Legal issues to consider in structuring of new Floating LNG developments

Hamish McArdle, Partner, and Oliver Byrne, Associate, of law firm Baker Botts, present part one of a two-part paper. This month’s covers the application of the traditional FPSO project structure to FLNG.

What for many years were only concepts and hypothetical legal structures, are now being applied to real projects, including some on which the authors are currently advising.

Baker Botts has previously written in LNG journal (Key Issues in Developing a Successful FLNG Project - [See May and June issues from 2009], and this two-part article is intended to provide a more detailed insight into some of the legal issues, problems and potential solutions that should be considered by the range of project participants: including upstream joint venture interest holders, vessel owners and service contractors.

Part One of this article, assesses some key features in the standard project structure model for the procurement, ownership and operation of the Floating Production Storage and Offloading vessel (FPSO), and its variants the FSO, FSU and FPS.

Consideration

Differences and parallels between floating LNG production and storage, and floating crude oil and liquids production and storage will be considered, with particular emphasis on some of the key legal provisions in the contracts for vessel and processing facilities construction, vessel charter and its operation and maintenance.

This includes: the obligations of the parties; contract term, work schedule; liability and indemnity regimes; change orders & variations; ownership rights and intellectual property; interface with other project contracts, and contractors and subcontractors.

Shell installed the first FPSO in 1977, for its Castellon field offshore Spain, and since then the use of FPSOs has become common place, so that there are currently approximately 90 FPSOs in operation globally.

That number is set to rise as FPSOs become the preferred option for accessing offshore reserves which might otherwise be deemed uneconomic.

Over time FPSOs evolved from relatively simple receiving and storage craft to large complex facilities with capacities up to a quarter of a million barrels a day.

Record

The excellent safety record, mobility and adaptability of FPSOs, as well as their lower up-front cost (compared to the costs of a conventional platform) have made them an ideal choice and good fit for the development of marginal or inaccessible offshore fields.

These FPSO project development characteristics have arguably been the catalyst for the emergence of FLNG projects and the application of technology and associated development of legal contracting arrangements for FLNG over the last 10 years.

The use of a floating production, storage and offloading facility for the development of a hydrocarbon resource has a number of attractions for upstream joint venture partners where the hydrocarbon resource may be located in a remote or hostile environment, where field size may be too small to justify large-scale permanent infrastructure, where decommissioning costs and environmental issues are critical to project economics, and where speed of development is a requirement.

These concerns are no different whether the hydrocarbon resource is oil or gas (and liquids).

The first FPSOs were new-builds, and some new-build FPSO projects continue today, but the higher costs associated with new-builds led to a rise in conversion projects (and some FPSO refit projects).

Converting existing vessels, often an oil tanker, to perform the FPSO role has its own pitfalls, not least the complex project synchronisation issues, both legal and physical.

An FPSO conversion project, involving the installation of the topside processing and storage facilities and bespoke mooring facility to maintain the vessel permanently at its station, will entail an array of contracts, with all the integration and coordination risks such a structure imposes.

Whether a new-build or a conversion, FPSO project structures have become relatively standardized in the last 30 years. This has given such projects legal and financial certainty. Given the technical parallels between FPSO and FLNG projects, it is appropriate to draw on this accumulated knowledge of FPSOs in order to help structure FLNG projects.

Optimal project

In a typical upstream joint venture (either under a Production Sharing Contract or other form of concession such as a Licence), the critical time for deciding whether to utilise an FPSO is at the time immediately following declaration of commercial discovery, where the joint venture parties work together under the leadership of their upstream field/Operator (“Operator”) to assess their technical and economic options for the development.

Not only will this decision process consider the use of an FPSO as opposed to a permanent or semi-permanent installation/structure, it will also need to consider the supply and installation of the broader and interconnected infrastructure elements for the subsea (including manifolds and trees), risers, umbilicals, flowlines and pipelines, buoys and moorings, and the operation and maintenance of the FPSO itself.

The key decision for the joint venture will be how to source the FPSO unit and thereafter operate it for the life of the field.
The same timing and decision-making processes for the upstream joint venture apply for offshore gas developments.

Whilst a number of FPSOs are owned by oil companies and supplied by them for the operations of joint ventures in which they are a party, it is more common for the FPSO to be supplied by a specialist contractor under a lease or charter, and the necessary operating services contracted for separately and supplied thereafter.

The joint venture must decide whether the FPSO will be constructed and supplied by the contractor and thereafter to market the FPSO to third parties, the latter approach (of vessel charter and contractor provided management services) is more common, although FPSO supply / charter (including fit out), and services, operation and maintenance.

These types of decisions fall within the competence of the joint venture Joint Operating Agreement (JOA), which most commonly will extend in its scope to the lifting and temporary storage (and occasionally intermediate transportation) of the hydrocarbons, but not the sale of the hydrocarbons.

The non-operator JOA parties will therefore be part of the decision making process in determining the FPSO project structure, and should be part of the contract drafting and review process which will be led by the Operator who in most circumstances will thereafter enter into the major project agreements on their behalf.

A number of elements may therefore be covered within this typical contracting structure, including design, construction and installation, commissioning and testing, services and operations (including expansions and tie-ins) and decommissioning.

Drilling activities and the supply and installation of the subsea elements are rarely included as part of the scope of the contracts for FPSO unit supply and operation. The same approach will apply to the structuring of floating production facilities for gas projects.

A key element of the FPSO contracting arrangement is the process of drawing up and issuing tenders, review, evaluation and negotiation with selected contractors and thereafter contract award.

The Operator will formalise the contract package which is comprised of instructions to tenderers, the form of tender, and the proforma contract which sets out the scope of work and the technical schedules & procedures.

The contract format is ordinarily comprised of General Conditions and Special Conditions, with the Special Conditions acting to vary the General Conditions in areas including delay, underperformance, and liquidated damages.

As the Operator has the lead in preparing the contract documentation, his standard terms and conditions usually form the basis for the contract which is issued to tenderers.

**Response**

However, the tender process will normally see the tenderers responding with significant amendments to the proposed contract, which are negotiated through to a final form which is then “bid” by the shortlisted tenderers.

This process of response, clarification and negotiation in order to produce a biddable contract should be factored-in to the overall project development timetable and final investment decision process.

The tender process can be time-consuming and introduces a degree of uncertainty for the Operator. It is critical that the Operator co-ordinates the process for FPSO/FLNG unit contract negotiation with the wider requirements of the project development and the various interconnecting contracts and liability regimes thereunder.

**Design issues**

The design and construction of an FPSO topside processing facility, and vessel mooring facility, whilst complex in many respects is in fact established technologically, and no longer novel.

Indeed many FPSOs can be adapted quite easily for use on other fields after their original deployment. Rarely will the joint venture contracting for an FPSO require the development of totally new technology and design elements.

Offshore gas production using floating facilities is new and technologically challenging, and the joint venture developers of an FLNG project are likely to require new technology, often specific to their particular gas field and location, which they may either licence from existing technology providers, or they may develop on a proprietary basis.

Proprietary technology will often require the entry into a Front End
Engineering and Design (FEED) contract, which will itself be a tendered contract.

Depending on the complexities of a development and the identified technological challenges it may face, the joint venture may consider awarding more than one FEED contract, and accordingly retain the option to select for the project the technology developed under one or more FEED contracts.

Ownership rights of the technology resulting from the FEED contract will be negotiated. The contractor may seek to retain some form of ownership or licence right notwithstanding that he is paid to develop the technology on behalf of the Operator.

FEED contracts, bespoke technology licensing arrangements, and the issues surrounding the development and ownership of technology are some of the core elements of FLNG project development which set these types of projects apart from the industry standard FPSO contracting regime.

Whilst it is possible and likely for an FPSO to have some novel technological elements, it is less likely that these will be fundamental to the project’s viability as a whole. Whereas an FLNG project must first establish, having assessed a range of factors including gas and liquids specification, reservoir characteristics, and mooring location/metocean conditions, that technologically gas can be delivered, processed, liquefied, stored and offloaded within design parameters which are economically acceptable in terms of the vessel and topsides construction and subsequent operation.

EPC aspect

The core elements of the contract for Engineering, Procurement and Construction (EPC), or together with unit integration and installation (EPCD), for an FLNG unit will be broadly similar to those for an FPSO. They include contractor obligations; vessel/unit information; work performance (schedule and timetable); sub-contracting; change order process; inspection and testing; commissioning; completion milestones (including substantial and final completions); default; performance criteria and liquidated damages; indemnities;
security for performance; intellectual property; and rights of third parties (lenders and charterers if applicable).

The EPC contract for an FLNG unit will specify that the unit is a gas processing LNG liquefaction FPSO unit, which is to be designed, engineered, integrated, installed, tested, completed, commissioned and handed over by the contractor, as applicable in accordance with a referenced FEED package.

As the unit is also a vessel the specific requirements of the vessel classification society will be stated.

The vessel and topsides integration requirements in an FLNG project introduce greater contracting risk and uncertainty as to liability for underperformance and default.

The FLNG unit owner/operator wishes to avoid a liability “gap” where neither the hull constructor nor the topsides engineer/contractor is liable.

Solution
A singled “wrapped” EPCI arrangement, where one contract covers both hull and topsides construction into an integrated whole may therefore be the preferred solution for the owner / operator.

As in an EPC for an FPSO, the main milestones in an FLNG EPC contract include fabrication, construction, substantial and final completion, and handover.

However there are potentially specific additional milestones in an FLNG EPC contract which distinguish it, including the readiness to receive gas stage, and the issuing of certification for acceptance of the liquefaction plant and unit performance.

Common to all EPC contracts is the mechanism for instruction and authorisation of changes in work scope (including design and materials), and changes to the timetable for the vessel construction and handover including rights to accelerate.

The unit owner generally has the ability to issue change requests, whilst the EPC contractor may request change orders in certain circumstances whilst providing an estimate of the revised contract price and timetable with such request.

Mechanism
The EPC contract will provide a mechanism for resolving disputes between contractor and owner subject to the owner’s right to require its requested variation to proceed, prior to the issuing of a binding change order.

The complexity of the EPC contract scope will necessitate the main contractor engaging sub-contractors. There may be an approved sub-contractor list, or a requirement that the unit owner must approve a sub-contractor, and/or have rights itself to nominate sub-contractors.

The contractor should be fully liable for the performance of the sub-contractor, whilst the sub-contracts themselves are to be substantially on the same terms as the EPC contract. A mechanical completion stage may be included covering the procurement, fabrication, installation and pre-commissioning of all of the systems comprising the FLNG unit, after which sea and dock trials and gas processing and liquefaction trials will most probably occur.

The trials are designed to demonstrate the unit’s compliance with the FEED package and the technical requirements of the EPC contract, followed by any necessary defects correction.

Given the importance in an FLNG project of field location and gas source to FLNG liquefaction technology, testing of liquefaction processing equipment may take place substantially offshore at the field location.

At substantial completion the unit is available for full commercial operations and capable of reliable and safe operation.

Ordinarily the owner will accept the unit subject to rectification by the contractor those outstanding items identified in the tests.

Hand-over
Thereafter the vessel is handed over, which is the point of transfer of care and custody from the contractor to the owner. Handover will most likely be followed by the issuing of certification of the unit’s readiness for gas liquefaction, signifying the ability of the unit to commence liquefaction.

Plant acceptance tests will then be run to demonstrate the nominal production rates of LNG and gas liquids in accordance with the FEED package.

Measuring and enforcing performance are critical to the unit owner, considering the technically challenging and time consuming nature of FLNG project development.

Damages for breach are the commonly used tool to incentivise contractor performance. The main areas for damages in the FLNG EPC contract relate to delay in construction or in delivery at the various milestones, and to performance of the plant and systems measured against design capacity.

Plant performance is critical to the economics of the FLNG project, and accordingly different liquidated damages will apply for the various elements of the plant design including for boil-off, LNG production, fuel consumption, water production/treatment etc.

The general approach favoured by owners is that the contractor should not benefit from any improved performance. In addition to liquidated damages, the owner generally reserves the right to reject the unit if its performance for any particular process element is outside of its specified maximum and minimum criteria.

The owner will also reserve additional rights to terminate or suspend the contract, to withhold payments and to apply guarantees in the event that the contractor is in default.

Contract defaults giving rise to termination and suspension rights will be negotiated but will commonly include remedied defects, non-performance of tests, unit non-performance against specified criteria, and where delay damages exceed a specified cap.

On a termination of the contract the owner will wish to be able to transfer the contract to another contractor without restriction, and to transfer or to take the benefit of necessary subcontracts.

For both FPSOs and FLNG units the parties may require each other to secure their payment obligations by providing security, often through bank guarantees.

Because of the complexity of the FLNG unit and its liquefaction technology, and the high value of these projects, it may be necessary to obtain multiple performance guarantees from the various contracting parties together making a package of security.

Bond
A contractor performance bond (or package of bonds from different contractors) to guarantee the unit’s performance for the duration of a negotiated guarantee period is likely to be requested.

The extent of provisions relating to intellectual property matters may be an area of difference between an EPC contract for an FLNG unit and one for an FPSO.

For these contracts owners are most likely to seek to own the intellectual property in the work, work documentation and the unit generally, although owner and contractor protections with respect to intellectual property use-rights can be built in to these contracts, notwithstanding that such party does not actually have ownership of the intellectual property itself.

The contractor may be required to assign rights to the owner, and to help the owner to protect such rights.

Some intellectual property rights may be “excluded” from this standard regime, including those owned by third parties and by the contractor prior to the entry into the EPC contract.

Where the FLNG unit will be chartered it is important that the EPC contract recognises the rights of the charterer in addition to those of the owner.

Typically this will mean that the contractor will be required to deliver all notices to the charterer, that the contract may not be cancelled or terminated without the charterer’s consent, and that the charterer’s consent must be obtained for Final Completion and for any modifications to the unit.

Use rights
Where, as described earlier in this article, the upstream joint venture (through its Operator) determines not to own the FPSO or FLNG unit, it is common for the vessel to be time chartered.

Time Charter Parties (TCP) are of course common to the LNG industry as a principal contract form for the many LNG fleets transporting LNG from land based liquefaction plants to the global LNG market.

Similar to these LNG shipping fleets a TCP for an FLNG unit will be bespoke in nature, but following some standard rules and incorporating a number of standard principles which are also common to the forms of vessel charter employed for FPSOs.

Most commonly the charter party will allocate operational and performance risk of the vessel to the owner, and, as referred to above, there will be some alignment between the ownership and charter of the FPSO/FLNG unit and the obligations of the parties under the vessel EPC/D contract.

Where the FLNG unit is bareboat chartered the owner will follow the charterer’s lawful and reasonable instructions subject to maritime standards and matters of safety and insurance.

The vessel would be crewed and all necessary equipment and services provided to operate the vessel, including maintenance and repairs. The charterer assumes a number of obligations, the principal being the payment of hire.
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There are two basic elements to the charter hire (payment structure): a capital element which covers the build/financing cost of the FLNG unit and which is ordinarily fixed over the term of the charter hire (or perhaps over an initial period) on an amortised basis; and an operating element which covers the provision of the unit and its maintenance/running costs, and which may be divided into a number of different elements and may be passed through to the charterer directly, where the charterer assumes such obligations.

The capital element will ordinarily be payable in all circumstances and without exception, as it reflects the owner’s committed financial obligation (often obtained through third party financing).

The operational element may be subject to certain charterer rights to reduce or suspend payment or to off-set or deduct certain amounts against such operational hire costs, which will be index linked and adjusted periodically.

The agreement may also specifically provide for an additional cost element to cover modifications to the vessel, and for an FLNG project which may wish to tie-in additional gas fields in the future, or to provide liquefaction for third party gas, this will be an important price element in the processing facility would charge for much the same manner as a typical gas (and liquids) production capacity and rate, LNG (and liquids) ship-to-ship off-loading rate, fuel/catalyst consumption and maintenance of mooring.

Guarantees
Where performance falls below the guaranteed levels the hire should be proportionately reduced, and in addition the term of the charter may be extended to compensate for the lost opportunity, or the charterer may have a termination right for material underperformance.

It will be critical for the charterer that the FLNG unit remains in service at its station without dry-docking for the entire duration of the Charter-party.

In all circumstances of non-performance by the owner it should be considered whether the charterer should be entitled to any consequential loss recovery which might be substantial both at the upstream level where production is suspended and/or the field is shut-in, and at the downstream level with respect to LNG sales contracts and LNG tanker/shuttle tanker demurrage.

"Off-hire" events mean that the charter hire payment obligation is suspended and the normal payment regime for the FPSO / FLNG unit does not apply (although the capital element of the hire may be excluded).

Off-hire events will be negotiated elements and the owner will of course wish to reduce the scope of the charterer to place the vessel off-hire, whilst the charterer will, as a minimum, wish to suspend the hire where the vessel’s performance does not meet the required standards, or where maintenance interrupts the facility of the vessel.

Compensation
The owner will be unwilling to offer, and the charter is unlikely to receive, any additional compensation or damages as a result of the vessel being off-hire.

Off-hire in excess of a specified period of time may permit the charterer to terminate the TCP.

A FPSO and FLNG unit charterer (in the same manner as an operator and service provider) will not wish to assume liability for any non-conformance or defect attributed to design and construction.

There is therefore a linkage to the EPC(I) contracting arrangements and the charterer, who will want to maintain rights to inspect vessels and up sides during their construction and integration, to attend testing / trials and to require rectifications.

The TCP should address a default by the owner to enable the charterer to take control and ownership of the vessel in circumstances where the owner’s default prevents or materially delays the usage and operation of the FPSO/FLNG unit.

Such control is often achieved through purchase options. Similar concerns and remedies apply in connection with owner default under vessel financing arrangements. The charterer will also require the protection of “quiet enjoyment” rights where the vessel is financed.

One legal issue common to all of the forms of FPSO and FLNG project contracts discussed in this article, and which will be applicable to the ownership/charter arrangement for the vessel, is the extent of the force majeure protections.

Relief
As the legal effect of a force majeure claim is to relieve the affected party from performance of its contractual obligations, this is a significant provision in a TCP where a non-payment of the hire significantly impacts the owner, and the non-performance of vessel services/function significantly impacts the charterer (and the wider FPSO/FLNG project).

The relief granted in the event of a force majeure claim will need to be carefully negotiated, as it too will impact circumstances constituting force majeure, and specifically within an integrated LNG value chain agreeing which upstream and downstream events will be permitted as force majeure events for the purposes of the TCP.

Regulatory requirements and the respective legal responsibilities of the owner and charterer for permits, consents and other authorisations must be addressed in the TCP.

It is unlikely that an owner will fully assume the risk of regulatory changes over the term of the TCP, and accordingly the liability of owner and charterer for the cost of vessel modification in the event such changes are mandated by law should be specified.

Operation
Whatever contract/ownership structure is adopted for an FPSO or FLNG unit, certain Operating and Maintenance (O&M) Services will be required to be performed in any event.

These normally include: work scope for the processing and off-take facilities and subsea equipment; performance criteria for the various elements of the production and offloading process and other key criteria including repairs and non-productive time; staffing, training and sub-contracting; an obligation to work with the EPC(I) contractor or the vessel owner to bring the FPSO up to operating standard; health, safety, security, environmental (including pollution) and emergency response matters; and allocation of liabilities and indemnities.

We will address a number of these issues in more detail.

This most important of obligations for the O&M contractor, to perform the scope of work, may only be one paragraph in the body of the contract, but the detail will be in a lengthy appendix outlining the full requirements for running the FPSO.

It should be specified that the contractor has the requisite
to perform the work to the required standard.

Linked to this is the obligation to provide an experienced and trained crew (or to procure such services through an approved sub-contracting arrangement), with key positions filled by pre-approved personnel. Ensuring a clear and unambiguous scope of work will go a long way to avoiding reactive variations to the contract and disputes as the project progresses.

**Alignment**

Whichever project structure is used, the importance of “back to back” terms between Charter-party and EPC/I elements of the project and the O&M services is paramount. Alignment of force majeure clauses, term, delay and warranties, amongst others, should all be addressed.

Without such alignment, a delay under an EPC/Charter-party contract could lead to an Operator being obliged to pay a contractor for O&M services, without a vessel to use them. Similarly, if an Operator has extension rights under a Charter-party to secure continued use of the unit in the event that field production continues beyond its predicted life, similar rights to extend O&M services should also be obtained, without which an Operator could end up with an FPSO/FLNG unit and no service provider, or with difficult negotiations to extend the term of such services.

**Integration**

As noted above, alignment may be complicated when structuring an FLNG project. Allocation of integration risk as between the hull and the topsides, and allocation of overall responsibility for the performance of the FLNG unit as a whole, are yet to be conclusively resolved.

One of the key elements underpinning the economics of a field development is the rate of production achievable over the life of the field.

This calculation drives the need for the O&M contractor to be properly incentivised in relation to non-productive time (NPT). Under a fully integrated model of FPSO/FLNG unit ownership and operation this is not a concern, but with a Charter-party/O&M model, the O&M contractor has no real incentive to keep the facilities running at full capacity.

It is critical therefore that to avoid lost production - or worse, a shut-in of the field - clear operating standards are defined in the O&M contract.

Attached to these standards should by a financial disincentive for the O&M contractor to fail to perform, which is commonly a reduction of the day rate received for all NPT.

In a similar way to the EPC/I contract, one would expect to see operating standards in an O&M contract relating to the gas acceptance rate, LNG production rate and LNG offloading rate, amongst others.

It is arguably even more critical in an FLNG scenario to ensure that these rates are adhered to, as the scheduling of gas receipt and LNG offloading with other independent contractors could break down and storage capacity problems and field shut-in problems arise if the FLNG unit cannot accept gas or unload LNG and other liquids or process and dispose of water at an acceptable/specified rate.

**Carve-outs**

The O&M contractor will usually expect some carve-outs to these obligations, including for example where the failure is caused by an act or omission of the operator, a customer, or another service provider to the operator.

The warranty in an FPSO O&M contract may be as simple as stating that the work will be performed in a safe and workmanlike manner in line with international standards and pursuant to applicable law.

In more developed examples specific warranties relating to defined performance standards, as discussed above, may be used.

These warranties can be linked to performance-related adjustments to the day rate paid to the O&M contractor, or may trigger a loss of day rate in serious circumstances.

The O&M contractor will usually insist that it takes no liability for consequential loss, and liability for pollution and environmental damage not attributable to the contractor’s performance of the services, and it is normal for both parties to exclude consequential losses.

It is usual in these types of contracts for a party to assume liability for its own employees and property, and commonly for contractors and sub-contractors engaged by such party, and their employees (so called hold harmless /knock-for-knock regimes).

**Liabilities**

It is important to state that such indemnities apply regardless of the negligence or default of the other party if the indemnities are to work effectively to cover all liabilities of a party’s “Group”.

Third-party liability is most commonly assumed by the party whose act or omission created the loss, but special arrangements are normally made for pollution and reservoir risk.

The operator/title-holder will normally take reservoir risk (in whole or substantially in part) as this is seen as too great a liability for a contractor to assume, and to do so would significantly increase the cost of the services.

It is also more likely that the Operator’s insurance would cost effectively cover such liability.

Other upstream related risks including overall “project” political risk, risk of change of law, and risk of delay in gas production start-up might be addressed in a similar manner. Pollution is most usually dealt with on a split liability basis, where the O&M contractor takes
responsibility for pollution emanating from the FPSO after the inlet flange, and the Operator takes responsibility for pollution emanating before the inlet flange (i.e. that is related to the field production, reservoir and other subsea contracts and infrastructure).

In this way, pollution emanating from or attributable to the activities of tankers and vessels loading LNG and liquids from the FPSO/FLNG unit are also the Operator’s responsibility, unless such vessels are also operated by the O&M contractor directly.

In all of these areas there should be no substantive difference between the liability regime for a crude oil FPSO O&M contract and that for an FLNG unit.

Conclusions

FPSOs have been a game-changer for accessing and monetising offshore petroleum reserves which might otherwise have been deemed uneconomic; the nascent FLNG industry could do the same for offshore gas reserves.

There is always uncertainty and an element of risk in undertaking the first projects in a new industry, but many of these obstacles may be overcome by reference to the lessons learned from the last thirty years of FPSO projects.

The technological and legal parallels between FPSOs and FLNG units mean that sponsors and lenders alike may reduce the risks in undertaking FLNG projects by using comparable project structures and principles. In this way, all parties can focus on how the project addresses the unique characteristics of FLNG, rather than reinventing the wheel for elements of the project synonymous with FPSOs.

Reference