

The First Offshore MH Production Test

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Phase 1 (FY 2001 – FY2008)

Basic Research

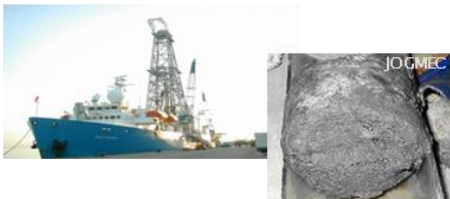
Onshore Production Tests

- 1st Production Test in 2002
- 2nd Production Test in 2008



Resource Assessment in Eastern Nankai Trough

- Seismic Surveys (2D, 3D)
- Exploratory Drillings

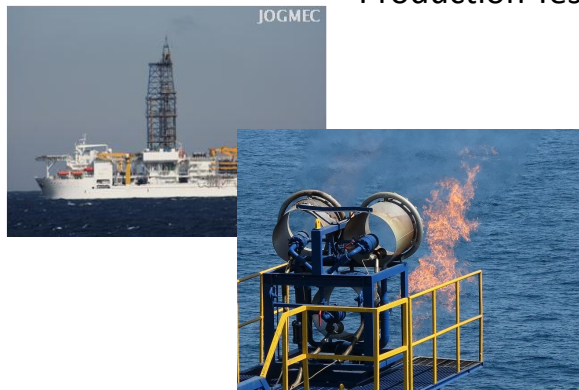


Phase 2 (FY 2009 – FY2015)

Technological Research and Production Tests

Production Tests

- 1st Offshore Production Test in 2013
- Middle to Long-term Onshore Production Test



Technological Studies

- Designing and Manufacturing Systems for Flow Test
- Studying Production Methods
- Assessing Environmental Impacts
- Resource Assessment

Phase 3 (FY2016 – FY2018)

Establishment of Technological Platform

To conduct studies to establish the technological platform for commercialization of methane hydrate

- Middle to Long-term Offshore Production Test
- Preparatory study for Commercial Production
- Economical Feasibility
- Evaluation of Environmental Impacts
- Overall Evaluation of the Total Program etc.

Outline of the First Offshore MH Production Test

When ?

FY2011– FY2013

- Preparatory Drilling in FY2011
- Flow Test in FY2012
- Well abandonment in FY2013

Who ?

- Implementing Body: JOGMEC
- Operator: JAPEX
- Operating Vessel: deep sea drilling vessel “Chikyu” owned by JAMSTEC

Where ?

At Eastern Nankai Trough

- Daini Atsumi Knoll



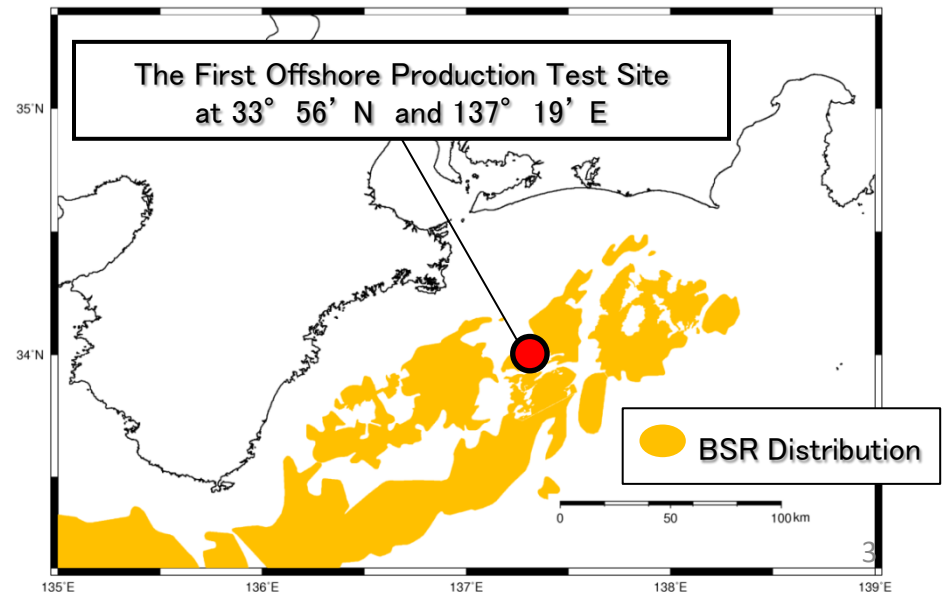
A sand core containing methane hydrate which fills its pore. The core was sampled at eastern Nankai trough

Source: Research Consortium for Methane Hydrate Resources in Japan

How ?

To produce methane hydrate offshore applying depressurization method

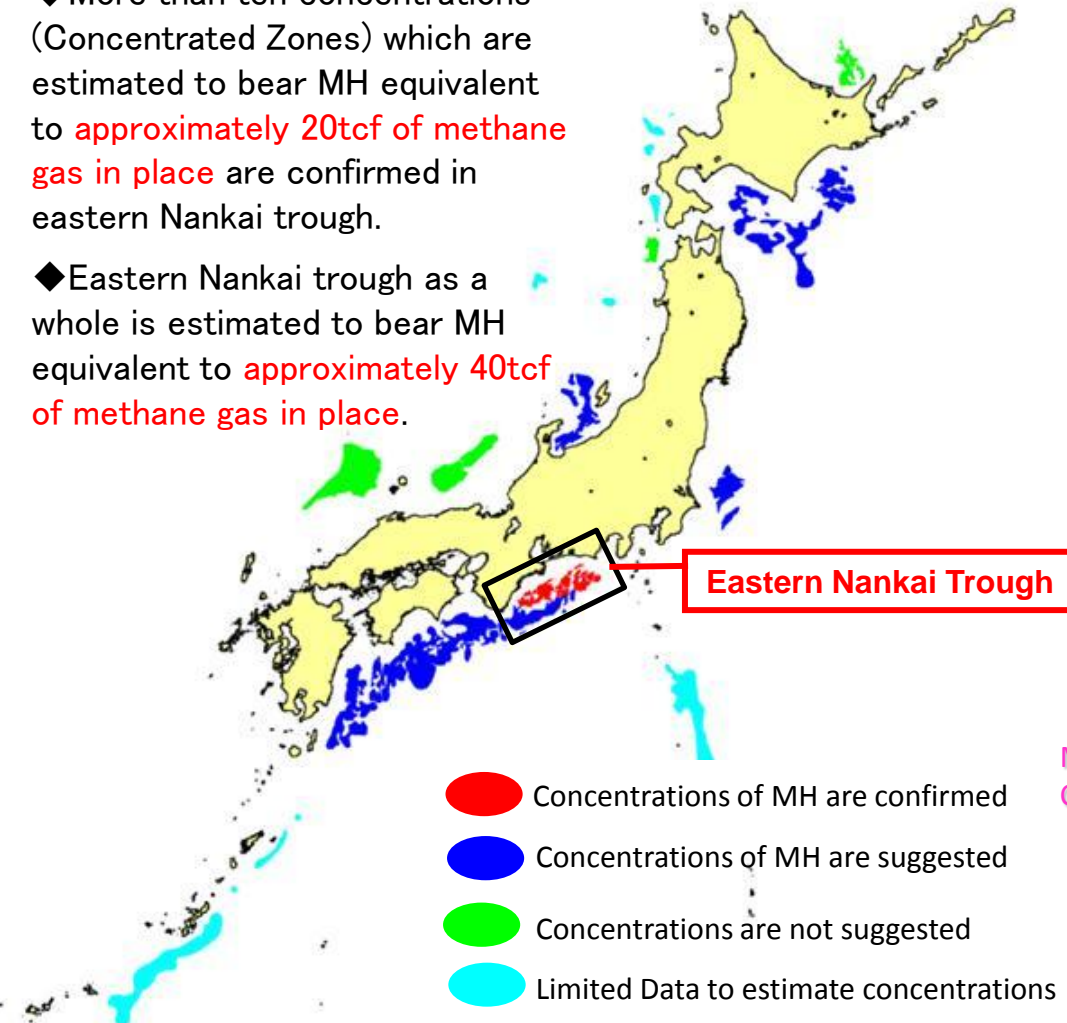
- Depressurization method was verified in the onshore production test conducted in Canada in 2008.



MH Distributed Areas Offshore Japan Estimated by BSR Occurrence

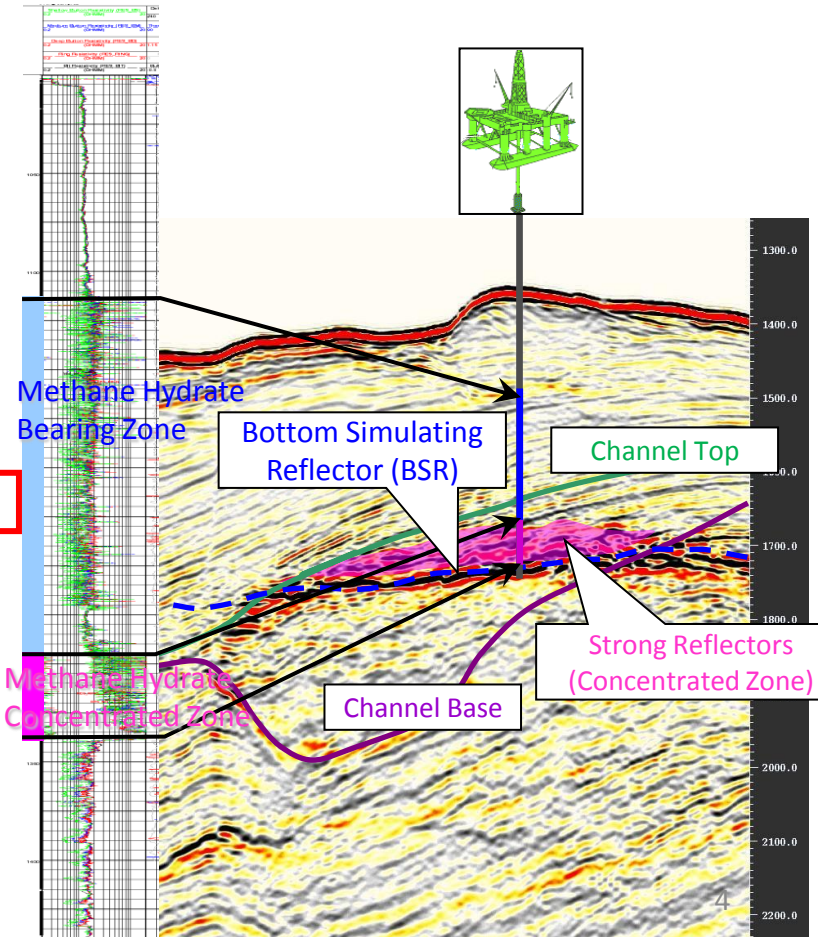
◆ More than ten concentrations (Concentrated Zones) which are estimated to bear MH equivalent to **approximately 20tcf of methane gas in place** are confirmed in eastern Nankai trough.

◆ Eastern Nankai trough as a whole is estimated to bear MH equivalent to **approximately 40tcf of methane gas in place**.

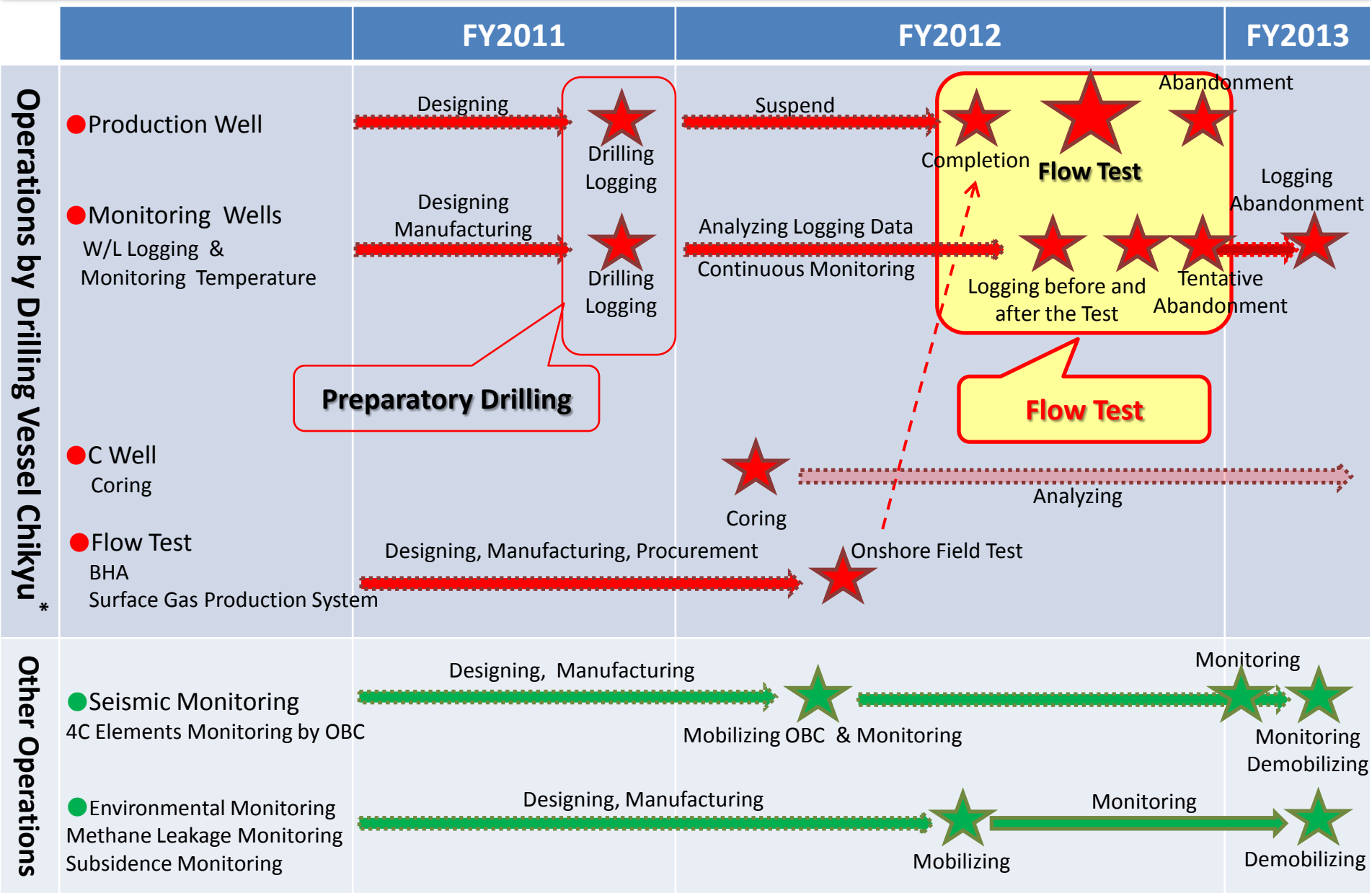


Selection of the Test Site at Eastern Nankai Trough

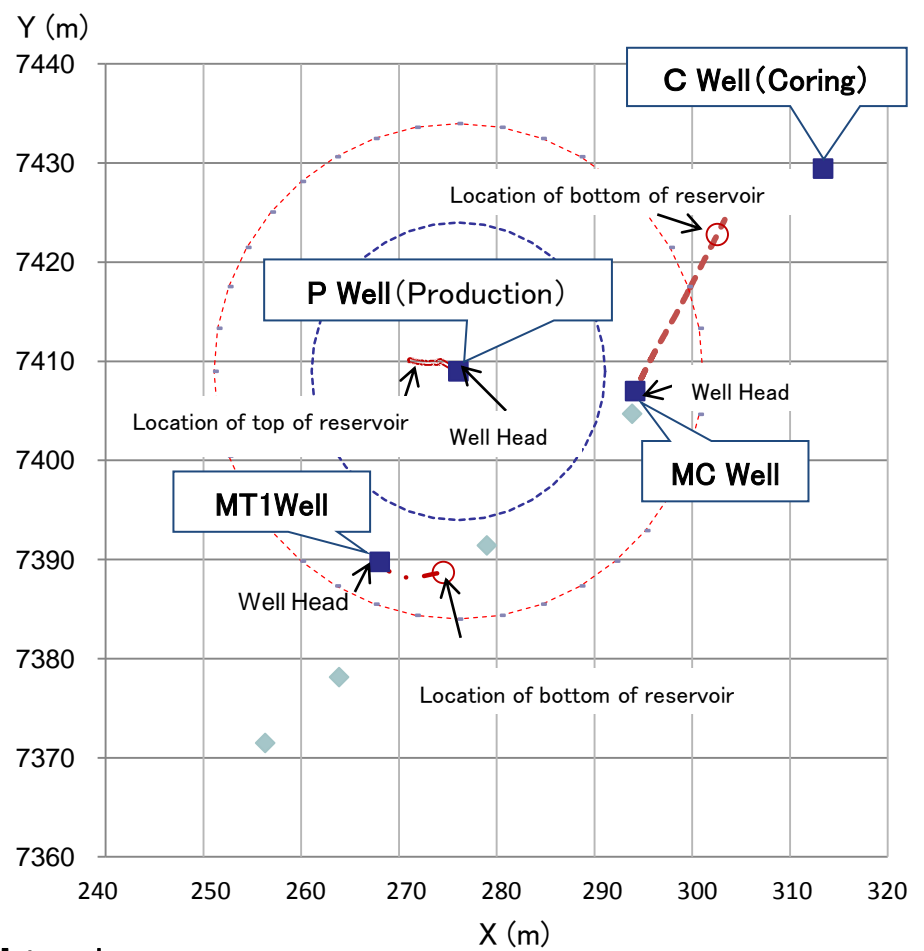
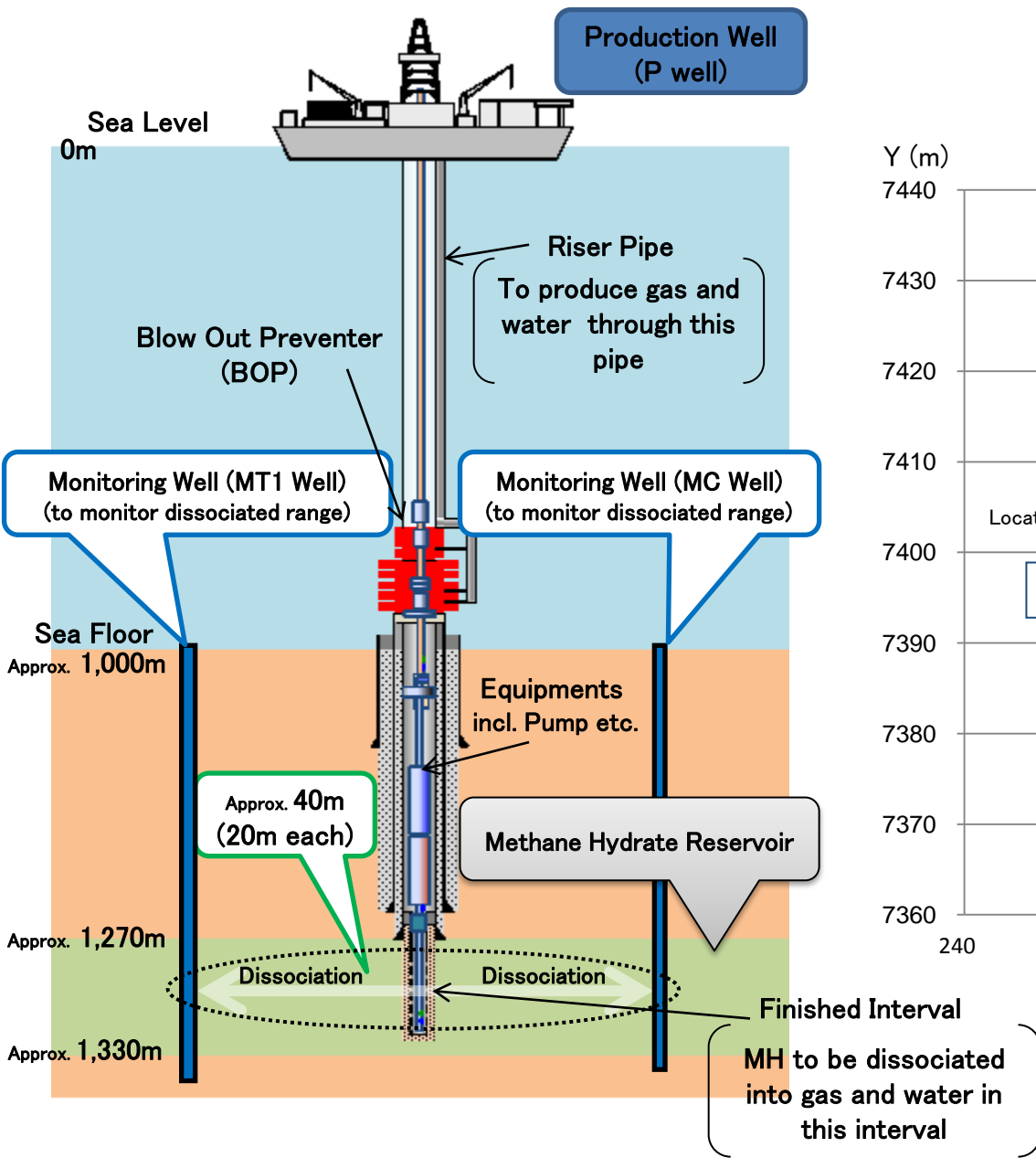
◆ Selected the site where MH concentrated zones are confirmed through seismic surveys and exploratory borings and structure of the sea floor does not have problems.



Overall Schedule of the First Offshore Production Test



Layout of Production Test Wells



Results of Flow Test

Progress of the Operation (Jan.28-Apr.1, 2013)

▪ March 12:

5:40: Started flow test, decreasing pressure

9:30: Confirmed gas production

considered from methane hydrate formations

10:00: Ignited flaring

▪ March 18:

4:00: Confirmed sand production

on board

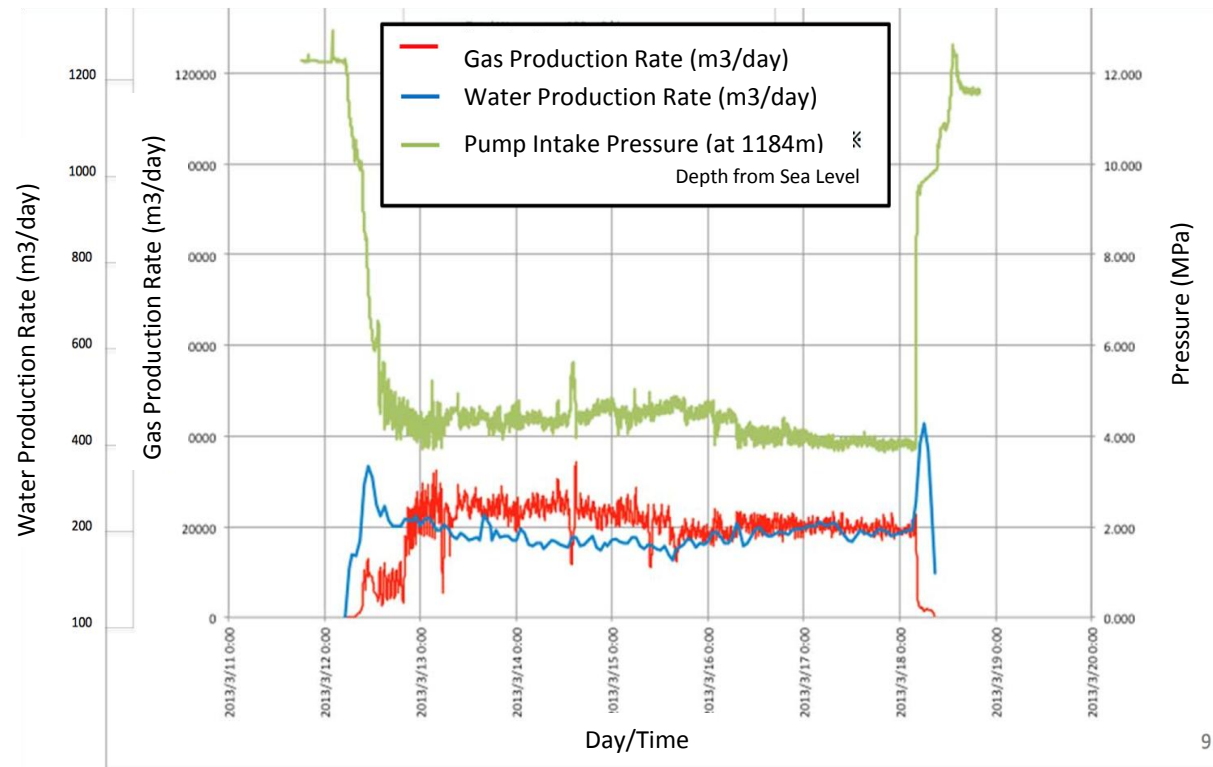
15:00: Completed kill well and
ended flow test

Gas Production

▪ Duration : approx. **6 days**

▪ Cumulative gas production :
approx. **120,000m³**

▪ Average gas production :
approx. **20,000m³/day**



Results and Issues of the First Offshore Production Test: Current Conclusion

- It was verified at least for a short period of time that depressurization was able to be realized at the ocean well and gas was able to be produced through MH dissociation.
- On the other hand, obstructive factors against safety depressurization in long-term such as sand production was revealed.

→ In order to evaluate economical feasibility, since it is essential to confirm long-term gas production behavior, it will be necessary to verify in the real fields ultimately, although it is tried to enhance accuracy of prediction through combining results of the test and modeling technologies.

From the above,

- Once overcoming technical issues, it is essential to conduct a field verification of stable and economically effective technologies.
- Therefore, it would be required to start preparations for necessary technology development and for production tests both onshore and offshore targeting for middle to long-term production period.

