Hydrocarbon management

HM 54

Guidelines for the management of measurement for the upstream oil and gas industry

energy institute

HYDROCARBON MANAGEMENT
HM 54 GUIDELINES FOR THE MANAGEMENT OF MEASUREMENT FOR THE UPSTREAM OIL AND GAS INDUSTRY

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FOREWORD

The Energy Institute (EI) Hydrocarbon Management Committee is responsible for the production and maintenance of standards and guidelines covering various aspects of static and dynamic measurement of petroleum. The Hydrocarbon Management Subcommittee 1 (HMC-1) deals primarily with the measurement of crude oil and gas in the upstream (production) sector.

HMC-1 is made up of experts from the oil industry, including representatives from oil companies, service companies and specialist contractors and consultants. The UK Oil and Gas Authority (OGA) is also represented. Equipment manufacturers and experts with specific knowledge of measurement techniques are regularly invited to present papers to the committee.

The EI maintains liaison with the American Petroleum Institute (API)'s Committee on Petroleum Measurement, along with other organisations concerned with quantitative and qualitative measurement in other countries and in other industries.

The EI Hydrocarbon Management guidelines (formerly Petroleum Measurement Manual and Petroleum Measurement papers) are widely used by the petroleum industry and have received recognition in many countries by consumers and the authorities. In order to promote international good practice the EI works via the British Standards Institute to develop standards through the International Standards Organization's technical committee TC-28 Petroleum Products and related products of synthetic or biological origin and its subcommittee TC28/SC2 Measurement of petroleum and related products.

A full list of Hydrocarbon Management guidelines is available on request from the EI. The EI Hydrocarbon Management guidelines are recommended for general adoption but should be read and interpreted in conjunction with safety, environmental, weights and measures, customs and excise and other regulations in force in the particular country in which they are to be applied. Such regulatory requirements have precedence over corresponding clauses in the EI document except where the requirements of the latter are more rigorous, when its use is recommended. Users should also consider contractual constraints imposed by interested parties.

Although it is believed that adoption of the recommendations of this guideline will assist the user, the EI cannot accept any responsibility, of whatsoever kind, for loss, damage or alleged damage arising or otherwise occurring where this document has been applied.

Users of these guidelines are invited to send comments, suggestions, or details of relevant experience:

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1 INTRODUCTION AND SCOPE

The measurement of hydrocarbons was relatively simple in the early days of the industry. Large fields were developed with in-field flowlines and gathering stations often feeding dedicated processing and measurement facilities, and exporting through dedicated pipelines.

The measurement approaches were also relatively simple. Oil was measured using turbine meters, which were in turn calibrated regularly against on-line prover systems to ensure measurement accuracy. Gas was measured using orifice plates designed to an international standard; the plates were inspected and the secondary instrumentation was calibrated at regular intervals.

The management of such measurement systems from the concept and design, through operation, calibration and validation, and on to reporting to government agencies for fiscal purposes was relatively straightforward.

This situation has changed dramatically in recent years, particularly in the offshore arena, as more secondary fields have been developed. Many of these fields make use of existing platforms and infrastructure to process and/or transport the produced fluids. In many situations, production from two or more fields is commingled prior to measurement and export of the total produced quantities. This has driven the need for measurement further upstream, with requirements for allocation measurement to determine the production from each source field.

The economics of many new fields are so marginal that in some cases the traditional measurement approaches and requirements have been relaxed to reduce the cost to a level acceptable for the proposed fields. This has led to an increase in measurement uncertainty in some systems, with a consequent increase in financial exposure for operators and government.

The management of measurement has therefore become increasingly important for the oil and gas industry, particularly in the offshore production environment.

This document has been produced to provide high level guidance for the management of measurement for the upstream oil and gas industry. It is not proscriptive but highlights the key areas that should be considered when designing and operating a measurement system.

Management of measurement covers all aspects of a measurement system from the statement of requirements, through system design and installation, to operation, calibration and reporting.

The concept of 'Management of Measurement' within this document is relevant irrespective of the regulatory and fiscal regime which may apply. However, UK requirements are summarised in Annex A.

The document is arranged in three main sections:

Section 2 Measurement philosophy: addresses the need for measuring hydrocarbon production, looking at the legal and statutory requirements and the financial and operational implications of different measurement applications.

Section 3 The measurement system: highlights the key stages in the design, manufacture and installation of the measurement system. Management of the equipment and personnel is also discussed.