MAYER • BROWN

2016

Treatment of key risks under EPC contracts

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Introduction

There are many different types of contract structure for the delivery of engineering projects, beyond the EPC model. In the oil & gas sector, examples include platform and pipeline EPCI (engineering, procurement, construction and installation); FPSO (floating production storage and offtake); and MOPU (mobile offshore production unit). There are also many standard or model forms for different types of contract for the various services, works and forms of collaboration that such projects involve, from Production Sharing Agreements and the Model Seismic Acquisition Contract,[1] to forms of Model Drilling Contract.[2]

However, the EPC model is used where an owner or employer wishes to engage a contractor to undertake the engineering, procurement and construction of a facility, whether this is an oil refinery for the production of petrochemicals, a processing plant for a gold mine or a major piece of infrastructure such as an airport. This paper considers the treatment of some key risks under such EPC contracts.

The purpose of an EPC contract, at its simplest, is to allocate risk to the contractor for the main elements leading to completion of a facility for use by an employer. These elements comprise the Engineering, Procurement and Construction of the works; hence 'EPC'.

The completion risks that are allocated to the contractor under this arrangement are generally those which impact on the cost and time to complete and which affect the quality of the completed facility. Many factors will impact on the management of these completion risks, such as the stage of completion of the design at the point at which the parties enter into the EPC contract, the sub-surface conditions which are encountered during construction of the foundations for the works, the availability of labour and materials, local laws and security (to name but a few). All of these factors are, to some extent, regulated by the terms of the EPC contract. However, for the purpose of this paper, I have focused on the following risk areas:

1. Legislative Change;
2. Force Majeure;
3. Design Development and Conversion Mechanisms.

This paper addresses these risks in the context of both bespoke and standard form EPC contracts. Whilst there are a number of such standard forms, one of the most widely used forms internationally are those published by FIDIC.[3] The so-called rainbow suite published in 1999, comprises Red, Green, Yellow and Silver Books (amongst others) but in this paper, I shall mention just the Yellow and Silver Books.[4] Both require the contractor to design and construct the works and in practice, are used on large and complex projects to allocate the principal completion risks to the contractor, albeit more so with the Silver Book. In particular, under the FIDIC Silver Book, subject to limited exceptions, the contractor assumes the risk for any deficiencies in the initial design of the employer which the contractor is required to complete.

The use of standard or model forms of EPC contract saves time for the parties and has the potential to reduce transaction costs, albeit users of such standard forms may frequently provide voluminous sets of bespoke amendments to reflect the requirements of the particular project and their attitude to risk.

By analysing how both bespoke EPC contracts and the FIDIC Silver Book allocate and manage the treatment of such risks, it is possible to acquire a better understanding of the issues involved and for contracting parties to develop appropriate strategies in relation to the tendering, negotiation and award of EPC contracts.

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1 Such as those produced by the Association of Independent Petroleum Negotiators, available at www.aipn.org.

2 Such as those produced by Oil & Gas UK, available at www.logic-oil.com.

3 Federation Internationale Des Ingenieurs-Conseils, which translates into English as the International Federation of Consulting Enginee

4 *Conditions of Contract for Plant and Design-Build* (Yellow Book) and *Conditions of Contract for EPC Turnkey Projects* (Silver Book), copies of which are obtainable via www.fidic.org.

Legislative change

Introduction

Legislative change refers to the risk that rules and regulations affecting the cost and/or schedule to complete the project may change during the currency of the design and construction period.

This is a particular risk in large projects which may take a number of years to progress from the drafting board (or the CAD station) to the completed facility. Over such an extended contract period, the laws governing the EPC contract and laws which are applicable in the location where the engineering and contracting activities are taking place, are likely to change. This may include changes to labour laws that make it more expensive to employ operatives, changes in regulations that increase the cost of materials necessary to construct the facility or new or enhanced regulations that restrict the level of emissions permitted from a completed facility.

Political risk can also lead to a change in law. This tends to occur in less developed or emerging economies, which are heavily dependent on commodities, from oil or iron ore, and where the host government feels compelled to balance its budget by imposing new taxes or requirements on companies developing projects in that country. The fall in the price of many commodities over recent years coupled with the rise in populist politics, has created a potent cocktail for political risk and so-called resource nationalism.

All such factors have the potential to increase materially the cost and time required to complete projects, particularly but not exclusively in emerging economies. Such risks will therefore be highly relevant when the contractor tenders its rates and prices for completing the project.

These legislative change risks are to be distinguished from the fluctuation provisions that are found in bespoke and standard form EPC contracts. Such fluctuation provisions will often involve application of a formula to the rates and prices for various types of activity, to account for the rise and fall in the cost of consumables necessary for the construction phase. Thus, the cost of consumables such as drill bits, explosives, fuel, lubrication oils, tires, and the like will be identified and their fluctuation in cost during the currency of the construction works will be adjusted via an agreed formula.

In comparison, legislative risk is not susceptible to a formulaic adjustment via a fluctuation provision. This is because the nature and impact of the risk is impossible (usually) to quantify accurately as it will impact over an uncertain range of cost components, albeit labour costs will usually be one of them.

If a change in legislation impacts on the cost of completing the project after the contract price has been agreed, the question arises as to who bears the burden (or the benefit) of the increase (or decrease) in price?

Where the risk is allocated to the contractor, this will be priced into the lump sum price and into the contractor's rates and prices to take account of the impact of the legislative change. However, where the employer retains the risk, there is no need for the contractor's prices to contain any contingency for such risk. If this risk impacts, the employer bears the cost but if it does not impact (because there is no change in law or any such change does not affect the contractor's performance), the cost to the employer is nil.

The effect of a change in law on the cost and time taken to complete all the deliverables required under an EPC contract will depend on a number of factors. However, two issues are important to consider, namely determining when the change of law occurred and how this is addressed under the terms of the contract.

One interesting scenario arises where the tender price has been agreed but the contract is yet to be awarded. In such circumstances, the form of the EPC contract may have been agreed under which the risk of the legislative change is allocated to the contractor effective from the date of execution of the contract. However, does that necessarily mean that the contractor bears the risk of that pre-contract, tender stage, change? The answer is not necessarily, as will be discussed below. However, first it is useful to start with a discussion about negotiating the change in law provision, to provide some context for the issues that arise.

Considerations when negotiating change in law provisions

Broadly speaking, where parties are considering entering into contract, there is a risk transfer choice to be made as regards legislative change risk. At one end of the spectrum the employer may take the risk by allowing the impact of legislative change to constitute an event which entitles the contractor to adjust its price and time to complete to accommodate the impact of the legislative change. At the other end of the spectrum, the legislative change risk may be allocated to the contractor so that legislative change is not a permissible cause justifying any adjustment in its price and schedule commitments. In between, there are options of separating out legislative change that affects just the project (which may be retained by the employer) and legislative change that applies more generally (which may be allocated to the contractor).

Another common device is to allocate the risk of change to the employer, but only if that change was not reasonably foreseeable by reference to impending changes known at the time of entering into the EPC contract. This may capture impending changes in law such as those which have been promulgated but not yet brought into force. If this approach is adopted, even though the change in law may come into force after the contract has been executed, the contractor will bear that risk and will be expected to have made sufficient allowance in its rates and prices for complying with the new law.

Parties may decide to use the FIDIC Yellow or Silver Book or another standard form contract which already contains specific change of law provisions. However, there may be instances where parties wish to amend such provisions or use a bespoke change of law provision. It is therefore worth considering some of the points that a change in law provisions may involve, according to the particular risk profile of the project.

The employer in particular may wish to exclude certain circumstances from its liability for an increase in the contract price, for example changes in tax law which affect only the contractor's profit and loss.

It is fair expectation that any properly drafted change in law provision will set out that a change in law will only affect the contract price where such change affects the contractor's performance of his obligations under the contract. However, the employer may seek to tighten this to state that the contract price will only be affected where there is a "*material*" effect on the contractor's obligations and it is sometimes added that such a change must make the obligations "*extremely costly*" to perform as a result. This presents a high threshold for the contractor to achieve if it wishes to establish that the price or schedule to complete the project should be adjusted in its favour.

The employer may also try to restrict the impact of the change of law to one which is "*extraordinary, unforeseen or unforeseeable*" which obviously represents a further and high threshold for the contractor. As with all such provisions, they present fertile ground for debate. For instance, how does one establish the level at which the contractor bears the burden of an "*ordinary*" impact arising from a change as opposed to a change whose impact is "*extraordinary*"?

Alternatively, the contractor may wish to limit the type of the change of law anticipated. For example, the contractor may argue that the FIDIC Yellow or Silver Book provision of "*changes in judicial or official governmental interpretation of such Laws*" is too wide and could be construed to include even ad hoc policy interpretation of an existing piece of legislation statute.

The parties should also consider specifying a requirement that the contractor provides notice of his intention to invoke the provisions, identifying the extent to which the contractor is prevented or delayed from performing its obligations and/or where compliance with the change is not reasonably feasible. In addition, the employer may want an option to discuss or disagree with the contractor's position on the change of law and may even want the option to terminate the contract where the change in law renders completion of the project uneconomic.

As will be appreciated, there are many issues to be considered (and negotiated) when agreeing legislative change risk provisions in EPC contracts.

What does the EPC contract say?

It is an obvious but nevertheless important point that a key consideration will be the provisions of the EPC contract itself.

In both standard form and properly drafted bespoke contracts, there should be a specific change in law provision. Such a provision will be expected to set out which party takes the risks associated with a change of law (such as change in price or delay in performing obligations) and from what date. For example, the provision may state that the contract price will only change where the change in law occurred after the contract has been executed or from a specific base date, consistent with the period during which the contractor was tendering its price. This means that the EPC contractor will be expected to include in its lump sum price, an allowance for the risk of an increase in price due to the state of the law as at the base rate, but that the contract price will be increased in accordance with any subsequent legislative change. On this basis, the employer takes the risk of a change in law from the base date.

The FIDIC Yellow and Silver Books provide an example of this approach. Sub-Clause 13.7 (*Adjustments for Changes in Legislation*) states:

> *"The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.*
>
> *If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in Laws, made after the Base Date, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 to:*
>
> > *(a) an extension of time for any such delay.....*
> >
> > *(b) payment of any such Cost, which shall be included in the Contract Price."*

The '*Base Date*' is defined in Sub-Clause 1.1.3.1 as:

> *"the date 28 days prior to the latest date for submission of the Tender."*

The effect of the legislative change clause in FIDIC is that a change in law will only affect the contract price where (i) the change occurs after the base date; (ii) the change affects the contractor's ability to perform his obligations under the contract; and (iii) the contractor has complied with its obligations under Sub-Clause 20.1.

This latter requirements refers to the strict notice requirement in FIDIC applicable to contractor's claims, which is addressed in Sub-Clause 20.1. This is a particular feature of the FIDIC suite of forms and provides that if the contractor fails to give notice within a set period of 28 days from when the contractor becomes (or ought to have become) aware of the relevant event or circumstance:

> *"the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim."*

Non-compliance with Sub-Clause 20.1, at least where the governing law of the contract is that of a common law jurisdiction, means that the contractor forfeits entitlement to any additional payment or time for performance. It is therefore a serious additional requirement for the contractor to obtain relief in terms of the additional time and money associated with legislative change, where the parties use one of the FIDIC standard forms as the basis of their EPC contract.

Disputes about the meaning of change in law provisions

A further consideration arises where there is no change of law provision in the EPC contract or it is not clear what the provisions mean. Therefore, in the event of a change of law which affects the contract, the parties may well embark on a contract interpretation exercise.

Under English law, the court or other tribunal will look at the intention of the parties by reference to what a reasonable person who had all the background knowledge which would have been available to the parties would have understood the parties to be using the language in the contract to mean. In doing so, the tribunal will consider the natural and ordinary meaning of the relevant clause, the overall purpose of the clause, the facts/circumstances known to the parties at the time of execution and commercial common sense. The tribunal will however, be careful not to undervalue the importance of the language of the contract or give weight to subjective evidence of any party's intentions. This approach to the interpretation of contracts under English common laws has been confirmed most recently in 2015 by a judgment of the United Kingdom's Supreme Court: *Arnold v Britton* [2015][5],

In the context of EPC contracts, this means that a court may consider objective evidence as to what the parties knew and discussed at the time of negotiating the contract in relation to a change of law and the effects of such an event. For example, the tribunal may consider a change of law clause in a particular way, or imply a change of law clause into the contract where, prior to entering into the agreement, there is objective evidence to prove that the parties discussed that a certain fixed price was agreed but noted that this would be subject to any change of law[6]. This may be particularly relevant where there have been pre-contract negotiations throughout a lengthy tender period, where legislative change risks are likely to be evolving, prior to contract award.

It should also be stressed that interpretation of a contract's meaning and effect may differ in common law and civil jurisdictions. It will therefore be important to determine the governing law of any EPC contract when considering change in law provisions. However and broadly speaking, it can be said that the courts of both common law and civil law jurisdictions will aim to look at ascertaining the objective intention of the parties at the time of entering into the contract where seeking to give effect to the meaning of the provision.

In addition, it should be noted that there is a duty of good faith in relation to the parties' contractual dealings in civil law jurisdictions which can alter the approach to the interpretation of the terms of any agreement and can impose wider obligations in terms of the requirement to act fairly than would apply in common law jurisdictions.

However, in some civil law jurisdictions and certain common law jurisdictions such as New Zealand[7], there may also be an ability for parties to rely on conduct which has taken place after formation of the contract and up to the point of dispute as an aid to interpretation of the contract.

Thus, if there is a dispute as to the meaning or operation of the contract as to the risk of legislative change, but there is evidence that both parties have operated the contract so as to allow the contractor to adjust its prices to account for the change in law arising after contract award, then in certain jurisdictions, this could constitute evidence that this is how the parties intended the provision to be construed and to operate.

Such an approach could lead to a different risk allocation than the one set out in the express terms of the contract.

Reservations and qualified tenders

Consider a situation where the express terms of the proposed form of contract against which the EPC contractor's tender is made follows the FIDIC model, in making the trigger date for the change in law the base date of the contractor's tender. The contractor's tender will therefore be based on the state of the law at the date of its tender. What happens if there is an extended tender period where, prior to contract award, there is a change in law such that the statutory minimum wage payable to workers is

5 *Arnold v Britton* [2015] UKSC 36
6 *AG of Belize v Belize Telecom Ltd* [2009] 1 WLR 1988
7 *Vector Gas Limited v Bay of Plenty Energy Limited* [2010] NZSC 5

increased? On a large project, the EPC contract may be employing thousands of such workers. If the contract price remains at the tendered price and the parties eventually enter into the contract, can the EPC contractor do anything to protect itself from the labour cost inflation risk occurring during the tender stage?

One strategy would be for the EPC the contractor to include a reservation of rights letter which seeks to reserve its rights to have the contract price increased upon a change in legislation which may arise in the future? Whether such a reservation of rights letter would form part of the contractual agreement would depend on whether that document is referenced in the contract.

Hudson[8] states that well-drafted contracts should expressly list the documents intended to form part of the contract but under English law all that is necessary is a reference to or identification of the document in some part of the admitted contract documents together with a sufficient indication of the extent to which the document is intended to govern or control the contractual rights of the parties. The contract may also contain specific provisions such as a definition of the term "*Contract*" listing the relevant documents, an entire agreement clause which could serve to include or exclude such a reservation of rights letter and a priority of documents clause which resolves any ambiguity or discrepancy around the documents.

However, if the contractor reserved its rights at the time of submitting the letter of tender/proposal, this could amount to a conditional or qualified offer which (if not expressly rejected by the employer) may be treated as having been accepted by the employer.

There are a number of additional considerations which may be relevant in the event of a change of law which occurs after the contract has been entered into, even where the terms of the contract seek to allocate this risk to the contractor but where the contractor may wish to obtain relief from the impact of the change. These are addressed briefly below.

Duty of good faith from employer to contractor

The question of good faith may arise where the employer knows about the impending change in legislation when inviting tenders but fails to bring this to the attention of the EPC contractor.

In certain common law jurisdictions, a public authority has been found to have an implied obligation to consider tenders in good faith and a general duty of good faith and fair dealing requires the employer to treat tenderers equally[10]. Whether an employer has a good faith obligation to share information or has certain duties where it is known a tender will become 'under-quoted' is not established under English law but it may be possible to spell out from the tender process, and specific documents that are used to regulate that process, a number of duties to treat the tenders of contractors in a particular manner such as fairly and in a transparent manner. If such duties can be established as a matter of contract, and there is relevant material to allow for change in law risk to be identified but this is ignored by the employer, then a breach of such duties will sound in damages.

Where the governing law of the contract is that of a civil law jurisdictions there may be greater scope for the contractor to establish some entitlement to relief because of the doctrine of good faith. Even where English Law is the governing law of the contract, it may be that the law governing the tender process is that of a civil law country, in which case the contractor may be able to deploy breach of good faith allegations to obtain a wider scope of relief than would be available under English common law.

8 *Building and Engineering Contracts, Hudson, 2015 p351*

9 *Building and Engineering Contracts, Hudson, 2015*, p376

10 *Pratt v Transit New Zealand* [2004] BLR1

Doctrine of Superior Knowledge (US Federal Law)

There is a doctrine under US law whereby, if a government entity has superior knowledge of a material fact which would likely impact a contractor's cost, and fails to disclose relevant information to the bidding contractor, the contractor may be entitled to recover the additional costs incurred by reason of the undisclosed fact. Such "*superior knowledge*" may include withholding technical/non-technical material facts relevant to the bidders' cost or performance such as design defects or defective work installed by another contractor. However, the employer would not be required to disclose information which the contractor could reasonably be expected to obtain from elsewhere for example from the public domain, which would be likely for an impending enactment of new legislation. Again, although this is the position under US law rather than English law, it is a factor which an employer inviting tenders should bear in mind when structuring the bidding process.

Summary

Overall parties will have to come to a compromise in relation to change of law provisions. In this regard, the FIDIC Yellow and Silver Books provide a good starting point, if a little more favourable to the contractor than the employer.

Whilst current market forces (with abundant contracting capacity chasing too little contracting demand) may encourage employers to seek to drive harder bargains, experience tells us that shifting too much risk to the EPC contractor is not a sustainable risk management strategy. It will result in more claims from the EPC contractor and ultimately, may involve contractor insolvency. If that occurs prior to project completion, the employer is left with the risk of an uncompleted project.

Contractors are likely to resist very restrictive change in law provisions particularly for projects with a longer duration as it makes it very difficult for the contractor to price the risk with any accuracy. The employer may have to accept some risk in relation to a change in price due to legislative change particularly for longer term contracts or it will find it difficult to come to an agreement with a contractor.

Ultimately, the outcome of such negotiations therefore depends not just on the relative bargaining power of the parties and the skill and ingenuity of their legal advisers but also on the willingness of both parties to strike a sensible balance in the allocation of risk to the party best able to manage that risk. In the case of legislative change, certain risks may be better managed by the EPC contractor through the reorganisation of its labour and procurement processes. However, ultimately this can boil down to a single question: who can best afford to bear the risk?

Force majeure

Introduction

Sometimes events occur which are beyond the control of either party and which can have a significant impact on the ability of the contractor to complete its works. When this happens, the contractor is likely to incur additional costs, and in addition the completion of the project may well be delayed. In extreme cases, it may not in fact be possible to complete the works at all.

In situations such as these, what relief, if any, is available to the contractor? The answer to this question depends upon the nature of the event which has occurred, the governing law which is applicable to the contract, and, of course above all, the contract terms themselves. We must consider the circumstances in which a contractor might be excused from performance (and indeed perhaps also compensated), in whole or in part, by "neutral" events occurring during the course of the contract which have not been anticipated and which, by their very nature, are not the fault of either the contractor or the employer.

An unanticipated supervening event which is the fault of neither party and which prevents performance of the works is generally referred to as a "*force majeure*" event. Although this is a civil law concept and there is no such corresponding concept in common law, the term is often used expressly in EPC contracts which may or may not be subject to civil law. EPC contracts will usually set out a list of force majeure events and specify what is to happen should any of those events occur.

The formula which is frequently seen in standard forms is to include those events identified as examples of force majeure, but to leave the definition open-ended by saying that it is not limited to them. However, where employers regard the force majeure risk as live (e.g., the likelihood of sandstorms in Saudi Arabia or heavy rains in West Africa), they may seek to tighten up on the threshold triggers and where external debt funders are involved, they will seek greater certainty and may require an exclusive rather than an open-ended list of events in order to qualify as force majeure.

Force majeure clauses

The classic risk management mantra is to allocate risk to the party best able to manage it. If greater risk (be it legislative risk or indeed any other material risk) is allocated to the contractor, in circumstances where the contractor cannot manage that risk, it will cause tensions and these may lead to costly disputes under the EPC contract (and supply chain contracts). Another mantra is that prevention is better than cure. That suggests clarity of approval and certainty as to contract drafting is where the parties' focus should be during tender stage, up to contract award.

However, just because there is no equivalent concept of force majeure in common law, it does not follow that where the term is used expressly in a contract, it will be given no meaning. The approach which might be adopted by a court or tribunal applying English law is illustrated by the case of *Lebeaupin v Crispin*.[11] In that case, a contract for the supply of salmon was expressly stated to be "*subject to force majeure*" and the court had to decide what that phrase meant. It referred to the source from which the term originates, the French Civil Code, and to commentaries on the Code. The court approved the definition in one such commentary:

> *"This term is used with reference to all circumstances independent of the will of man; and which is not in his power to control, and such force majeure is sufficient to justify the non-execution of a contract. Thus, war, inundations, and epidemics, are cases of force majeure; it has even been decided that a strike of workmen constitutes a case of force majeure".*

This is not a closed definition, and the court went on to note that a breakdown of machinery or an abnormal storm could fall within the understanding of the phrase. However ultimately, what the phrase means depends upon the context in which it is used, or as the court found:

> *"...a 'force majeure' clause should be construed in each case with a close attention to the words which precede or follow it, and with a due regard to the nature and general terms of the contract. The effect of the clause may vary with each instrument"*

11 *Lebeaupin v Richard Crispin and Company* [1920] 2 KB 714.

In most modern international EPC contracts, the context of a force majeure clause should be an extensive contractual provision which sets out at some length what events are included within the meaning of "*force majeure*", what the nature of those events must be, and what the consequences are.

FIDIC's approach to force majeure

In this regard, it may be instructive to see what FIDIC says about force majeure. This is addressed in similar terms in the Yellow and Silver Books. Sub-Clause 19.1 defines "*force majeure*" to mean "*an exceptional event or circumstance*":

a) *which is beyond a party's control,*

b) *which such party could not reasonably have provided against before entering into the Contract,*

c) *which, having arisen, such party could not reasonably have avoided or overcome, and*

d) *which is not substantially attributable to the other Party."*

These are the qualities which define the character of the event or circumstance in order for it to be "*force majeure*". Thereafter, Sub-Clause 19.1 lists the kinds of events or circumstances which are included as "*force majeure*". It is expressed to be a non-exclusive list and reads as follows:

i. *war, hostilities (whether war be declared or not), invasion, act of foreign enemies;*

ii. *rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war;*

iii. *riot, commotion, disorder, strike or lockout by persons other than the Contractor's personnel and other employees of the Contractor and Sub-contractors;*

iv. *munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and*

v. *natural catastrophes such as earthquakes, hurricane, typhoon or volcanic activity.*

A point to note is that, as mentioned above, the force majeure events or circumstances which are listed are expressly not limited to those identified; the list in Sub-Clause 19.1 is preceded by the words: "*including but not limited to ...*" It follows that another event may occur which does not readily fall into any of these categories, but where it is still possible to contend that it is in fact a force majeure event.

However, it must be remembered that a force majeure clause will have to be construed in the context of the contract in which it appears, and a court or tribunal applying English law will have special regard to the types of events and circumstances which are listed. Although the reason the list is non-exclusive so as to enable other events and circumstances which the parties may not have thought of to be caught within the definition of "*force majeure*", the fact that the parties have not chosen to include an event or circumstance which might have been conceivable could persuade a court or tribunal that they deliberately chose to exclude it.[12]

It is also important to understand that the provisions of Sub-Clause 19.1 (a) to (b) and (i) to (v) need to be read together. Therefore, the force majeure event or circumstance in (i) to (v) needs to have all the features set out in (a) to (b) in order to qualify for relief under Clause 19.

Furthermore, under Sub-Clause 19.2, the force majeure event or circumstance in question has to prevent a party from performing any of its obligations under the contract:

> *"If a Party is or will be prevented from performing any of its obligations under the Contract by Force Majeure..."*

12 See *Tandrin Aviation Holdings Ltd v Aero Toy Store LLC and another* [2010] EWHC 40. The fact that the event relied upon (the economic downturn) was not "even remotely connected" with any of the examples of force majeure listed in the contract led the court to conclude it was not a force majeure event.

Particular note should be taken of the use of the words "*prevented*" and "*any*". On one view, the effect of the force majeure event or circumstance has to be so severe that it is insufficient if it prevents only some parts of the work from being carried out. However, it is important to understand the influence of civil law in the context of Clause 19, which views a contract as creating a number of obligations or duties and that there may be a failure to perform any one or more of these.[13] Understood in this way, the reference to the party being prevented from performing any one or more of its duties is likely to mean that the relief provided by Clause 19 for a force majeure event or circumstance can legitimately apply to only one or more of the obligations as the case may be. This interpretation is reinforced by contrasting the use of the words which define when the parties can terminate if the force majeure event or circumstance prevents progress for an extended period.[14] It is also any of the parties to the contract who can be prevented from performance by the force majeure event or circumstance, although it expressly does not apply to the obligation of one party (almost invariably the employer) to the contract to make payments to the other.

In order to rely on the force majeure provisions of Clause 19 and obtain relief, a notice has to be served within 14 days of awareness or deemed awareness of the event or circumstance. Upon satisfying that requirement, if the force majeure event causes the contractor a delay to its works, it is entitled to an extension of time.

In addition, the contractor is entitled to payment of any cost it incurs in the case of:

i. *war, hostilities (whether war be declared or not), invasion, act of foreign enemies;*

ii. *rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war <u>if the event or circumstance occurs in the Country</u> [emphasis added];*

iii. *riot, commotion, disorder, strike, or lockout by persons other than the Contractor's personnel and other employees of the Contractor and Sub-contractors <u>if the event or circumstance occurs in the Country</u> [emphasis added];*

iv. *munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity <u>if the event or circumstance occurs in the Country</u> [emphasis added].*[15]

It will be noted that the right to recover additional costs as well as additional time depends upon the events or circumstances being ones which arise from human conduct. As such, under FIDIC terms, natural events only allow the contractor an extension of time and not any additional costs which it may incur. In addition, as shown by the words which are emphasised above, the events or circumstances which allow additional costs to be awarded have to take place in the country where the site is located except in the case of war and the like, which can be taken into account if it occurs outside that country.

A further condition under FIDIC (and commonly found in bespoke force majeure clauses) requires the affected party to have to use all reasonable endeavours to minimise any delay in the performance of the contract, and the party affected by the force majeure event or circumstance has to notify the other when it ceases to be so affected.[16]

However, it is possible that the force majeure event or circumstance may continue for so long that either party may wish to 'call it a day' and terminate the contract. The standard FIDIC terms provide for this: either party can give notice of termination if the progress of the works is prevented for a continuous period of 84 days, or multiple periods, for the same event of force majeure, which total more than 140 days.[17] The language used in Sub-Clause 19.6 is important as it refers to the "*execution of substantially all the works in progress*" being prevented for these periods. This is to be contrasted with "*performing any of its obligations under the Contract*" which appear in Sub-Clauses 19.2 and 19.4. Therefore, in order to terminate under Sub-Clause 19.6, it is necessary not only for an individual obligation to be incapable of performance by reason of the force majeure event or circumstance, but the effect must be felt on the performance of the contract as a whole.

13 See: Nicholas, "*Force majeure and Frustration*" (1979) 27 Am. J. Comp. Law 231.
14 See discussion of Sub-Clause 19.6 below.
15 Sub-Clause 19.4.
16 Sub-Clause 19.3.
17 Sub-Clause 19.6.

Should a valid notice of termination be given, the standard terms set out what the contractor is to be paid. Broadly, these allow the contractor to be compensated for any work it has carried out, or costs which it has incurred in ordering plant and materials or reasonably incurred in expectation of completing the works.[18] In addition, the contractor is entitled to be paid the costs it incurs in removing its equipment and repatriating its staff.

Finally, Sub-Clause 19.7 provides something of a back-stop. It allows either party to serve notice terminating the contract should an event or circumstance occur which is outside the control of the parties and which makes it impossible or unlawful for either party to fulfil its contractual obligations, or which under the law governing the contract entitles the parties to be released from further performance of the contract. The event or circumstance can be one of the types of events or circumstances defined as force majeure in Sub-Clause 19.1, or it could be something completely different. It is the effect which matters, namely to cause performance of the contract to be impossible, illegal or to entitle a party to be released from performance under the applicable law. If the contract is terminated under Sub-Clause 19.7, the contractor is paid the same costs as if it the contract had been terminated under Sub-Clause 19.6.

Therefore, Sub-Clause 19.7 contemplates something happening which is extreme, and it is difficult in practice to envisage why in such a situation one of the parties would not want to serve a notice of termination. The concept is similar to the doctrine of frustration which applies under common law. That said, it is not precisely the same. If the contract in question is subject to English law and if the event or circumstance would allow a party to contend successfully that performance of the contract had been frustrated, that would certainly be something which under the governing law of the contract *"would entitle the parties to be released from further performance…"* for the purposes of the second part of Sub-Clause 19.7.

However, termination is permitted additionally where performance is *"impossible or unlawful"*. It may well be that, depending on the facts of an individual case, impossibility or illegality will be a frustrating event, but it is not always the case. For example, a prohibition on continuing the works by law may only be temporary in nature. Under English common law, the party seeking to invoke the frustration doctrine would have to persuade a court or tribunal that *"the interruption…was so long as to destroy the identity of the work and service when resumed, with the work and service when interrupted"*.[19] It is therefore an open question whether impossibility or illegality under Sub-Clause 19.7 is less exacting in its application.

One South African case which illustrates the approach which the courts might take to Sub-Clause 19.7 is *Rumdel Cape/EXR Holdings/Mazcon v South African National Roads Agency Soc Ltd*.[20] The contractor alleged that it was unable to continue with the works for the improvement of a flyover system in Durban because the workforce which it was required to use was militant, unproductive and prone to acts of violence. After a series of wildcat strikes, the vast majority of the workforce was dismissed by the contractor, and this led to riots and the death of a security guard. The contractor sought a declaration that it was entitled to claim release from performance under the provisions of Sub-Clause 19.7 of the contract which incorporated the FIDIC terms. The court decided that the contractor could not rely on the provisions of Sub-Clause 19.7 because the workforce was employed by the contractor and therefore it was the contractor's responsibility. In addition, the court concluded that industrial unrest was foreseeable and could have been insured against, and that it was not impossible for the works to continue because the contractor could pay for additional security. This decision again shows that for a contractor to claim an entitlement to be released from further performance, the bar is set high; just because it is difficult or more expensive than the contractor might have envisaged, that is not enough, of itself, to constitute force majeure.

18 Plant and materials ordered by the contractor or which it is compelled to accept for delivery are paid for by the employer, but they become the employer's property.

19 Lord Wright in *Cricklewood Property & Investment Trust Ltd v Leighton's Investment Trust Ltd* [1945] AC 221.

20 *Rumdel Cape/EXR Holdings/Mazcon v South African National Roads Agency Soc Ltd* (7312/2014) ZAKZDHC 68.

Force majeure clauses and local law

As has been mentioned above, when unexpected events occur which have an impact on the ability of a party to satisfy its obligations, the starting point is always to consider the terms of the contract which have been agreed in any determination of the relief which may be available. It is a cornerstone of most legal systems that the parties can choose to allocate risks as they see fit and agree a mechanism to regulate the rights and duties of the parties in unforeseen circumstances.

However, local law remains important for a number of reasons. First, the contract may not purport to provide a complete and comprehensive mechanism to regulate the position in the event of force majeure arising. Instead, it may include provisions which expressly defer to local law and which therefore require an understanding of the circumstances in which supervening events permit a party relief in the performance of its obligations. For example, Sub-Clause 19.7 of the FIDIC terms expressly refers to the law governing the contract when it permits termination should an event or circumstance arise which entitles the parties to be released from further performance under that law.

Secondly, some civil codes do not in fact permit the parties to exclude certain provisions. In the case of Article 147 of the Egyptian Civil Code, Article 249 of the UAE Civil Code, and Article 146 of the Iraqi Civil Code, it is impermissible to exclude the ability of a court or tribunal to adjust the obligations of the parties in the event of financial hardship. These parts of the respective Codes refer to events which are unpredictable or unforeseeable, and therefore if the contract has contemplated the occurrence of such events, either specifically or generically, they cannot by definition have been unpredicted or unforeseen. Nevertheless, in the context of force majeure terms such as Clause 19 of FIDIC, these "*financial hardship*" provisions potentially remain potent. Sub-Clause 19.2 and the relief available under Sub-Clauses 19.4 and 19.6 is only triggered when the performance of a party's obligations is prevented. A party may in fact be able to continue with the performance of its obligations, albeit in circumstances where unpredictable or unforeseen events have occurred which will cause it "*financial hardship*", and that may bring the relevant local law provisions into play. Sub-Clause 19.2 does not deal with such a situation, and therefore it is unlikely that the parties can be said to have predicted or foreseen in their contract that such events would occur for this particular purpose.

An interesting case which illustrates the importance of local law in the context of contractual force majeure provisions is *National Oil Corp* (*Libya*) *v Libyan Sun Oil* (*US*).[21] The claimant, NOC, was a Libyan State enterprise and entered into an exploration and production sharing agreement with the respondent, Sun Oil. The contract contained a force majeure clause which allowed a party to be excused from the performance of its obligations to the extent attributable to force majeure. Force majeure was defined to include, without limitation, Acts of God, insurrection, riots, war, and any unforeseen circumstances and acts beyond the control of such party. The clause went on to say that either party could choose to terminate the contract in the event that the force majeure "*affected*" the fulfilment of the obligations of either party for certain defined periods of one year or two.

The US government subsequently declared that US passports were no longer valid for travel to Libya, and three months later the government also banned the importation of Libyan oil to the States and placed restrictions upon the export of goods and technical information. Sun Oil relied upon the force majeure clause in its contract and purported to terminate the contract pursuant to its terms.

NOC commenced arbitration proceedings against Sun Oil, and the central question for determination was whether Sun Oil had validly invoked the force majeure clause. The tribunal found that it had not. Although Libyan law allowed the parties to exclude or modify the provisions of the law which applied to force majeure, properly construed, the contract did not in fact exclude such provisions. Accordingly, Article 360 of the Libyan Civil Code applied. This allowed an obligor to be released from its obligation when a force majeure event occurs which, inter alia, renders performance of the obligation absolutely impossible. Sun Oil's performance of the contract was not impossible, because it could have used its foreign affiliates' non-US personnel and technology to perform the contract without violating the sanctions, even though that may not have been how it had intended to proceed and would have cost materially more to perform. The result was a finding that Sun Oil had not been entitled to terminate the contract and the tribunal made a substantial award of damages in NOC's favour. That award was subsequently enforced in the US courts.

21 ICC case No. 4462 (1985).

The *Sun Oil* decision is therefore a useful reminder of the potential importance of local law and the need to take legal advice on it. If local law permits the exclusion or modification of the provisions which would otherwise apply in the event of unforeseen supervening events, it is important to use clear language if a different contractual regime is to apply. This will be particularly significant where the force majeure clause purports to provide relief in situations which fall short of impossibility of performance, because the yardstick to measure the existence of force majeure under most civil codes is in fact impossibility. Had the FIDIC terms incorporating Clause 19 been used in the *Sun Oil* case, the result would have been the same because, on the facts, it could not be said that Sun Oil had been "*prevented*" from performing its obligations or executing its works for the purposes of Sub-Clauses 19.4 and 19.6. Similarly, performance would not have been "*impossible*" and Libyan law would not have allowed Sun Oil to be released from further performance for the purposes of Sub-Clause 19.7.

The reasoning of the tribunal in the *Sun Oil* case is, however, curious. The parties had clearly chosen a threshold for force majeure events which was quite low. The opportunity to terminate the contract was afforded in circumstances where the fulfilment of the obligations by either of them was "*affected*" by a force majeure event for the requisite continuous period. The tribunal found that the word "*affected*" was too vague, but that was the test which, for better or worse, the parties had agreed. The tribunal found that the parties had not waived the provisions of Article 360 of the Libyan Civil Code, but that raises the question when do the parties actually ever waive the requirements of local law? Take the 'industry standard' Clause 19 of FIDIC: that does not expressly waive the requirements of local law, and indeed positively contemplates its operation in Sub-Clause 19.7. Does it follow that even in the FIDIC regime, which provides as careful a contractual code for force majeure as one might contemplate, the threshold as to what is force majeure under local law still has to be met? As we have seen, most of the civil codes require an event to render performance impossible before it is to be regarded as one to which the force majeure rules apply, but that would appear to mean that something beyond prevention of performance or execution of the works (to use the language of Clause 19) and into the realms of impossibility is in fact required. That may well be much the same in practice, but it is a different way of analysing the operation of Clause 19, and if the parties want something less than prevention to afford relief, the reasoning in the *Sun Oil* case would suggest that the local law threshold has to be satisfied unless local law is expressly excluded.

Force majeure in practice under an EPC contract

Aside from the impact of local law, it remains the case that the contractual terms of a force majeure provision will be the determining factor in the clause's effectiveness. There are a number of key factors which may be considered when parties to an EPC contract encounter a potential force majeure event. The easiest way to discuss such factors is to run through and apply such considerations to a typical example. Consider the following provision, extracted from an EPC contract:

> *"In the event and to the extent that an event of Force Majeure affects the Contractor's ability to perform the Services, or increases Contractor's cost or time of performance of the Services, an adjustment in one or more of the Baseline Schedule, the Guaranteed Completion Date, the Contract Price, the Performance Guarantees, Minimum Performance Standards, the Reliability Guarantee, and the Payment and Milestone Schedule, shall be made by the Company pursuant to this Clause."*

The brief facts were as follows. A contractor and an employer entered into an EPC contract for the contractor to complete the engineering, procurement, installation, commissioning and start up services for the upgrade and expansion of gas fired power plant. The services under the EPC contract required the contractor to purchase some equipment and then transport the equipment to the facility under construction and install it. The EPC contract contained (i) a schedule which set out the date on which the equipment was expected to be delivered to the facility (serving as the benchmark for all progress based reporting) and (ii) a Guaranteed Completion Date (which was one year later that the delivery date). During the transportation phase, a transport vessel chartered by the EPC contractor broke down before it was loaded with, and began to transport, the equipment. The contractor notified the employer of a potential delay and confirmed that it was seeking an alternative vessel. The alternative vessel was duly chartered and the equipment was eventually delivered but this was one month later than the expected date. The contractor then claimed that delay was an event of force majeure within the terms of the EPC contract. The employer denied that the event was a force majeure event.

The EPC contract contained a definition of force majeure and this stated:

> *"Force Majeure shall mean an event or circumstance, the occurrence of which is beyond the reasonable control of the affected party ... and such event or circumstance prevents or hinders the affected party from complying with its obligations under the Agreement."*

And expressly included, without limitation:

> *"Transportation accidents or transportation equipment breakdowns in moving equipment and material for the benefit of the Project."*

In addition, the EPC contract provided that if the contractor's costs were increased by the occurrence of an unavoidable force majeure event then the contractor would be entitled to reimbursement of those costs from the employer.

In evaluating the above scenario and whether the contractor could properly demonstrate entitlement to relief by reason of a force majeure event, the following key issues has to be considered.

Initial qualifications: As per the definition of force majeure noted above, overall the contractor needed to be able to prove that the event was beyond its control, did not arise out of circumstances which were in the contractor's knowledge, was not a circumstance which the contractor should have protected itself against at the time of entering into the agreement and the break down of the vessel prevented or hindered the contractor from complying with its obligations under the EPC contract.

Has the event/circumstance prevented or hindered: One of the key hurdles in this and many other force majeure clauses is that the contractor had to establish that the break down of the vessel either prevented or hindered the contractor from completing its obligations. It should be noted that the meaning of the word "*prevents*" must contrast in some way to the word "*hinders*", otherwise one would argue that there was no point to the contract draughtsman using two different words. Such contrast is recognised in *Chitty*. The word "*prevents*" is likely to mean that the event has become legally or physically impossible whereas "*hinders*" is likely to mean a degree of interference or impediment short of rendering the obligation impossible to perform.[22] "*Hindrance*" therefore provides a lower threshold than "*prevention*", which will favour the argument of the contractor , i.e., the contractor only has to prove that the break down of the vessel interfered with its ability to perform its obligations rather than prove that the break down made performance of such obligations impossible.

Has the event/circumstance affected compliance with a contractual obligation: The contractor also needed to show that the event or circumstance prevented or hindered it from complying with one or more of its obligations under the contract. In this example in particular, the employer disputed whether the event merely increased the time required for performance and therefore whether it was a 'contractual obligation' for the contractor to meet the due date or whether this was this just a term set out in the purchase order/schedule. On this argument, the event of force majeure would be met only if the event caused the contractor to not meet the Guaranteed Completion Date.

In particular, the employer in this case argued that there was sufficient float in the contractor's programme that was able to absorb the delay caused by the vessel breakdown, such that the contractor could not establish that it had been prevented from meeting the Guaranteed Completion Date.

22 *Chitty on Contracts (30th ed) Vol. 1 at Para 14-141 to 14-143*

However, in this case the contractor was able to establish that the event qualified as force majeure, notwithstanding the fact it had not proved any delay to the Guaranteed Completion Date. This was because the definition of force majeure included where it affected the due date set out in the schedule for delivery of the equipment. In this sense, whilst the force majeure event may not have affected the achievement of the Guaranteed Completion Date, nevertheless, the delay was found to have hindered the achievement of a "*contractual obligation*" for the purpose of satisfying the force majeure clause.

Does the event/circumstance fit into a specific force majeure event: In the above scenario, the contractor alleged that the vessel break down constituted a transportation equipment breakdown in moving equipment for the benefit of the project and therefore qualified as a specific force majeure event. However, the equipment had not actually been loaded onto the vessel when it broke down. The employer therefore argued that a narrow meaning of the clause should be used and that the event did not qualify as an event of force majeure because the vessel was not 'moving' equipment. However, whenever a party seeks to interpret a contractual provision so as to exclude another from claiming relief, it is apposite to consider the words of Lord Reid in *AG Schuler v Wickman Machine Tools*[23] namely that the more unreasonable a result of a particular construction of a clause, the more unlikely it is that the parties can have intended it and if they had intended such an outcome it should have been made clear. Applying this approach, it was found that a reasonable observer would have considered that the provision included for the event which had in fact occurred and the likely conclusion would be that the vessel breaking down on the day of loading would be included as and event of force majeure.

Summary

It should always be remembered that tribunals may be sympathetic to the party claiming force majeure where its overall view of the merits is such as to favour the contractor. In such circumstances, the tribunal may be willing to interpret the force majeure clause widely in order to benefit the contractor. The tribunal will also consider what the relevant provisions were intended to capture when the contract was put in place and this may lead to the adoption of a wide rather than a narrow meaning. Most interesting of all is the finding in the example above that the hindrance of an obligation to proceed in accordance with a Base Line Schedule which (of itself) may not cause delay to achievement of a milestone, was considered to be an 'obligation' for the purposes of a force majeure event.

Parties should therefore bear in mind, when drafting and negotiating force majeure provisions, the obligations that may be affected (whether "*hindered*" or "*prevented*". Where it is intended for the force majeure event to be one which increases the cost or time to perform, consideration should be given to listing those critical milestones and excluding non-critical ones. Thus (for example) if the event does not in fact cause critical delay to the contractor's achievement of a milestone date, because the affected activities are not in the critical path or the effect has been absorbed by available programme float, then it will be more difficult for the contractor to show that those particular and time-critical allegations were prevented or hindered by the event.

The above example also shows the importance of how the wording of force majeure clauses will fall to be applied within the context of the contract as a whole, in terms of its operation so as to relieve the party seeking to rely upon it from performance of its obligations. The possible effect of such clauses must therefore be carefully considered at negotiation in order to establish a clear risk allocation and help avoid such disputes later down the line.

23 *AG Schüler v Wickman Machine Tool Sales* [1973] UKHL 2.

Design development and conversion mechanisms

Introduction

Design development describes the process by which a high-level design for a project is translated into the detailed design which allows ultimately for procurement and construction to proceed. This is an iterative process of refining the engineered scope of a project. There will be a series of engineering milestones as part of the development process including the designs for early packages such as piling and foundations, production of equipment data sheets and P&ID,[24] purchase orders for equipment and any long lead items, the issue of IFC[25] drawings for structural steelwork etc.

The concept of 'design development' is another key risk under EPC contracts, particularly turnkey projects. Ordinarily when an employer enters into a turnkey EPC contract with a contractor, it expects that the contractor will undertake the project through from its design phase, through procurement and culminating with a completed and functional project, all for a fixed price. The lump sum turnkey (LSTK) model cedes control of the EPC process to the contractor. Employers who wish to manage more closely themselves the EPC process (because they have the expertise relevant to the particular technologies being assembled) may be more inclined to the FIDIC Yellow Book approach, than the FIDIC Silver Book for the EPC contract.

No employer wants to experience surprises during the development of its project, particularly where these may subsequently result in an increase in the price or duration of the project. However, when a contractor enters into an EPC contract there will almost certainly be a number of undecided design points at the stage of contract award. Nevertheless, the employer may regard the design as sufficiently well developed to allow the contractor to complete final engineering details and proceed with procurement and construction so any further changes which need to be made down the line are included within the LSTK price. In this situation, the contractor will want to ensure that it anticipates any such changes and factors them into the contract price but this may serve only to increase the quantum of the risk contingencies factored into the contractor's rates and prices which may cause the LSTK bid price to be inflated. To minimise the risk of an inflated LSTK price, well-advised employers may opt to engage the contractor initially under a design development contract, prior to the parties entering into the EPC contract.

The design development procedure and the feasibility study

It may help to illustrate this, at high level, by referring to a typical project process, from the feasibility study through to the FEED contracts and the EPC contract and price.

In order to verify the business case for developing a project and as a necessary step before proceeding to an investment decision, it is common for the employer to arrange for a feasibility study to be carried out. A feasibility study is a detailed assessment of the practicalities of developing the project and bring it into production. The feasibility study will consider factors such as location, facilities required, local infrastructure, the plant and machinery required and details of the availability of labour for the particular types of construction required. The feasibility study will also address the market for the end product, be it energy, processed goods or expected throughput for a particular piece of infrastructure. In certain circumstances, an employer may first choose to do a pre-feasibility study in order to gauge the scope of the project prior to investing in the main study.

The main feasibility study is often referred to as the "*Definitive Feasibility Study*" or (where project finance is involved, a bankable feasibility study) (the **"**DFS**"**). The DFS is particularly important as it presents a thorough analysis of the proposed project and the approximate price based on the anticipated scope of the project. Once the DFS is complete, the employer will be provided with an estimate of the overall cost of the project within a specified range or accuracy tolerance (for example, £100 million capital costs, with stated contingencies but plus/minus 20% overall).

24 A Piping and Instrumentation Diagram (P&ID) is a schematic illustration of the functional relationship of piping, instrumentation and system equipment components.

25 Issued for Construction (IFC).

The completed DFS will ordinarily be presented to the employer>s investment committee and represents an important milestone in the investment decision-making process. The employer may decide to structure the financing in any number of ways. As a brief overview, if some form of debt financing is required, external lending institutions will need to be satisfied as to the completion risks. Post Lehman and the deleverage policies of banks and other financial institutions, alternative forms of financing have emerged such as royalties and streaming but the fact remains that the investment community remains keen on EPC contracts because of the attraction of a clear transfer of completion risks to the EPC contractor.

However, it should be recognised that the variation in the cost estimate provided by the DFS is likely to be of such magnitude that neither the contractor nor the employer will want to take on the risk of such a significant change in price by fixing a LSTK price at this stage in the process.

Design development and FEED contracts

FEED stands for "*Front End Engineering Design*" and is the engineering phase which (if the employer wishes to adopt this route) will follow completion of the DFS.

Under this approach, once the employer is satisfied with the results of the DFS, it will engage a contractor to enter into a FEED contract and carry out a further and more detailed review of the project in light of the DFS. This may be the same engineering firm or contractor who worked on the DFS although the FEED contract may also be tendered competitively.

An important distinction between FEED and EPC contracts is the price mechanism under each, FEED contract will be cost reimbursable, where the FEED is paid on a schedule of rates for various disciplines of engineer and other consultants according to number of days worked.

The FEED process ultimately aims to bring the DFS price estimate into a smaller tolerance range by focusing on the technical requirements as well as the anticipated investment cost for the project. In order to further clarify the project cost, the FEED contractor will review and analyse the DFS and approach the market to obtain quotes for each of the different work packages. The output of the FEED review is a more defined project with a more specific price estimate and a more certain project schedule.

There may also be cost-optimisation studies undertaken as part of the FEED process, as the employer seeks (with the assistance of the contractor) to identify efficiencies in the contract process and thereby reduce the initial capital cost of the project and/or introduce operational efficiencies that serve to increase the internal rate of return.

The FEED process is also extremely important to help minimise unexpected design changes which may result in adjustments in price or project schedule further down the line. Allocating a firm price to a project too early in the process is extremely risky as there are a large number of variables which may not be anticipated or allowed for. It is usually these unanticipated variables which subsequently lead to problems. Both the DFS and the FEED process aim to identify, define more closely and develop means by which such variables are to be measured within a LSTK price in the eventual EPC contract.

EPC contract

The ultimate aim of the employer is to appoint a contractor to carry out the works and execute the project to meet the employer's specific requirements. In practice, once the FEED process is complete, the employer will need to engage an EPC contractor to complete final detailed Engineer, Procurement and Construction of the works. It may be beneficial for the employer to engage the same contractor for the FEED process and the execution process as the EPC contractor. However, the employer will also want to ensure that the price of the project is competitive.

In order to achieve this commercial tension, the employer may instruct more than one contractor to assist with aspects of the FEED process and confirm their contract price. Alternatively, once the FEED review is complete, the employer may open the offer of the execution of the works out to the market or a number of pre-qualified EPC contractors who will review the FEED study and then propose a contract price.

Intellectual property rights in the FEED design will need to be assignable. The FEED contractor may also (as a term of its engagement) be asked to provide a guarantee or warranty so that the employer or a subsequent EPC contractor may rely on the design assumptions, basic and detailed engineering without having to undertake a verification exercise (which would effectively check the FEED but thereby duplicate cost and take more time).

In any of these scenarios, the employer will seek to use an agreed form of EPC contract to avoid further negotiation of the terms of the contract. For instance, the employer will seek to agree the EPC contract with the FEED contractor before the FEED process begins on the basis that if the FEED contractor will also be appointed as contractor for execution of the works. On this basis, the FEED contractor will enter into a previously agreed form of EPC contract rather than further negotiating the terms at the point of contract award. Where the employer invites tenders from EPC contractors, it will likely be on the basis that they enter into the standard terms of the EPC contract, save for the contract price and finalised schedule.

Ultimately, the employer will select the preferred contractor and both parties will then enter into the EPC contract. The exact process of how this works will be explained further below in the context of Conversion Mechanisms.

Design development and design liability under EPC contracts

The concept of design liability is a key consideration when considering who is responsible for the performance of the completed project under the EPC contract and it has an important relationship with the design development process. Put at its simplest, the issue is who owns the design (and its attendant risk)?

The common position on design liability, which is illustrated by the discussion of the FIDIC Yellow and Silver Book provisions discussed below, is that the contractor is required to take full responsibility for the design of the works. This concept may be unattractive to the contractor, particularly where the initial design work (including the DFS and FEED process) has been undertaken by another contractor (or engineering firm) on behalf of the employer.

In the initial stages of design development, the employer seeks the assistance of the FEED contractor to develop and verify the early design assumptions. However, under the traditional EPC arrangement, it is the contractor who bears the burden of the design risk and it may be required to assume liability for the employer's design that it is required to develop and complete.

Changes in the design of the works, once the contract is already in place, will almost certainly create a tension between the parties, because such changes will likely lead to changes in the contract price or the time taken for completion of the works. The contractor is likely to argue that it is entitled to relief in terms of additional time and money whereas the employer may seek to argue that such changes are simply 'design development' which does not serve to increase the contractor's entitlement to time or money.

Unless the EPC contractor has some right of recourse or a carve out of liability for the design undertaken by others prior to award of the EPC contract, it may find that it is being asked to underwrite the sufficiency of the design but without having had the chance to verify that design. Clearly, no properly advised contractor would readily sign up to such a risk arrangement.

FIDIC Yellow and Silver Books, Clause 5 (Design)

In order to consider how design development and design liability may be covered in an EPC contract, it is worth looking at the FIDIC Silver Book provisions. Design obligations are covered under Clause 5 which states:

> *"The Contractor shall be deemed to have scrutinised, prior to the Base Date, the Employer's Requirements (including design criteria and calculations, if any). The Contractor shall be responsible for the design of the Works and for the accuracy of such Employer's Requirements (including design criteria and calculations), except as stated below.*
>
> *The Employer shall not be responsible for any errors, inaccuracy or omission of any kind in the Employer's Requirements as originally included in the Contract and shall not be deemed to have given any representation of accuracy or completeness of any data or information, except as stated below. Any data or information received by the Contractor from the Employer or otherwise, shall not relieve the Contractor from his responsibility for the design and execution of the Works."*

The clause then goes on to specify specific carve outs from the general risk assumption of the contractor, to those for which the employer retains responsibility, numbered (a) to (d). The first three items in this list are fairly limited in scope but the last item in (d) has the potential to provide considerable scope for debate. This states: "*portions, data and information which cannot be verified by the Contractor, except as otherwise stated in the Contract*". Clearly, whether or not data within the Employer's Requirements can be "*verified by the Contractor*" is a question of fact but the extent of the verification process needs to be understood and applied in the context of the other terms of the Contract.

In this regard, it should be remembered that the FIDIC Silver Book is expressed to be a set of Conditions of Contract "*for EPC Turnkey Projects*". The philosophy that underpins this is therefore to allocate more risk to the contractor than applies under the Yellow Book, for example. Consistent with the Turnkey approach, the Silver Book places a requirement on the contractor to be responsible for the accuracy of the Employer's Requirements, subject to the limited exceptions noted above. The intention of this drafting is to minimise the extent of the employer's responsibility on the basis that ordinarily the contractor will have more technical resources than the employer and is being paid accordingly.

However, what if the Contractor only undertakes a cursory review of the data in the Employer's Requirements so that it does not in fact verify whether that data is buildable within the Contract Price and Time for Completion as allowed for in the Contractor's tender. In such circumstances, does item (d) mean that the Employer retains responsibility for the design error? It might be suggested that such verification would, as a minimum, be expected to completed to a "*reasonable*" extent. What is "*reasonable*" depends on all the circumstances, including whether the Contractor has been allowed sufficient time to verify the design data included in the Employer's Requirements. In contrast to the FIDIC Silver Book drafting, the Yellow Book includes an express allowance for such factors. In Sub-Clause 5.1 (General Design Obligations) of the Yellow Book, the final paragraph allows the Engineer to determine whether any defects found in the Employer's Requirements and notified by the Contractor should be treated as a Variation. In evaluating this question in terms of what an experienced contractor exercising due care would be expected to have discovered, the drafting requires the Engineer to have regard to such factors: "*taking account of cost and time*" allowed to the Contractor to complete the verification exercise. Does the absence of such words in the Silver Book, mean that even where limited time is allowed to the Contractor on a Turnkey Project in order to scrutinised the deign data in the Employer's Requirements is to be ignored when deciding whether item (d) applies? Although FIDIC Silver requires (and deems) the Contractor to have scrutinised and verified the design data in the Employer's Requirements, are those requirements to be ignored when (as a fact) the Contractor does not verify that the Employer's Requirements are free of errors?

Moreover, the Employer's Requirements may contain a number of documents which the employer thinks are adequate in terms of defining the scope of the works but a contractor may consider such documents fail to provide an appropriate level of detail which will not allow the contractor to obtain firm prices to deliver the requirements of the employer.

In practice, this approach to risk allocation under the FIDIC Silver Book is often changed and the parties may seek to reach a compromise by amending the scope of the carve outs from the design liability provision.

Parties may also include provisions which identify areas where the design is not yet fixed and will be confirmed in due course or conversely use other contract provisions such as deeming provisions as to the contractor's knowledge of the site and local conditions to ensure that the employer has a level of assurance that the contractor's LSTK price includes for such risks.

Interestingly, the FIDIC Silver Book does not specifically address the concept of design development *per se*. Parties may of course seek to include a specific design development provision in the EPC contract. Typically, such a clause may provide that the contract price and the specification of works make allowance for design development including changes due to further design information issued by the employer which is stated to be for the purpose of explanation, development and or clarifications of the Employer's Requirements. The clause may further specify that such changes as part of the design development process will not be considered a variation and may further specify what design development actually includes.

Additional design development considerations

There are some broad conclusions that may be offered by way of guidance to parties when considering design development in relation to a project:

Distinguish between design development and any design approvals: Generally the design development process is used to ensure that the requirements of the project are clear to the employer and is not an approval process *per se*. The concern is that a process of approvals may serve to alter the allocation of design risk, noting that the risk will usually sit with the contractor, which an approval process may otherwise reverse. Of course, there may be instances where an approval is required because the employer is best placed to provide such confirmation, but this should be expressly set out in the EPC contract.

Distinguish between design development and variations in the contract: Ordinarily a change in design development will not constitute a variation in the contract which is key as a variation will invariably lead to a change in contract price, and possibly also the schedule for completion.

Ensure there are clear procedures for the employer to comment on or reject a change in design proposed by the contractor: The parties should set out some specific and objective grounds for comment or rejection such as: "*the design does not comply with the specification of works*" or "*the design does not comply with statutory requirements*". There should be a maximum time allowance for the turnaround of such comments and consideration given to preventing mass substitution that swamp the design approval process. Parties may also wish to consider including provisions which cover a scenario where a comment from an employer on the design, in accordance with the above bullet point, would lead to another aspect of the design having to be changed and whether such further change would or would not amount to a variation.

Include a clear dispute resolution procedure in the EPC contract: This should enable disputes to be addressed efficiently, without disturbing the progress of the works. Consideration should therefore be given to providing for decisions of the employer or a third party expert to be temporarily binding to enable the work to proceed and payments to be made (or not) on an interim basis. Overall, the aim should be to enable disputes to be concluded quickly.

Overall, it is important for both employers and contractors to consider design development and the implications of design liability prior to entering in the EPC contract. Moreover, it is beneficial for both parties for there to be a detailed and considered design development process, prior to the final EPC contract, to ensure that changes in design are kept to a minimum. Lastly, parties should ensure that the risk allocation as to changes in design and related points, particularly design development, is set out clearly in the EPC contract to avoid disputes further down the line.

Conversion Mechanisms

As discussed above, there are a number of different stages between the employer's decision to begin a project and the execution of an EPC contract under which the contractor agrees to carry out the works. As we have seen, such processes may start with a definitive feasibility study (DFS), followed by a contract to undertake the front end engineering design or FEED. However, unless the project is to be procured on an entirely cost-reimbursable basis, the expectation is that the process will culminate with the agreement of a lump sum contract price and the parties entering into the EPC contract.

Ordinarily a specialist firm of consulting engineers or a contractor or number of contractors will carry out the DFS. Following this, the same engineering firm or contractor may be instructed to carry out the FEED process. Once the FEED has been completed and the employer is satisfied with it, then the employer will usually appoint a single contractor to actually carry out the works under the EPC contract. In some circumstances the employer may appoint the same contractor under the FEED contract and the EPC contract.

As also noted above, the terms of an EPC contract, save for the price, may be agreed at the same time as awarding the FEED contract. However, it is also possible to have a single contract which incorporates both the FEED aspect and the EPC contract.

More often than not, a single contract in these circumstances will contain what is known as a conversion mechanism, in anticipation that the contractor under the FEED contract may subsequently become the contractor under the EPC contract. This conversion mechanism serves to convert the contract from a cost reimbursable form of contract (i.e. one where the contractor is paid on a fee basis for the work done) to a lump sum turnkey contract or LSTK contract with a fixed contract price.

In practice, at the beginning of the FEED process, there will be an estimated price of the works. As the FEED process progresses, this price should become more specified with less chance of variation until a point where a contractor can evaluate and establish a price under which it would be willing to carry out and complete the works, such price being adjusted to take account of any anticipated variations.

At the end of the FEED process this price will be proposed to the employer who will consider the price and have the option to accept or reject the price. Where the employer accepts the price, the price will be converted to a fixed lump sum and will be the fixed contract price under the EPC contract. Where the employer disagrees with the price or part of the price, the conversion mechanism will set out a process whereby the parties will attempt to adjust and agree to a different price (ordinarily by the contractor proposing recalculated prices). In the event that the parties cannot agree, the employer will have the right to terminate the contract or alternatively it might be agreed that the employer can instruct an expert to conclusively determine one or more elements of the price.

An important feature of this process is that the project timetable needs to make sufficient allowance for the conversion to take place. If an employer does not have the time to undertake a conversion process properly, it is best advised not to start.

However, one way in which a conversion mechanism may operate is by way of an open book estimate whereby:

- a number of months into the FEED process (e.g. after say 4-6 months), the contractor would provide the employer with an estimate of the lump sum price which takes account of the FEED results up to that point;
- at set periods of time thereafter (e.g. monthly) the contractor would provide revised prices based on the continuing FEED process, such prices to be fully supported by data on an open-book basis;
- once a certain period of the FEED process has passed (e.g. 9 months) the employer would, each month (or other agreed period), have the option to either convert to a lump sum contract on the basis of the revised estimate or continue with the FEED process and convert when it is completed;
- once the employer elects to convert, the FEED process will end, and the contractor is required to execute the EPC contract, configuring the FEED outputs on a LSTK basis.

This should give the employer visibility as to contingencies allowed for by contractor in developing its price for the work and in its scheduling assumptions. The employer will need cost engineers and scheduling engineers to evaluate the open book estimates provided.

Generally the employer will be keen to have the works begin as soon as it is comfortable with the price and the price is within budget. This example mechanism therefore, provides the employer with the opportunity to convert to the lump sum EPC contract as soon as the price is at an acceptable level. By choosing to convert before the end of the FEED process, the employer takes the benefit of the works starting earlier and also not having to pay for the remainder of the FEED process. On the other hand, at the point of conversion, the employer takes the risk that the overall price could have eventually been less.

It is also worth considering that where the FEED process ends early, there *may* be an increased chance of a change in design occurring down the line which results in a change in price. The employer would therefore want to ensure that, as far as is reasonable, the contractor has the burden of this risk under the EPC contract rather than the employer itself.

Ultimately, as with the other risks discussed in this paper, it is important that the terms of the conversion mechanism are clear, in particular setting out a process for a situation where there is a disagreement on the price proposed. In addition, parties need to consider the effect of any other provisions in the EPC contract once the price has been converted.

Conclusions

Overall, this paper addresses three of the key risks associated with EPC contracts, namely, legislative change, force majeure and design development. In doing so, it examines how such risks may be treated under the contract and in practice.

This paper also seeks to highlight how standard contracts such as FIDIC approach such risks and how parties may wish to depart from the standard clauses, considering each project on a case-by-case basis.

Overall, it is hoped that the paper provides some practical considerations for parties when negotiating the EPC contract or addressing such risks.

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