Methane Hydrate Gas

Atle Saure Lokøy, Specialist Engineer, Aker Solutions
Me and my Background on Methane Hydrate project – MH21

Atle Saure Lokøy

Education
BEng Marin. Bergen
MSc Strathclyde. Glasgow

Key words
Offshore and onshore service support
Workover equipment
System Engineering

GCE Subsea
FOUI group

Japan - MH21

Fantastic corporation with Client
Good performance by Equipment
Team achievement

Tranby - EPC
Subsea Lifecycle Services

System Integrating testing
Norway

Daini – Atsumi
Knoll

Team leader and supervisor Offshore

Wife
3 kids
Misje - Sotra

Specialist Engineer
Aker Solutions Ågotnes

My “Aker Solutions” footprints since 2004
Aker Solutions leading positon in the Methane Hydrate Segment

Japan to secure their energy sourcing

- Japan is world largest importer of Liquefied Natural Gas (LNG)
- Diversification from Nuclear energy (Fukushima)
- Methane Hydrate is massive source of gas in Japan seabed

MH21 Project – Japan Drilling Company

- MH21 announced in July 2001
- Aker identified prospect in 2014.
- Study work to adopt existing technology to Methane Hydrate application
- System delivered Q1 2017 and shipped to Japan for Rig integration
- System installed on well May 2017 and test production started
- System retrieved from well April 2018 and Core samples collected
Methane Hydrates

- Frozen gas found in shallow offshore reservoirs
- Cold temperatures and high pressure keeps the gas frozen
- The amount of energy stored in methane hydrates exceeds any other fossil energy source

Environmental issues?

- Methane gas released directly to the atmosphere is a huge treat to the environment
- Emissions after use of the Methane Hydrates is amongst the lowest of fossil fuels
- Pounds of CO2 emitted per million British thermal units (Btu) of energy for various fuels

Geopolitical:
- Some countries VERY dependent on energy imports, actively seeking new sources for energy

Key Countries:
- Japan
- India
- China

Natural gas is primarily methane (CH4), which has a higher energy content relative to other fuels, and thus, it has a relatively lower CO2-to-energy content.
Aker Solutions role enabling methane gas test production

Test Production Phase

- Open Water Riser
- Umbilical
- Scope of Supply
- LWRP
- Depressurization

Graphs and diagrams illustrate the process of methane gas test production, including temperature and pressure graphs, and diagrams of equipment such as Open Water Risers and Umbilicals.
Aker Solutions role enabling methane gas test production

Test Production Phase

Enable pressure reduction in reservoir

Weeks of gas production

Storm hang-off

Topside layout
Aker Solutions role enabling methane gas test production

Preparation Phase

LWRP in Moon Pool

Umbilicals

Deck testing

Safe Deck handling
All lifting and other deck handling activities were performed in safe manner

Good planning of all operations.

Preparation Phase
Deck testing of the equipment and installation of umbilical reels was performed offline
Aker Solutions role enabling Methane gas test production

Running and Retrieval Phase

- Makeup Upper Completion
- Splash zone
- Upper Completion entering well

1000 meter water depth
Run Completion in open hole without use of BOP
Development of a system for commercial production

- AKSO current business is well testing services with Workover technology
- The Field Development discussions have started
- Transit existing subsea technologies into a Methane Hydrate SPS application
- A MH field is characterized by low pressure, many wells, high sand content and need for pumping, hence a “simplified SPS with pumps” is a good starting point
- The time is now to develop concepts ahead of completion and protect IP with patent applications

A Subsea energy plant could be a future solution for Methane Production, with generated heat re-injected to boost production
Process from ongoing well test to commercial production

Well Test System

Test production required to understand reservoir behaviour, sand volumes, extractable reserves and expected flow rates

System includes workover system product configured for optimized methane test production, including:

- WOCS
- Riser
- Well Control
- Interface to ESP

2017-2018

Commercial production (SPS)

India and Japan indicated fast track process to commercial production if test production was successful

- What does a MH XMT look like
- Size of tie-in and jumpers
- Umbilicals and flowline requirements
- Manifold layout and functionality
- Controls architecture

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