The First Offshore MH Production Test

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Japan's Methane Hydrate Development Program (announced in 2001)

Phase 1 (FY 2001 – FY2008)

Basic Research

Onshore Production Tests

- 1st Production Test 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

Offshore Production Tests

- 1st Production Test - FY2012
- 2nd Production Test - FY2014

Technological Studies

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

Phase 3 (FY2016 – FY2018)

Establishment of Technological Platform

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

- Preparatory study for commercial production
- Feasibility
- 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

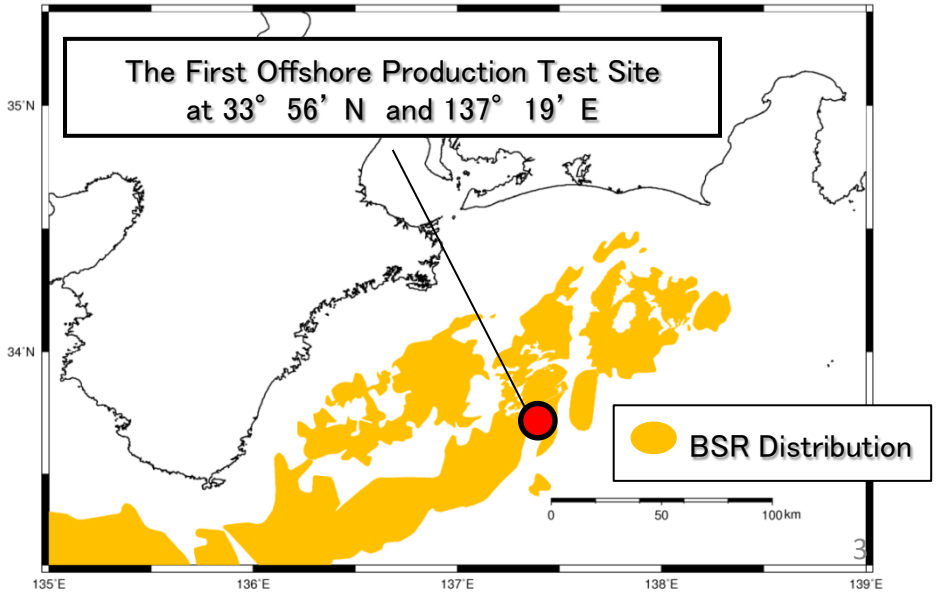
- Daini Atsumi Knoll

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.

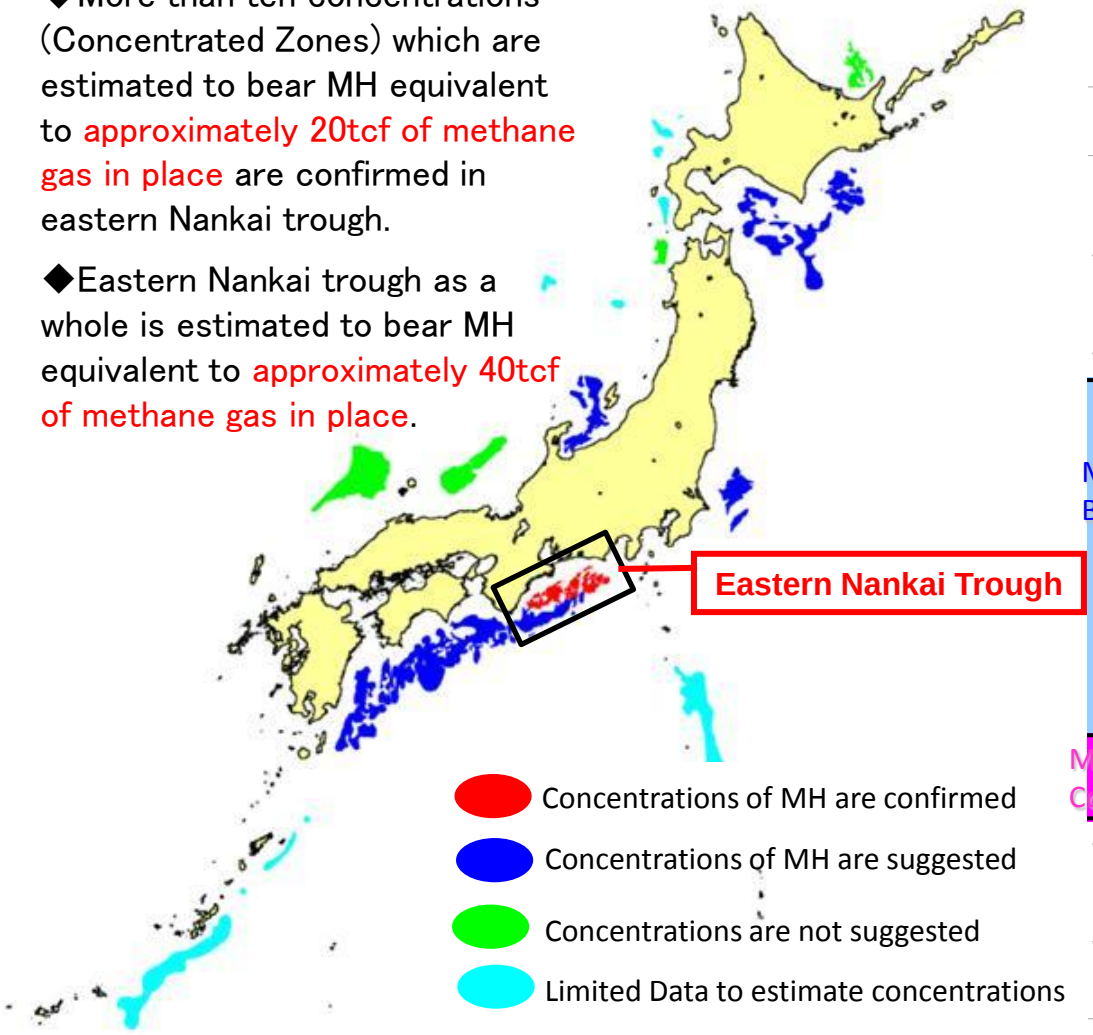


Distribution of MH and Selection of the First Offshore Production Test Site

MH Distributed Areas Offshore Japan Estimated by BSR Occurrence

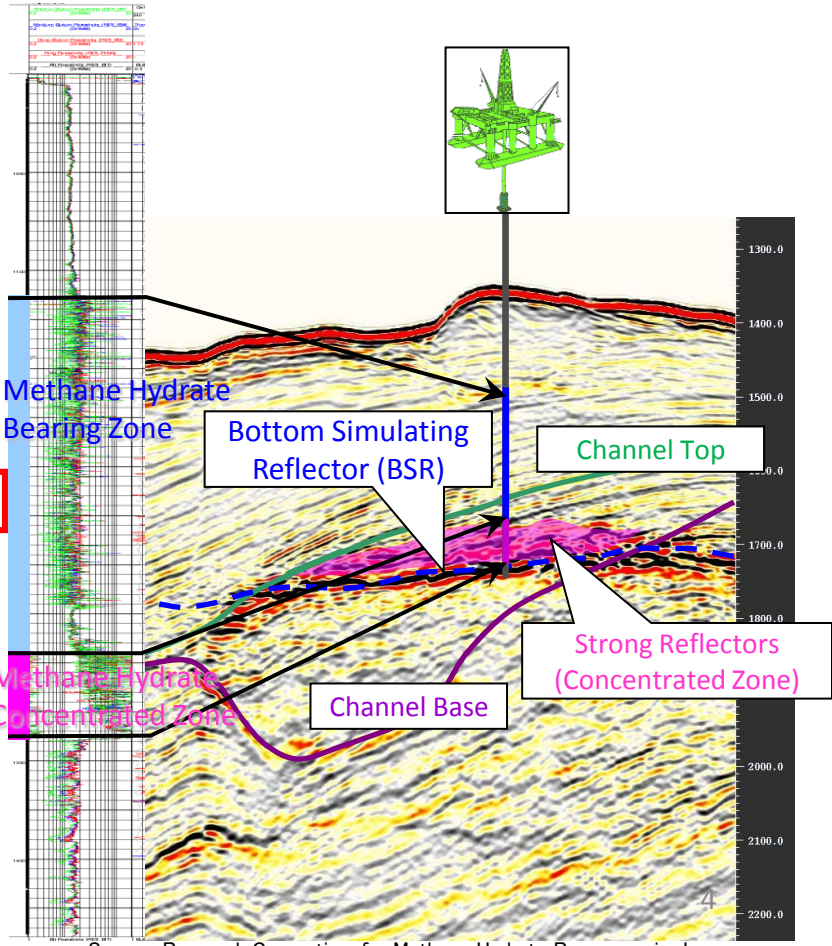
◆More than ten concentrations (Concentrated Zones) which are estimated to bear MH equivalent to approximately 20tcf of methane gas in place are confirmed in eastern Nankai trough.

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



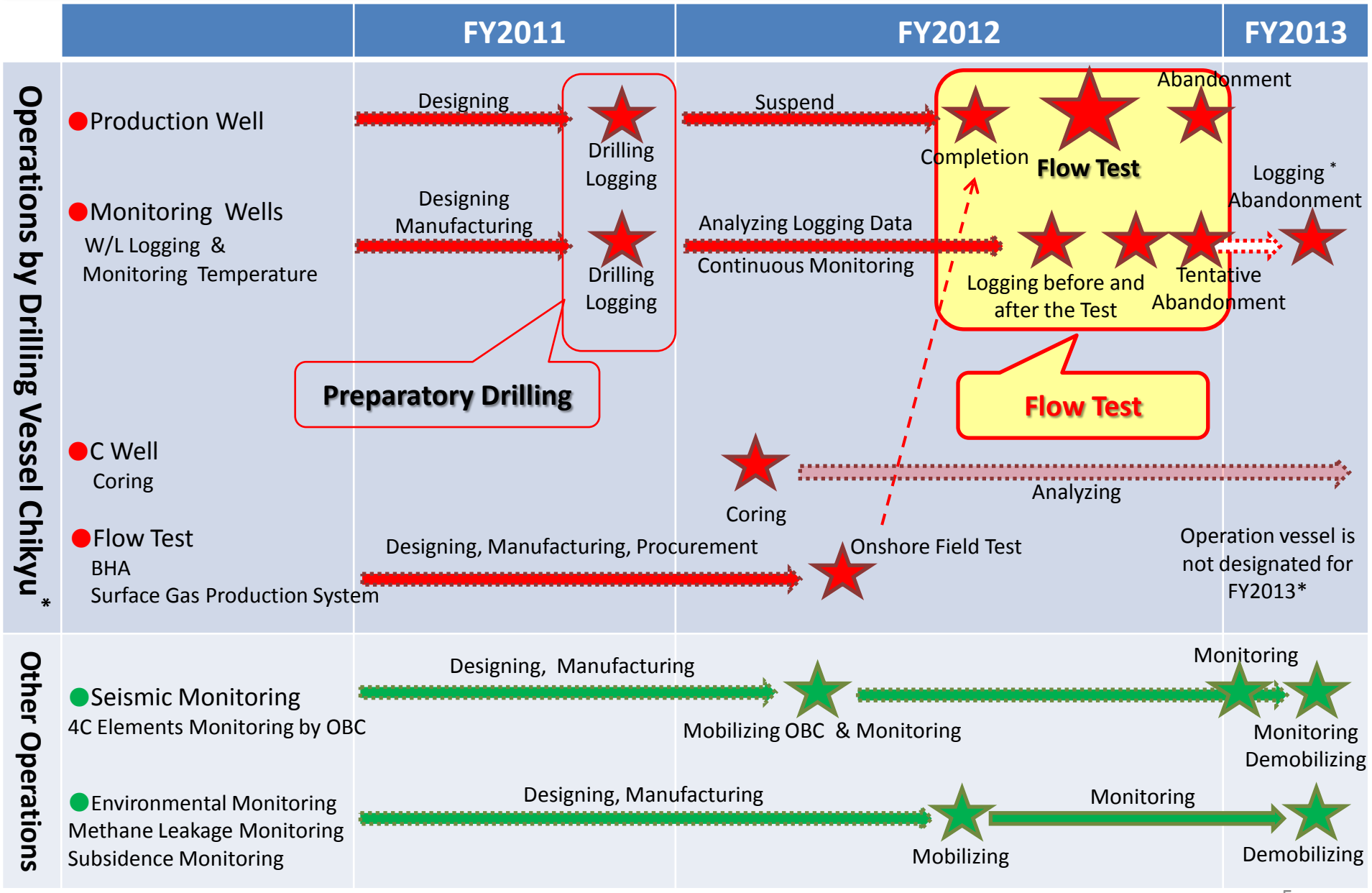
Selection of the Test Site at Eastern Nankai Trough

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

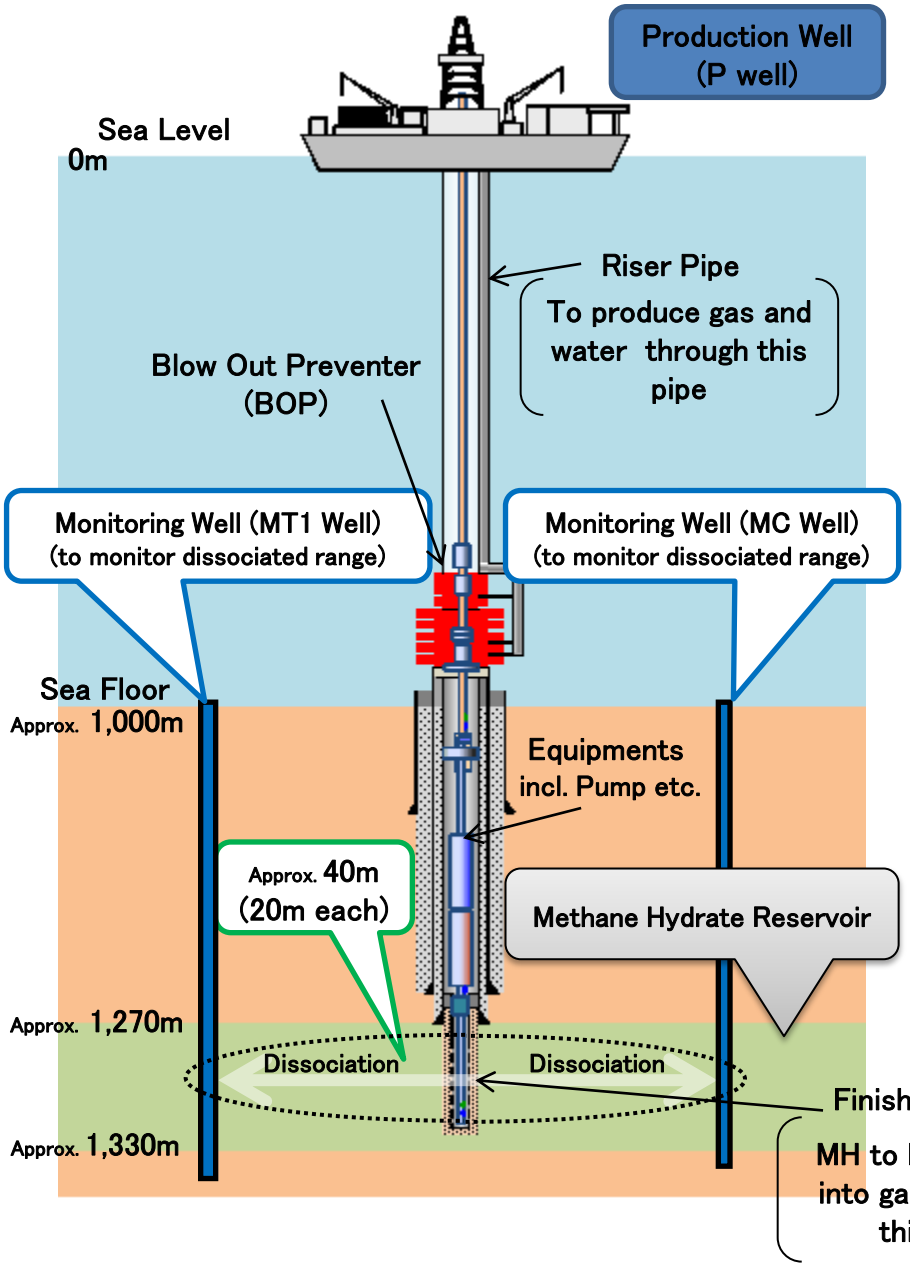


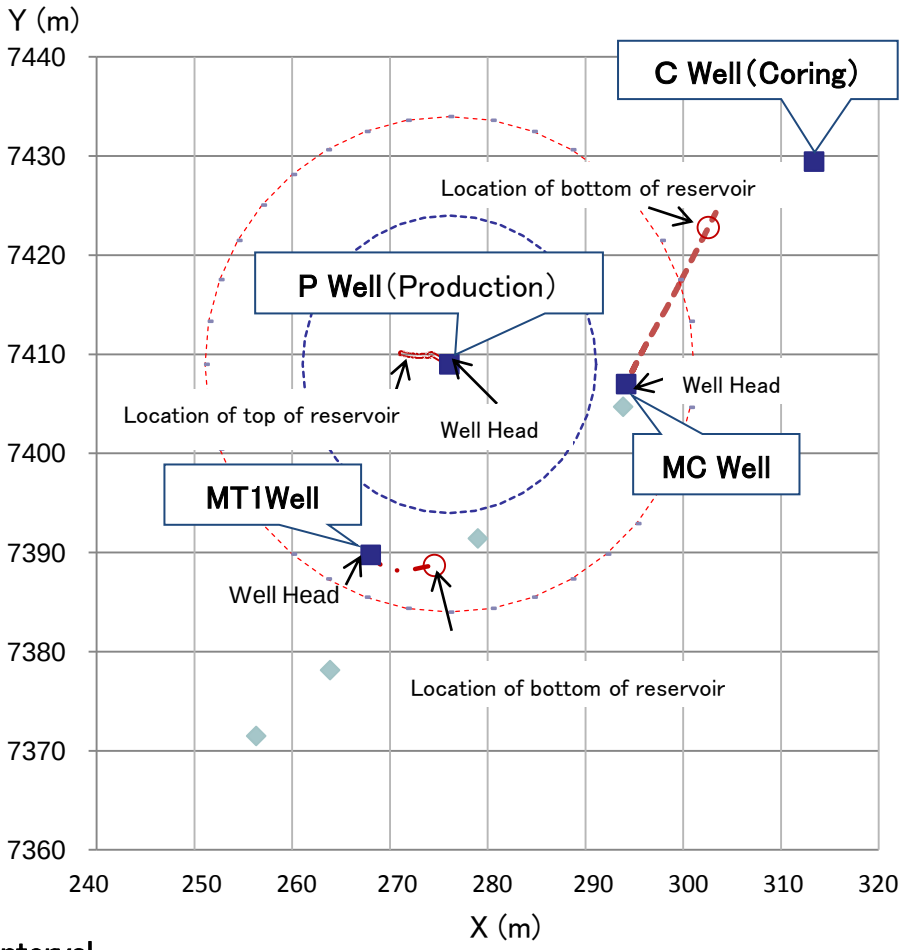
Source：Research Consortium for Methane Hydrate Resources in Japan

Overall Schedule of the First Offshore Production Test



Layout of Production Test Wells





Provisional Results of Flow Test

Progress of the Operation

- January 28, 2013: Started preparatory operations at the test site
- February 2: Completed logging at MC well, moved to P Well
- February 14: Completed BOP setting
- February 25:Completed drilling P well
- March 3: Completed gravel pack
- March 12: Finished running BHA, installed packer

approx. 5:40am: Started flow test, decreasing pressure

approx. 9:30am: Confirmed gas production considered from methane hydrate layers

approx. 10:00am: Ignited flaring

- March 18: Ended flow test
- March 26: Completed logging at MC well
- April 1: Arrived Shimizu Port

Gas Production (provisional)

- **Duration : approx. 6 days**
- **Cumulative gas production : approx.120,000m^3**
- **Average gas production : approx. 20,000m^3/day**

Provisional Results of Flow Test

●Current Understanding of the First Production Test

1. Verified offshore MH production technology

➔Conducted flow test with depressurization method for approximately 6 days

➔To evaluate the production technology based on the test data in FY2013

2. Confirmed offshore MH production behavior

➔Acquired data concerning MH production behavior at the site through the flow test, while still acquiring several monitoring data

➔To evaluate the production behavior based on the test data in FY2013

3. Applied and verified monitoring technologies

➔Continuing to monitor MH dissociation behavior and environmental impacts until around summer of 2013

➔To evaluate the technology by gathering data in FY2013