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## RAPID: A New Approach for Improved Regularity and Decreased Maintenance Costs

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### Abstract

Statoil is a Norwegian based oil and gas company with a daily oil and gas production of 1.1 million boe, operations in 30 countries and about 24.000 employees. Statoil is the world's 3rd largest net seller of crude oil, and supplies two-thirds of all Norwegian gas to the European market. As part of an improvement campaign with focus on increased production and reduced maintenance and operational costs, Statoil is working with initiatives related to turnaround strategies and execution of maintenance that requires shutdown. One of these initiatives is called RAPID, which stands for "Remove Activities, Prolong Interval and Decrease duration". The project was released to challenge existing procedure and mindset to handle turnarounds and shutdowns recognising that turnarounds are the largest single contributor to reduced production in Statoil. Turnarounds with production shutdown are conducted on a regular basis, with a typical duration of 15 days and with a 1-3 yrs. frequency for offshore facilities and 4-8 yrs. for land based facilities. It is a long-term objective to reduced lost production due to turnarounds by increased use of condition monitoring, new procedures for hot work, safety integrity verification, opportunity maintenance and improved planning. This paper describes the RAPID-project and its applied methodologies.

### Introduction

Statoil is an integrated oil and gas company with the main activities in the North Sea region outside the coast of Norway. Today Statoil is the world's third largest net seller of crude, and large amounts of gas are exported to the European Continent. The company operates several onshore and offshore facilities, both mature installations (from late 1970s) and new installations, recently put into operation. The most recent projects are Kristin (offshore production plant) and Snøhvit (land based LNG plant with subsea installations). The oil and gas production by Statoil totals about 1.1 million barrels of oil equivalent per day. This is more than sufficient

to cover daily requirements for the five Nordic nations – Norway, Sweden, Denmark, Finland and Iceland.

As in all oil and gas industry asset management is one important focus area, e.g. maintenance of tail end production facilities (declined fields), maintenance of subsea production equipment, and operation and maintenance of distant facilities. Typical focus areas are turnaround strategy optimization, remote operation of facilities, improved maintenance management strategies, increased use of condition monitoring and use of mobile ICT (Information Communication Technology).

Statoil has ongoing activities and utilize extensive effort to develop methods and tools that define and monitor the technical condition both on the lowest level as well as on the system and plant level /1/. The activities do also include development and utilization of existing and new condition monitoring techniques. These activities are of vital importance to be able to change strategy from periodic turnarounds to an on-condition and opportunistic based strategy.

### Turnarounds in Statoil

In Statoil, about 20 offshore platforms and 5 on-shore plants (crude oil and gas treatment plants and refineries) are subjected to turnarounds on a regular basis. The facilities are all linked together in a complex production infrastructure consisting of infield subsea production pipes, transportation pipelines and shuttle tankers. This infrastructure ensures that oil and gas from the wells finally reaches the market.

There are differences in the offshore and onshore turnarounds practice. Onshore, the turnaround frequency is typical 5 yrs., the duration is typical 4 weeks and the amount of work approx. 150 000 hours. Offshore, the frequency is typical 1-2 yrs., the duration is typical 2 weeks and the amount of work between 14 000 - 90 000 hours. The turnaround-planning organisation varies from being a fixed organisation to an "ad hoc" organisation for each turnaround. The main workforce is contractors. Offshore there is mainly one main contractor with a wide responsibility, in contrary to onshore where there could be one contractor per work package. The logistics support challenge between offshore and onshore turnarounds is quite different. Offshore, the weather restrictions both with respect to wind and waves are limiting the operation window. This restricts the activity to the period late spring to early autumn. In addition the owner of the gas transport system (Gassco) has