utilities', 'System', and 'Help'. Below the menu bar is a toolbar with various icons and a 'New Entries' button. The main area is divided into two sections: 'Dialog Structure' on the left and 'Reading Group Definition' on the right. The 'Dialog Structure' section shows a tree view with 'Reading Group Definition' expanded, containing 'Reading Group Entries'. The 'Reading Group Definition' section displays a table with two columns: 'Reading group' and 'Description'. The first row contains the entry 'ZUC1' with the description 'MQCI LNG, COMPOSITION, DET, IS06578 VP'. Below the table, there is a 'Position...' button and the text 'Entry 455 of 455'. At the bottom of the window, a status bar indicates 'Data was saved' with a 'View details' link.

Reading group	Description
ZUC1	MQCI LNG, COMPOSITION, DET, IS06578 VP

Save your copy actions and select an appropriate customizing transport.

Goto -> Range Groups:

Repeat the copy procedure for range group QUC0 (copy to ZUC1):



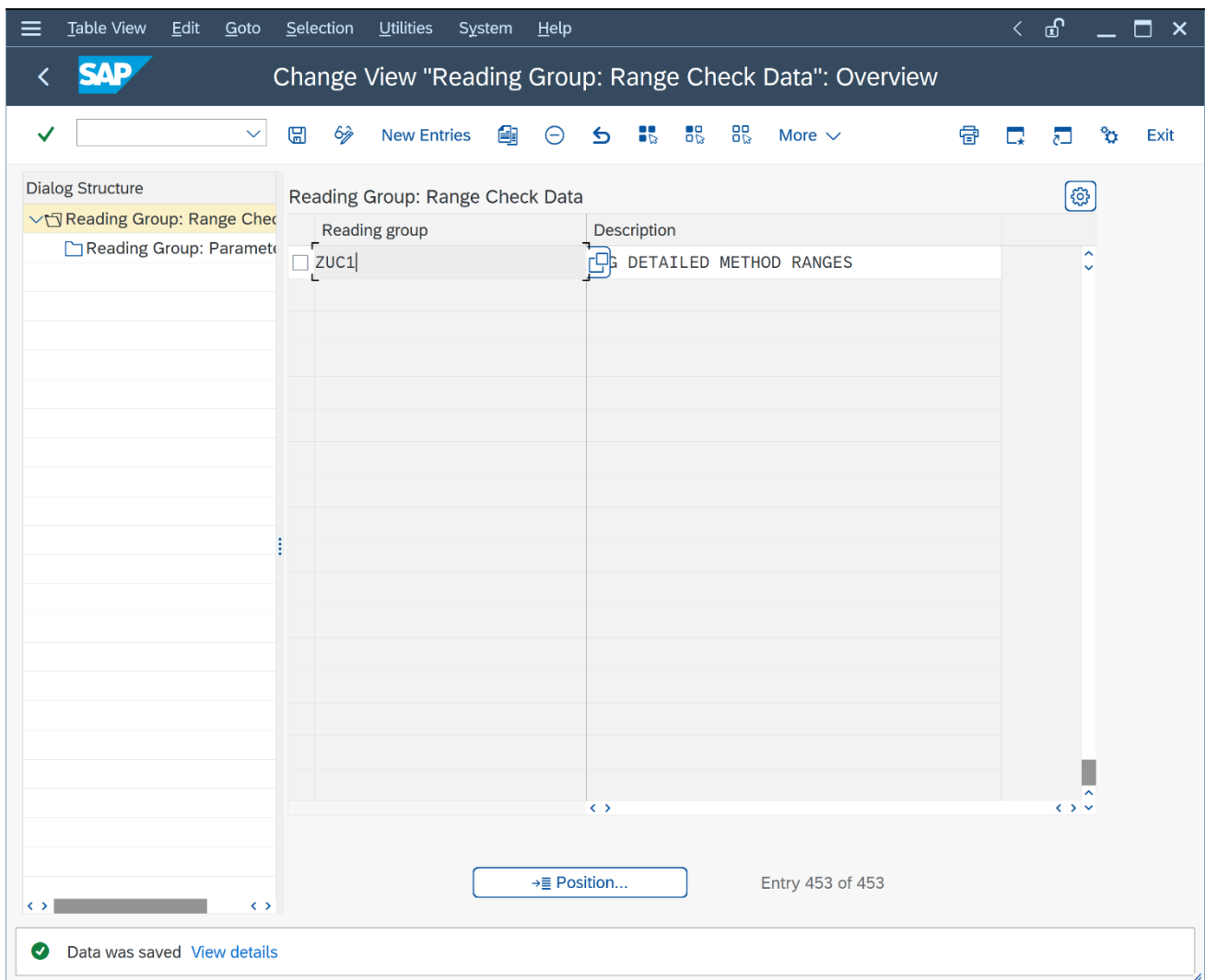
Change View "Reading Group: Range Check Data": Overview

Dialog Structure

- Reading Group: Range Check Data
 - Reading Group: Parameters

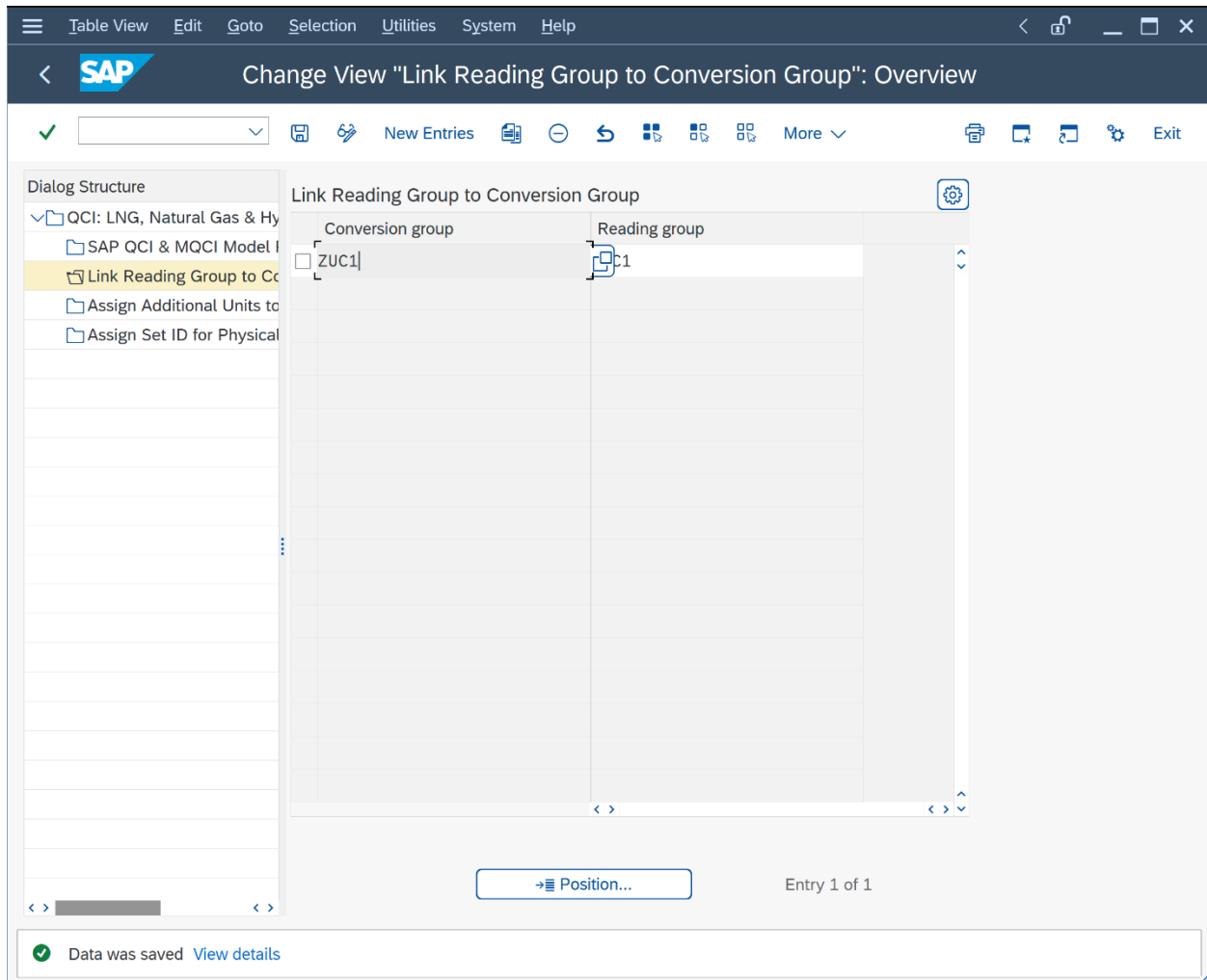
Reading group	Description
<input checked="" type="checkbox"/> QUC0	DETAILED METHOD RANGES
<input type="checkbox"/> QUC7	LNG DETAILED METHOD RANGES
<input type="checkbox"/> QUCA	LNG DETAILED METHOD RANGES
<input type="checkbox"/> QUCB	LNG DETAILED METHOD RANGES
<input type="checkbox"/> QUCC	LNG DETAILED METHOD RANGES
<input type="checkbox"/> QUCD	LNG DETAILED METHOD RANGES
<input type="checkbox"/> QV00	ISO 12213 GAS 1, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV02	ISO 12213 GAS 1, E/VOLUME, DENSITY
<input type="checkbox"/> QV04	ISO 12213 GAS 1, E/MASS, REL. DENSITY
<input type="checkbox"/> QV06	ISO 12213 GAS 1, E/MOL, DENSITY
<input type="checkbox"/> QV0E	ISO 12213 GAS 2, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV0G	ISO 12213 GAS 2, E/VOLUME, DENSITY
<input type="checkbox"/> QV0I	ISO 12213 GAS 2, E/MASS, REL. DENSITY
<input type="checkbox"/> QV0K	ISO 12213 GAS 2, E/MOL, DENSITY
<input type="checkbox"/> QV0S	ISO 12213 GAS 3, E/VOLUME, REL. DENSITY
<input type="checkbox"/> QV0U	ISO 12213 GAS 3, E/VOLUME, DENSITY
<input type="checkbox"/> QV0W	ISO 12213 GAS 3, E/MASS, REL. DENSITY

Entry 405 of 452



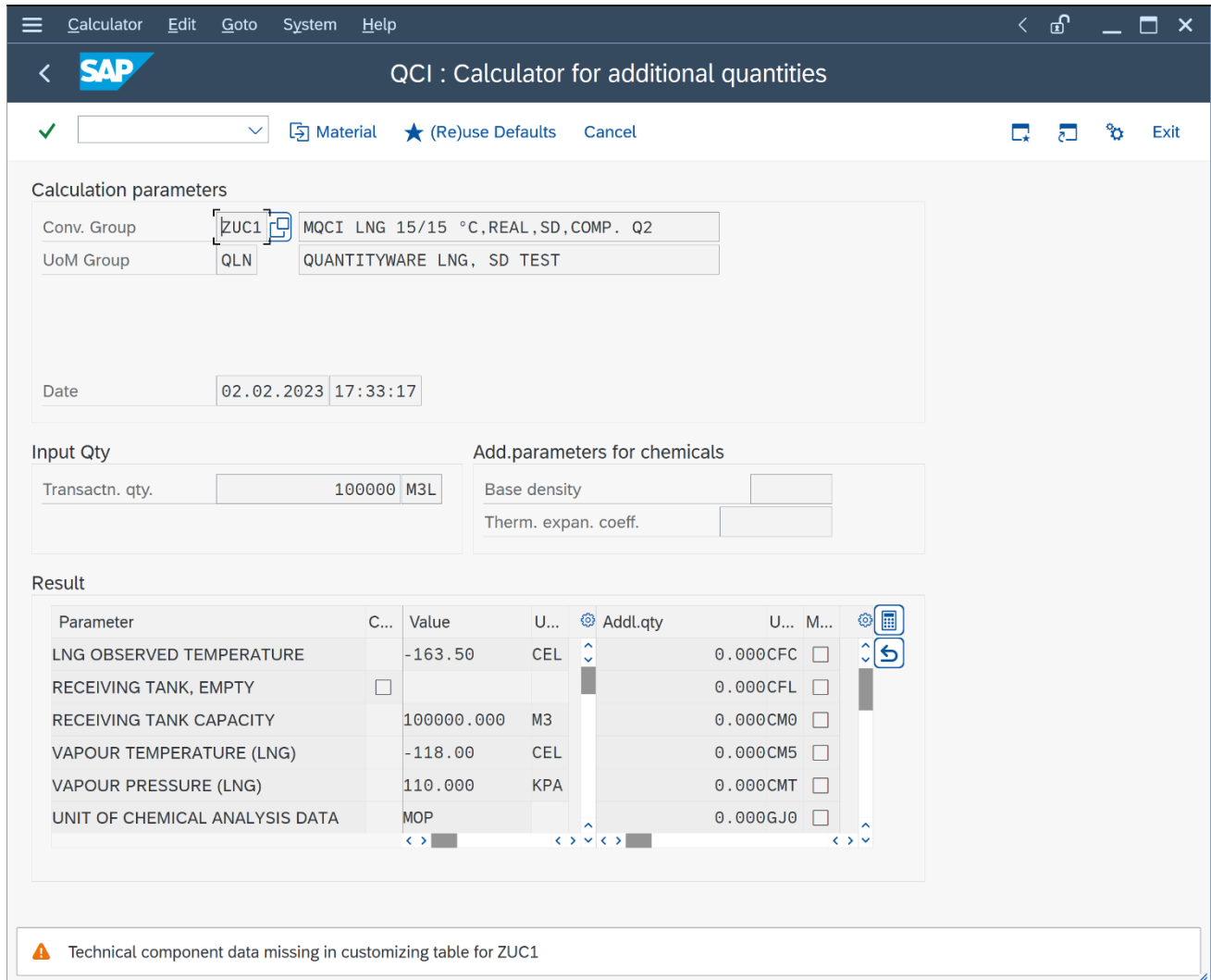
Save your copy actions and select an appropriate customizing transport.

Finally, go back to the conversion group configuration via GMC menu path: Goto -> Gas Conversion Groups and select "Link reading group to conversion group" for your new conversion group ZUC1:



Change the assignment from QUC0 to ZUC1. Save your actions and select an appropriate customizing transport.

Now you have finished copying template conversion group QUC1 to ZUC1. A test calculation (via the GMC push button “Oil & Gas Test Calculator”) should produce identical results when compared with the test calculation for conversion group QUC1:



The screenshot shows the SAP QCI Calculator interface. The title bar reads "QCI : Calculator for additional quantities". The main window contains several sections:

- Calculation parameters:**
 - Conv. Group: ZUC1 (highlighted with a red box)
 - UoM Group: QLN
 - Material: MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
 - Quantity: QUANTITYWARE LNG, SD TEST
 - Date: 02.02.2023 17:33:17
- Input Qty:**
 - Transactn. qty.: 100000 M3L
- Add.parameters for chemicals:**
 - Base density: [empty]
 - Therm. expan. coeff.: [empty]
- Result:**

Parameter	C...	Value	U...	Add.qty	U...	M...
LNG OBSERVED TEMPERATURE		-163.50	CEL		0.000CFC	<input type="checkbox"/>
RECEIVING TANK, EMPTY	<input type="checkbox"/>				0.000CFL	<input type="checkbox"/>
RECEIVING TANK CAPACITY		100000.000	M3		0.000CM0	<input type="checkbox"/>
VAPOUR TEMPERATURE (LNG)		-118.00	CEL		0.000CM5	<input type="checkbox"/>
VAPOUR PRESSURE (LNG)		110.000	KPA		0.000CMT	<input type="checkbox"/>
UNIT OF CHEMICAL ANALYSIS DATA		MOP			0.000GJ0	<input type="checkbox"/>
- Message:**

Technical component data missing in customizing table for ZUC1

Apparently, we are still missing some settings for ZUC1. The “Technical Component Data” is missing. To solve this, we navigate to the QuantityWare BCG IMG:

Implementation Guide Edit Goto Additional Information Utilities System Help

SAP Display IMG

Existing BC Sets Release Notes More

Structure

- QuantityWare Solutions
 - Bulk Calculations - Petroleum (BCP)
 - Compliance & Transparency - Petroleum (CTP)
 - Bulk Calculations - Gas (BCG)
 - Basic Settings & Constants
 - Quantity Conversion Settings
 - Product & Standard Specific Settings
 - Assign natural gas & LNG main component technical keys**
 - Define basic natural gas, LNG & LPG physical constants & values
 - Define compression factors for dry air
 - Maintain ISO 13443 conversion factors
 - Maintain physical property data for natural gas, LNG & LPG components
 - Maintain additional physical property data settings
 - Define empirical formula for natural gas components
 - Maintain ISO 6578 constants for LPG density calculation
 - Maintain orthobaric molar volumes of individual components of LNG
 - Maintain correction factors for volume reduction of LNG mixtures
 - Maintain UoM Compliance Analysis reference data
 - Gas Measurement Cockpit Settings
 - Compliance & Transparency - Gas (CTG)

Table View Edit Goto Selection Utilities System Help

SAP Change View "Maintain Natural Gas & LNG Special Components": Overview

✓ [] New Entries [] [] [] More [] [] [] [] [] Exit

Maintain Natural Gas & LNG Special Components

Conversion group	Methane technical name	Nitrogen technical name	Oxygen technical name
<input type="checkbox"/> QUAC	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUAD	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB0	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB1	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB2	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB3	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB4	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB5	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUB6	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC0	METHANE	NITROGEN	OXYGEN
<input checked="" type="checkbox"/> QUC1	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC2	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC3	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC4	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC5	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC6	METHANE	NITROGEN	OXYGEN
<input type="checkbox"/> QUC7	METHANE	NITROGEN	OXYGEN

→ Position... Entry 13 of 37

Here, we select: Product & Standard Specific Settings -> Assign natural gas & LNG main component keys. Apparently, an entry is defined for our source conversion group QUC1, it needs to be present for ZUC1 as well. Thus, you now copy this entry to ZUC1:

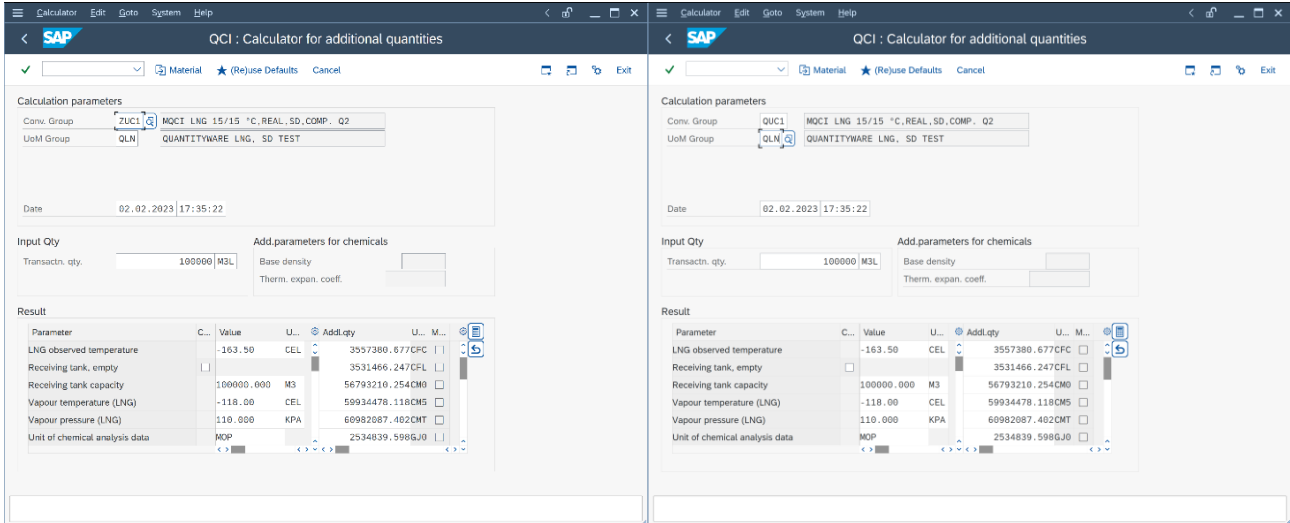
The screenshot displays the SAP S/4HANA 'Maintain Natural Gas & LNG Special Components' overview screen. The interface includes a top navigation bar with options like 'Table View', 'Edit', 'Goto', 'Selection', 'Utilities', 'System', and 'Help'. Below the navigation bar, the title bar reads 'Change View "Maintain Natural Gas & LNG Special Components": Overview'. A toolbar contains various icons and the text 'New Entries', 'More', and 'Exit'. The main area features a table with the following columns: 'Conversion group', 'Methane technical name', 'Nitrogen technical name', and 'Oxygen technical name'. The table contains one entry with the following data:

Conversion group	Methane technical name	Nitrogen technical name	Oxygen technical name
ZUC1	ETHANE	NITROGEN	OXYGEN

Below the table, there is a 'Position...' button and the text 'Entry 38 of 38'.

Save your actions and select an appropriate customizing transport.

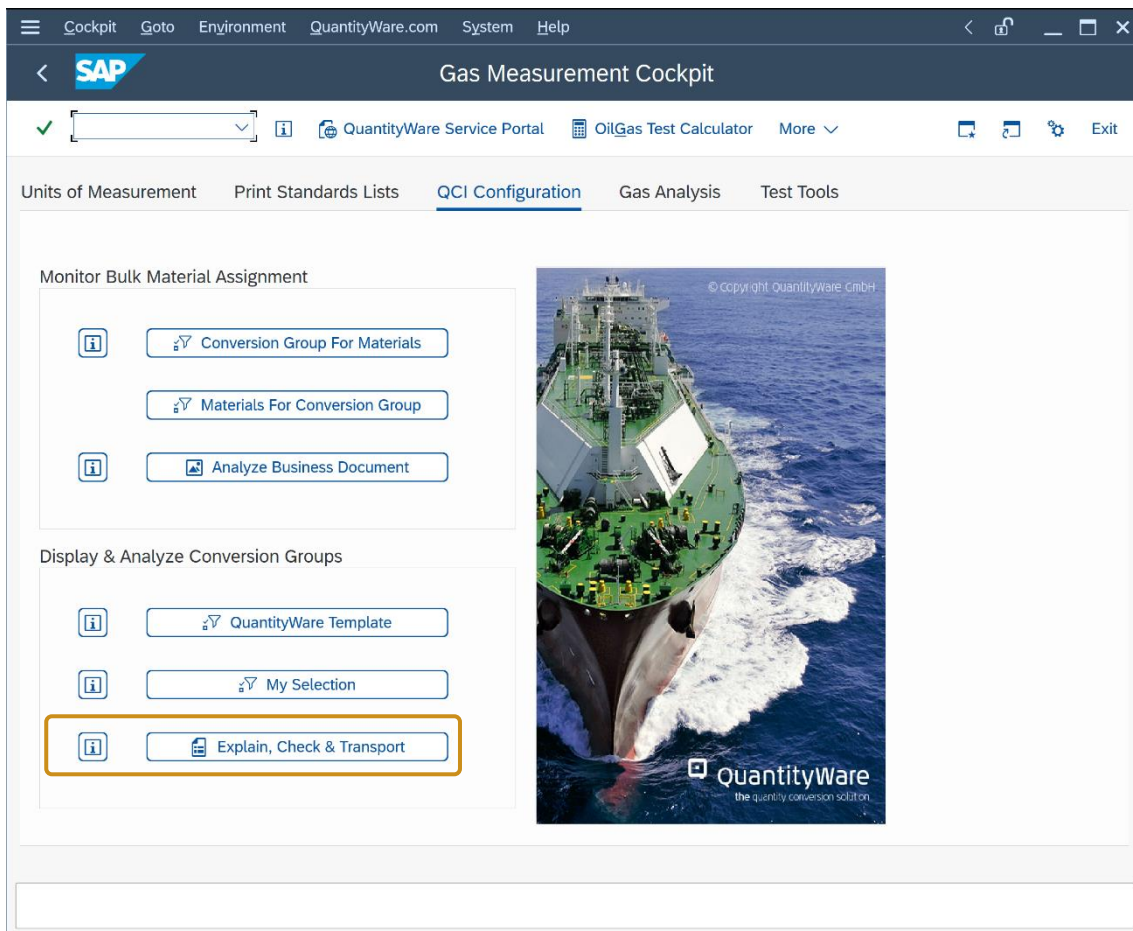
Now the trial calculation is working with the expected identical results:



2.3. Test Case 03 – Build Transport for LNG Conversion Group - Template

Estimated test case execution time: 150 minutes

Part 1 The GMC contains the “Explain, Check and Transport” Tool, which simplifies the collection of all relevant template configuration data for a conversion group. This is useful as a conversion group is a complex configuration object which may require additional data from many different tables - not only the ones you touched during test case 02 execution. Select the GMC “QCI Configuration & Products” tab strip and select “Explain Check & Transport” - ECT.



Program Edit Goto System Help

SAP Gas Measurement Cockpit: ECT - LNG, Natural Gas, H2 & NGL Conv. Groups

✓ [] [] [] [] [] Cancel [] [] [] [] [] Exit

Select conversion group & action

Conversion group: ZUC1

Language: English

Explain conversion group

Check conversion group

Display UoM for conv. group

Include UoM into transport

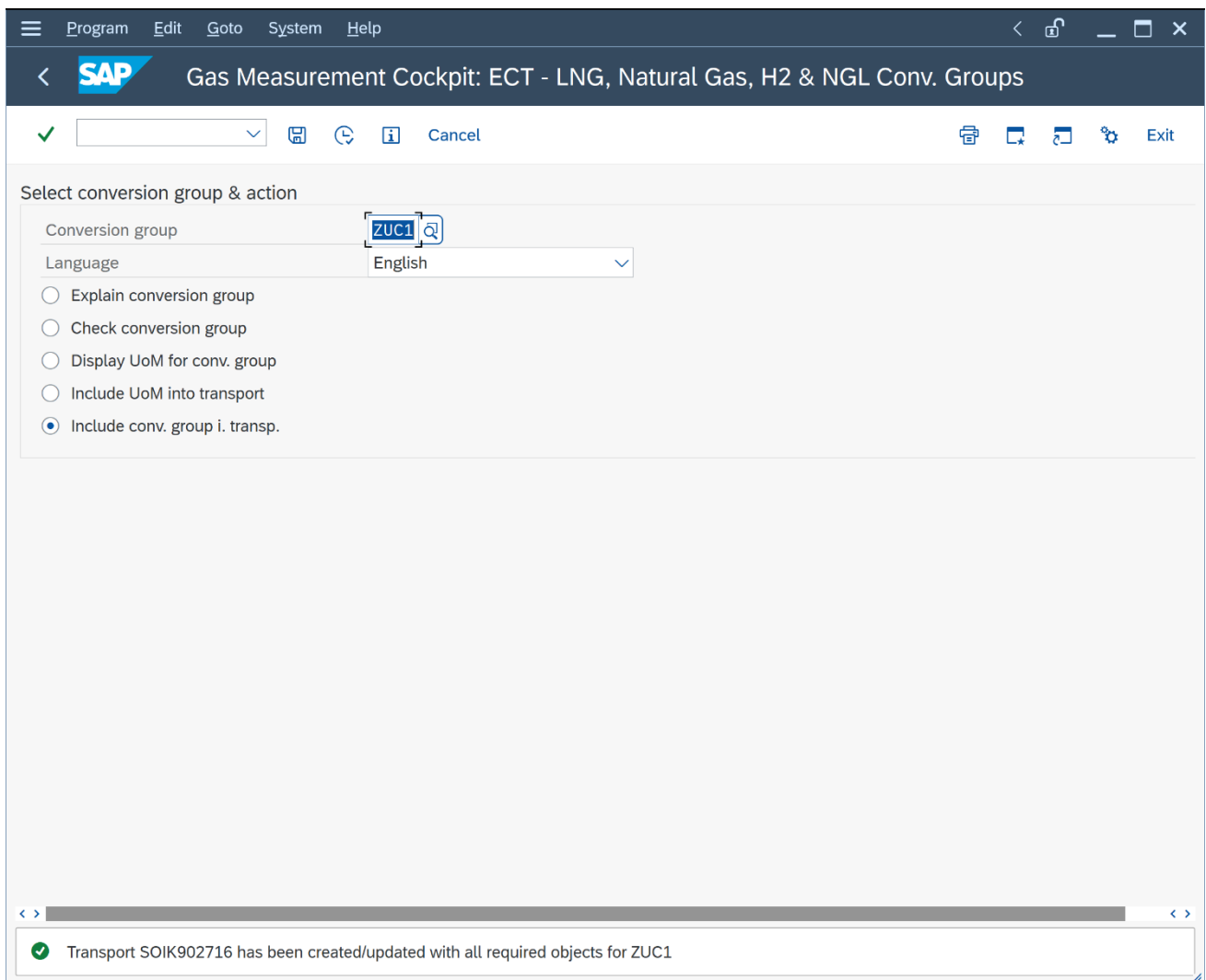
Include conv. group i. transp.

Enter Transport Request

Request: SOIK902716 Customizing request

Short Description: ZUC1 to Development Client 010

✓ [] Own Requests ✗

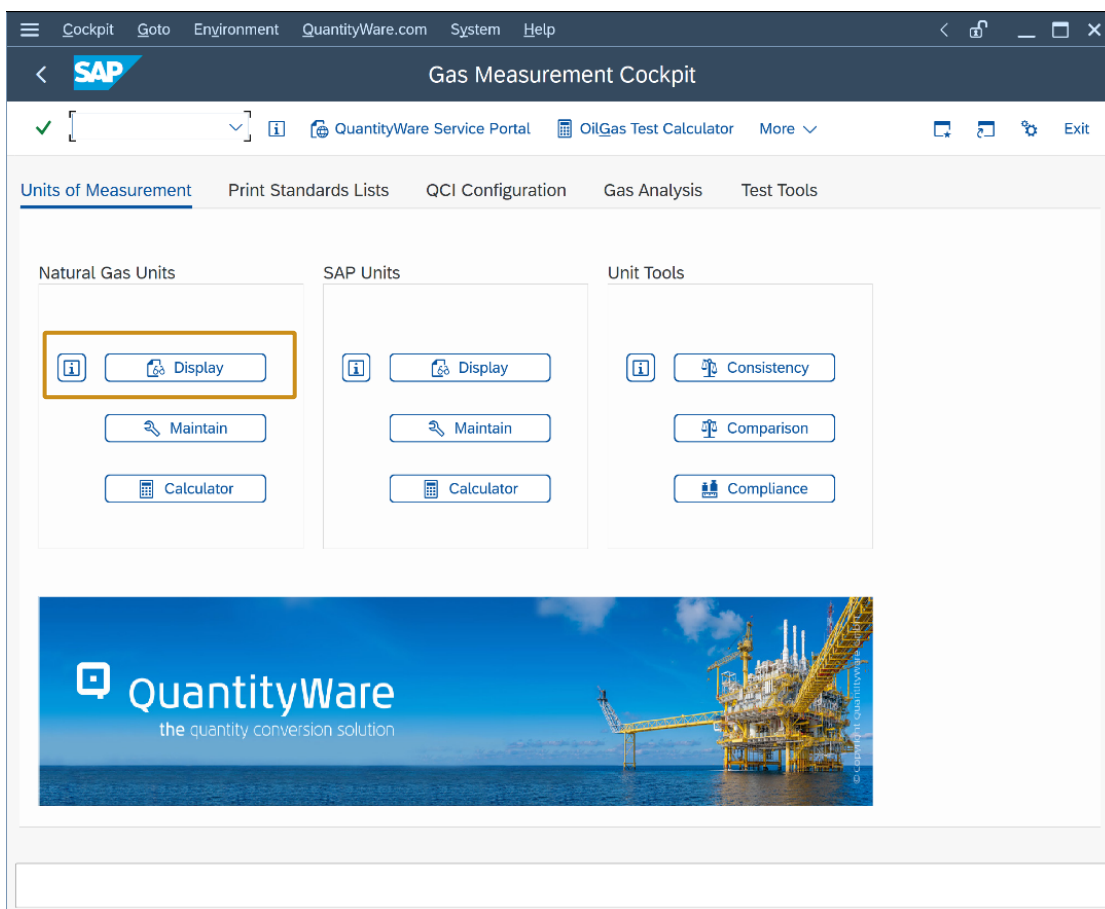


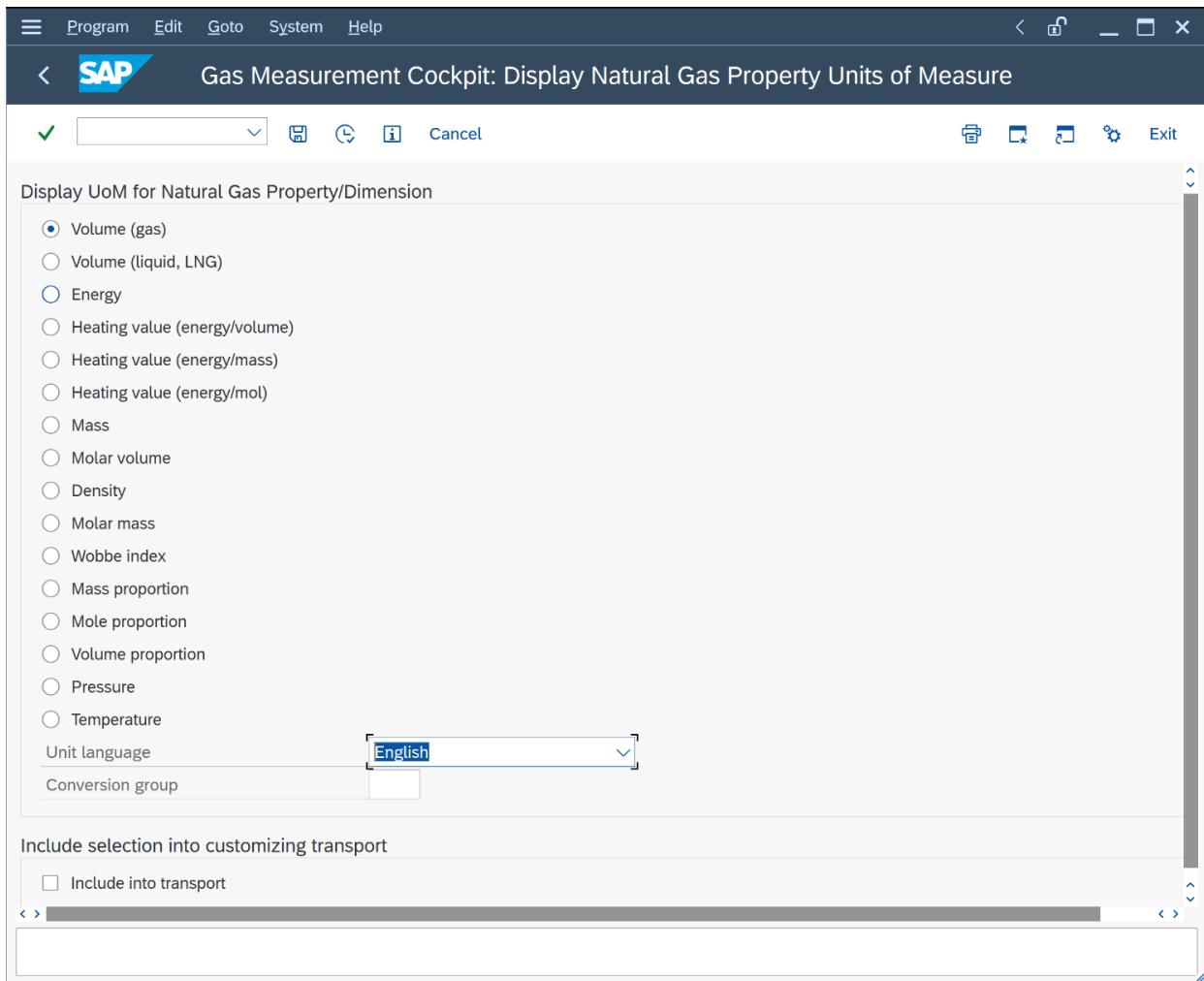
Enter your new ZUC1 conversion group and select "Include conv. group i. transp.". Select an empty/new customizing transport. **Follow your in-house procedures to have this transport imported into your development client.**



With the “Check, Explain and Transport” tool, you may also include all required UoM data for a conversion group into a single customizing transport. Since your development client typically contains previously configured UoM data, it is strongly recommended to **only copy UoM data for UoM that are NOT already present** into your development client from client 045. Otherwise, you may overwrite your existing and (hopefully) validated UoM data in that client with the QuantityWare template UoM configuration, which is validated using [NIST SP 811](#).

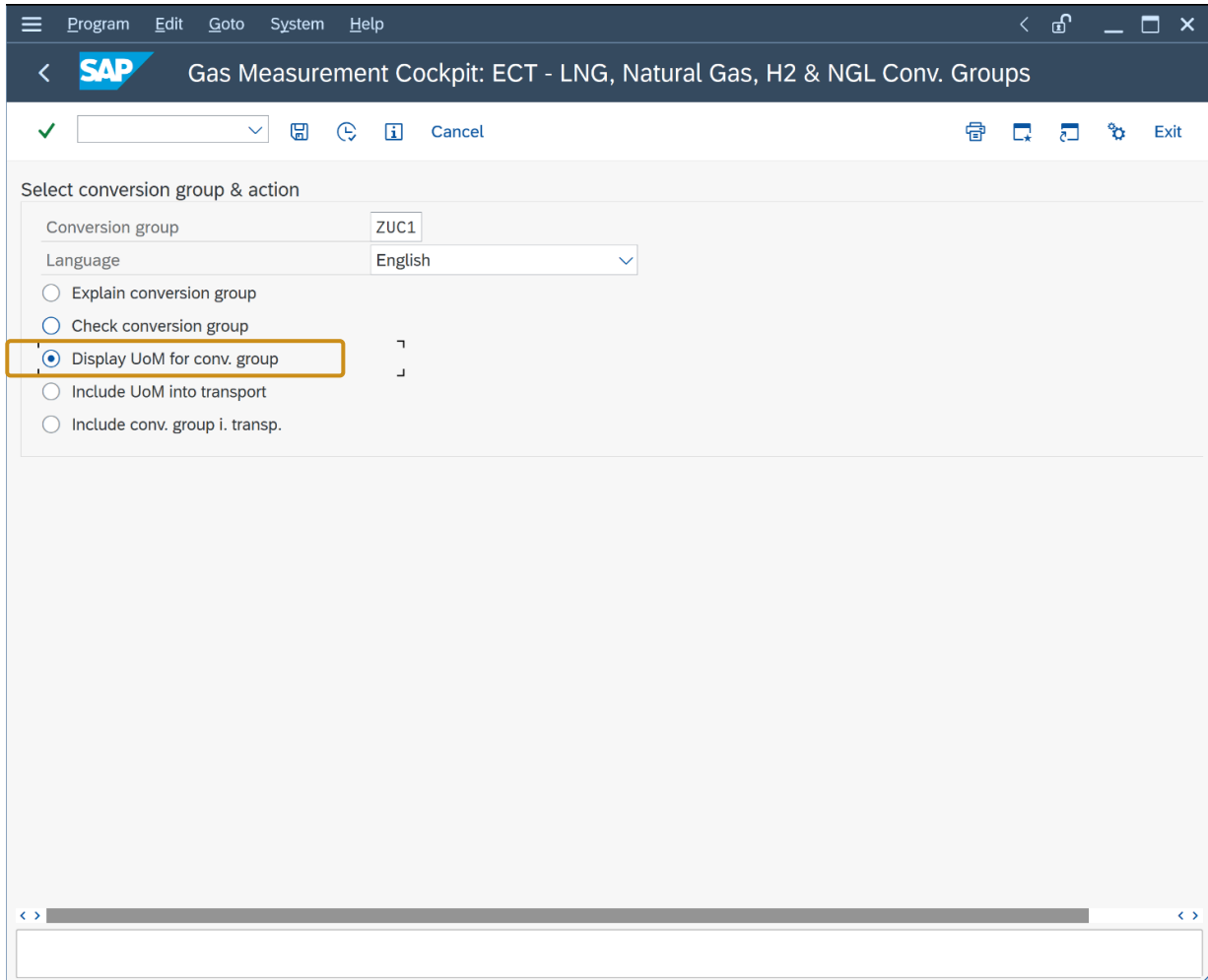
Part 2: Natural gas quantity conversions may require several new SAP Dimension IDs and associated UoM definitions, which are delivered with the BCG Template in client 045. **To prepare the configuration in your development client**, you should thus **merge & migrate** all additional SAP Dimension ID and associated UoM from the template client 045 to your development client. To identify the required Dimension ID and UoM, Select the GMC “Units of Measurement” tab strip and select “Natural Gas Units – Display”:





Compare the available UoM for all SAP Dimension ID (Volume, Volume (liquid, LNG), Energy ... Pressure, Temperature) with those available in your development client. If Dimension ID or UoM are missing in your development client, collect the missing data in client 045 and **follow your in-house procedures to have this transport imported into your development client.**

Alternatively, you can list the UoM and SAP dimension ID's which are required for conversion group ZUC1 using the ECT tool again:



Measurement Cockpit: Display Units of Measure for Conversion Group

Display All UoM Required for My Conversion Group

List of UoM for conversion group: ZUC1
MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

No	Dimension text	OG	ISO	P	Measurement unit text	One UoM =	Factor	SI	UoM conversion
22	pressure	PAL	X		pascal	1 PA =	1.0000000000	PA	UoM Conversion
23	heating value(vol.)	B8	X		joule per cubic meter	1 JM3 =	1.0000000000	JM3	UoM Conversion
24	heating value(molar)	B15	X		joule per mole	1 JOM =	1.0000000000	JOM	UoM Conversion
25	heating value (mass)	J2	X		joule per kilogram	1 JKG =	1.0000000000	JKG	UoM Conversion
26	mass proportion	3H	X		kilogram per kilogram	1 KGK =	1.0000000000	KGK	UoM Conversion
27	mole fraction				mole fraction	1 MOM =	1.0000000000	MOM	UoM Conversion
28	gas constant				SI unit J / (mol * K)	1 RSI =	1.0000000000	RSI	UoM Conversion
29	length	MTR	X		meter	1 M =	1.0000000000	M	UoM Conversion
30	heating value(molar)	B44	X		kilojoule per mole	1 KJL =	1,000.0000000000	JOM	UoM Conversion
31	molar mass				kilogram per kilomole	1 KKM =	0.0010000000	KGK	UoM Conversion
32	No dimension				relative density (air) - gas	1 RDA =	See mat. master		Not possible
33	mole fraction				mole %	1 MOP =	0.0100000000	MOM	UoM Conversion
34	density	GP	X		milligram per cubic meter	1 MGQ =	0.0000010000	KGV	UoM Conversion
35	No dimension				API gravity	1 API =	See mat. master		Not possible
36	No dimension				relative density (water 60 °F)	1 RDW =	See mat. master		Not possible

You may selectively collect this UoM data in client 045 and **follow your in-house procedures to have this transport imported into your development client.**



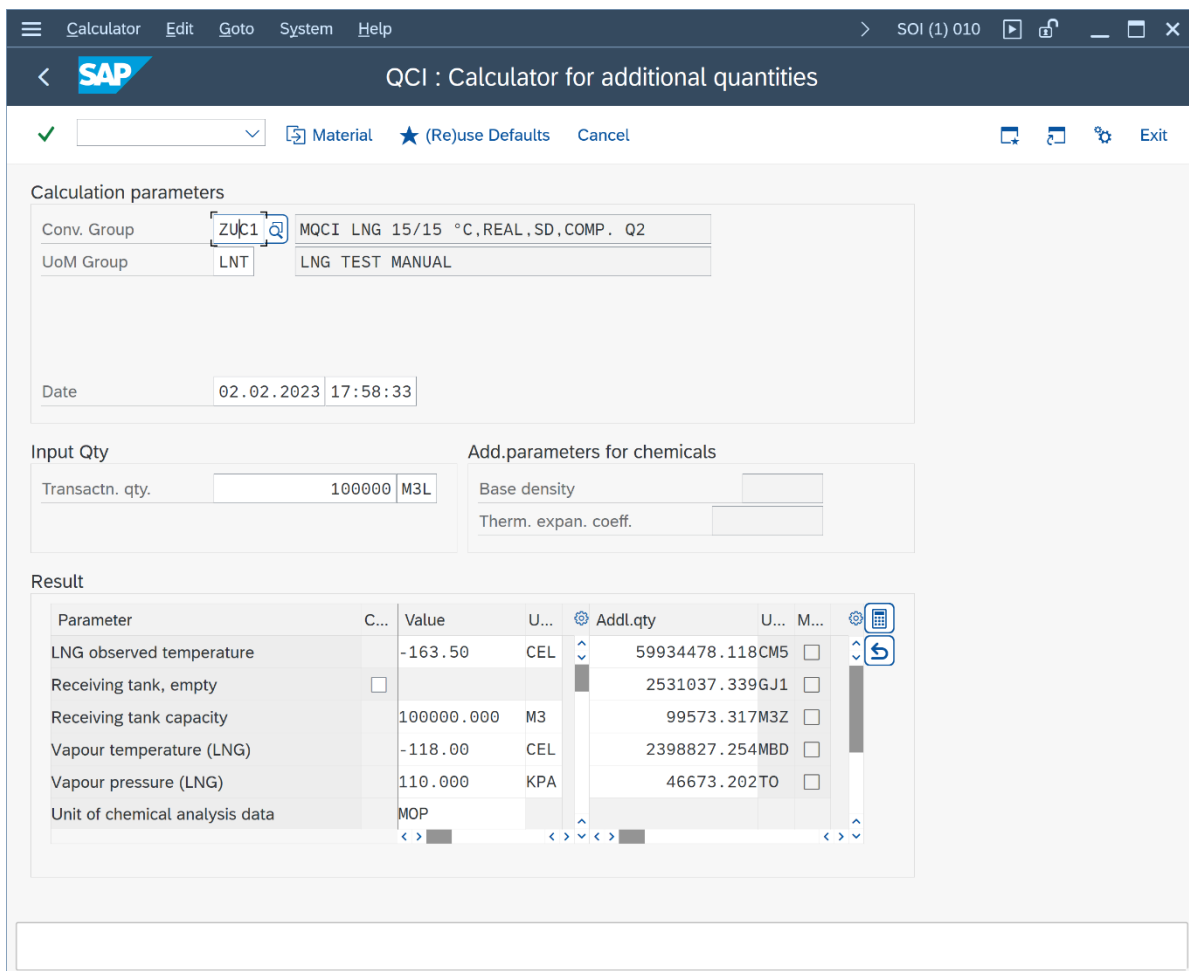
In the following test cases, your material and plant data definitions as well as available UoM groups/definitions may differ from those used in the screen shots

2.4. Test Case 04 – Test LNG Conversion Group in Development Client

Estimated test case execution time: 60 minutes

After your ZUC1 conversion group has been successfully transported to your development client, log on to that client and start the Gas Measurement Cockpit (GMC) using transaction /n/qtyw/cockpit_gas. Note that in this client, the GMC will show less options than in client 045 (where the QuantityWare template is available). For example, the BCG installation test is not available in this client, since it requires the complete QuantityWare BCG template.

Part 1: Go to the “Oil & Gas Test Calculator” and check if conversion group ZUC1 has been transported correctly to your development client, i.e., perform several trial calculations:



The screenshot shows the SAP QCI Calculator interface. The 'Calculation parameters' section is populated with the following values:

- Conv. Group: ZUC1
- UoM Group: LNT
- Date: 02.02.2023 17:58:33

The 'Input Qty' section shows:

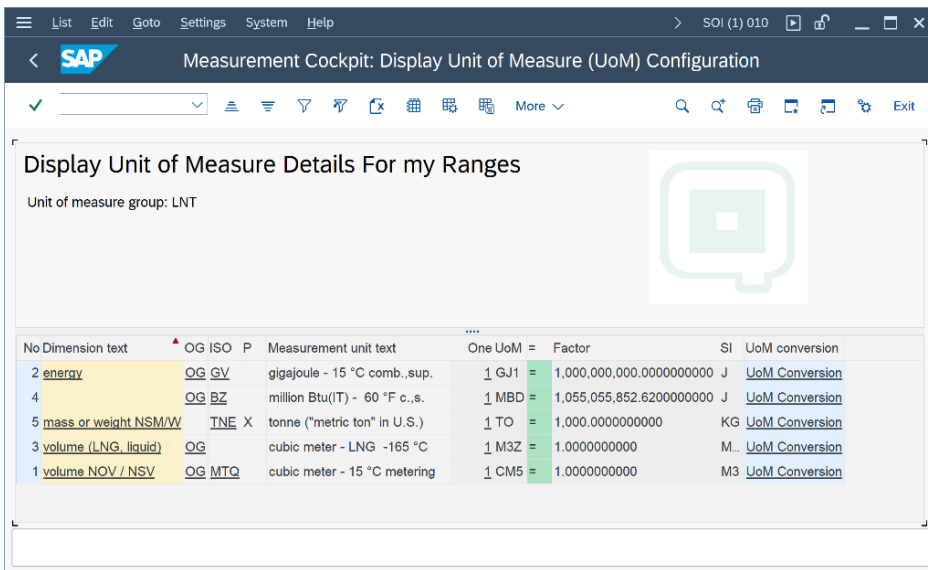
- Transactn. qty.: 100000 M3L

The 'Add.parameters for chemicals' section has empty fields for Base density and Therm. expan. coeff.

The 'Result' table displays the following data:

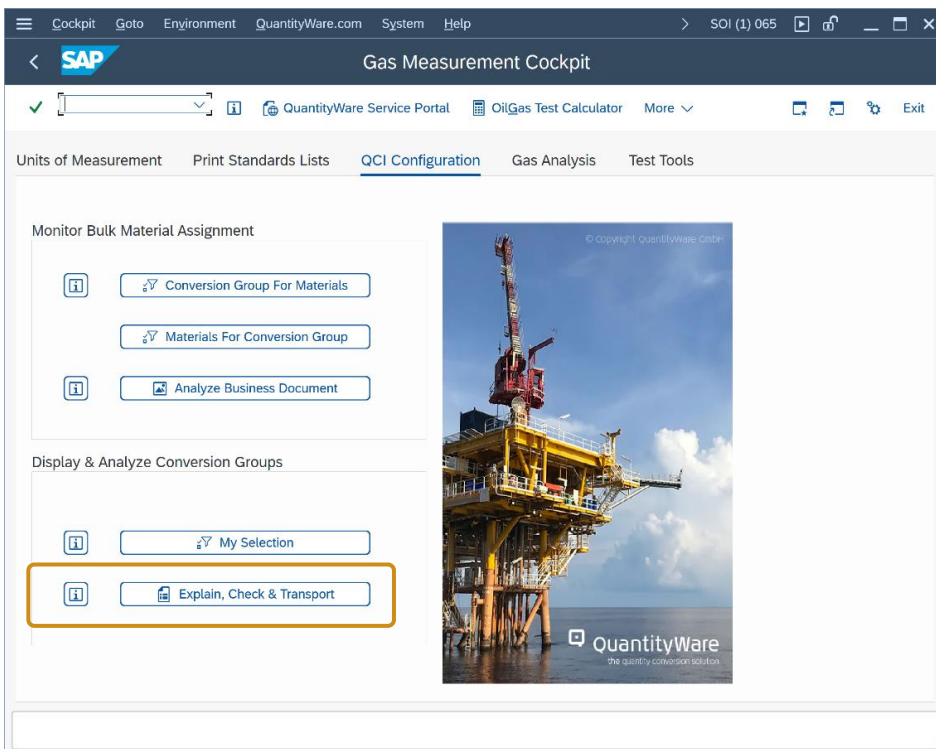
Parameter	C...	Value	U...	AddL.qty	U...	M...
LNG observed temperature		-163.50	CEL	59934478.118CM5		
Receiving tank, empty	<input type="checkbox"/>			2531037.339GJ1		
Receiving tank capacity		100000.000	M3	99573.317M3Z		
Vapour temperature (LNG)		-118.00	CEL	2398827.254MBD		
Vapour pressure (LNG)		110.000	KPA	46673.202T0		
Unit of chemical analysis data		MOP				

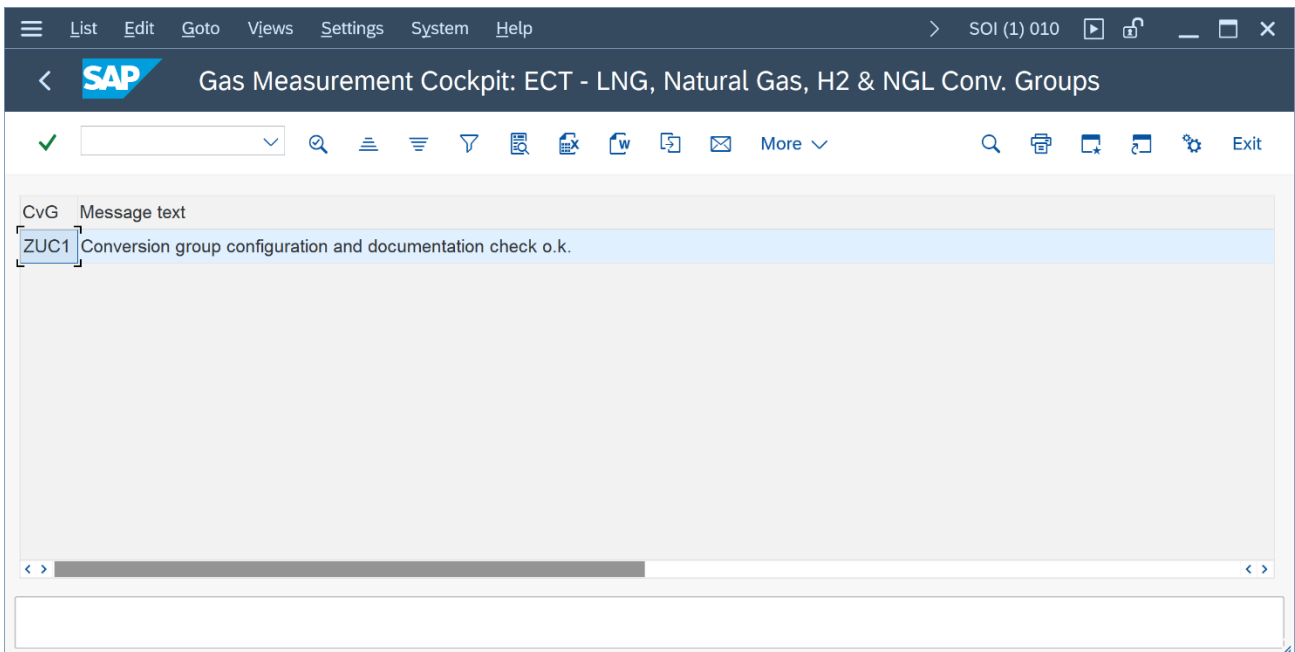
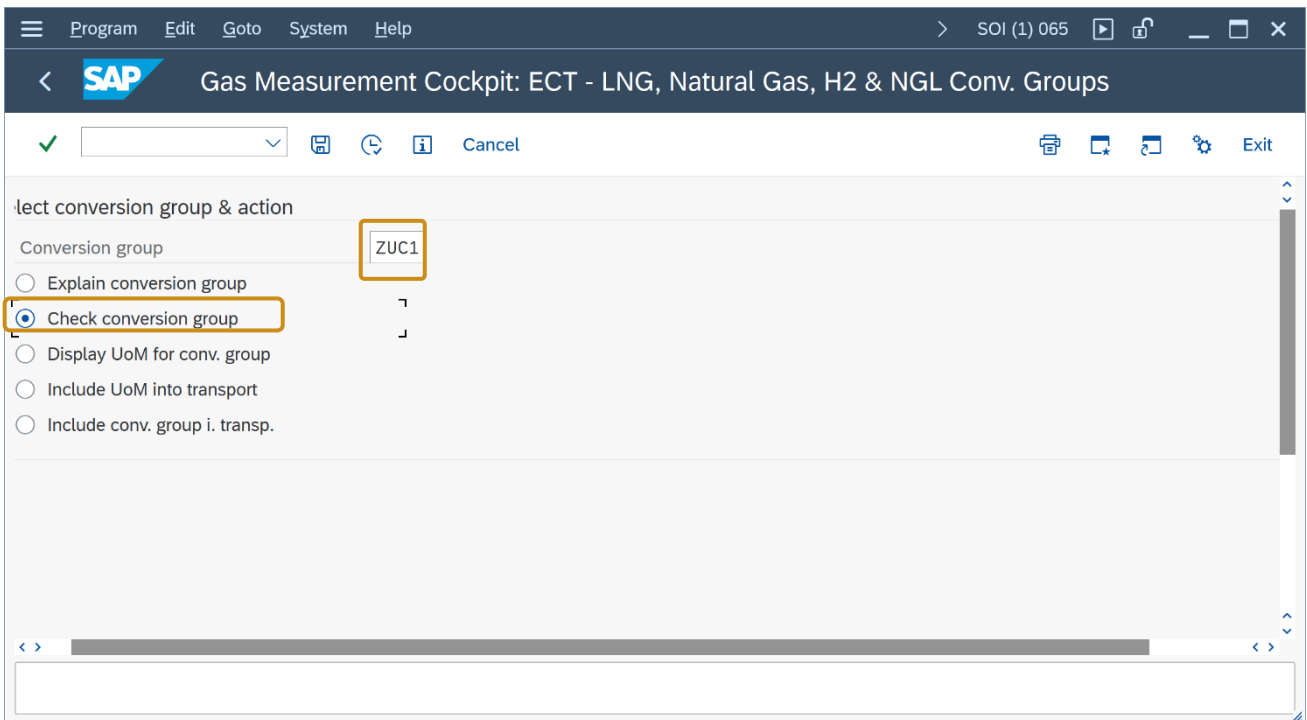
Note that we did not transport test UoM group QLN and are using a newly defined UoM group LNT instead. UoM group LNG contains 5 different UoM of four different SAP dimensions:



In your development client, you should define a UoM group like UoM group LNG for testing purposes.

Part 2: Once you have manually validated that conversion group ZUC1 is running in your development client, perform the automated validation test. Select the GMC "QCI Configuration" tab strip and select "Explain Check & Transport". Enter ZUC1 as conversion group, select "Check conversion group" and then "Execute" (F8)



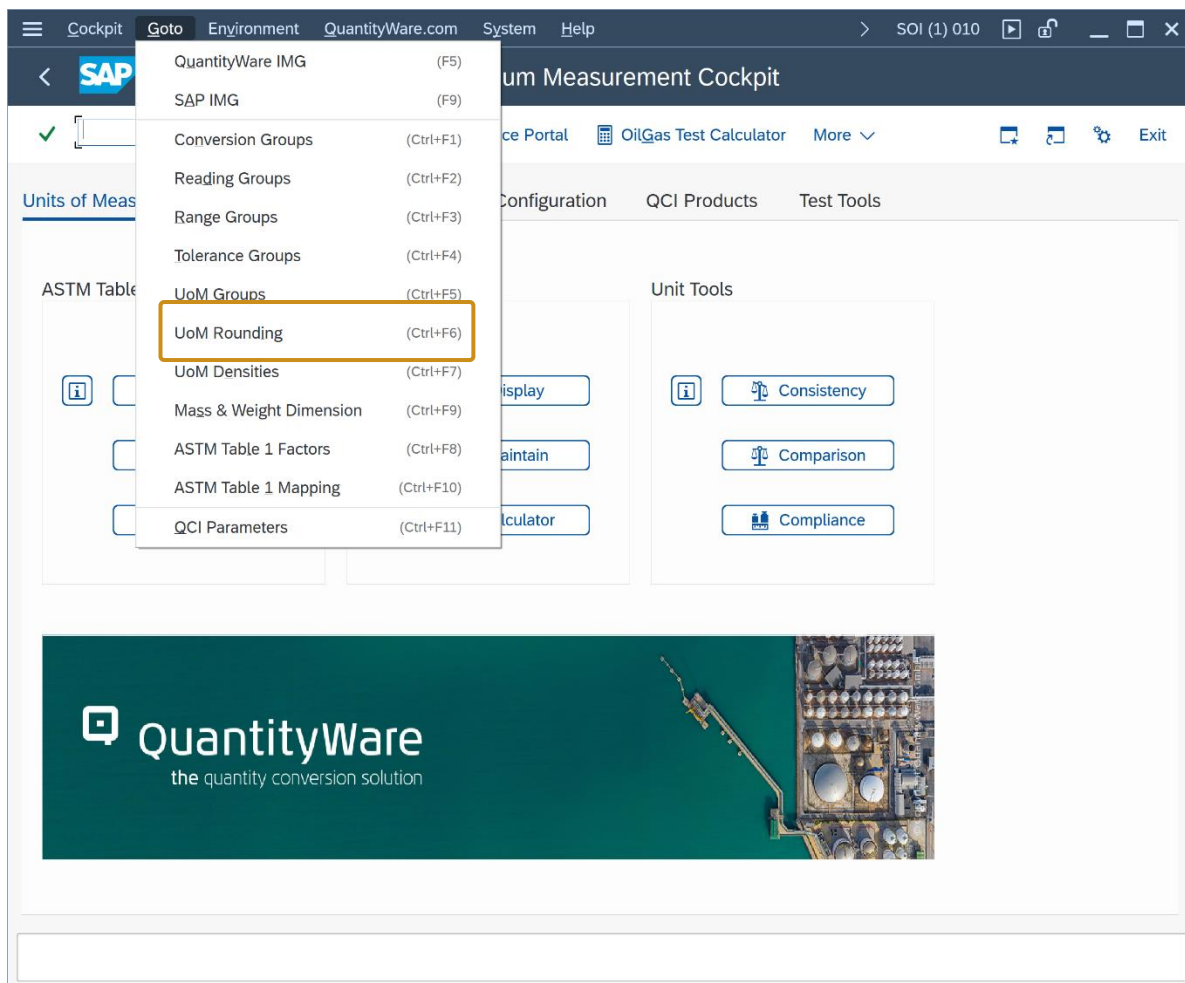


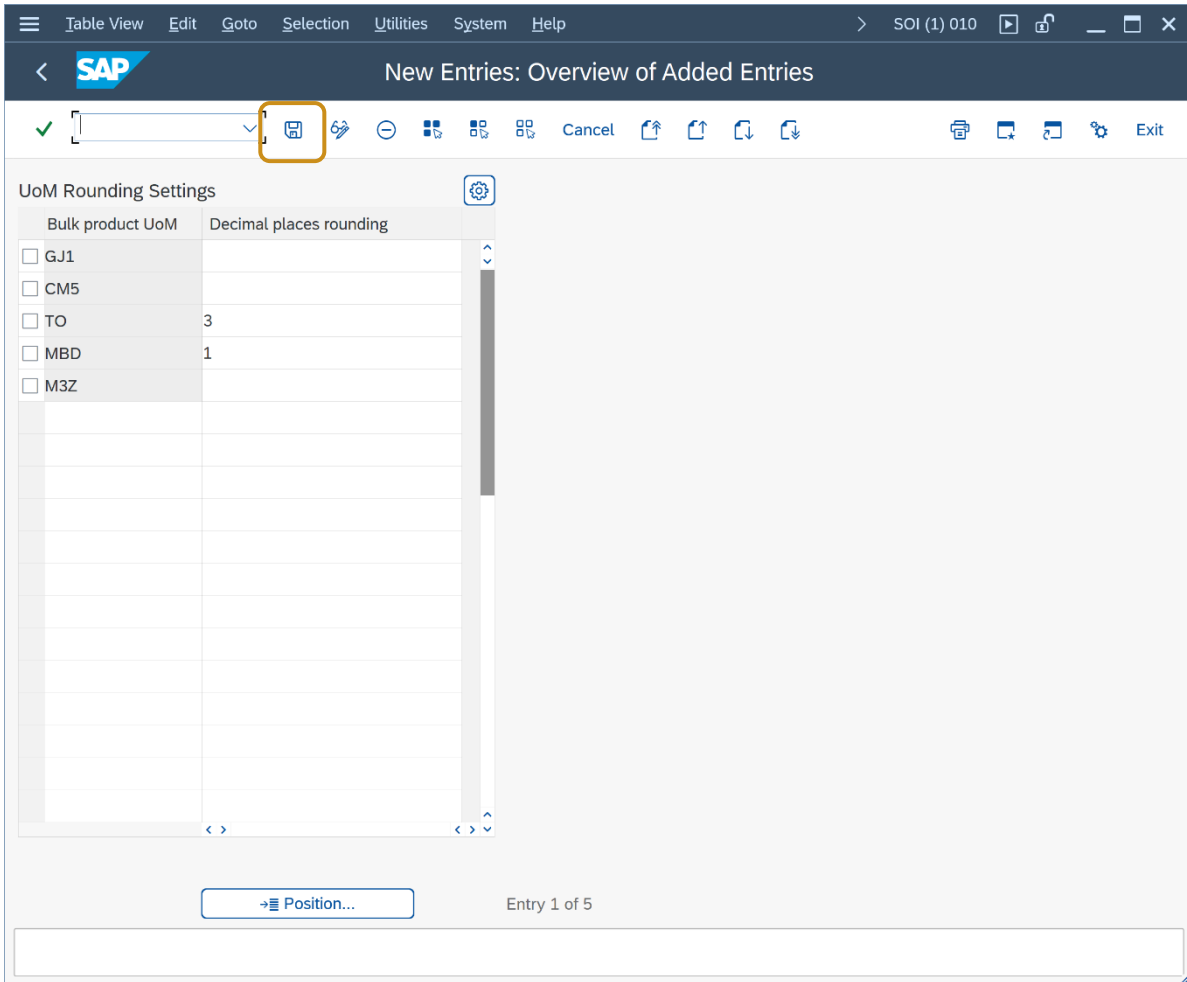
Ensure that no error or warning messages are present. **This test should produce identical results when compared with the results for ZUC1 in client 045.**

2.5. Test Case 05 – Define UoM Rounding - Development

Estimated test case execution time: 10 minutes

In your development client, define the appropriate UoM rounding for your UoM group. From the GMC menu, select: Goto -> UoM Rounding and enter the UoM M3Z, MBD, GJ1, CM5 and TO with 1 / 0 (Space) decimal places rounding:



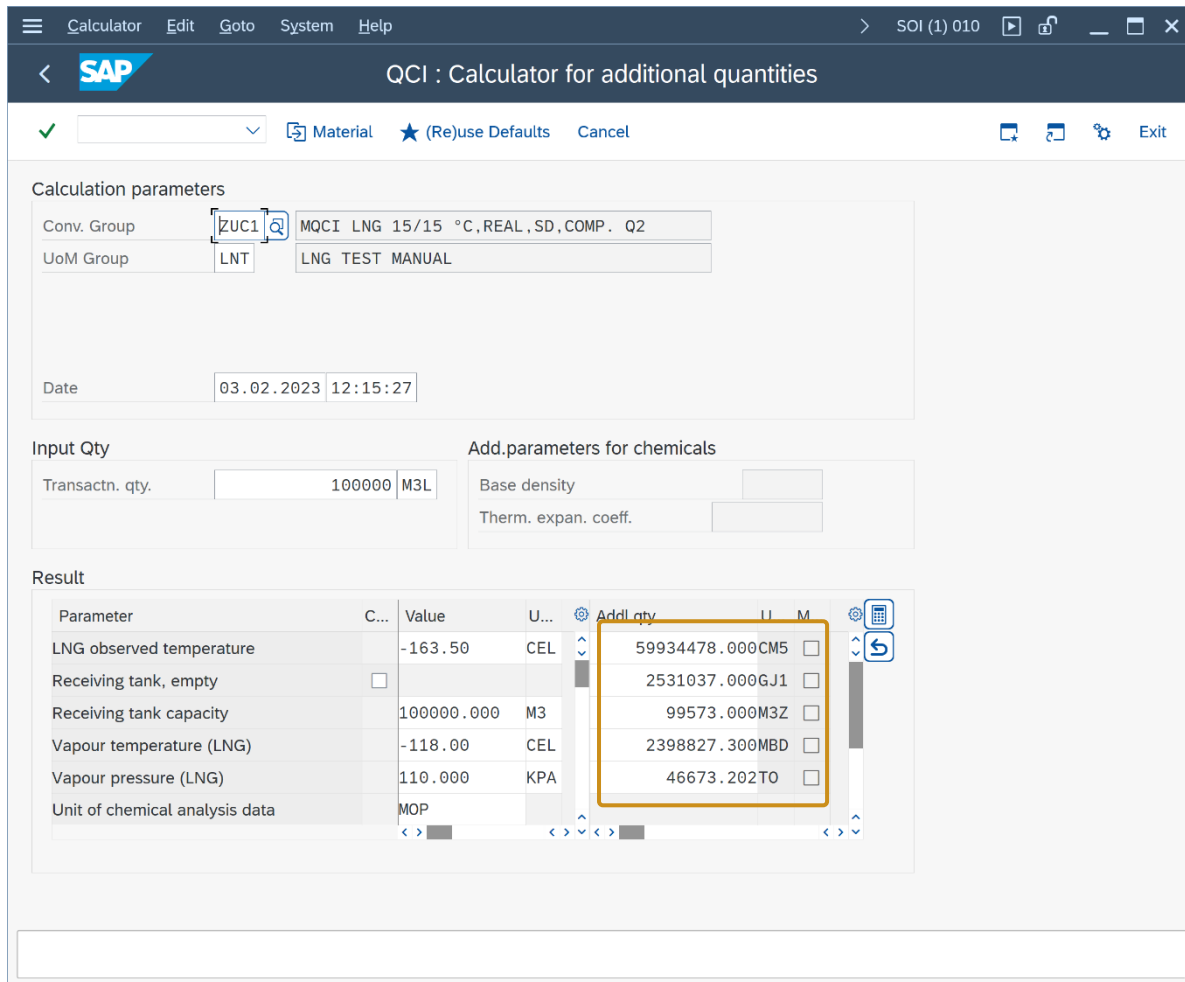


The screenshot shows the SAP 'New Entries: Overview of Added Entries' window. The title bar includes 'SAP' and 'New Entries: Overview of Added Entries'. The menu bar contains 'Table View', 'Edit', 'Goto', 'Selection', 'Utilities', 'System', and 'Help'. The status bar shows 'SOI (1) 010'. The toolbar includes a checkmark, a dropdown menu, a yellow-bordered 'Save' icon, a pencil, a left arrow, a grid icon, a refresh icon, a 'Cancel' button, a copy icon, a paste icon, a left arrow, and an 'Exit' button. The main content area is titled 'UoM Rounding Settings' and contains a table with the following data:

Bulk product UoM	Decimal places rounding
<input type="checkbox"/> GJ1	
<input type="checkbox"/> CM5	
<input type="checkbox"/> TO	3
<input type="checkbox"/> MBD	1
<input type="checkbox"/> M3Z	

At the bottom, there is a button labeled '→ Position...' and the text 'Entry 1 of 5'.

Check that the rounding settings are working by performing another trial calculation (via GMC push button "Oil & Gas Test Calculator"):



The screenshot shows the SAP QCI Calculator interface. The 'Calculation parameters' section includes 'Conv. Group' (ZUC1) and 'UoM Group' (LNT). The 'Input Qty' section shows 'Transactn. qty.' as 100000 M3L. The 'Result' table is as follows:

Parameter	C...	Value	U...	Addl. qty.	U	M
LNG observed temperature		-163.50	CEL	59934478.000	CM5	<input type="checkbox"/>
Receiving tank, empty	<input type="checkbox"/>			2531037.000	GJ1	<input type="checkbox"/>
Receiving tank capacity		100000.000	M3	99573.000	M3Z	<input type="checkbox"/>
Vapour temperature (LNG)		-118.00	CEL	2398827.300	MBD	<input type="checkbox"/>
Vapour pressure (LNG)		110.000	KPA	46673.202	TO	<input type="checkbox"/>
Unit of chemical analysis data		MOP				

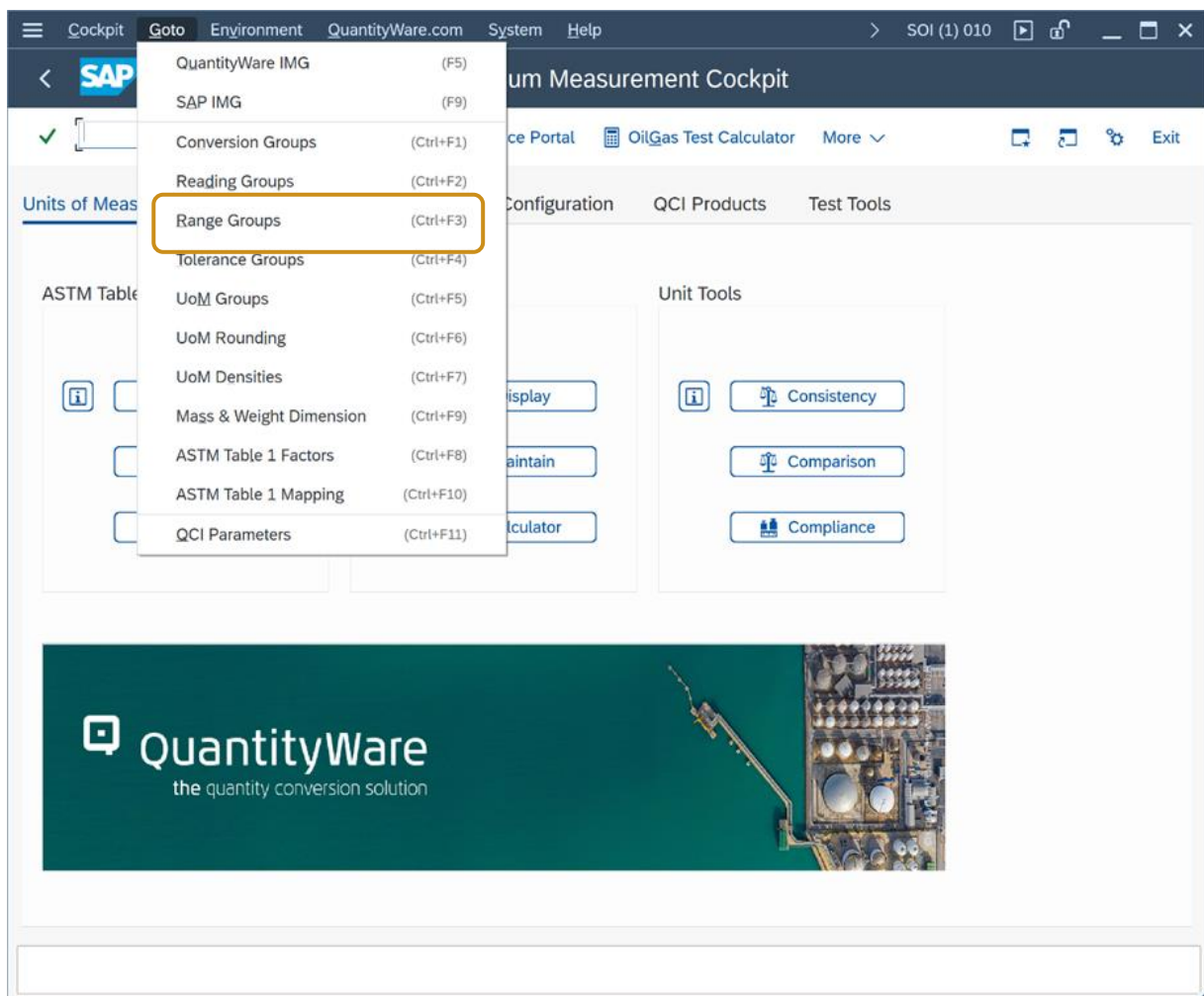


Via transaction CUNI, you may also change the display decimal settings for all UoM, such that trailing zeros are no longer displayed (as shown in the screen print above).

2.6. Test Case 06 – Define Ranges for LNG Conversion Group - Development

Estimated test case execution time: 20 minutes

In your development client, define the appropriate range limits for three of the input parameters. From the GMC menu, select: Goto -> Range Groups and define range limits for the LNG observed temperature (liquid), LNG methane fraction (CH₄) and LNG Tot. Sulphur (incl. Mercaptan) fraction:



SAP Change View "Reading Group: Parameter Ranges": Overview

SOI (1) 010

Table View Edit Goto Selection Utilities System Help

New Entries

Dialog Structure

- Reading Group: Range Check
 - Reading Group: Parameter Ranges

Rdg. group	Parameter name	Description
<input type="checkbox"/>	ZUC1 COMPOSUNIT	Unit of chemical analysis data
<input type="checkbox"/>	ZUC1 ETHANE	Ethane (C2H6)
<input type="checkbox"/>	ZUC1 HYDSULIMP	Hydrogen sulfide
<input type="checkbox"/>	ZUC1 IMPUNIT	Impurities: unit of measure
<input checked="" type="checkbox"/>	ZUC1 METHANE	Methane (CH4)
<input checked="" type="checkbox"/>	ZUC1 MTLNG	LNG observed temperature
<input type="checkbox"/>	ZUC1 N-BUTANE	n-Butane (n-C4H10)
<input type="checkbox"/>	ZUC1 N-HEXANE	Hexanes +
<input type="checkbox"/>	ZUC1 N-PENTANE	n-Pentane (C5H12)
<input type="checkbox"/>	ZUC1 NITROGEN	Nitrogen (N2)
<input type="checkbox"/>	ZUC1 OBSVAPRES	Vapour pressure (LNG)
<input type="checkbox"/>	ZUC1 OXYGEN	Oxygen (O2)
<input type="checkbox"/>	ZUC1 PROPANE	Propane (C3H8)
<input type="checkbox"/>	ZUC1 RECTANKEMP	Receiving tank, empty
<input type="checkbox"/>	ZUC1 TANKCAP	Receiving tank capacity
<input type="checkbox"/>	ZUC1 TMETBUTANE	2-Methylbutane (i-Pentane)
<input type="checkbox"/>	ZUC1 TMETPROPAN	2-Methylpropane (i-Butane)
<input checked="" type="checkbox"/>	ZUC1 TALSULPH	Tot.sulphur(incl. Mercaptane)

Position... Entry 1 of 19

SAP Change View "Reading Group: Parameter Ranges": Details

SOI (1) 010

Table View Edit Goto Selection Utilities System Help

New Entries Cancel Exit

Dialog Structure

- Reading Group: Range Check
- Reading Group: Parameter Ranges**

Reading Group: Parameter Ranges

Description	Methane (CH4)
Unit of measure	MOP
Error:high	99.000000
Indicator	Non zero range limit
Warning: high	98.000000
Indicator	Non zero range limit
Warning: low	92.000000
Indicator	Non zero range limit
Error:low	90.000000
Indicator	Non zero range limit
Param. (const.)	
Comp. operator	

Parameter is a density or heating value
 Parameter is a natural gas component
 Parameter is a natural gas impurity

Change View "Reading Group: Parameter Ranges": Details

Reading group: ZUC1
Parameter name: MTLNG

Reading Group: Parameter Ranges

Description: LNG observed temperature
Unit of measure: CEL

Error:high: 155.000000 -
Indicator: Non zero range limit

Warning: high: 157.000000 -
Indicator: Non zero range limit

Warning: low: 164.000000 -
Indicator: Non zero range limit

Error:low: 169.000000 -
Indicator: Non zero range limit

Param. (const.):
Comp. operator:

Table View Edit Goto Selection Utilities System Help > SOI (1) 010

SAP Change View "Reading Group: Parameter Ranges": Details

✓ [] New Entries Cancel Exit

Dialog Structure

- Reading Group: Range Check
- Reading Group: Parameter Ranges**

Reading Group: Parameter Ranges

Description: Tot.sulphur(incl. Mercaptane)
 Unit of measure: MGQ

Error:high: 200.000000
 Indicator: Non zero range limit

Warning: high: 160.000000
 Indicator: Non zero range limit

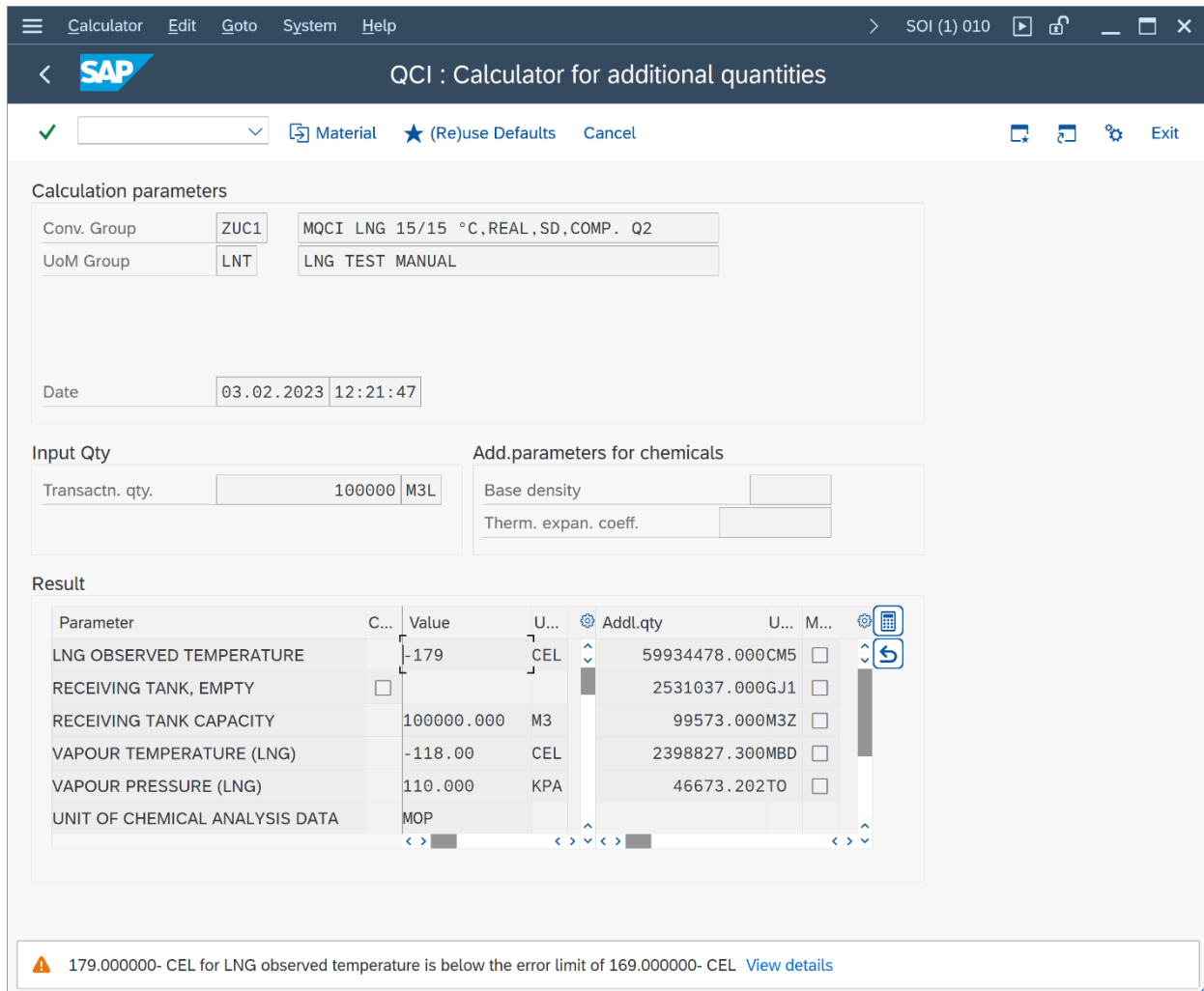
Warning: low: []
 Indicator: No range limit specified

Error:low: []
 Indicator: No range limit specified

Param. (const.): []
 Comp. operator: []

Parameter is a density or heating value
 Parameter is a natural gas component
 Parameter is a natural gas impurity

Once you have maintained the ranges and saved your work, perform trial conversions and test that the range limits are working:



Calculator Edit Goto System Help > SOI (1) 010

SAP QCI : Calculator for additional quantities

Material (Re)use Defaults Cancel

Calculation parameters

Conv. Group: ZUC1 MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

UoM Group: LNT LNG TEST MANUAL

Date: 03.02.2023 12:21:47

Input Qty: Transactn. qty. 100000 M3L

Add.parameters for chemicals: Base density, Therm. expan. coeff.

Result

Parameter	C...	Value	U...	Addl.qty	U...	M...
LNG OBSERVED TEMPERATURE		-179	CEL	59934478.000	CM5	<input type="checkbox"/>
RECEIVING TANK, EMPTY	<input type="checkbox"/>			2531037.000	GJ1	<input type="checkbox"/>
RECEIVING TANK CAPACITY		100000.000	M3	99573.000	M3Z	<input type="checkbox"/>
VAPOUR TEMPERATURE (LNG)		-118.00	CEL	2398827.300	MBD	<input type="checkbox"/>
VAPOUR PRESSURE (LNG)		110.000	KPA	46673.202	T0	<input type="checkbox"/>
UNIT OF CHEMICAL ANALYSIS DATA		MOP				

⚠ 179.000000- CEL for LNG observed temperature is below the error limit of 169.000000- CEL [View details](#)

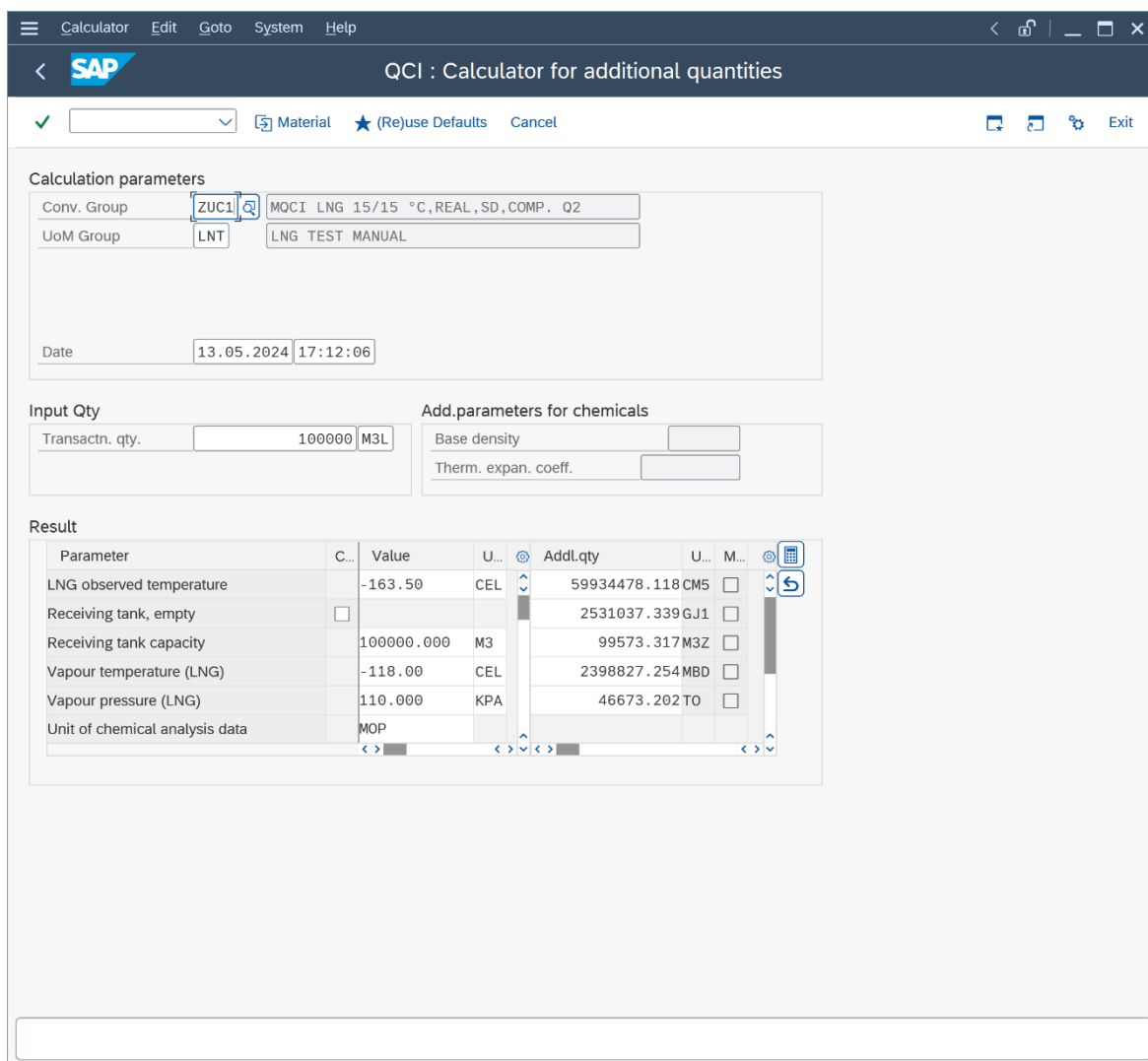


Good range data is vital to ensure good data quality e.g., for measurement values being passed from the field to the ERP system, as well as to prevent fraudulent via “open door (unrealistic) calculations”. For production usage, you should define ranges for all relevant input data e.g., the complete chemical composition data as well.

2.7. Test Case 07 – Define Test Scenarios for LNG Conversion Group - Development

Estimated test case execution time: 60 minutes

Test scenarios are your insurance against manipulation and proof that that your quantity conversion configuration is running as designed and tested, in production. For this test case we assume that you have validated the calculations of conversion group ZUC1 (e.g., independent calculations in a spreadsheet or by comparing the results with data from legacy systems, typically done by certified BCG consultants). Let's take the following test calculation - GMC push button "Oil & Gas Test Calculator" - and transfer it into our first test scenario (note that we use the non-rounded UoM settings):

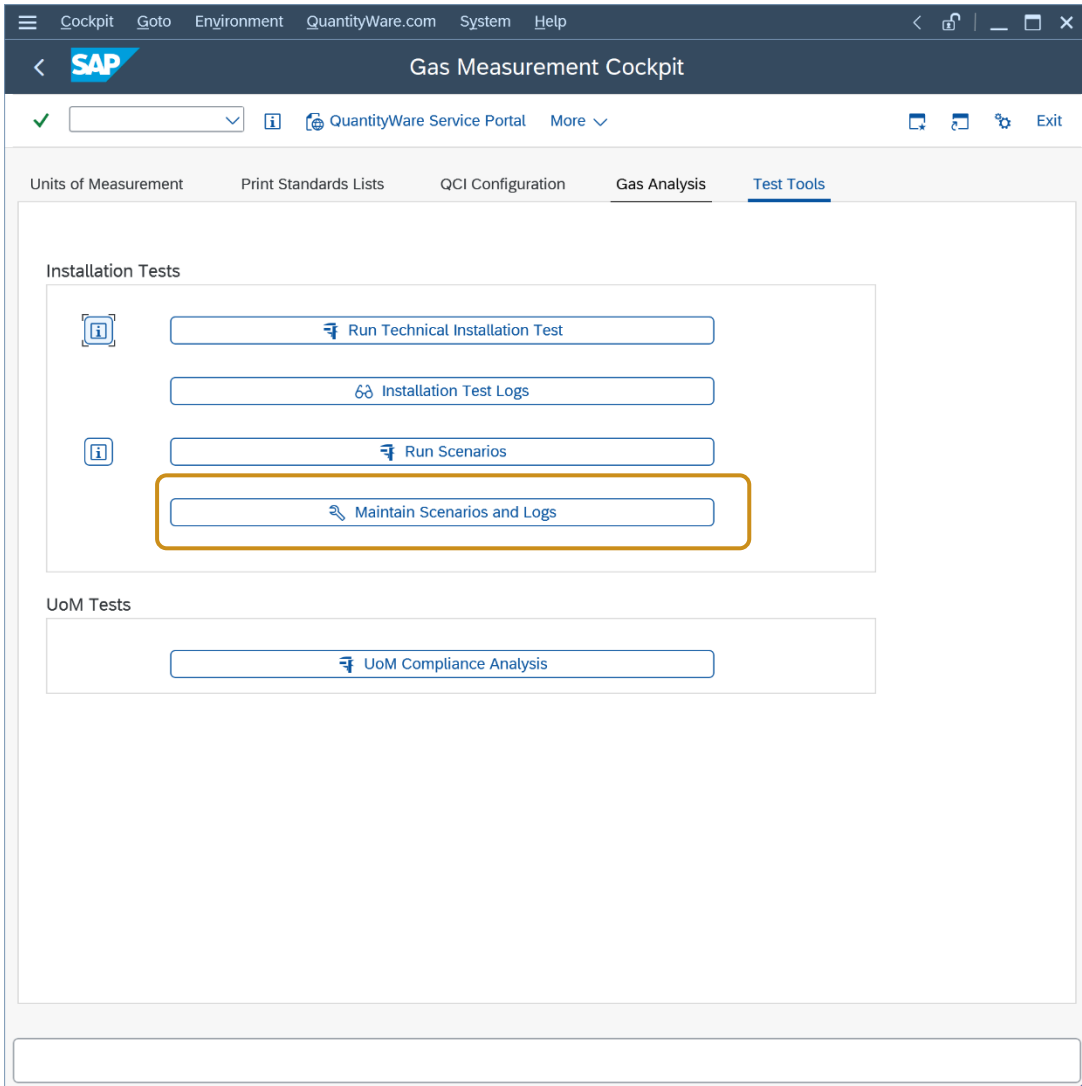


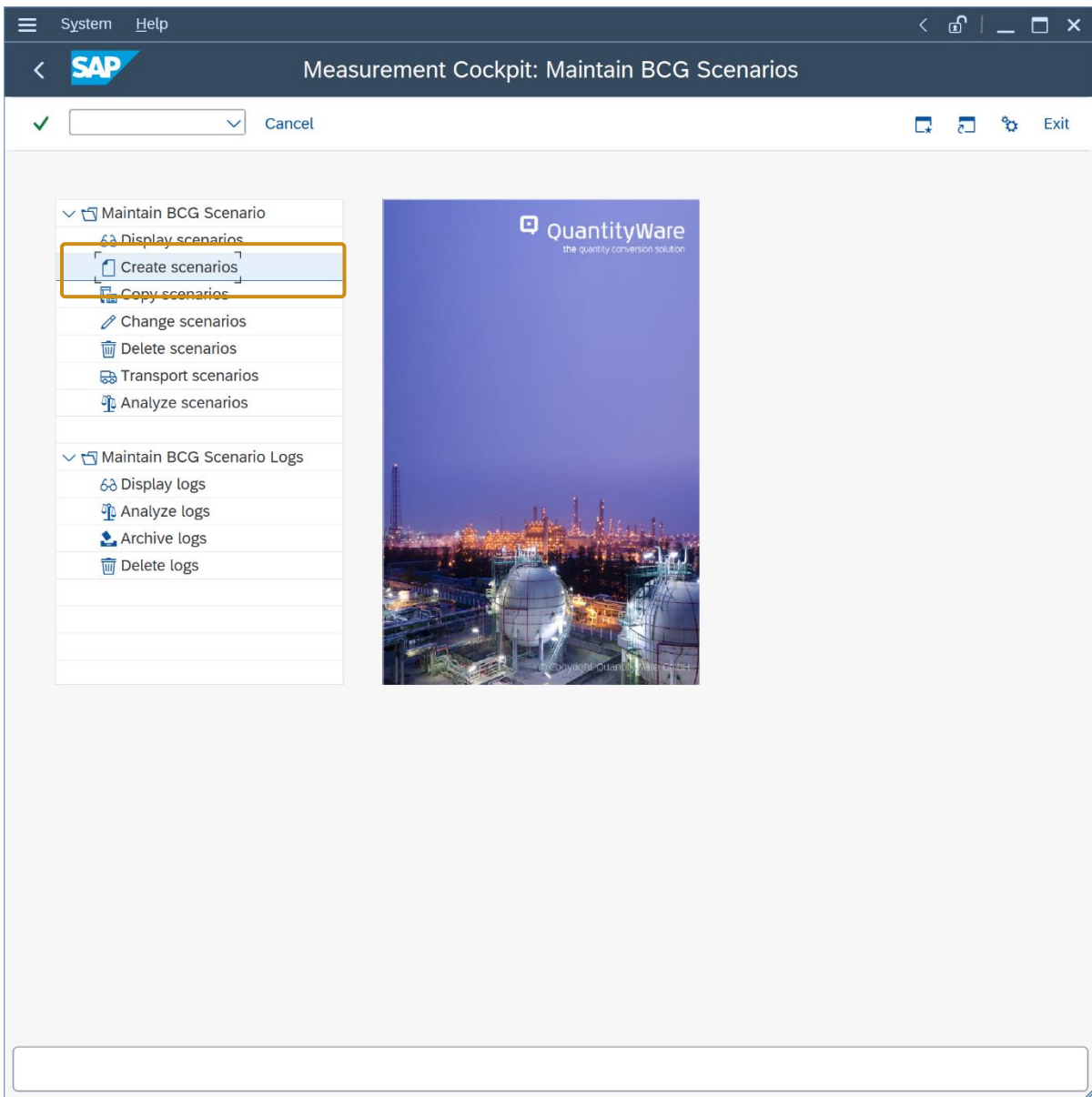
The screenshot shows the SAP QCI Calculator interface. The title bar reads "QCI : Calculator for additional quantities". The main window contains several sections:

- Calculation parameters:**
 - Conv. Group: ZUC1
 - UoM Group: LNT
 - Date: 13.05.2024 17:12:06
- Input Qty:**
 - Transactn. qty.: 100000 M3L
- Add.parameters for chemicals:**
 - Base density: [empty]
 - Therm. expan. coeff.: [empty]
- Result:**

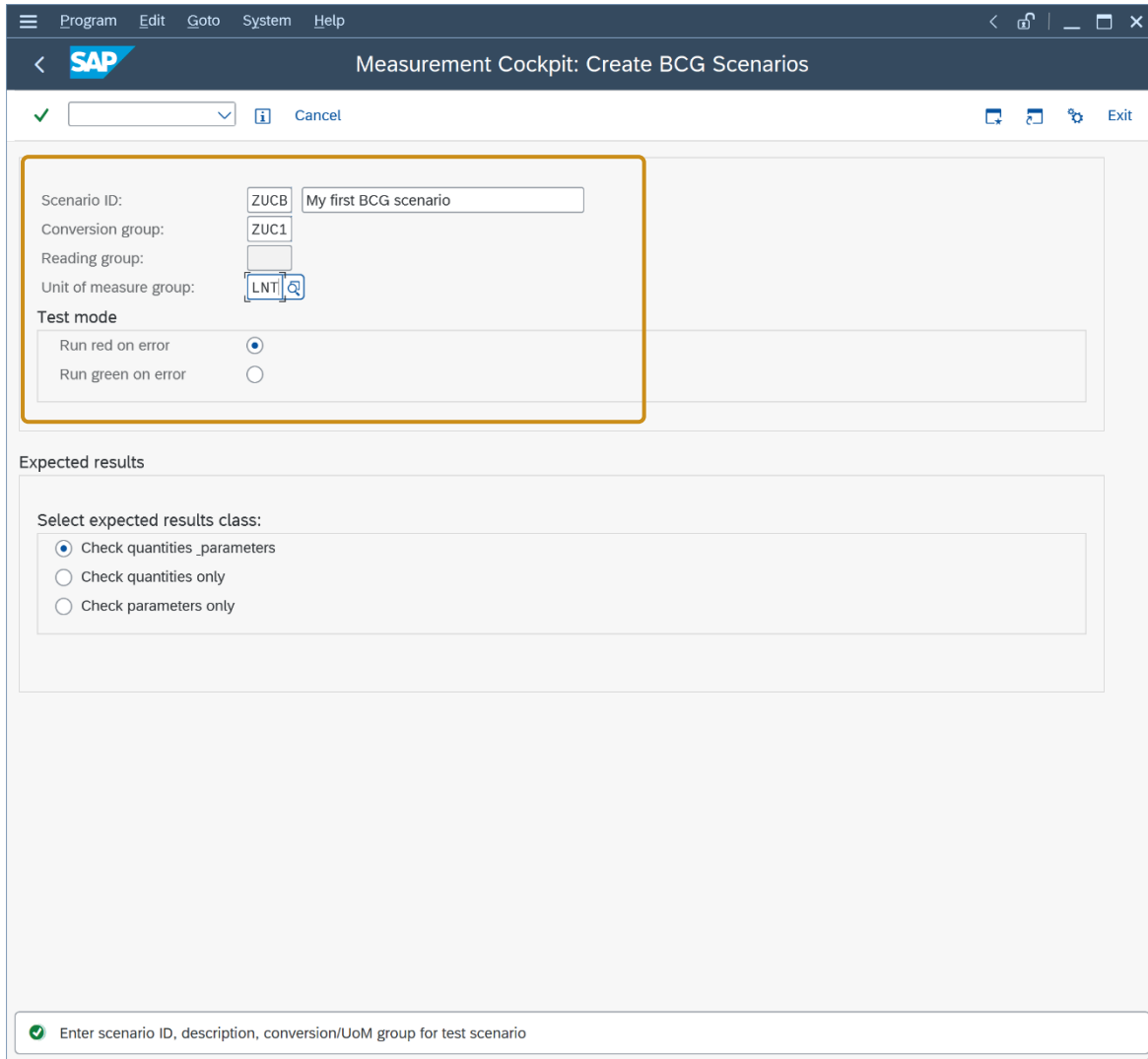
Parameter	C...	Value	U...	Addl.qty	U...	M...
LNG observed temperature		-163.50	CEL	59934478.118	CM5	<input type="checkbox"/>
Receiving tank, empty	<input type="checkbox"/>			2531037.339	GJ1	<input type="checkbox"/>
Receiving tank capacity		100000.000	M3	99573.317	M3Z	<input type="checkbox"/>
Vapour temperature (LNG)		-118.00	CEL	2398827.254	MBD	<input type="checkbox"/>
Vapour pressure (LNG)		110.000	KPA	46673.202	TO	<input type="checkbox"/>
Unit of chemical analysis data		MOP				

From the GMC tab strip “Test Tools” select “Maintain Scenarios & Logs”, then “Create scenarios”:





Enter the scenario ID (e.g., ZUCA), a description, the conversion group ZUC1 and UoM group LNT and press "Enter":

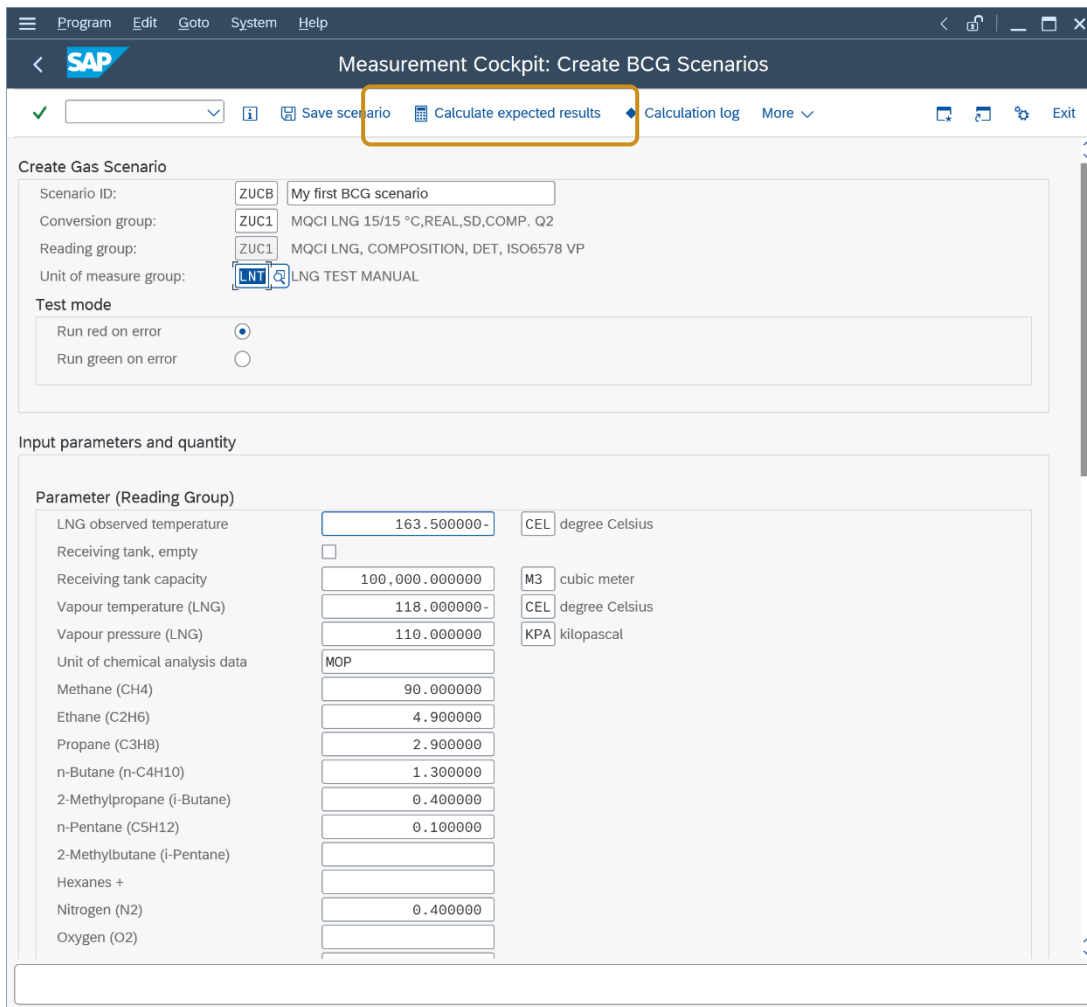


The screenshot shows the SAP Measurement Cockpit interface for creating BCG scenarios. The dialog box has a title bar with 'SAP' and 'Measurement Cockpit: Create BCG Scenarios'. Below the title bar, there is a navigation bar with a back arrow, a search icon, and a 'Cancel' button. The main content area is divided into several sections:

- Scenario ID:** A text input field containing 'ZUCB' and a description field containing 'My first BCG scenario'.
- Conversion group:** A dropdown menu showing 'ZUC1'.
- Reading group:** An empty dropdown menu.
- Unit of measure group:** A dropdown menu showing 'LNT' with a search icon.
- Test mode:** Two radio buttons: 'Run red on error' (selected) and 'Run green on error'.
- Expected results:** A section titled 'Select expected results class:' with three radio buttons: 'Check quantities _parameters' (selected), 'Check quantities only', and 'Check parameters only'.

At the bottom of the dialog box, there is a status bar with a green checkmark and the text: 'Enter scenario ID, description, conversion/UoM group for test scenario'.

In the details screen, the reading group values are defaulted as input parameters. Now enter the LNG observed temperature as -163.500 °C and the transaction quantity of 100,000.000 M3L. Then select the “Calculate expected result” push button, confirm the calculation and save the scenario (CTRL + F4), confirming all messages:



The screenshot shows the SAP Measurement Cockpit interface for creating BCG scenarios. The window title is "Measurement Cockpit: Create BCG Scenarios". The top menu bar includes "Program", "Edit", "Goto", "System", and "Help". The main toolbar contains "Save scenario", "Calculate expected results" (highlighted with a red box), "Calculation log", and "More".

Create Gas Scenario

Scenario ID: ZUCB My first BCG scenario
 Conversion group: ZUC1 MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
 Reading group: ZUC1 MQCI LNG, COMPOSITION, DET, ISO6578 VP
 Unit of measure group: LNT LNG TEST MANUAL

Test mode

Run red on error:
 Run green on error:

Input parameters and quantity

Parameter (Reading Group)	Value	Unit
LNG observed temperature	163.500000-	CEL degree Celsius
Receiving tank, empty	<input type="checkbox"/>	
Receiving tank capacity	100,000.000000	M3 cubic meter
Vapour temperature (LNG)	118.000000-	CEL degree Celsius
Vapour pressure (LNG)	110.000000	KPA kilopascal
Unit of chemical analysis data	MOP	
Methane (CH4)	90.000000	
Ethane (C2H6)	4.900000	
Propane (C3H8)	2.900000	
n-Butane (n-C4H10)	1.300000	
2-Methylpropane (i-Butane)	0.400000	
n-Pentane (C5H12)	0.100000	
2-Methylbutane (i-Pentane)		
Hexanes +		
Nitrogen (N2)	0.400000	
Oxygen (O2)		

Program Edit Goto System Help

SAP Measurement Cockpit: Create BCG Scenarios

Save scenario Calculate expected results Calculation log More Exit

Input parameters and quantity

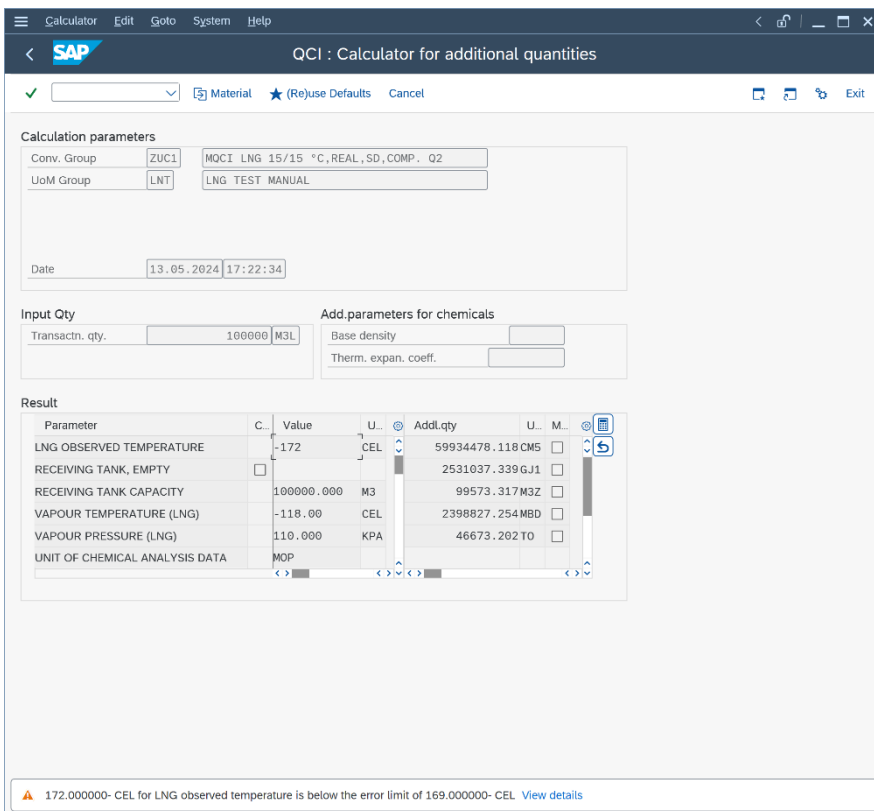
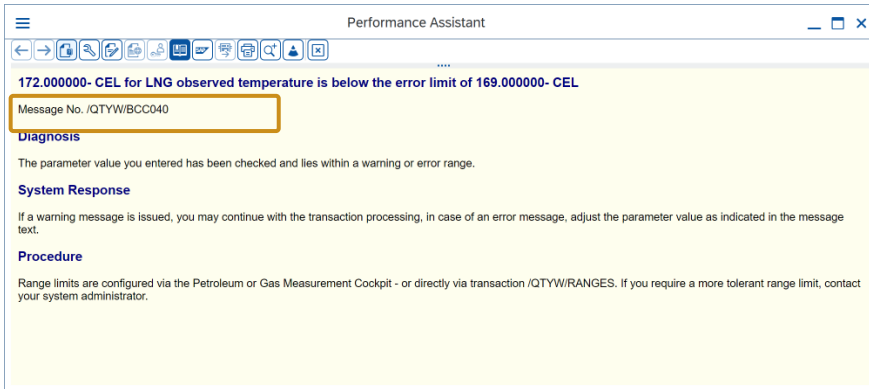
Parameter (Reading Group)	Value	Unit
LNG observed temperature	163.500000-	CEL degree Celsius
Receiving tank, empty	<input type="checkbox"/>	
Receiving tank capacity	100,000.000000	M3 cubic meter
Vapour temperature (LNG)	118.000000-	CEL degree Celsius
Vapour pressure (LNG)	110.000000	KPA kilopascal
Unit of chemical analysis data	MOP	
Methane (CH4)	90.000000	
Ethane (C2H6)	4.900000	
Propane (C3H8)	2.900000	
n-Butane (n-C4H10)	1.300000	
2-Methylpropane (i-Butane)	0.400000	
n-Pentane (C5H12)	0.100000	
2-Methylbutane (i-Pentane)		
Hexanes +		
Nitrogen (N2)	0.400000	
Oxygen (O2)		
Impurities: unit of measure	MGQ	
Hydrogen sulfide	5.000000	
Tot.sulphur(incl. Mercaptane)	150.000000	

Transaction quantity

Quantity	100,000.0000	M3L cubic meter - LNG - liquid
----------	--------------	--------------------------------

Expected results

For the second scenario, we want to ensure that the range check is always executed correctly (extremely important for production environments):



Thus, we define the following scenario:

SAP Measurement Cockpit: Create BCG Scenarios

Save scenario Calculate expected results Calculation log More

Create Gas Scenario

Scenario ID: ZUCR My second BCG scenario - E

Conversion group: ZUC1 MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

Reading group: ZUC1 MQCI LNG, COMPOSITION, DET, ISO6578 VP

Unit of measure group: LNT LNG TEST MANUAL

Test mode

Run red on error

Run green on error

Application area /QTYW/BCC Message number 040

Input parameters and quantity

Parameter (Reading Group)

LNG observed temperature 172.000000 CEL degree Celsius

Receiving tank, empty

Receiving tank capacity 100,000.000000 M3 cubic meter

Vapour temperature (LNG) 118.000000 CEL degree Celsius

Vapour pressure (LNG) 110.000000 KPA kilopascal

Unit of chemical analysis data MOP

Methane (CH4) 90.000000

Ethane (C2H6) 4.900000

Propane (C3H8) 2.900000

n-Butane (n-C4H10) 1.300000

2-Methylpropane (i-Butane) 0.400000

n-Pentane (C5H12) 0.100000

2-Methylbutane (i-Pentane)

Hexanes +

Nitrogen (N2) 0.400000

Select: "Run scenario" to immediately check if the scenario runs as expected:

Program Edit Goto System Help

SAP Measurement Cockpit: Create BCG Scenarios

Run scenario Cancel

Create Gas Scenario

Scenario ID: ZUCR My second BCG scenario - E

Conversion group: ZUC1 MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

Reading group: ZUC1 MQCI LNG, COMPOSITION, DET, ISO6578 VP

Unit of measure group: LNT LNG TEST MANUAL

Test mode

Run red on error

Run green on error

Application area /QTYW/BCC Message number 040

Input parameters and quantity

Parameter (Reading Group)

LNG observed temperature	172.000000-	CEL	degree Celsius
Receiving tank, empty	<input type="checkbox"/>		
Receiving tank capacity	100.000.000000	M3	cubic meter
Vapour temperature (LNG)	118.000000-	CEL	degree Celsius
Vapour pressure (LNG)	110.000000	KPA	kilopascal
Unit of chemical analysis data	MOP		
Methane (CH4)	90.000000		
Ethane (C2H6)	4.900000		
Propane (C3H8)	2.900000		
n-Butane (n-C4H10)	1.300000		
2-Methylpropane (i-Butane)	0.400000		
n-Pentane (C5H12)	0.100000		
2-Methylbutane (i-Pentane)			
Hexanes +			
Nitrogen (N2)	0.400000		

Scenario ZUCR already exists; continue with new scenario ID

List Edit Goto Settings System Help

SAP Measurement Cockpit: Run Scenarios

Information Cancel

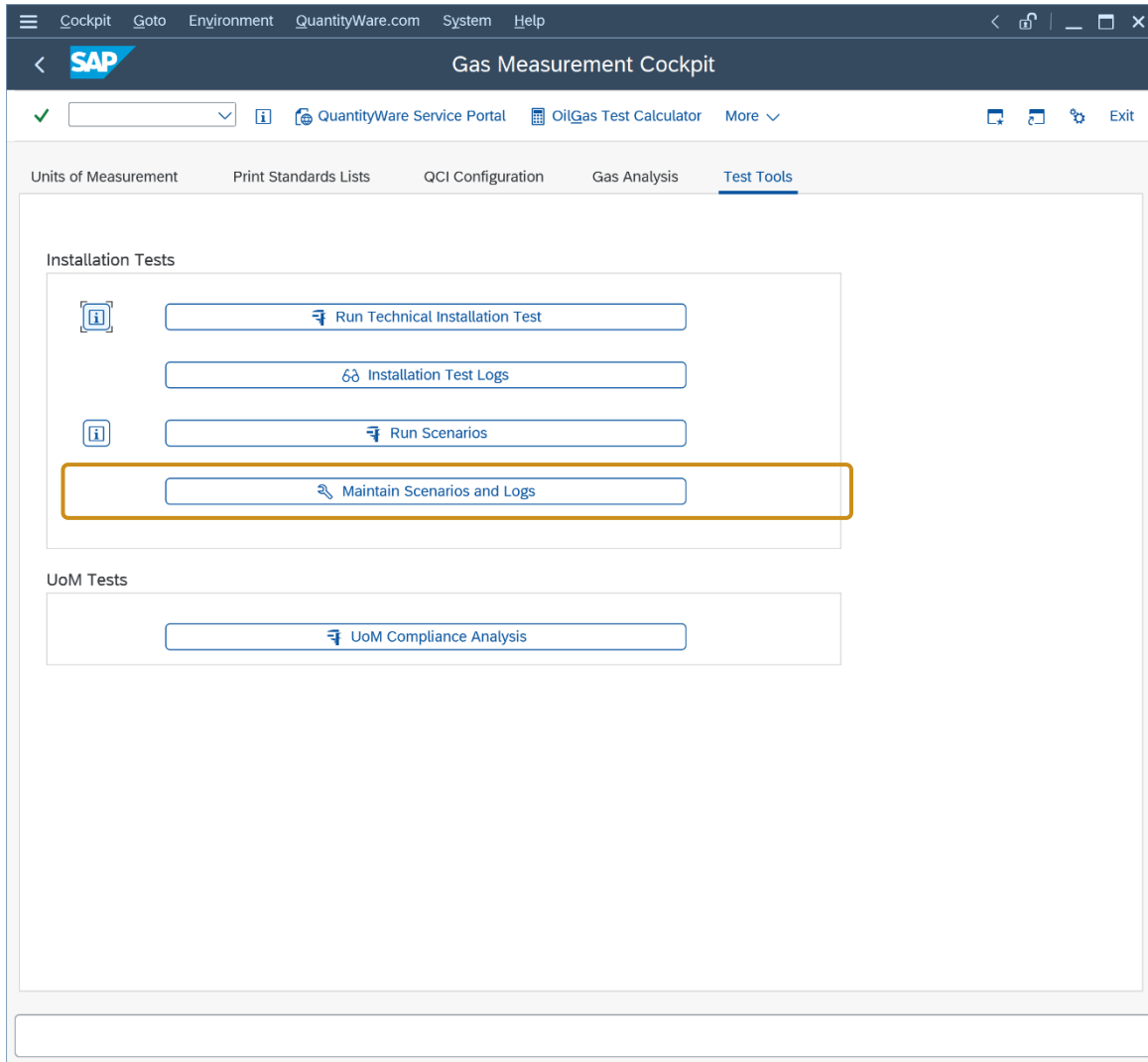
Test Scenario Results

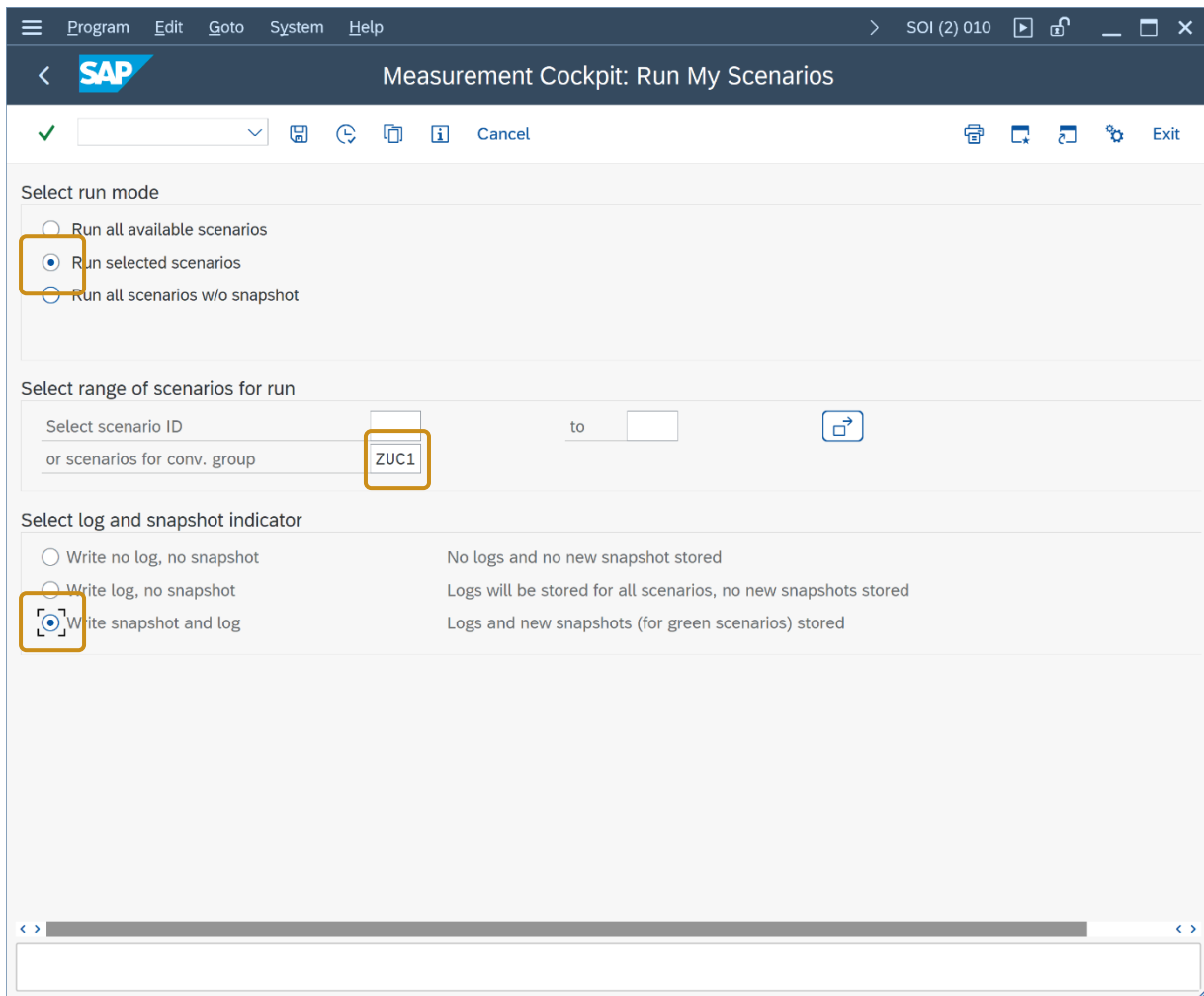
System/client:SOI/010
Date time: 13.05.2024 17:26:07

My scenarios
No errors detected

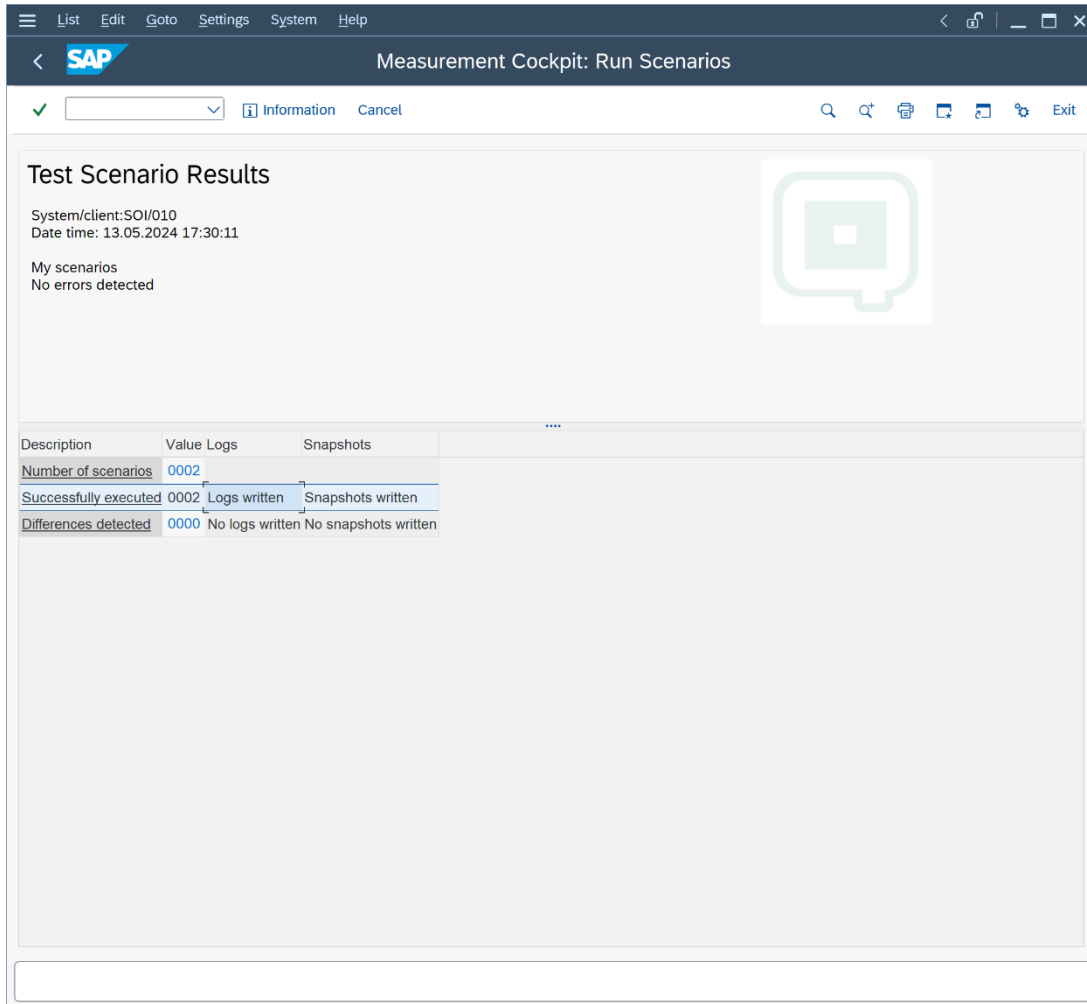
Description	Value	Logs	Snapshots
Number of scenarios	0001		
Successfully executed	0001	No logs written	No snapshots written
Differences detected	0000	No logs written	No snapshots written

Now, go back to the GMC tab strip "Test Tools" and select "Run Scenarios". Then, select "Run selected scenarios", enter "ZUC1" as conversion group and "Write snapshot and log":



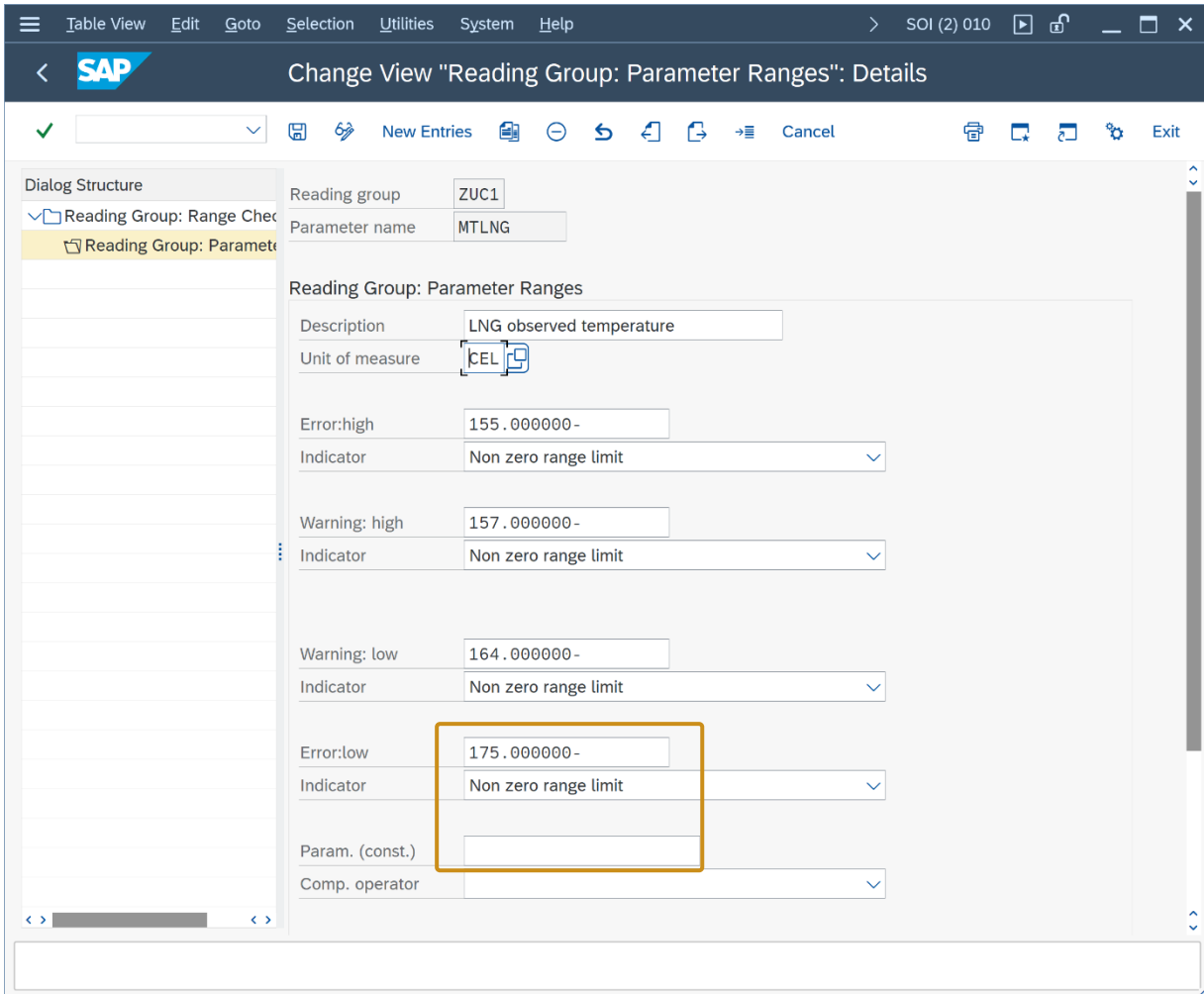


If you have maintained the two scenarios correctly, the following result will be displayed:

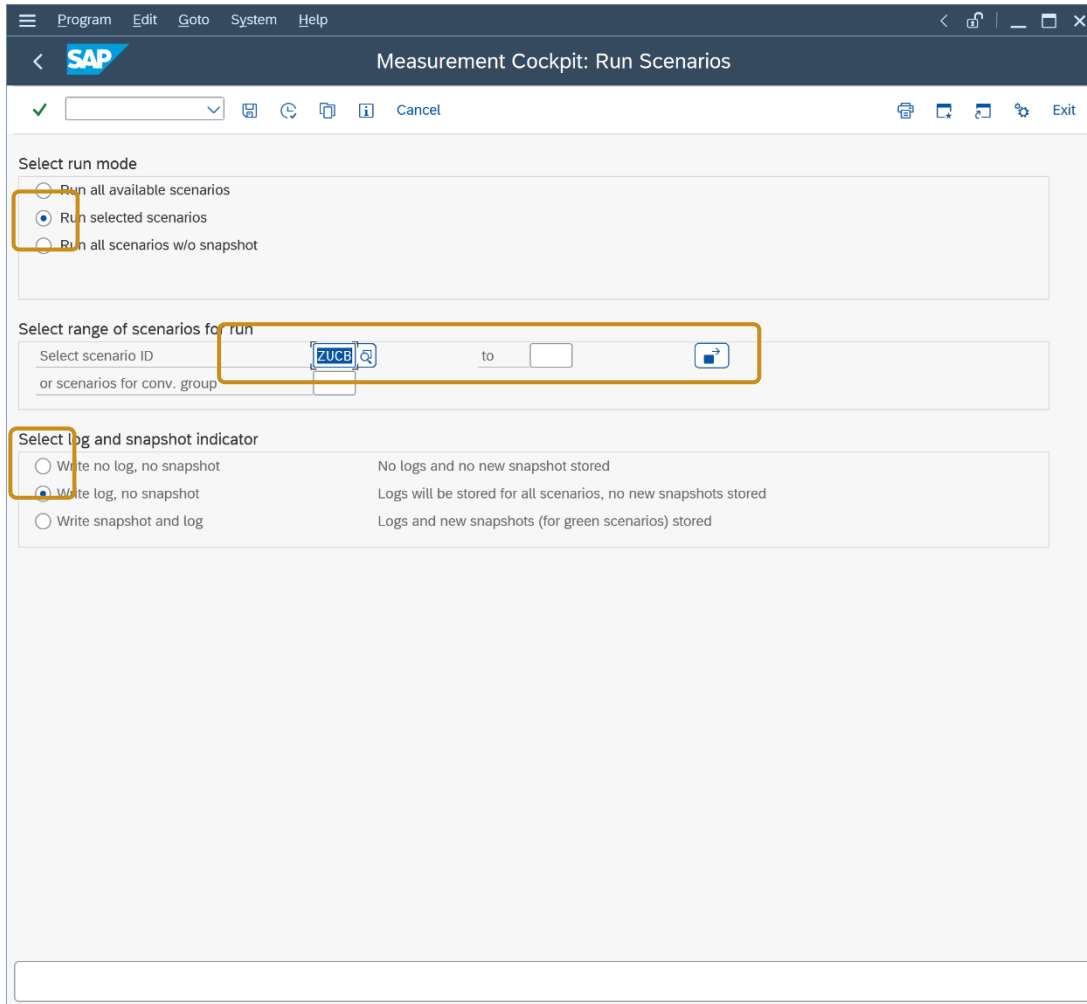


The system has performed a quantity conversion in background and compared the actual results with the expected results defined in the scenarios. Two logs have been written to the database and snapshots for successfully executed scenarios have been written to the database as well.

To test this tool, let's go back to the range data for conversion group ZUC1 (see test case 06) and change the LNG actual temperature "low" error limit to -175 °C.



If we now run all available scenarios again, one scenario fails:



☰ List Edit Goto Settings System Help ◀ 🔒 ▢ ✕

◀ **SAP** Measurement Cockpit: Run Scenarios

✓ ℹ Information Cancel 🔍 🔍 🖨 📄 🔧 Exit

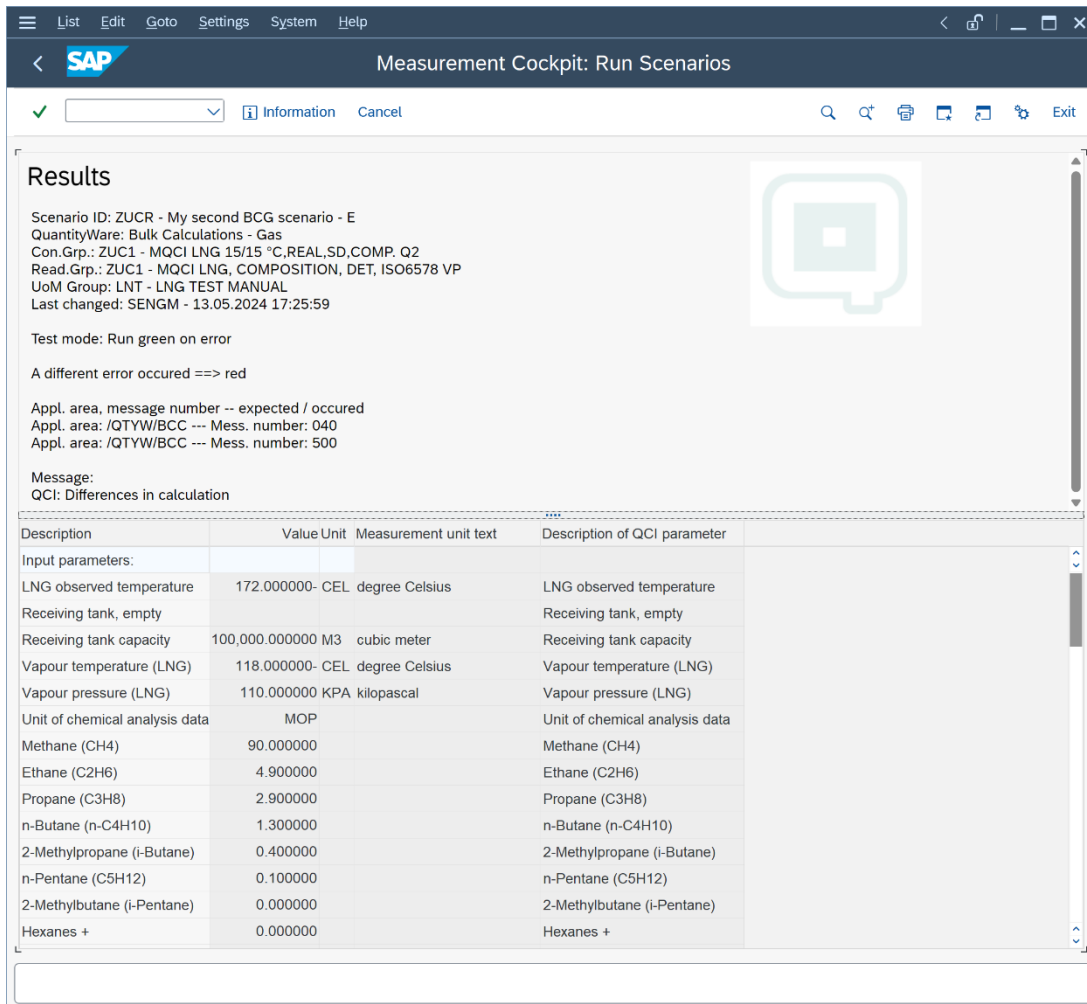
Test Scenario Results

System/client: SOI/010
 Date time: 13.05.2024 17:32:20

My scenarios
 ERRORS detected

Description	Value	Logs	Snapshots
Number of scenarios	0002		
Successfully executed	0001	No logs written	No snapshots written
Differences detected	0001	No logs written	No snapshots written

The expected range error is not raised during the internal test run, which is displayed in the detail view for the scenario:



Results

Scenario ID: ZUCR - My second BCG scenario - E
 QuantityWare: Bulk Calculations - Gas
 Con.Grp.: ZUC1 - MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
 Read.Grp.: ZUC1 - MQCI LNG, COMPOSITION, DET, ISO6578 VP
 UoM Group: LNT - LNG TEST MANUAL
 Last changed: SENGM - 13.05.2024 17:25:59

Test mode: Run green on error

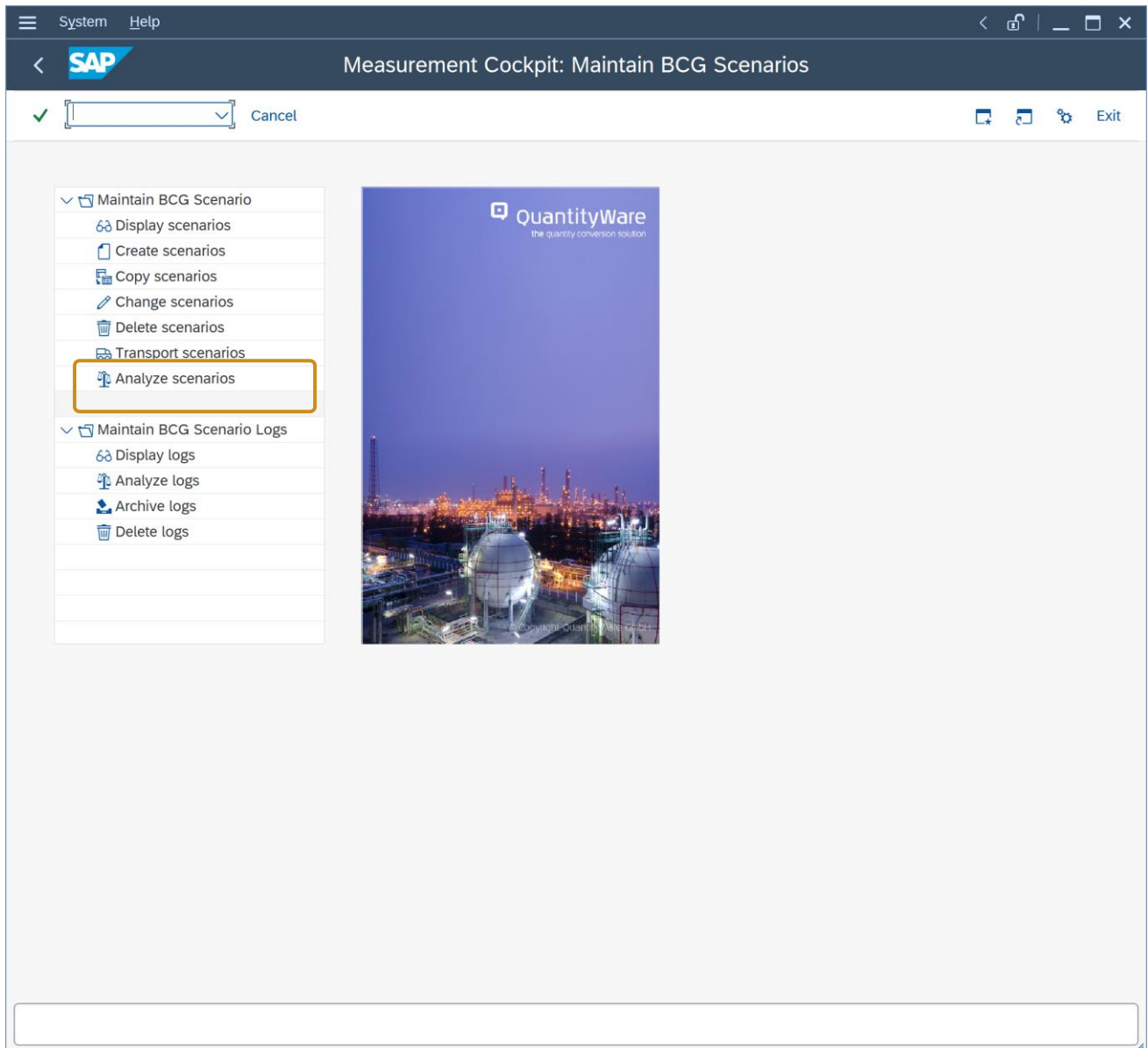
A different error occurred ==> red

Appl. area, message number -- expected / occurred
 Appl. area: /QTYW/BCC --- Mess. number: 040
 Appl. area: /QTYW/BCC --- Mess. number: 500

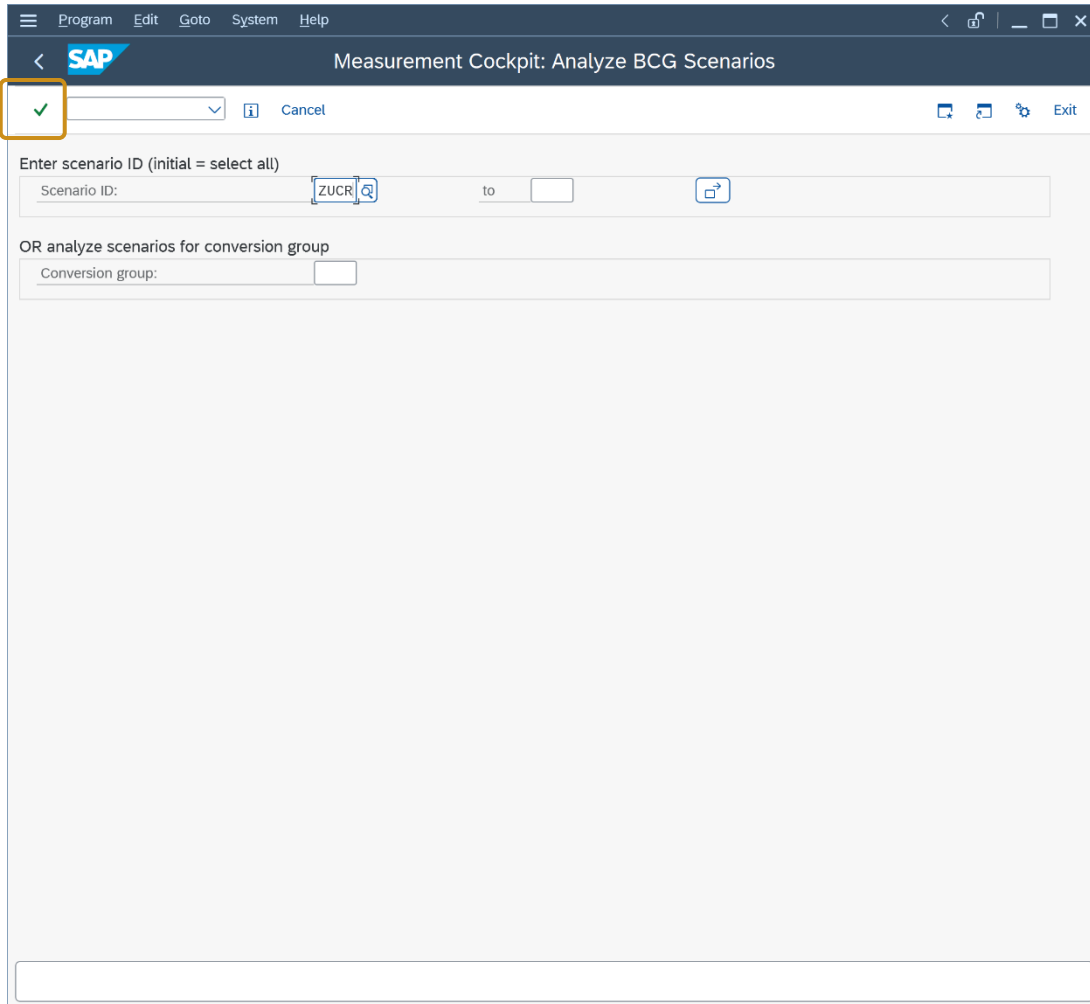
Message:
 QCI: Differences in calculation

Description	Value	Unit	Measurement unit text	Description of QCI parameter
Input parameters:				
LNG observed temperature	172.000000	CEL	degree Celsius	LNG observed temperature
Receiving tank, empty				Receiving tank, empty
Receiving tank capacity	100.000.000000	M3	cubic meter	Receiving tank capacity
Vapour temperature (LNG)	118.000000	CEL	degree Celsius	Vapour temperature (LNG)
Vapour pressure (LNG)	110.000000	KPA	kilopascal	Vapour pressure (LNG)
Unit of chemical analysis data		MOP		Unit of chemical analysis data
Methane (CH4)	90.000000			Methane (CH4)
Ethane (C2H6)	4.900000			Ethane (C2H6)
Propane (C3H8)	2.900000			Propane (C3H8)
n-Butane (n-C4H10)	1.300000			n-Butane (n-C4H10)
2-Methylpropane (i-Butane)	0.400000			2-Methylpropane (i-Butane)
n-Pentane (C5H12)	0.100000			n-Pentane (C5H12)
2-Methylbutane (i-Pentane)	0.000000			2-Methylbutane (i-Pentane)
Hexanes +	0.000000			Hexanes +

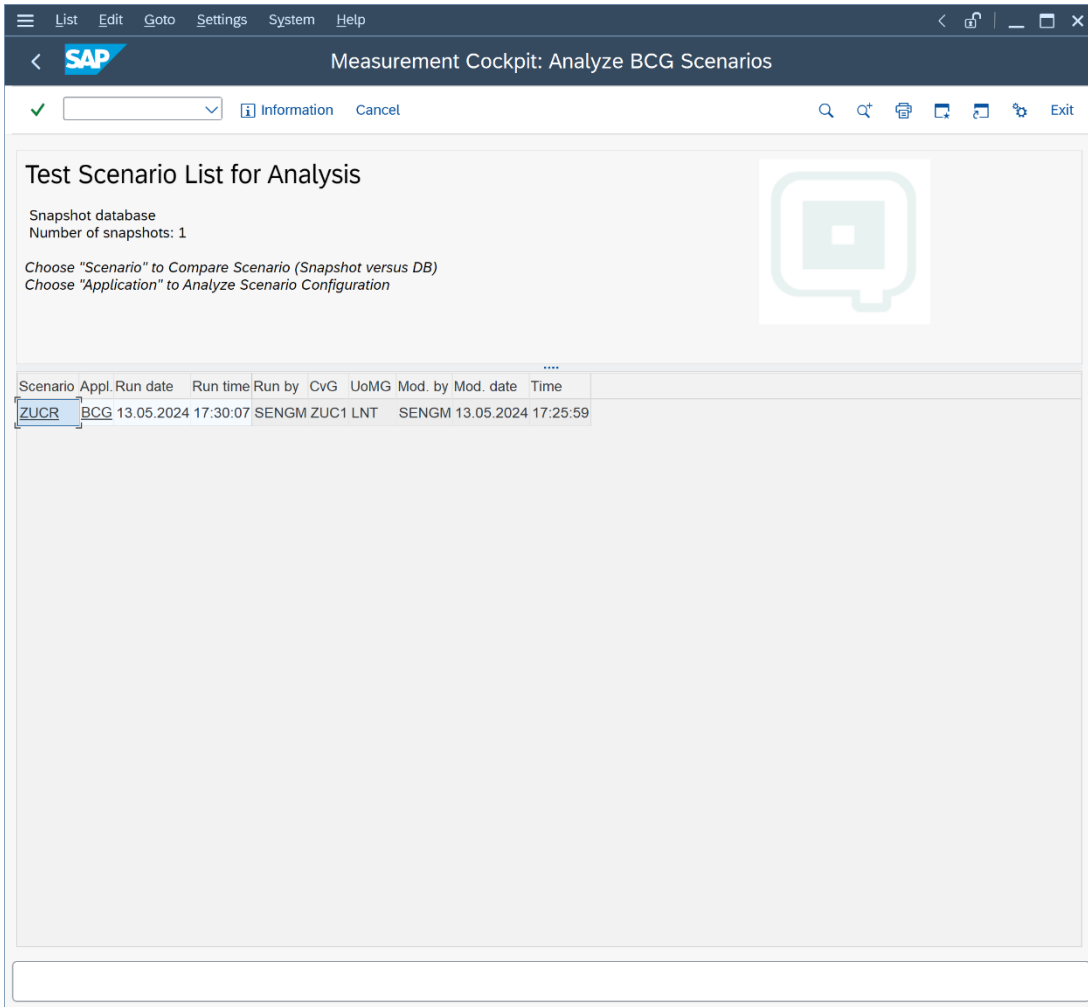
Go back to “Maintain Scenarios and Logs” and select “Analyze scenarios”, such that you can compare the snapshot data with the current configuration data:



Enter the scenario ID ZUCE and select "Enter" to display the snapshot header data:



The screenshot shows the SAP Measurement Cockpit interface for analyzing BCG scenarios. The title bar reads "SAP Measurement Cockpit: Analyze BCG Scenarios". A green checkmark icon in a box is highlighted in the top left corner. Below the title bar, there is a navigation bar with a dropdown menu, an information icon, and a "Cancel" button. The main content area has two sections: "Enter scenario ID (initial = select all)" and "OR analyze scenarios for conversion group". The "Enter scenario ID" section contains a text input field with "ZUCR" entered, followed by a "to" label and another empty text input field. The "OR analyze scenarios for conversion group" section contains a text input field for "Conversion group".



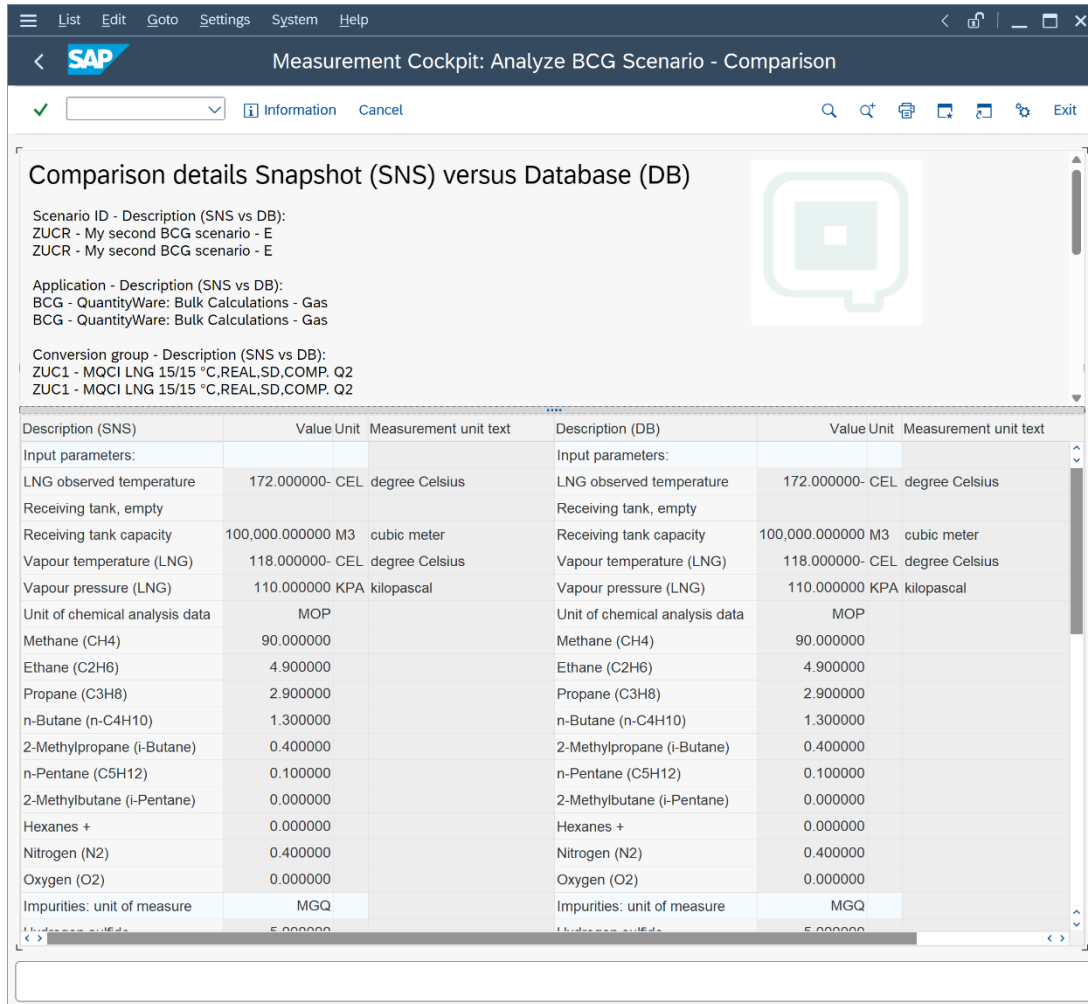
The screenshot shows the SAP Measurement Cockpit interface for analyzing BCG scenarios. The window title is "Measurement Cockpit: Analyze BCG Scenarios". The main content area is titled "Test Scenario List for Analysis".

Snapshot database
Number of snapshots: 1

Choose "Scenario" to Compare Scenario (Snapshot versus DB)
Choose "Application" to Analyze Scenario Configuration

Scenario	Appl.	Run date	Run time	Run by	CvG	UoMG	Mod. by	Mod. date	Time
ZUCR	BCG	13.05.2024	17:30:07	SENGM	ZUC1	LNT	SENGM	13.05.2024	17:25:59

If you click the Scenario ID, the comparison of the snapshot data for the scenario and the current system scenario is displayed:



Comparison details Snapshot (SNS) versus Database (DB)

Scenario ID - Description (SNS vs DB):
 ZUCR - My second BCG scenario - E
 ZUCR - My second BCG scenario - E

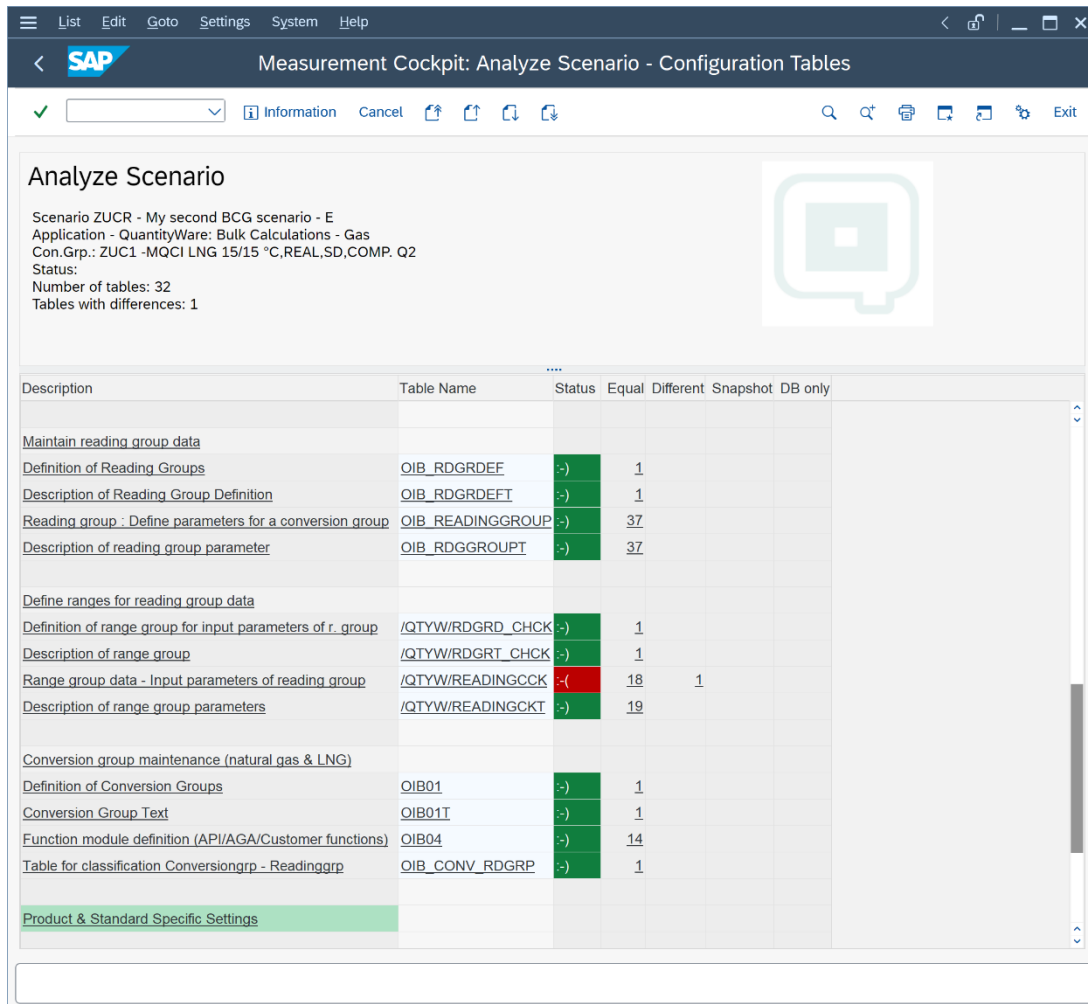
Application - Description (SNS vs DB):
 BCG - QuantityWare: Bulk Calculations - Gas
 BCG - QuantityWare: Bulk Calculations - Gas

Conversion group - Description (SNS vs DB):
 ZUC1 - MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
 ZUC1 - MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

Description (SNS)	Value	Unit	Measurement unit text	Description (DB)	Value	Unit	Measurement unit text
Input parameters:							
LNG observed temperature	172.000000	CEL	degree Celsius	LNG observed temperature	172.000000	CEL	degree Celsius
Receiving tank, empty				Receiving tank, empty			
Receiving tank capacity	100,000.000000	M3	cubic meter	Receiving tank capacity	100,000.000000	M3	cubic meter
Vapour temperature (LNG)	118.000000	CEL	degree Celsius	Vapour temperature (LNG)	118.000000	CEL	degree Celsius
Vapour pressure (LNG)	110.000000	KPA	kilopascal	Vapour pressure (LNG)	110.000000	KPA	kilopascal
Unit of chemical analysis data							
Methane (CH4)	90.000000			Methane (CH4)	90.000000		
Ethane (C2H6)	4.900000			Ethane (C2H6)	4.900000		
Propane (C3H8)	2.900000			Propane (C3H8)	2.900000		
n-Butane (n-C4H10)	1.300000			n-Butane (n-C4H10)	1.300000		
2-Methylpropane (i-Butane)	0.400000			2-Methylpropane (i-Butane)	0.400000		
n-Pentane (C5H12)	0.100000			n-Pentane (C5H12)	0.100000		
2-Methylbutane (i-Pentane)	0.000000			2-Methylbutane (i-Pentane)	0.000000		
Hexanes +	0.000000			Hexanes +	0.000000		
Nitrogen (N2)	0.400000			Nitrogen (N2)	0.400000		
Oxygen (O2)	0.000000			Oxygen (O2)	0.000000		
Impurities: unit of measure		MGQ		Impurities: unit of measure		MGQ	

Apparently, there are no differences detectable in the scenario definition.

If you click the application (BCG), the configuration data is displayed and compared with the current system data:

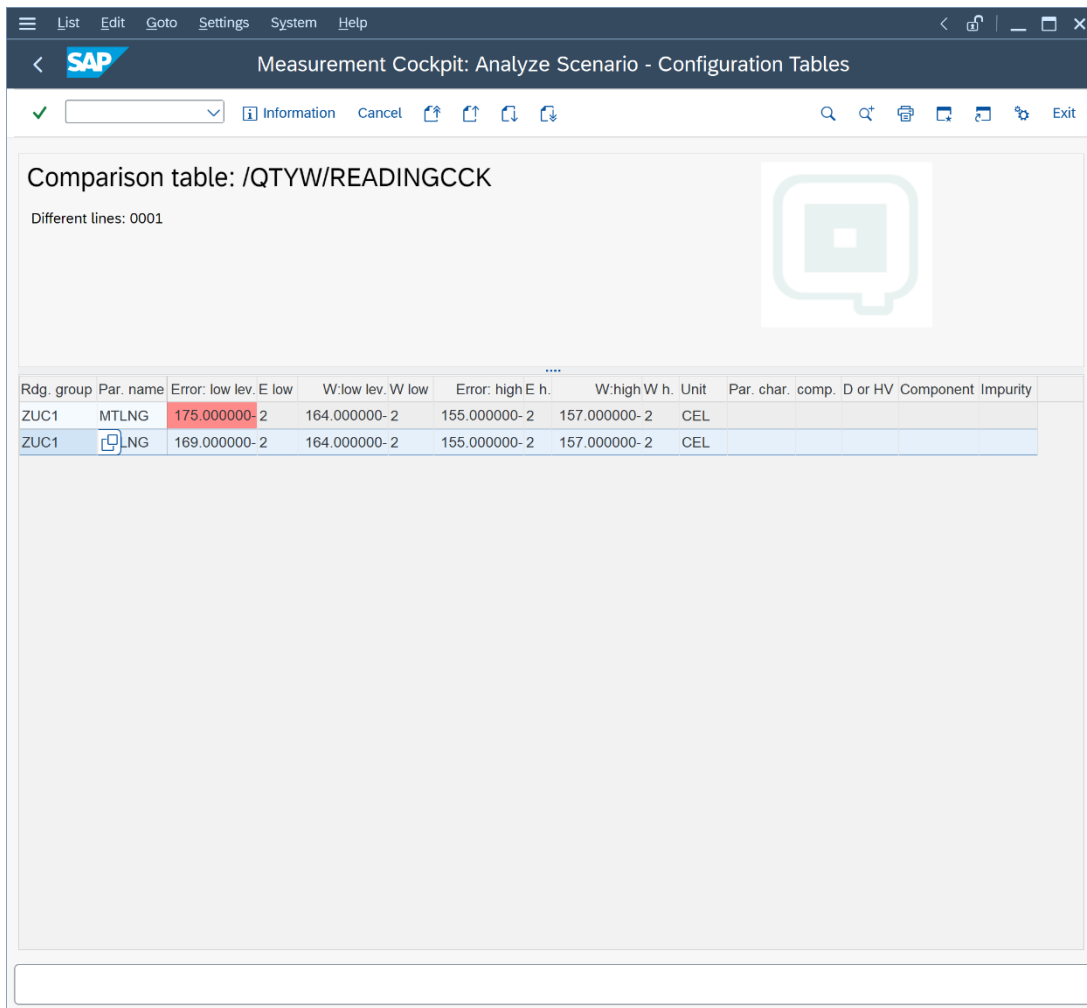


Analyze Scenario

Scenario ZUCR - My second BCG scenario - E
 Application - QuantityWare: Bulk Calculations - Gas
 Con.Grp.: ZUC1 -MQCI LNG 15/15 °C,REAL,SD,COMP. Q2
 Status:
 Number of tables: 32
 Tables with differences: 1

Description	Table Name	Status	Equal	Different	Snapshot	DB only
Maintain reading group data						
Definition of Reading Groups	OIB_RDGRDEF	-)	1			
Description of Reading Group Definition	OIB_RDGRDEFT	-)	1			
Reading group : Define parameters for a conversion group	OIB_READINGGROUP	-)	37			
Description of reading group parameter	OIB_RDGGROUPT	-)	37			
Define ranges for reading group data						
Definition of range group for input parameters of r. group	/QTYW/RDGRD_CHK	-)	1			
Description of range group	/QTYW/RDGRT_CHK	-)	1			
Range group data - Input parameters of reading group	/QTYW/READINGCCK	-(18	1		
Description of range group parameters	/QTYW/READINGCKT	-)	19			
Conversion group maintenance (natural gas & LNG)						
Definition of Conversion Groups	OIB01	-)	1			
Conversion Group Text	OIB01T	-)	1			
Function module definition (API/AGA/Customer functions)	OIB04	-)	14			
Table for classification Conversiongrp - Readinggrp	OIB_CONV_RDGRP	-)	1			
Product & Standard Specific Settings						

As expected, the change of the range data is marked in red and by clicking the “1” in the “Different” column, the change of the reading group range is displayed.



Comparison table: /QTYW/READINGCCK
Different lines: 0001

Rdg. group	Par. name	Error: low lev. E low	W:low lev. W low	Error: high E h.	W:high W h.	Unit	Par. char.	comp.	D or HV	Component	Impurity
ZUC1	MTLNG	175.000000-2	164.000000-2	155.000000-2	157.000000-2	CEL					
ZUC1	NG	169.000000-2	164.000000-2	155.000000-2	157.000000-2	CEL					

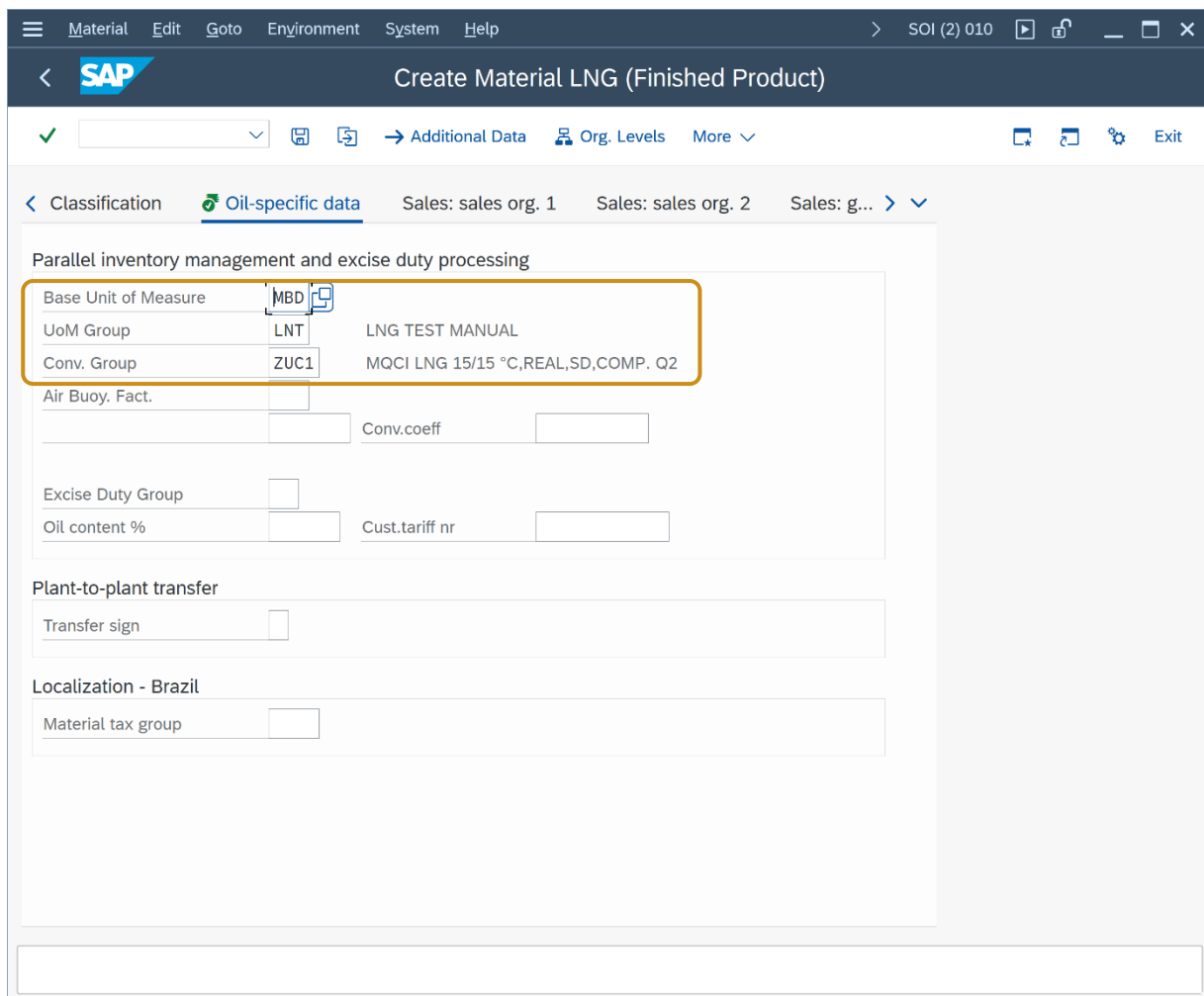
Practically seen from an application agents' perspective, this makes complex, laborious debugging of such issues a thing of the past! From a business management perspective, we have "raised the bar" in the areas of data integrity, security, and process transparency as we have an easy-to-use automated "audit" check for the most important values in our ERP system – the quantities.

2.8. Test Case 08 – Assign LNG Conversion Group to Material - Development

Estimated test case execution time: 30 minutes

Now that you have a well-defined conversion group ZUC1 available, including automated test scenarios (QuantityWare recommends to defined **at least 10** scenarios per conversion group), you assign the conversion group to a material in the material master at plant level (Oil specific data view).

In our example development client, we utilize transaction MM02 (Change Material) and an LNG material code:



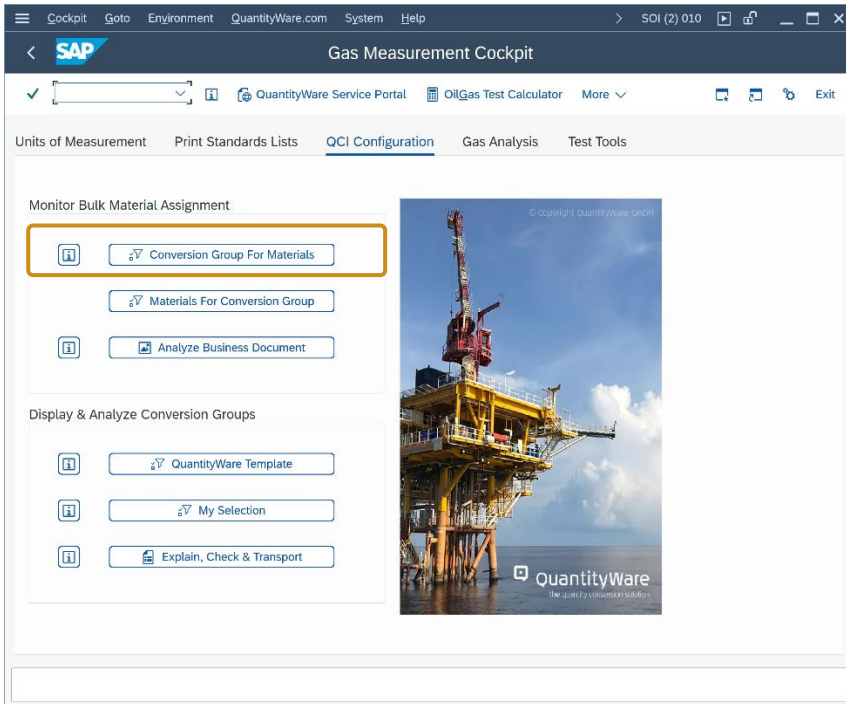
The screenshot shows the SAP MM02 'Create Material LNG (Finished Product)' interface. The 'Oil-specific data' tab is active. The 'Parallel inventory management and excise duty processing' section is highlighted with a red box. The fields in this section are:

Base Unit of Measure	MBD	
UoM Group	LNT	LNG TEST MANUAL
Conv. Group	ZUC1	MQCI LNG 15/15 °C,REAL,SD,COMP. Q2

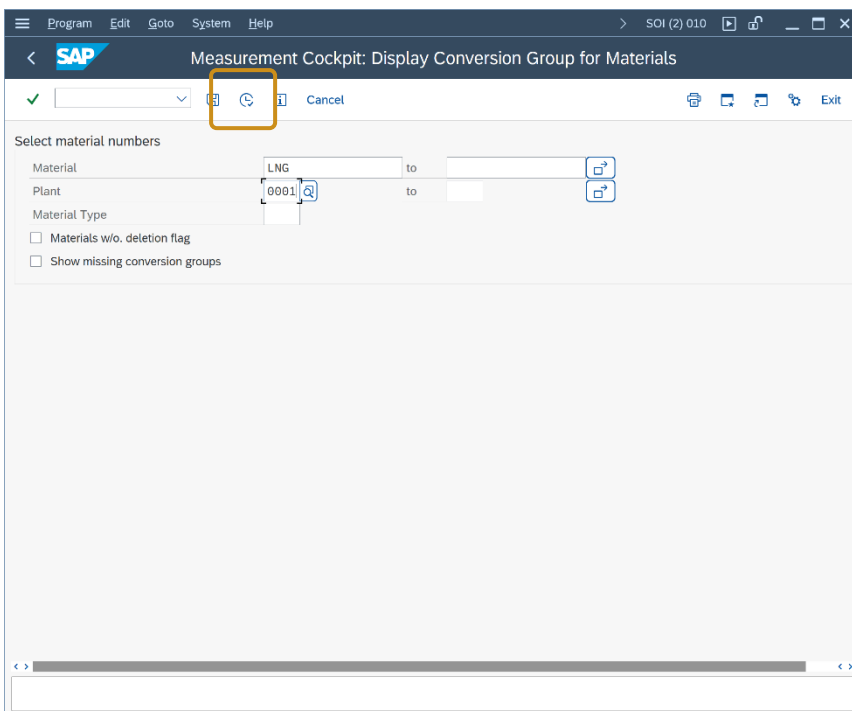
Other visible fields include:

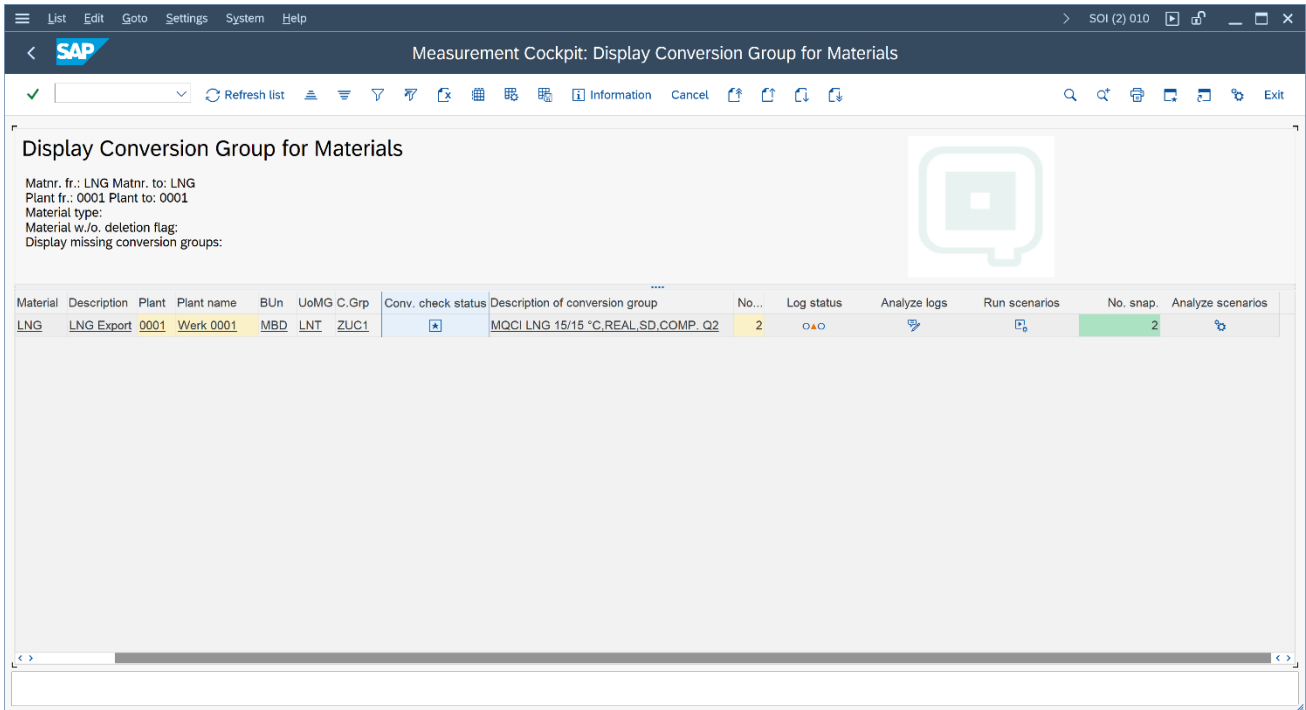
- Air Buoy. Fact. (checkbox)
- Conv.coeff (input field)
- Excise Duty Group (checkbox)
- Oil content % (input field)
- Cust.tariff nr (input field)
- Plant-to-plant transfer: Transfer sign (checkbox)
- Localization - Brazil: Material tax group (input field)

Let's go back to the Gas Measurement Cockpit, tab strip "QCI Configuration & Products" and select "Conv. group for materials":



Enter e.g., the material name (LNG) and select "Execute" (F8):





From this central list, you can monitor the quantity conversion status for all materials in production, e.g., execute test scenario runs if errors have occurred, analyze the test scenario log status (typically the test scenarios should be executed via a periodic job in background) or perform a snapshot analysis.

3. Summary

The BCG Test Manual provides overview guidance for **testing** the QuantityWare BCG solution and obtaining a detailed overview on the BCG capabilities.

The 8 test cases described in this document provide a quick and goal-oriented way to define an LNG conversion group for production usage. In addition, the importance of automated test scenarios is emphasized which is, with respect to time, typically the major effort in an implementation project (see PAIG for further details). Test scenarios can and should be transported through your system landscape together with your conversion group configuration, once defined in your development client. If your organization attributes value to auditing and auditable processes, test scenarios **must** be created, distributed, and used.

As noted in test case 02, one of the most challenging tasks is the correct assignment of a BCG template conversion group to your bulk materials. In addition, the test cases described in this document assume that no further configuration adjustments to a template conversion group is required, which is almost never the case. E.g., many template conversion groups are equipped with configuration options for specific requirements - trained experts must decide whether changes are required before moving a Z*** copy to production.



Thus, if you decide to purchase and implement QuantityWare BCG, careful inspection, validation, and implementation of BCG [by certified BCG consultants](#) or staff is strongly recommended - to save time and effort, but also to ensure that the configuration of such a fundamental system area has been performed accurately and correctly.

Legal Notices

© Copyright 2024 QuantityWare GmbH. All rights reserved.

SAP, R/3, mySAP, mySAP.com, xApps, xApp, SAP NetWeaver, and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP AG in Germany and in several other countries all over the world. All other product and service names mentioned are the trademarks of their respective companies.

Microsoft, Windows, SQL-Server, PowerPoint and Outlook are registered trademarks of Microsoft Corporation.

These materials and the information therein are subject to change without notice. These materials are provided by the company QuantityWare GmbH for informational purposes only. There is no implied representation or warranty of any kind, and QuantityWare GmbH shall not be liable for errors or omissions with respect to the materials provided. The only warranties for the products and services of QuantityWare GmbH are those set forth in the express warranty statements accompanying such products and services, if any. No statement within this document should be construed as constituting an additional warranty.