Integrated Subsea Development for Marginal Fields
Typical Contracting Strategies

Traditional Contracting Strategies

Legend:
- Traditional
- Integrated

1. Commitment at (or prior to) DG2
   - Feasibility
   - Pre-FEED
   - iFEED
   - iEPCI

2. Design competition: Commitment at DG3
   - Feasibility
   - Pre-FEED
   - iFEED
   - iEPCI

3. Separate tender for FEED: Commitment at DG3
   - Feasibility
   - Pre-FEED
   - FEED
   - iEPCI

4. Separate SURF and SPS bids with option for iEPCI
   - Feasibility
   - Pre-FEED
   - FEED
   - SPS
   - SURF
   - iEPCI

5. Traditional approach: Separate SURF and SPS contracts
   - Feasibility
   - Pre-FEED
   - FEED
   - SPS
   - SURF

Contractor added value

Time to 1st Production

Appraise
- DG1: Tender/Negotiated
- DG2: Tender
- DG3: Tender

Select
- DG1: Typically referred to as Conceptual Design or Pre-FEED
- DG2: Typically referred to as Feasibility
- DG3: Detailed Design / EPCI
- DG4: Operations Support / LoF Services, etc.

Define
- DG2: Typically referred to as FEED

Execute

Operate
Fully integrated project execution

- Rationalized subsea architecture and design
- Optimized technology applications

Conceptual design & FEED

- Improved technologies application and combination
- Reduced project interfaces and contingencies
- Shortened time to first oil and offshore installation through better planning
- Strengthen leverage on procurement

Project execution

- Increased oil and gas recovery and equipment uptime
- Increased service capabilities
- Improved performance over the life of a field
- Unique asset and technological capabilities
- Best possible line-up to undertake client challenges

Life of field

iFEED® is an enabler

iEPCI™ is a differentiator

iLoF® is a growth engine
Subsea Case 1

Partnering early to unlock iEPCI value

**Scope**

- 4-slot manifold w/ diver tie-ins.
- 4 EHXTs, incl Controls and WH.
- 5km PiP Prod flowline.
- 5km piggy back wash water line.
- 17km Umbilical.
- Wye structure.
- Diver tie-ins

**Value delivered**

- **Novel Target Cost model for full subsea scope**
- **Key Personnel continuation from FEED to Execute**
- **Integrated schedule with reduced float**
- **Optimised offshore campaigns**
- **Accelerated schedule and time to 1st oil**
- **Client Value - £100m+ saving**

**Contracting model**

<table>
<thead>
<tr>
<th>Dec 2018</th>
<th>Mar 2019</th>
<th>Jul 2019</th>
<th>1st Oil May 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED Re-Validation / Pre-Execute (co-located team)</td>
<td>Target Cost Estimate (TCE) Preparation and Benchmark, LLI Procurement</td>
<td>Client committed to long lead procurement (XT’s, Umbilical, Linepipe, Controls) post Pre-Execute Study.</td>
<td>Full iEPCI contract signed July 2019.</td>
</tr>
</tbody>
</table>

- • 3rd party FEED performed by previous Operator.
- • TechnipFMC engaged formally via Alliance with Front End Pre-Execute Study to optimize FEED.
- • Commencement of detailed design for LLI.
- • Client committed to long lead procurement (XT’s, Umbilical, Linepipe, Controls) post Pre-Execute Study.
- • iEPCI TCE compilation, including internal and external benchmark / audit.

**Lessons learned**

- Conventional 3rd party FEED re-validation performed by TechnipFMC, allowing system ownership to deliver a working system design that did not previously exist in the inherited FEED.
- Fully integrated team rationalises the resource requirements from co-located FEED, through to project execution, reducing interfaces and enhancing decision making.
- Pre-Execute study allowed for completing FEED optimization, in parallel to detailed design on key long lead components, accelerating first oil, a key driver for the client.
**Subsea Case 2**

**iEPCI™ Subsea tie-back Project**

<table>
<thead>
<tr>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>- One or two subsea drill centres inclusive of drilling template(s), manifold(s), trees &amp; wellheads.</td>
</tr>
<tr>
<td>- A single insulated PiP production flowline.</td>
</tr>
<tr>
<td>- Electro-hydraulic control and chemical umbilical.</td>
</tr>
<tr>
<td>- Topside equipment including TUTU &amp; HPU.</td>
</tr>
<tr>
<td>- Topside control system for control of the field and mid-life upgrade to the existing control system.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contracting model</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Joint and transparent cost estimating;</td>
</tr>
<tr>
<td>- Joint risk identification and mitigation;</td>
</tr>
<tr>
<td>- Cost transparency;</td>
</tr>
<tr>
<td>- Commitment to cost estimates;</td>
</tr>
<tr>
<td>- Joint contingency management;</td>
</tr>
<tr>
<td>- Embracing gains;</td>
</tr>
<tr>
<td>- Continuous improvement;</td>
</tr>
<tr>
<td>- Meeting the cost of supply target.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reduced lift cost to economic level</td>
</tr>
<tr>
<td>- Reduced contingency allowance</td>
</tr>
<tr>
<td>- Optimized &amp; flexible field layout</td>
</tr>
<tr>
<td>- De-coupled rig and vessel schedule</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lessons learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Use of standard products and new technology enabling reduced lead time (SS 2.0)</td>
</tr>
<tr>
<td>- Working as an integrated team from concept stage allowed better understanding of cost drivers early in the process</td>
</tr>
<tr>
<td>- Alignment of the integrated plan across companies to manage workflow requirements of data between each</td>
</tr>
<tr>
<td>- Early engagement at concept stage allowed early forecasting followed on by securing manufacturing slots</td>
</tr>
<tr>
<td>- Selection of vertical tree enabled batch drilling &amp; setting of conductors, minimum number of HP riser runs for running completions and finally installing trees from vessel resulting in overall cost &amp; risk reduction</td>
</tr>
<tr>
<td>- Combining topside control with the upgrade work allowed reduction/optimisation space required on platform</td>
</tr>
</tbody>
</table>

**Client Vision**
Performing as One Team to safely and reliably deliver globally competitive small pool developments