

Good operational practice on the management of
subsea production control systems and associated
hydraulic fluids

GOOD OPERATIONAL PRACTICE ON THE MANAGEMENT OF SUBSEA
PRODUCTION CONTROL SYSTEMS AND ASSOCIATED HYDRAULIC FLUID

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FOREWORD

The North Sea oil and gas industry has pioneered the use of subsea production control systems (SPCS) and has driven the development of the technology to enable the efficient commercial exploitation of smaller reservoirs tied back to existing platforms. In the majority of cases SPCSs use and discharge chemicals to sea as part of planned operations and the chemicals used are assessed and approved for discharge under the UK regulatory regime. Due to the growing age, scale and complexity of the subsea systems in operation there is a potential for an increase in use and discharge of chemicals over time and/or the potential for a release of chemicals due to unplanned events. The hydraulic fluids are generally very low toxicity, biodegradable and have non-bioaccumulative characteristics. Consequently the environmental risk from discharges or releases is low. Due to their location and complex design inspection, intervention, repair or replacement of SPCSs results in high cost and can increase risk to personnel involved in associated diver operations.

Subsea is a specialised technical discipline, with its own technical design and operating standards and practices. This publication aims to raise awareness amongst subsea engineers and non-specialists across the industry on good operational practices associated with the management of SPCSs and associated hydraulic fluid. This publication does not seek to replicate or replace existing industry standards covering the design of subsea control systems. It should be noted that subsea control systems are diverse in their design, age and operation and consequently not all of the good practices in this publication will be technically feasible or cost-effective in every situation.

By following good operational practice operators of subsea production control systems can manage their operations anticipating hydraulic fluid use and discharge over time with sufficient arrangements to identify and respond should an abnormal condition arise.

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The Energy Institute's (EI) Upstream Environmental Working Group (USEG) initiated the development of guidance to help to minimise the uncontrolled release of subsea production control fluids to the sea.

The industry guidance was developed by Viper Subsea Technology Ltd. and based on information relating to the use of subsea hydraulic systems gathered in an initial fact-finding phase undertaken by Xodus Group Ltd.

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Project coordination and committee liaison were undertaken by Beate Hildenbrand (EI).

1 INTRODUCTION

1.1 SCOPE

The guidelines described in this publication apply specifically to SPCSs, both direct acting and electro-hydraulic, where pressurised hydraulic control fluid is distributed and controlled on the seabed to operate process valves and subsea isolation valves (SSIVs). The principal objective of these guidelines is to raise awareness of operational good practice of SPCSs and associated hydraulic fluids. By implementing good practice, operators of SPCSs can manage their anticipated hydraulic use and discharge and have systems in place to recognise and respond should abnormal conditions occur.

The guidelines are intended to supplement the design requirements specified in ISO 13628 - *Petroleum and Natural Gas Industries – design and operation of subsea production systems*.

Although these guidelines are intended for use in UK Continental Shelf (UKCS) subsea fields, and make reference to the UKCS regulatory requirements set by the Department of Business Energy and Industry Strategy (BEIS), the principles described can equally be applied in other geographical locations.

The guidelines do not apply to the discharge or release of hydrocarbons from subsea production pipelines or equipment, nor are they intended to cover the integrity management of the non-hydraulic subsystems of the SPCS.

It is recognised that many subsea systems have been installed in many locations for some time and due to their location and complex design inspection, intervention, repair or replacement of SPCSs results in high cost and can increase risk to personnel involved in associated diver operations. In this regard some aspects of this operational good practice may not be able to be easily applied to existing SPCSs.

1.2 APPLICATION

This good practice publication is intended for use by:

- engineers involved with the design, installation and maintenance of SPCS;
- subsea controls engineers;
- environmental specialists, and
- offshore operations staff/control room operators.

1.3 CODES AND STANDARDS FOR SUBSEA HYDRAULIC SYSTEMS

Relevant applicable international and local codes and standards representing the criteria for the design of a hydraulic system include: