

Specification on “Trend Survey of Subsea Production System” (Draft)

September 1st, 2008

Japan Oil, Gas and Metals National Corporation (JOGMEC)
Survey and Technology Department

1. General

This specification applies to the work titled “Trend Survey of Subsea Production System (SPS) ” mandated to the consultant.

The consultant is required to submit the proposal documents including work procedures covering the whole scope of work specified by JOGMEC.

2. Work scope

① Literature research/ Case example for SPS

The consultant shall survey the recent (1998-2008) literature (SPE, OTC, DOT, OGJ (Oil Gas Journal) E&P etc.) for case examples, and summarize the technology at least the following items.

- Outline of SPS
- History and the Present State of SPS including the world record in water depth & Subsea tieback distance
- The criteria for application of SPS in water depth, distance from shore, field spread.
- Advantages over other systems such as fixed platform equipped with well head in cost and productivity.
- Technical issue & duration in installation of Subsea structures and equipments.
- Technical issue in operation such as flow assurance, maintenance, power supply, lifetime of umbilicals
- Reliability of Subsea structures and equipments.
- Latest information on design standard such as DNV, NORSK.
- Abandonment methods and cost for each area.
- R&D Activity on SPS in the world.

② Interview with Oil Companies and service companies

- The consultant shall interview with the Oil Companies and the other service companies about technical challenge and future outlook of SPS based on the information of ①.
- The consultant shall collect the addresses and contact person information of the vendors, consultants, and service companies.
- The consultant summarize the advantages and disadvantages of each equipment, through interview with vendors and service companies together with ①.
Information on the equipment listed below should be at least included.

- ✓ Subsea well head
- ✓ Subsea manifold
- ✓ Subsea separator
- ✓ Subsea desander
- ✓ Subsea multiphase pump
- ✓ Subsea booster (compressor)
- ✓ Subsea injection system
- ✓ Subsea flow line & pipeline (including the prevention and removal technologies of hydrate/wax, anti-corrosion technology such as pigging and anode, and prediction technologies for them)
- ✓ Riser-related technologies
- ✓ Umbilical (for hydraulic, power, chemical, communication)

③ Case Study

- The consultant shall organize at least 4 cases of actual application cases of SPS impartially worldwide based on the information gathered in ① and ②.

④ Outlook for the future of SPS

- The consultant shall describe the way forward of SPS and how the technology will contribute to oil industry.
- In the case that other critical issues arise during the survey, they will be investigated and reported on.

3. Deliverables

Report

Hard copy: 3 copies

Digital file: 10 copies of CD

* The digital file shall be in MS Word or other editable/copiable format. This report shall be disclosed to Japanese oil industries.

Presentation

The consultant shall make a presentation with the results of the technical survey in Tokyo by Feb. 2009.

* Presentation materials are to be distributed to presentation participants.

4. Place of implementation

Contractor's office, or designated place by JOGMEC

5. Scheduling time

1. Two Week Progress Report: Progress will be reported every two weeks to JOGMEC person in charge.
2. Interim Review (50% Review) Report: The consultant shall submit Interim Review (50% Review) Document 2month after the start of contract.
3. Draft of Presentation Material: The consultant shall submit a draft of presentation materials 1month before presentation in Japan to reflect JOGMEC's comments and requests in advance.
4. Draft of Final Report: The consultant shall submit a draft of Final Report 1month before the end of

contract.

5. Final Report: The consultant shall submit the Final Report no later than the end of contract. Final document should be finalized after JOGMEC review.

6. Budget

Maximum lump-sum budget for this work is US\$225,000 (JPY 25,000,000).

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