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Guidelines for meter selection for the upstream oil and gas industry

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GUIDELINES FOR METER SELECTION FOR THE UPSTREAM OIL AND GAS INDUSTRY

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A registered charity, the EI serves society with independence, professionalism and a wealth of expertise in all energy matters.

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CONTENTS

Foreword **6**

1 Introduction **7**

2 Meter selection process **8**
2.1 Introduction 8
2.2 Process conditions 8
2.3 Typical meter locations 9
2.4 Fluid phases 11
2.5 Presence of specific chemicals 11
2.6 Selection process 12
2.7 Uncertainty requirements 13
2.8 Cost constraints 14
2.9 Installation considerations 14
2.9.1 Maintenance redundancy and access 14
2.9.2 Pipework 14
2.9.3 Provision of a bypass 15
2.9.4 Direction of flow and meter orientation 15
2.9.5 Flow control valves 16
2.9.6 Location 16
2.9.7 Trace heating and insulation 16
2.9.8 Electrical connections 16
2.10 Operational considerations 16
2.10.1 Changes in operating parameters 16
2.10.2 Operational costs 17
2.11 Maintenance considerations 17
2.11.1 Maintenance costs 17
2.11.2 Meters with functional and verification diagnostics 18
2.12 Calibration 18

3 Common types of meter (primary element) **19**
3.1 Introduction 19
3.2 Turbine meters 19
3.3 Orifice plates 20
3.4 Coriolis meters 20
3.5 Ultrasonic meters (USM) 21
3.6 Positive displacement meters (PD) 21
3.7 Multi-phase flow meters (MPFM) 22
3.8 Vortex meters 22
3.9 Venturi meters 22
3.10 Cone meters 22
3.11 Annubar/Pitot tubes 23
3.12 Electromagnetic (MAG) meters 23

Contents continued

Page

Annexes

Annex A Bibliography 36

Annex B Examples of meter installations 40
B.1 Liquid turbine meter run 41
B.2 Liquid ultrasonic (USM) meter run 42
B.3 Gas orifice plate meter run 43
B.4 Gas ultrasonic meter run 44
B.5 Liquid positive displacement (PD) meter run 45
B.6 Liquid coriolis meter run 46
B.7 Multiphase metering 47
B.8 Sampling and density meter 48

LIST OF FIGURES AND TABLES

Page

Figures

Figure 1 Simplified hydrocarbon process 10
Figure 2 General meter selection 12
Figure 3 Uncertainty profile of various meter types. 35

Tables

Table 1 Typical uncertainties 13
Table 2 Overview of meter characteristics and performance 24

FOREWORD

Measurement accuracy is essential in the sale, purchase and handling of petroleum products. It reduces the likelihood of disputes between buyer and seller and facilitates control of losses. Accurate measurement demands the use of standard equipment and procedures that are traceable to national reference standards.

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 EI maintains liaison with parallel working groups of the American Petroleum Institute's (API-MPMS) Committee on Petroleum Measurement, and other organisations concerned with quantitative 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 (BSI) 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 sub-committee 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 any other interested party.

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 damage or alleged damage arising or otherwise occurring where this document has been applied.

Attention is also drawn to the fact that some of the equipment mentioned in the guide is protected by patents throughout the world. The mention of any proprietary information in this guide does not imply its endorsement by the EI for any particular application; neither does omission imply rejection.

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

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1 INTRODUCTION

The selection of the correct meter or primary element along with the appropriate secondary instrumentation is fundamental to the performance and/or reliability of any metering system. The implications of the wrong selections may result in:

– reduction in confidence in the reported figures;
– increased financial exposure due to higher uncertainties, and
– increased maintenance/man-hour issues.

Detailed standards covering the selection of meters already exist such as BS 7405:1991 *Guide to selection and application of flow meters for the measurement of fluid flow in closed conduits*, and this document is intended to be complementary to these as it provides guidance to assist designers and metering technicians when deciding on the type of metering device to install for a particular type of fluid stream.

Of all process measurements, flow measurement is the most important as it has the greatest contribution to the economic viability of any project involved with the sale of oil and gas production.

For a given development project, operators should discuss the planned measurement approach and likely uncertainty levels with regulatory authorities at the earliest possible stage in field development. Irrespective of the regulatory authority's requirements for measurement uncertainty, operators should consider the use of an uncertainty evaluation at an early stage for commercial reasons, particularly at the contract negotiation stage and then throughout field life.

To avoid problems during operation, operators should also ensure that the relevant process conditions that are to be attributed to any primary measurement meter are fully understood and documented and made available to the respective engineering disciplines at the design stage.