

4th International Workshop

LNG Training Course

15th June 2016

National Physical Laboratory, United Kingdom

08.30 – 09.00

Registration

09.00 – 09.30

A general introduction on metrology and traceability

Presented by Paul J. Brewer, NPL

09.30 – 10.30

Tank gauging

Presented by Henning Kolbjørnsen, Justervesenet

This session will focus on measurement and measurement uncertainty of displaced volume of LNG based on tank measurements. A presentation on the topic will be given followed by an illustrative exercise. The exercise aims to give the participant an illustration of the complexity in estimating measurement uncertainty of the displaced volume of LNG.

10.30 – 10.45

Refreshment break

10.45 – 11.45

Flow measurements

Presented by Nikola Pelevic, VSL

The course briefly covers the flow meter technologies typically used for cryogenic flow metering. The basic principles will be discussed as well as some of the challenges and solutions for cryogenic flow metering. Similarly, various calibration methods applicable to LNG flow metering are discussed. Some calibration results as well as field comparison tests will be discussed. The relevant regulation will be briefly introduced.

11.45 – 12.45

Composition measurements

Presented by Gerard Nieuwenkamp, VSL

The training about composition will cover the role of the (liquefied) natural gas composition in custody transfer, and how composition is measured. Composition plays a role in volume conversion (to reference conditions) as well as in the energy determination. The conventional method for composition measurement is sampling + gas chromatography, and this forms the heart of the training. The performance evaluation of online analysers (ISO 10723) will also be covered.

12.45 – 13.45 Lunch

13.45 – 14.30 **Energy calculations**
Presented by Jürgen Rauch, PTB

This training session will cover the topic of calorific values and enthalpies of LNG under different thermodynamic conditions.

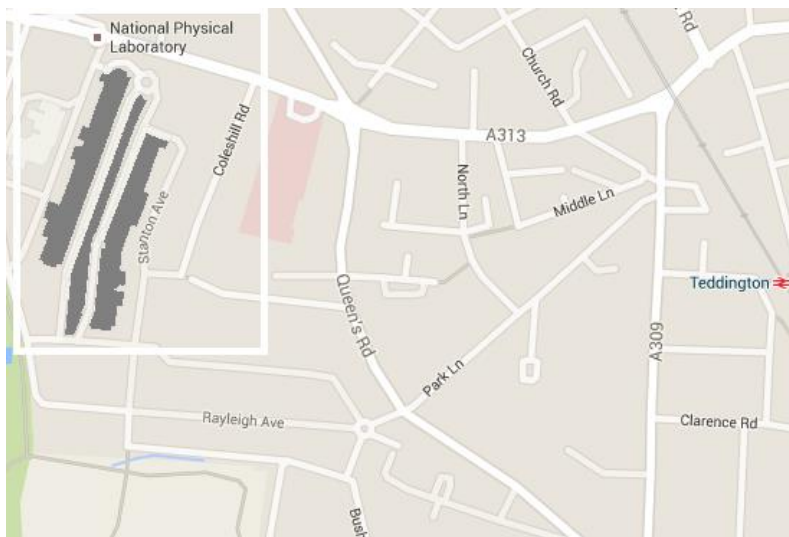
14.30 – 14.45 Refreshment break

14.45 – 15.30 **Density calculations**
Presented by Markus Richter, Ruhr-Universität Bochum

During this session a software tool for calculation of thermophysical properties will be presented. The software tool will include the enhanced version of the Klosek McKinley Method (RKM) as well as the original RKM, the GERG-2008 equation of state for natural gas, cubics, and the COSTALD correlation

15.30 End of Training Course

How to find us



NPL
Hampton Road,
Teddington.
Middlesex,
United Kingdom
TW11 0LW

For further details on getting to
NPL, please visit:

[http://www.npl.co.uk/upload/
pdf/npl-map-col.pdf](http://www.npl.co.uk/upload/pdf/npl-map-col.pdf)