

# Improving gas production and well integrity in subsea applications

## Intervention using 3M™ Ceramic Sand Screens

### Customer challenge

- ▶ Site was a former oil well with an unexploited gas cap
- ▶ An intervention was needed to convert the well to natural gas production
- ▶ High velocities were expected in the gas cap perforations, which threatened the integrity of the well due to erosion
- ▶ Intervention was conducted using a light well intervention vessel (LWIV)

### Why ceramic sand screens?

- ▶ Increased well lifecycle longevity helps lower capital expenditures
- ▶ Increased production envelope enables higher production rates
- ▶ Suitable for gas wells expecting high risk of erosion due to high production rates
- ▶ Simplicity of deployment, especially for subsea applications

### Results

One well was equipped with a 3M™ Ceramic Sand Screen System in April 2016 and has been producing since August 2016.

- ▶ Production rates: 42MMSCFD
- ▶ Easy rig-less operation from LWIV with E-Packer
- ▶ 30ft screen was set directly across the new perforations
- ▶ Achieved above 40ft/s velocity in the perforations without sand production

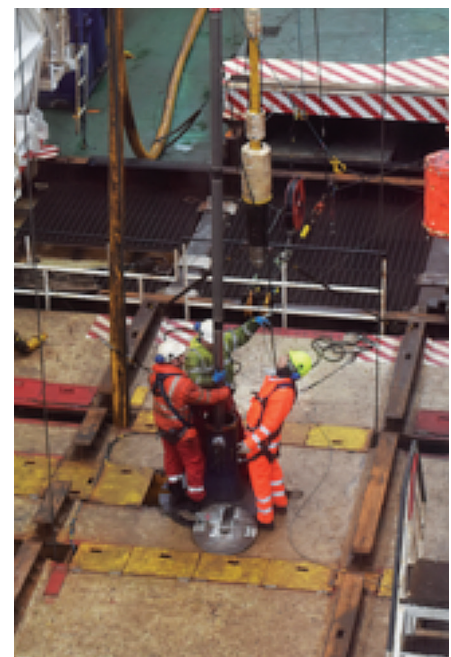
### Customer key decision drivers

The decision matrix included:

- ▶ Robust sand control
- ▶ Reliability in erosive subsea environment
- ▶ Simplicity of intervention

### Economic comparison with other options

- ▶ Metallic non-erosion resistant screens with possible flow rate restrictions to mitigate erosion were considered
- ▶ Sand management



Photos courtesy of Royal Dutch Shell and Helix ESG

## Technical references

**SPE-176225-MS:** Cased Hole Ceramic Screen Cutting Completion Cost for Marginal Reservoir: Application in Tunu Field

**OTC-25106-MS:** An Innovative Approach of Revival for Damaged Wells in High Erosive Environment Using Ceramic Sand Screens – BG Group

**SPE 146721:** An Innovative Milestone in Sand Control – Maersk Oil & Gas

**SPE 160327:** Ceramic Sand Screens for Sand Control in Unconsolidated Reservoirs (with Fines Content) – RAG

**SPE 166092-MS:** Ceramic Sand Screen: Ceramic Sand Screen – An Innovative Downhole Sand Control Solution for Old and Challenging Cased Holes – BG Group

**MOC-Egypt- April 2016:** Ceramic Sand Screen Systems - A Unique Down-Hole Solution for Sand Control

Sand Control with Ceramic Screens in Unconsolidated Reservoirs Demonstrated in the Mature Gaiselberg Oilfield. OIL GAS European Magazine, 2/2012, p. 74–78

**SPE-182278-MS:** Sand Control in Corrosive and Erosive Downhole Conditions at High Temperatures- 3M Technical Ceramics

**Warranty, Limited Remedy, and Disclaimer:** Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. User is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application. User is solely responsible for evaluating third party intellectual property rights and for ensuring that user's use of 3M product does not violate any third party intellectual property rights. Unless a different warranty is specifically stated in the applicable product literature or packaging insert, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OF NON-INFRINGEMENT OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

**Limitation of Liability:** Except where prohibited by law, 3M will not be liable for any loss or damages arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

**Technical Information:** Technical information, recommendations, and other statements contained in this document or provided by 3M personnel are based on tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed. Such information is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any 3M or third party intellectual property rights is granted or implied with this information.



### 3M Technical Ceramics

Zweigniederlassung der 3M Deutschland GmbH  
Max-Schaidhauf-Str. 25, 87437 Kempten, Germany

Phone +49 (0)831 5618-0  
Web 3M.com/ceramicsandscreens

### 3M Advanced Materials Division

3M Center  
St. Paul, MN 55144 USA

Phone 1-800-367-8905  
Web www.3M.com/advancedmaterials

The management system has been certified according to DIN EN ISO 9001, DIN EN ISO 50001, DIN EN ISO 14001.

3M is a trademark of 3M Company. Used under license by 3M subsidiaries and affiliates.

Please recycle. Printed in USA © 3M 2017. All rights reserved. Issued: 9/17 12541HB 98-0212-4272-6