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EPC Contracts in the process plant sector

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Introduction

Engineering, Procurement and Construction (**EPC**) contracts are a common form of contract used to undertake construction works by the private sector on large-scale and complex process plant projects[1]. Under an EPC Contract a Contractor is obliged to deliver a complete facility to a Developer who need only turn a key to start operating the facility, hence EPC Contracts are sometimes called turnkey construction contracts. In addition to delivering a complete facility, the Contractor must deliver that facility for a guaranteed price by a guaranteed date and it must perform to the specified level. Failure to comply with any requirements will usually result in the Contractor incurring monetary liabilities.

It is timely to examine EPC Contracts and their use on process plant projects given the bad publicity they have received, particularly in contracting circles. A number of Contractors have suffered heavy losses and, as a result, a number of Contractors now refuse to enter into EPC Contracts in certain jurisdictions. This problem has been exacerbated by a substantial tightening in the insurance market. Construction insurance has become more expensive owing both to significant losses suffered on many projects and the impact of September 11 on the insurance market. Further, some project proponents believe that the project delivery methods such as Engineering, Procurement and Construction Management (EPCM) give them greater flexibility and that they have the expertise and experience required to control costs in an EPCM Contract.

However, because of their flexibility, the value and the certainty Sponsors and Lenders derive from EPC Contracts, the authors believe EPC Contracts will continue to be a pre-eminent form of construction contract used on large-scale process plant projects in most jurisdictions[2].

This paper will only focus on the use of EPC Contracts in the process plant sector. However, the majority of the issues raised are applicable to EPC Contracts used in all sectors.

Prior to examining process plant EPC Contracts in detail, it will be useful to explore the basic features of a process plant project.

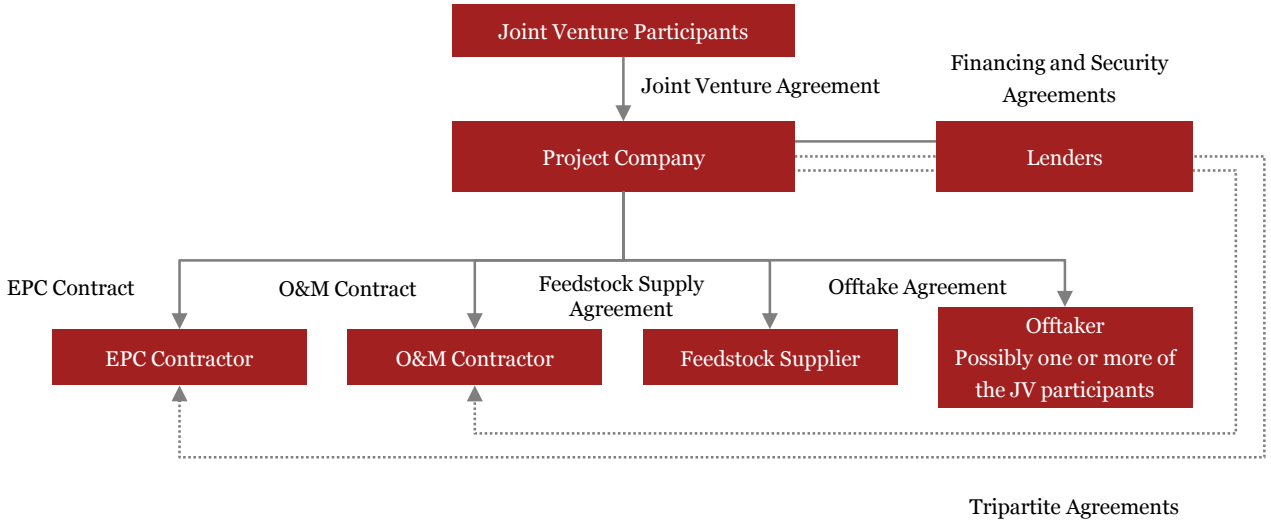
1 A Liquefied Natural Gas (**LNG**) project would also usually involve a shipping deal and/or pipeline aspects.

2 Even if the project is developed by a large conglomerate there are usually contracts between the various entities. For example, where the proponent will also be the supplier there will often be a supply agreement put in place so that the new project is properly defeasible and business property accountable.

Basic features of a process plant project

The contractual structure

The diagram below illustrates the basic contractual structure of a simple project financed process plant project using an EPC Contract[3].



The detailed contractual structure will vary from project to project. However, most projects will have the basic structure illustrated above[4]. As can be seen from the diagram, the following agreements will usually be entered into:

- A Joint Venture (JV) agreement between the JV participants, which sets out the rights and obligations of the JV participants in relation to management, control and funding of the project. Usually the JV participants will establish a special purpose vehicle (referred to as the Project Company in the above diagram), which will be the entity that will construct and own the process plant facility. There is a significant advantage in establishing a special purpose vehicle as it means that one body is responsible for the delivery of projects, and relationships with government, customers, Contractors and suppliers.

- An agreement governing the operation and maintenance of the process plant facility. This is usually a long-term Operating and Maintenance Agreement (**O&M agreement**) with an Operator for the operation and maintenance of the facility. The term of the O&M agreement will vary from project to project. The Operator will usually be one of the JV participants whose main business is manufacturing the product to be produced at the facility.

- A supply agreement governing the supply of feedstock to the process plant. For an ammonia and urea plant or a methanol plant, the main feedstock material is natural gas and therefore the Project Company will usually enter into a gas supply agreement with a local gas supplier. On most projects this will require the construction of infrastructure for the supply of the feedstock to the facility. For example, a pipeline to supply natural gas to the facility. The Project Company will often engage a separate Contractor to design and construct this infrastructure.

- Offtake agreements govern the sale of the product of the project. For process plant projects these agreements are crucial to the development proceeding. Financiers will not lend the funds and boards will not approve the project if there are no customers locked in to take the product. The impact of the offtake

3 A LNG project would also usually involve a shipping deal and/or pipeline aspects.

4 Even if the project is developed by a large conglomerate there are usually contracts between the various entities. For example, where the proponent will also be the supplier there will often be a supply agreement put in place so that the new project is properly defeasible and business property accountable

agreement is on practical completion. If there are take or pay agreements it is vital that the project is ready to deliver product from inception date of the offtake agreement or it will face penalties. It may even have to buy product on the open market to meet its obligations. This can be a costly exercise if those markets are thinly traded or demand for these products is high.

- Financing and security agreements with the Lenders to finance the development of the project.

There are a number of contractual approaches that can be taken to construct a process plant facility. An EPC Contract is one approach. Another option is to have a supply contract, a design agreement and construction contract with or without a project management agreement. The project management can be, and often is, carried out by the proponent itself. Alternatively, an EPCM or project management contract can be used for the management. The choice of contracting approach will depend on a number of factors, including the time available, the Lender's requirements, the sophistication of the proponent and the identity of the Contractor(s)

Accordingly, the construction contract is only one of a suite of documents on a process plant project. Importantly, the promoter or the joint venture participants of the project operate and earn revenue under contracts other than the construction contract. Therefore, the construction contract must, where practical, be tailored so as to be consistent with the requirements of the other project documents. As a result, it is vital to properly manage the interfaces between the various types of agreements. These interface issues are discussed in more detail below.

The major advantage of the EPC Contract over the other possible approaches is that it provides for a single point of responsibility. This is discussed in more detail below.

Joint venture participants

- Interestingly, on large project-financed projects the Contractor is increasingly becoming one of the Sponsors, ie an equity participant in the Project Company. This is not the case in traditional process plant projects. Contractors will ordinarily sell down their interest after financial close because, generally speaking, Contractors will not wish to tie up their capital in operating projects. In addition, once construction is complete the rationale for having the Contractor included in the Ownership consortium often no longer exists. Similarly, once construction is complete a project will normally be reviewed as lower risk than a project in construction, therefore, all other things being equal, the Contractor should achieve a good return on its investments.

- Many Developers of process plant companies are large companies that sometimes choose to finance projects from their balance sheet. However, this is not always the case. Often they will seek finance to fund the project or there may be a number of small companies looking to develop assets that are regarded as stranded or too small for large companies to operate profitably. These smaller companies will need finance to carry out these developments. In these cases, the EPC Contractor is required to be a large, experienced participant in the industry that the Sponsors and Lenders are confident can successfully deliver the project and is large enough to cope with losses if it does not. Further, companies with a successful track record means that insurance for the project is easier to obtain. The larger Owners will still use an EPC Contract or design and construct contract for parts of large projects even if self-management, EPCM or project management are used for the greater project.

Bankability

A bankable contract is a contract with a risk allocation between the Contractor and the Project Company that satisfies the Lenders. Lenders focus on the ability (or more particularly the lack thereof) of the Contractor to claim additional costs and/or extensions of time as well as the security provided by the Contractor for its performance. The less comfortable the Lenders are with these provisions, the greater amount of equity support the Sponsors will have to provide. In addition, Lenders will have to be satisfied as to the technical risk. Obviously price is also a consideration, but that is usually considered separately to the bankability of the contract because the contract price (or more accurately the capital cost of the project facility) goes more directly to the economic bankability of the project as a whole.

Before examining the requirements for bankability, it is worth briefly considering the appropriate financing structures and lending institutions. Historically, the most common form of financing for process plant projects is project financing. Project financing is a generic term that refers to financing secured only by the assets of the

project itself. Therefore, the revenue generated by the project must be sufficient to support the financing. Project financing is also often referred to as either “non-recourse” financing or “limited recourse” financing.

The terms “non-recourse” and “limited recourse” are often used interchangeably, however, they mean different things. “Non-recourse” means there is no recourse to the project Sponsor at all and “limited recourse” means, as the name suggests, there is limited recourse to the Sponsor. The recourse is limited both in terms of when it can occur and how much the Sponsor are forced to contribute. In practice, true non-recourse financing is rare. In most projects the Sponsor will be obliged to contribute additional equity in certain defined situations.

Traditionally project financing was provided by commercial Lenders. However, as projects became more complex and financial markets more sophisticated, project finance also developed. In addition, as well as bank borrowings Sponsor are also using more sophisticated products like credit wrapped bonds, securitisation of future cash flows and political, technical and completion risk insurance to provide a portion of the necessary finance.

In assessing bankability, Lenders will look at a range of factors and assess a contract as a whole. Therefore, in isolation it is difficult to state whether one approach is or is not bankable. However, generally speaking, the Lenders will require the following:

- a fixed completion date
- a fixed completion price
- no or limited technology risk
- output guarantees
- liquidated damages for both delay and performance
- security from the Contractor and/or its parent
- large caps on liability (ideally, there would be no caps on liability, however, given the nature of EPC Contracting and the risks to the Contractors involved there are almost always caps on liability)
- restrictions on the ability of the Contractor to claim extensions of time and additional costs.

An EPC Contract delivers all of the requirements listed above in one integrated package. This is one of the major reasons why they are the predominant form of construction contract used on large-scale project-financed infrastructure projects and why they can be effective on process plant projects.

Basic features of an EPC Contract

The key clauses in any construction contract are those which impact on:

- time
- cost
- quality.

The same is true of EPC Contracts. However, EPC Contracts tend to deal with issues with greater sophistication than other types of construction contracts. This is because, as mentioned above, an EPC Contract is designed to satisfy the Lenders’ requirements for bankability.

EPC Contracts provide for:

- **A single point of responsibility**: The Contractor is responsible for all design, engineering, procurement, construction, commissioning and testing activities. Therefore, if any problems occur the Project Company need only look to one party – the Contractor – to both fix the problem and provide compensation. As a

result, if the Contractor is a consortium comprising several entities the EPC Contract must state that those entities are jointly and severally liable to the Project Company.

- **A fixed contract price**: Risk of cost overruns and the benefit of any cost savings are to the Contractor's account. The Contractor usually has a limited ability to claim additional money which is limited to circumstances where the Project Company has delayed the Contractor or has ordered variations to the works.

- **A fixed completion date**: EPC Contracts include a guaranteed completion date that is either a fixed date or a fixed period after the commencement of the EPC Contract. If this date is not met the Contractor is liable for delay liquidated damages (**DLDs**). DLDs are designed to compensate the Project Company for loss and damage suffered as a result of late completion of the facility. To be enforceable in common law jurisdictions,[5] DLDs must be a genuine pre-estimate of the loss or damage that the Project Company will suffer if the facility is not completed by the target completion date. The genuine pre-estimate is determined by reference to the time the contract was entered into.

DLDs are usually expressed as a rate per day which represents the estimated extra costs incurred (such as extra insurance, supervision fees and financing charges) and losses suffered (revenue forgone) for each day of delay.

In addition, the EPC Contract must provide for the Contractor to be granted an extension of time when it is delayed by the acts or omissions of the Project Company. The extension of time mechanism and reasons why it must be included are discussed below.

- **Performance guarantees**: The Project Company's revenue will be earned by operating the facility. Therefore, it is vital that the facility performs as required in terms of output, efficiency and reliability. Therefore, EPC Contracts contain performance guarantees backed by performance liquidated damages (PLDs) payable by the Contractor if it fails to meet the performance guarantees. The performance guarantees usually comprise a guaranteed production capacity, quality and efficiency. PLDs must also be a genuine pre-estimate of the loss and damage that the Project Company will suffer over the life of the project if the facility does not achieve the specified performance guarantees. As with DLDs, the genuine pre-estimate is determined by reference to the time the contract was signed. PLDs are usually a net present value (NPV) (less expenses) calculation of the revenue forgone over the life of the project. For example, for an ammonia and urea plant if the production rate of urea is 50 tonnes less than the specification, the PLDs are designed to compensate the Project Company for the revenue forgone over the life of the project by being unable to sell that 50 tonnes of urea. It is possible to have a separate contract that sets out the performance requirements, testing regime and remedies. However, this can create problems where the EPC Contract and the performance guarantees do not match. In our view, the preferred option is to have the performance guarantees in the EPC Contract itself. PLDs and the performance guarantee regime and its interface with the DLDs and the delay regime are discussed in more detail below.

- **Caps on liability**: As mentioned above, most EPC Contractors will not, as a matter of company policy, enter into contracts with unlimited liability. Therefore, EPC Contracts for process plant projects cap the Contractor's liability at a percentage of the contract price. This varies from project to project, however, a cap of 100% of the contract price is common. In addition, there are normally subcaps on the Contractor's liquidated damages liability. For example, DLDs and PLDs might each be capped at 20% of the contract price, with an overall cap on both types of liquidated damages of 30% of the contract price. There will also likely be a prohibition on the claiming of consequential damages. Put simply, consequential damages are those damages that do not flow directly from a breach of contract, but which may have been in the reasonable contemplation of the parties at the time the contract was entered into. This used to mean heads of damage like loss of profit. However, loss of profit is now usually recognised as a direct loss on project-financed projects and, therefore, would be recoverable under a contract containing a standard exclusion of

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5 For the purposes of this paper, we have assumed the EPC Contract will be governed by the law of a common law jurisdiction. Where there are differences between jurisdictions, we have adopted the English law approach. Therefore, if an EPC Contract is governed by a law other than English law you will need to seek advice from local counsel to ensure the contract is enforceable in the relevant jurisdiction. For example, in both the PRC and Malaysia liquidated damages amounts specified in a contract may be subsequently altered by a court. If a party can show that the liquidated damages amounts will either under- or in some cases over-compensate a party the court can adjust the damages payable so they more accurately reflect the actual damage suffered by a party.

consequential loss clause. Nonetheless, care should be taken to state explicitly that liquidated damages can include elements of consequential damages. Given the rate of liquidated damages is pre-agreed, most Contractors will not object to this exception.

In relation to both caps on liability and exclusion of liability, it is common for there to be some exceptions. The exceptions may apply to either or both the cap on liability and the prohibition on claiming consequential losses. The exceptions themselves are often project specific, however, some common examples include cases of fraud or wilful misconduct, situations where the minimum performance guarantees have not been met and the cap on delay liquidated damages has been reached, and breaches of the intellectual property warranties.

- **Security**: It is standard for the Contractor to provide performance security to protect the Project Company if the Contractor does not comply with its obligations under the EPC Contract. The security takes a number of forms, including:
  - A bank guarantee or bond for a percentage, normally in the range of 5–15% of the contract price. The actual percentage will depend on a number of factors including the other security available to the Project Company, the payment schedule (because the greater the percentage of the contract price unpaid by the Project Company at the time it is most likely to draw on security ie to satisfy DLD and PLD obligations the smaller the bank guarantee can be), the identity of the Contractor and the risk of it not properly performing its obligations, the price of the bank guarantee and the extent of the technology risk
  - Advance payment guarantee, if an advance payment is made
  - A parent company guarantee – this is a guarantee from the ultimate parent (or other suitable related entity) of the Contractor which provides that it will perform the Contractor's obligations if, for whatever reason, the Contractor does not perform.
- **Variations:** The Project Company has the right to order variations and agree to variations suggested by the Contractor. If the Project Company wants the right to omit works, either in their entirety or to be able to engage a different Contractor this must be stated specifically. In addition, a properly drafted variations clause should make provision for how the price of a variation is to be determined. In the event the parties do not reach agreement on the price of a variation, the Project Company or its representative should be able to determine the price. This determination is subject to the dispute resolution provisions. In addition, the variations clause should detail how the impact, if any, on the performance guarantees is to be treated. For some larger variations the Project Company may also wish to receive additional security. If so, this must also be dealt with in the variations clause.
- **Defects liability**: The Contractor is usually obliged to repair defects that occur in the 12 to 24 months following completion of the performance testing. Defects liability clauses can be tiered. That is, the clause can provide for one period for the entire facility and a second extended period, for more critical items.
- **Intellectual property**: The Contractor warrants that it has rights to all the intellectual property used in the execution of the works and indemnifies the Project Company if any third parties' intellectual property rights are infringed.
- ***Force majeure***: The parties are excused from performing their obligations if a *force majeure* event occurs. This is discussed in more detail below.
- **Suspension**: The Project Company usually has a right to suspend the works.
- **Termination**: This sets out the contractual termination rights of both parties. The Contractor usually has very limited contractual termination rights. These rights are limited to the right to terminate for non-payment or for prolonged suspension or prolonged *force majeure* and will be further limited by the tripartite or direct agreement between the Project Company, the Lenders and the Contractor. The Project Company will have more extensive contractual termination rights. They will usually include the ability to terminate immediately for certain major breaches or if the Contractor becomes insolvent and the right to terminate after a cure period for other breaches. In addition, the Project Company may have a right to terminate for

convenience. It is likely the Project Company's ability to exercise its termination rights will also be limited by the terms of the financing agreements.

- **Performance specification**: Unlike a traditional construction contract, an EPC Contract usually contains a performance specification. The performance specification details the performance criteria that the Contractor must meet. However, it does not dictate how they must be met. This is left to the Contractor to determine. A delicate balance must be maintained. The specification must be detailed enough to ensure the Project Company knows what it is contracting to receive but not so detailed that if problems arise the Contractor can argue they are not its responsibility.

Whilst there are, as described above, numerous advantages to using an EPC Contract, there are some disadvantages. These include the fact that it can result in a higher contract price than alternative contractual structures. This higher price is a result of a number of factors, not least of which is the allocation of almost all the construction risk to the Contractor. This has a number of consequences, one of which is that the Contractor will have to factor into its price the cost of absorbing those risks. This will result in the Contractor building contingencies into the contract price for events that are unforeseeable and/or unlikely to occur. If those contingencies were not included, the contract price would be lower. However, the Project Company would bear more of the risk of those unlikely or unforeseeable events. Sponsors have to determine, in the context of their particular project, whether the increased price is worth paying.

As a result, Sponsor and their advisors must critically examine the risk allocation on every project. Risk allocation should not be an automatic process. Instead, the Project Company should allocate risk in a sophisticated way that delivers the most efficient result. For example, if a project is being undertaken in an area with unknown geology and without the time to undertake a proper geotechnical survey, the Project Company may be best served by bearing the site condition risk itself as it will mean the Contractor does not have to price a contingency it has no way of quantifying. This approach can lower the risk premium paid by the Project Company. Alternatively, the opposite may be true. The Project Company may wish to pay for the contingency in return for passing off the risk which quantifies and caps its exposure. This type of analysis must be undertaken on all major risks prior to going out to tender.

Another consequence of the risk allocation is the fact that there are relatively few engineering and construction companies that can and are willing to enter into EPC Contracts. As mentioned in the introduction, some bad publicity and a tightening insurance market have further reduced the pool of potential EPC Contractors. The scarcity of EPC Contractors can also result in relatively high contract prices.

Another major disadvantage of an EPC Contract becomes evident when problems occur during construction. In return for receiving a guaranteed price and a guaranteed completion date, the Project Company cedes most of the day-to-day control over the construction. Therefore, project companies have limited ability to intervene when problems occur during construction. The more a Project Company interferes, the greater the likelihood of the Contractor claiming additional time and costs. In addition, interference by the Project Company will make it substantially easier for Contractors to defeat claims for liquidated damages and defective works.

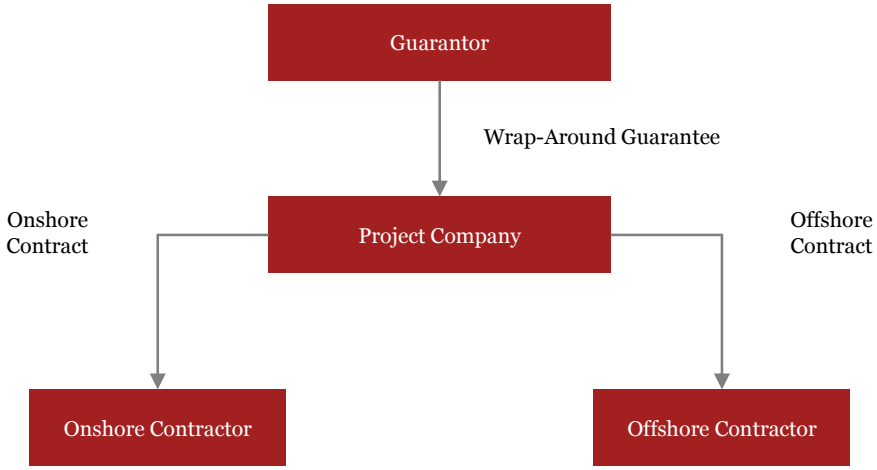
Obviously, ensuring the project is completed satisfactorily is usually more important than protecting the integrity of the contractual structure. However, if a Project Company interferes with the execution of the works they will, in most circumstances, have the worst of both worlds. They will have a contract that exposes them to liability for time and costs incurred as a result of their interference without any corresponding ability to hold the Contractor liable for delays in completion or defective performance. The same problems occur even where the EPC Contract is drafted to give the Project Company the ability to intervene. In many circumstances, regardless of the actual drafting, if the Project Company becomes involved in determining how the Contractor executes the works then the Contractor will be able to argue that it is not liable for either delayed or defective performance.

As a result, it is vitally important that great care is taken in selecting the Contractor and in ensuring the Contractor has sufficient knowledge and expertise to execute the works. Given the significant monetary value of EPC Contracts, and the potential adverse consequences if problems occur during construction, the lowest price should not be the only factor used when selecting Contractors.

Split EPC Contracts

One common variation, particularly in Asia, on the basic EPC structure illustrated above is a split EPC Contract. Under a split EPC Contract, the EPC Contract is, as the name implies, split into two or more separate contracts.

The basic split structure (illustrated below) involves splitting the EPC Contract into an onshore construction contract and an offshore supply contract.[6]

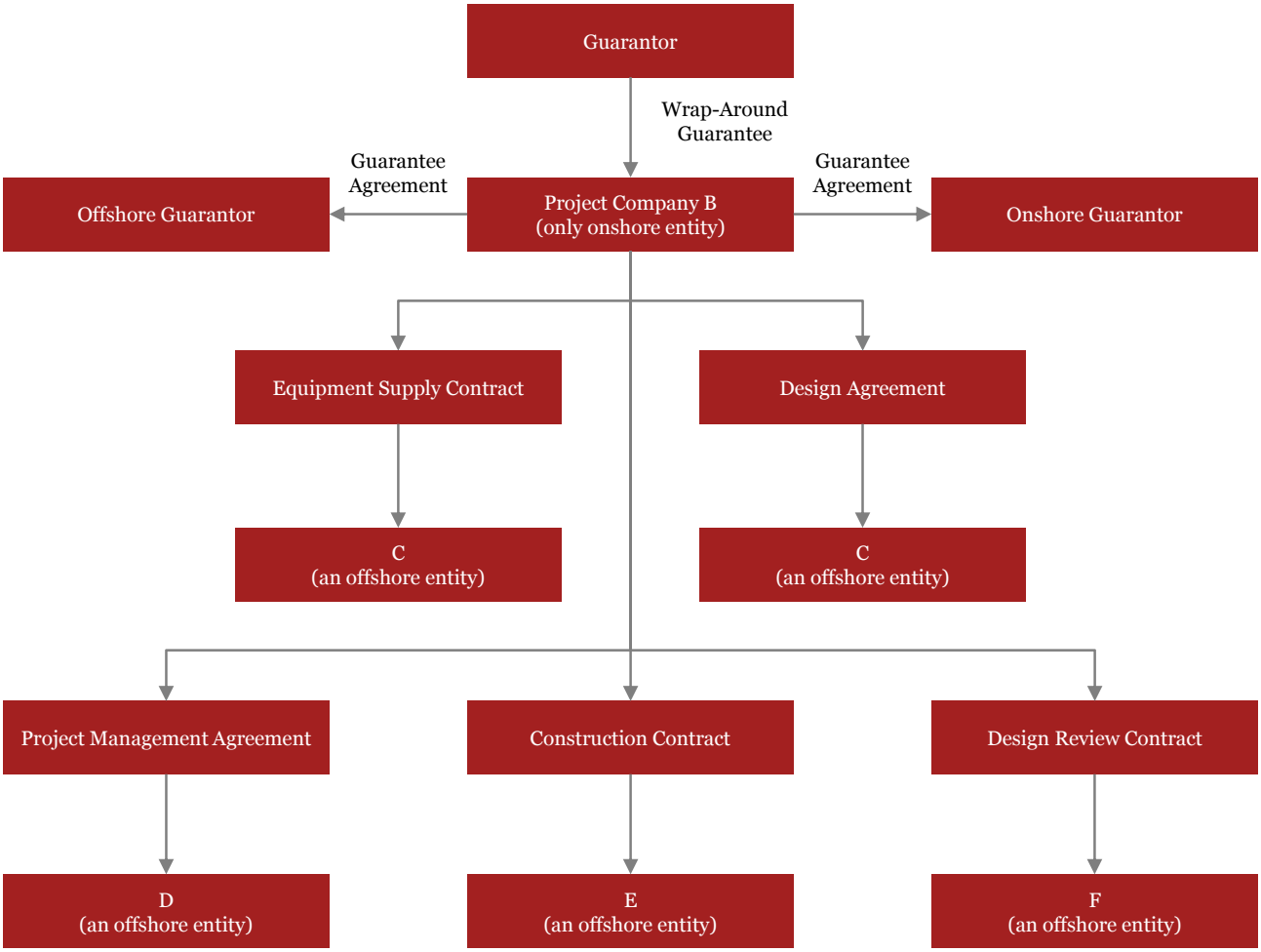


There are two main reasons for using a split contract. The first is because it can result in a lower contract price as it allows the Contractor to make savings in relation to onshore taxes; in particular on indirect and corporate taxes in the onshore jurisdiction. The second is because it may reduce the cost of complying with local licensing regulations by having more of the works, particularly the design works, undertaken offshore.[7] In addition, in some countries that impose restrictions on who can carry out certain activities like engineering and design services, splitting the EPC Contract can also be advantageous because it can make it easier to repatriate profits. Below is a diagram illustrating a more complex split EPC structure we have used previously that dealt with both tax and licensing issues.

6 We have prepared a paper that deals with the variations and complications in split EPC Contracts. You should consult that paper if you want more information on this topic.

7 Modularisation is now a common form of construction and is an example where a split EPC Contract may be particularly appropriate.

Example split EPC Structure



Example simple split EPC Structure

Whilst a split EPC Contract can result in costs savings, there are risks to the Project Company in using such a structure. This mainly arises because of the derogation from the principle of single point of responsibility.

Unlike a standard EPC Contract, the Project Company cannot look only to a single Contractor to satisfy all the contractual obligations (in particular, design, construction and performance). Under a split structure, there are at least two entities with those obligations. Therefore, a third agreement, a wrap-around guarantee,[8] is used to deliver a single point of responsibility despite the split.

Under a wrap-around guarantee, an entity, usually either the offshore supplier or the parent company of the contracting entities, guarantees the obligations of both Contractors. This delivers a single point of responsibility to the Project Company and the Lenders. The contracting entities will then enter into a separate agreement to determine how, as between themselves, liability is to be apportioned. However, that agreement is not relevant for the purposes of this paper.

In addition, the wrap-around guarantee will, if properly drafted, prevent the various Contractors from relying on the defaults of the other parties to avoid performing their contractual obligations – a tactic known as a horizontal defence. The wrap-around guarantee should also prevent a Contractor from relying on the Project Company's default where the Project Company's default was a result, either directly or indirectly, of the non-performance, under-Guarantor performance or delay in performance of any of the other Contractors under their respective contracts.

8 This is also called a coordination agreement, an administration agreement or an umbrella deed.

In addition to horizontal defences, the wrap-around guarantee should deal with the following matters:

- **Guarantees and indemnities**: The Guarantor must guarantee the performance of the totality of the works and the ability of the separate parts to work seamlessly.

- **Liquidated damages**: This is linked to the issue of horizontal defences discussed above. The wrap-around guarantee must ensure that liquidated damages are paid regardless of which Contractor is late and which Contractor fails to perform. Similarly, the aggregate cap of liability in the wrap-around guarantee must override any caps on liability in the split contracts themselves.

- **Provision of a performance bond by the Guarantor or its parent**: It is usually prudent to have the Guarantor provide security for their obligations under the wrap-around guarantee. This may be in addition to or in replacement of the security provided under the EPC Contracts themselves. It will depend on the particular requirements of each project.

- **Liability (and limitation of liability) of the Guarantor**: The Guarantor's liability should be equal to the aggregate liability of the contracting entities under the split EPC Contracts.

- **Duration of the wrap-around guarantee**: The wrap-around guarantee should remain in force for as long as possible to offer the Project Company additional protection in the event latent defects occur. In any event, it should remain in force until the expiry of the defects liability period or the resolution of any dispute arising out of or in connection with the construction of the facility, whichever is the later.

- **Dispute resolution**: The procedures should be identical to those in the project documents and allow the Project Company to consolidate claims.

- **Termination**: Termination of an EPC Contract should automatically terminate the other EPC Contract(s) and the wrap-around guarantee (except in respect of accrued liability).

- **Tax indemnity**: Ideally the Contractor(s) should indemnify the Project Company for any taxes or penalties payable as a result of the split.

In addition, the wrap-around guarantee should contain provisions dealing with the practical consequences of splitting the contract and how the contracts and the project should be administered. For example, there should also be clauses dealing with more mundane issues like notices. Notices issued under one contract should be deemed to be notices under the other contracts.

Whenever an EPC Contract is split, the primary driver both of the general structure of the split and the particular drafting approach must be achieving a tax-effective structure. Therefore, tax advice from experts in the relevant jurisdiction must be obtained and those experts must review the split contracts and the wrap-around guarantee.

Key process plant-specific clauses in process plant EPC Contracts

General interface issues

As noted above, an EPC Contract is one of a suite of agreements necessary to develop a process plant project. Therefore, it is vital that the EPC Contract properly interfaces with those other agreements. In particular, care should be taken to ensure the following issues interface properly:

- commencement and completion dates
- liquidated damages amounts and trigger points
- caps on liability
- indemnities
- entitlements to extensions of time
- insurance
- *force majeure*
- intellectual property.

Obviously, not all these issues will be relevant for all agreements. In addition to these general interface issues that apply to most types of projects, there are also process plant project issues that must be considered. These issues are many and varied and depend largely on the nature of the project. For example, on a methanol project the facility must be ready and able to accept feedstock, process it to meet rigorous occupational health, safety and environmental guidelines and export methanol to meet supplier and customer demands and contractual obligations. They are discussed in more detail below.

Some major process plant-specific interface issues are:

- access for the Contractor to the feedstock to allow timely completion of construction, commissioning and testing
- consistency of commissioning and testing regimes
- feedstock, product and by-product (such as greenhouse emissions) specification requirements
- interface issues between the relevant government agencies and System Operator and the Contractor. In particular, whilst the Project Company must maintain a long-term/comfortable relationship with either the government or the system Operator the Contractor does not.

Feedstock and product storage

Usually, EPC Contracts will not provide for the handover of the facility to the Project Company until all commissioning and reliability trialling has been successfully completed.[9]

This raises the important issue of the supply of feedstock and other consumables (such as water) and receipt of product during testing and commissioning and the need for the EPC Contract to clearly define the obligations of the Project Company in providing feedstock and sufficient storage or product demand to fully and properly commission and test the facility.

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9 Some Owners will, however, carry out the commissioning themselves.

Lenders need to be able to avoid the situation where the Project Company's obligation to ensure feedstock and storage (or demand) is uncertain. This will result in protracted disputes with the Contractor concerning the Contractor's ability to commission and test the facility at design conditions and to obtain extensions of time in situations where delay has been caused as a result of the failure or otherwise of the Project Company to provide sufficient (or sufficient quality) feedstock or storage.

With respect to the obligation to ensure the availability of sufficient feedstock, the Project Company is the most appropriate party to bear this risk *vis-à-vis* the Contractor, since the Project Company usually either builds the infrastructure itself or has it provided through the relevant supply agreement. Issues that must be considered include:

- Where is the feedstock from, an existing facility or a new facility?
- If it is a new facility, what is the timing for completion of that facility – will it fit in with the timing under the EPC Contract? What are the risks – and what can be done if it is not finished?
- Will new infrastructure be required to transport the feedstock material to the site such as the construction of a new pipeline? Will this be completed in time?
- What happens if insufficient feedstock is available or not available at all? Contractors will usually want the test to be deemed complete in these circumstances.
- What happens if the feedstock does not meet the specification? The EPC Contract should provide an adjustment mechanism to cope with this.

From the Project Company's perspective, the EPC Contract should set out the quantity of feedstock material and the date at which it must be provided. If possible, it should specify a maximum quantity that will be supplied. This will enable the Project Company to arrange the supply of this material by entering into a supply agreement with a third party.

With respect to the Contractor's ability to export product or store product, the EPC Contract must adequately deal with this risk and satisfactorily answer the following questions to ensure the smooth testing, commissioning and achieving commercial operation:

- What is the extent of the product export obligation? It will usually be an obligation to provide storage or demand for the product for a fixed period of time.
- What is the timing for the commencement of this obligation? Does the obligation cease at the relevant target date of completion? If not, does its nature change after the date has passed?
- What is the obligation of the Project Company to provide demand or storage in cases where the Contractor's commissioning/plant is unreliable – is it merely a reasonableness obligation?
- Which party is responsible for loss or damage to the product that is being stored?
- What happens if the Project Company fails to provide sufficient storage or demand? Contractors will usually seek to have the test deemed complete.

Many EPC Contracts are silent on these matters or raise far more questions than they actually answer. Given that the Project Company's failure will stem from restrictions imposed on it under its supply or offtake agreements, the best answer is to back-to-back the Project Company's obligations under the EPC Contract (usually to provide an extension of time and/or costs) with its supply and offtake agreements. This approach will not eliminate the risk associated with commissioning and testing issues, but will make it more manageable.

Our experience in a variety of projects has taught us that the issue of availability and quality of feedstock and availability of storage or demand is a matter that must be resolved at the contract formation stage.

Interfacing of commissioning and testing regimes

It is also important to ensure the commissioning and testing regimes in the EPC Contract mirror the requirements of any supply and offtake agreements. Mismatches only result in delays, lost revenue and liability for damages under the EPC Contract, supply or offtake agreements, all of which have the potential to cause disputes. This is even more important where the EPC Contract is part of a larger development, say a methanol plant on the back of a new gas processing plant. For example, the gas process plant might need the methanol plant to take its product as much as the methanol plant needs its product. If the interface is not carefully thought through and agreed in the contracts then this interface becomes a ripe area for disputes.

Testing/trialling requirements under any related contracts must provide the necessary Project Company satisfaction under the EPC Contract and the offtake and supply contracts. Relevant testing issues which must be considered include:

- Will any related facilities be required for the tests/trialling?

- Is there consistency between obtaining handover from the Contractor under the EPC Contract and commercial operation? It is imperative to ensure that there is a sufficient window for the EPC Contract facility and any related facilities to be tested. Contractors will usually want an agreement that where the testings/trials cannot be undertaken, through no fault of its own, in a reasonable time frame the test/trials are deemed to be completed. It must not be forgotten that various certifications will be required at the Lender level. The last thing the Lenders will want is the process to be held up by their own requirements for certification. To avoid delays and disruption it is important that the Lenders' engineer is acquainted with the details of the project and, in particular, any potential difficulties with the testing regime. Therefore, any potential problems can be identified early and resolved without impacting on the commercial operation of the facility.

- Is the basis of the testing to be undertaken mirrored under both the EPC Contract and related facility? Using the methanol example above, is the gas processing plant required to produce the same quality gas that the methanol plant is to be tested/trialled, and ultimately operated on?[10]

- On what basis are various environmental tests to be undertaken?

- What measurement methodology is being used? Are the correction factors to be applied under the relevant documents uniform? Are references to international standards or guidelines to a particular edition or version?

- Are all tests necessary for the Contractor to complete under the EPC Contract able to be performed as a matter of practice?

Significantly, if the relevant specifications are linked to guidelines such as the international environmental guidelines, consideration must be given to changes which may occur in these guidelines. The EPC Contract reflects a snapshot of the standards existing at a time when that contract was signed. It may be a number of years post that date in which the actual construction of the project is undertaken thus allowing for possible mismatches should the legislative/guidelines have changed as regards environmental concerns. It is important that there is certainty as to which standard applies. Is it the standard at the time of entering the EPC Contract or is it the standard which applies at the time of testing?

Consideration must therefore be given to the appropriate mechanism to deal with potential mismatches between the ongoing obligation of complying with laws, and the Contractor's obligation to build to a specification agreed at a previous time. Consideration must be given to requiring satisfaction of guidelines "as amended from time to time"[11]. The breadth of any change of law provision will be at the forefront of any review.

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10 This sounds basic but it has been a relatively common error. The same issue arises if the testing, using this example, was contingent on another related facility being able to accept some or all of the product.

11 It is often the case that if amendments to the design are required as a result the Contractor will be entitled to extensions of time and/or variations.

The above issues raise the importance of the testing schedules to the EPC Contract. The size and importance of the various projects to be undertaken must mean that the days where schedules are attached at the last minute without being subject to review are gone – they are part and parcel of the EPC Contract.

Discrepancies between the relevant testing and commissioning requirements will only serve to delay and distract all parties from the successful completion of testing and reliability trials.

These are all areas where lawyers can add value to the successful completion of projects by being alert to and dealing with such issues at the contract formation stage.

Feedstock specification issues

The nature of the feedstock to be supplied to the Contractor under the EPC Contract is also another important issue. Where there is a supply agreement[12] it is vitally important that adequate review is done at the EPC Contract level to ensure that the feedstock being provided under the supply agreement meets the requirements of the EPC Contract. Similar consideration will need to be given to any Project Company where it will be supplying the feedstock itself. This is a common area of dispute where the facility fails to meet the specification in test/trials.

Differing feedstock specification requirements can only result in delay, cost claims and extension of time claims at the EPC Contract level. Feedstock specification issues will be hidden away in the schedules. Again, watch out for those schedules.

In addition, where certain tests require specific types or quality of feedstock, the review should check that there are arrangements in place for that type of quality of feedstock to be provided. If the specification calls for a wide range of feedstock and provision is made for it to be tested as such it will be meaningless if the test cannot be undertaken. For example, the production plan might show an increase in a certain contaminant over the life of the project so a test on the lower quality feedstock may be appropriate, but only if it is possible to do so.

Interface issues between a supplier or offtaker and the EPC Contractor

At a fundamental level, it is imperative that the appropriate party corresponds with the relevant supplier or offtaker/system Operator during construction on issues such as the provision of offtake facilities/feedstock requirements/testing requirements and timing.

The Project Company must ensure the EPC Contract states clearly that it is the appropriate party to correspond with the supplier or offtaker and the System Operator. Any uncertainty in the EPC Contract may unfortunately see the EPC Contractor dealing with the supplier or offtaker and/or the system Operator thus possibly risking the relationship of the Project Company with its customer. Significantly, it is the Project Company which must develop and nurture an ongoing and long-term relationship with the offtaker. On the other hand, it is the Contractor's prime objective to complete the project on time or earlier at a cost which provides it with significant profit. The clash of these conflicting objectives in many cases does not allow for such a smooth process. Again, the resolution of these issues at the EPC Contract formation stage is imperative.

12 As opposed to the situations of the Operator of the new plant also supplying the feedstock, which presents its own problems.

Interface issues between the operating and maintenance agreement and the EPC Contract

During the transition from the construction to operating phase of the project, a number of interface issues arise which need to be addressed by both the EPC Contract and the operating and maintenance agreement.

The first is commissioning. In many EPC Contracts, the Project Company is required to provide personnel to assist the Contractor with commissioning. The personnel provided by the Project Company will more than often be personnel of the Operator.[13]

To enable the Operator to have sufficient time to mobilise its personnel, it needs to have adequate notice of the likely date of the commencement of commissioning. This is particularly important where the Operator is not a local or domestic organisation and will be mobilising personnel from different parts of the world. An EPC Contract, therefore, must require the Contractor to give advance notice to the Project Company as to the likely date of commissioning.

The second interface issue that needs to be addressed is the completion and handover of the facility. Again, the Operator will need to have sufficient notice of the likely date of completion as the commencement date under the operating and maintenance agreement (commencement of operation) will immediately follow this date. As with commissioning, the Operator will need to mobilise personnel that are not already on site assisting with commissioning.

On some projects, the Contractor (or the Project Company itself depending on the identity of the Sponsor) may require the Project Company to carry out the commissioning and performance testing. In those circumstances, handover of the facility will usually take place on mechanical completion.

While this arrangement may provide the Project Company with greater control of commissioning and performance testing, it creates bankability issues. For example, if the performance guarantees are not achieved or the project is not completed by the guaranteed completion date, the Contractor could argue that the acts or omissions of the Project Company prevented it from achieving the performance guarantees or completion by the guaranteed completed date. Even when such allegations are without merit they can be very difficult and expensive to disprove. For those reasons, it is preferable if the EPC Contract provides that the Contractor is responsible for commissioning and carrying out the performance tests and not the Project Company.[14]

Key performance clauses in process plant EPC Contracts

Rationale for imposing liquidated damages

Almost every construction contract will impose liquidated damages for delay and impose standards in relation to the quality of construction. Most, however, do not impose PLDs. EPC Contracts impose PLDs because the achievement of the performance guarantees has a significant impact on the ultimate success of a project. Similarly, it is important that the facility commences operation on time because of the impact on the success of the project and because of the liability the Project Company will have under other agreements. This is why DLDs are imposed. DLDs and PLDs are both sticks used to motivate the Contractor to fulfil its contractual obligations.

The law of liquidated damages

As discussed above, liquidated damages must be a genuine pre-estimate of the Project Company's loss. If liquidated damages are more than a genuine pre-estimate, they will be a penalty and unenforceable. There is no legal sanction for setting a liquidated damages rate below that of a genuine pre-estimate, however, there are the obvious financial consequences.

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13 See section 7.4.2 for a more detailed discussion on this issue.

14 Ibid.

In addition to being unenforceable as a penalty, liquidated damages can also be void for uncertainty or unenforceable because they breach the Prevention Principle. Void for uncertainty means, as the term suggests, that it is not possible to determine how the liquidated provisions work. In those circumstances, a court will void the liquidated damages provisions. The Prevention Principle was developed by the courts to prevent Employers, ie project companies, from delaying Contractors and then claiming DLDs. It is discussed in more detail below in the context of extensions of time.

Prior to discussing the correct drafting of liquidated damages clauses to ensure they are not void or unenforceable it is worth considering the consequences of an invalid liquidated damages regime. If the EPC Contract contains an exclusive remedies clause the result is simple – the Contractor will have escaped liability unless the contract contains an explicit right to claim damages at law if the liquidated damages regime fails. This is discussed in more detail below.

If, however, the EPC Contract does not contain an exclusive remedies clause, the non-challenging party should be able to claim at law for damages they have suffered as a result of the challenging party's non – or defective-performance. What then is the impact of the caps in the now invalidated liquidated damages clauses?

Unfortunately, the position is unclear in common law jurisdictions, and a definitive answer cannot be provided based upon the current state of authority. It appears the answer varies depending upon whether the clause is invalidated due to its character as a penalty, or because of uncertainty or unenforceability. Our view of the current position is set out below. We note that whilst the legal position is not settled the position presented below does appear logical.

- **Clause invalidated as a penalty**: When liquidated damages are unenforceable at law because they are a penalty (ie they do not represent a genuine pre-estimate of loss), the cap on liquidated damages will not act as a cap on damages claims at general law. Equity will also read down a penalty and allow appropriate compensation. This may not be an issue if the provision is less than the loss suffered. We also note that it is rare for a court to find liquidated damages are penalties in contracts between two sophisticated, well-advised parties.

- **Clause invalidated due to acts of prevention by the PrincipalPrincipal**: When a liquidated damages clause is invalidated due to an act of prevention by the Principal for which the Contractor is not entitled to an extension of time, the liquidated damages or its cap will not act as a cap on damages claims at general law.

- **Clause void for uncertainty**: A liquidated damages clause which is unworkable or too uncertain to ascertain what the parties intended is severed from the EPC Contract in its entirety, and will not act as a cap on the damages recoverable by the Principal from the Contractor. Upon severance, the clause is, for the purposes of contractual interpretation, ignored.

However, it should be noted that the threshold test for rendering a clause void for uncertainty is high, and courts are reluctant to hold that the terms of a contract, in particular a commercial contract where performance is well advanced, are uncertain.

Drafting of liquidated damages clauses

Given the role liquidated damages play in ensuring EPC Contracts are bankable, and the consequences detailed above of the regime not being effective, it is vital to ensure they are properly drafted to ensure Contractors cannot avoid their liquidated damages liability on a legal technicality.

Therefore, it is important, from a legal perspective, to ensure DLDs and PLDs are dealt with separately. If a combined liquidated damages amount is levied for late completion of the works, it risks being struck out as a penalty because it will over-compensate the Project Company. However, a combined liquidated damages amount levied for under-performance may under-compensate the Project Company.

Our experience shows that there is a greater likelihood of delayed completion than there is of permanent under-performance. One of the reasons why projects are not completed on time is Contractors are often faced with remedying performance problems. This means, from a legal perspective, if there is a combination of DLDs and PLDs, the liquidated damages rate should include more of the characteristics of DLDs to protect against the risk of the liquidated damages being found to be a penalty.

If a combined liquidated damages amount includes a NPV or performance element, the Contractor will be able to argue that the liquidated damages are not a genuine pre-estimate of loss when liquidated damages are levied for late completion only. However, if the combined liquidated damages calculation takes on more of the characteristics of DLDs the Project Company will not be properly compensated if there is permanent under-performance.

Where there is significant under-performance such as a failure to meet the minimum performance guarantees, an EPC Contract will generally provide for remedies other than the payment of PLDs. For example, the range of remedies usually included in an EPC Contract in relation to the minimum performance guarantees not being met are:

- the Contractor is required to replace the facility or any part of the facility and repeating the performance tests until the minimum performance guarantees are met
- termination of the contract with the Project Company completing the facility or engaging a third party to do so
- rejection of the facility or part of the facility in which case the Contractor must repay all sums paid by the Project Company and the cost of dismantling and clearing the facility or part of the facility
- issuing a certificate of completion despite the Contractor not meeting the minimum performance guarantees with a corresponding reduction in the contract price.[15]

It is also important to differentiate between the different types of PLDs to protect the Project Company against arguments by the Contractor that the PLDs constitute a penalty. For example, if a single PLD's rate is only focused on output and not efficiency, problems and uncertainties will arise if the output guarantee is met but one or more of the efficiency guarantees are not. In these circumstances, the Contractor will argue that the PLDs constitute a penalty because the loss the Project Company suffers if the efficiency guarantees are not met are usually smaller than if the output guarantees are not met.

Drafting of the performance guarantee regime

Now that it is clear that DLDs and PLDs must be dealt with separately it is worth considering, in more detail, how the performance guarantee regime should operate. A properly drafted performance testing and guarantee regime is important because the success or failure of the project depends, all other things being equal, on the performance of the process plant facility.

The major elements of the performance regime are:

- testing
- guarantees
- liquidated damages.

Liquidated damages were discussed above. Testing and guarantees are discussed below.

Testing

Performance tests may cover a range of areas. Three of the most common are:

- **Functional tests**: These test the functionality of certain parts of the facility. For example, pumps, valves, pressure vessels etc. They are usually discrete tests which do not test the facility as a whole. Liquidated damages do not normally attach to these tests. Instead, they are absolute obligations that must be complied

15 For a more detailed discussion of this issue please consult our paper on "Performance Guarantees and Remedies in EPC Contracts".

with. If not, the facility will not reach the next stage of completion (for example, mechanical completion or provisional acceptance).

- **Emissions tests**: These test compliance against environmental requirements. Again, these are normally absolute obligations because the consequences of failure can be as severe as being forced to shut down the facility. These tests should ensure the most stringent obligations imposed on the Project Company, whether by government regulations or by Lenders, are met. Emissions tests occur at various times, including during and after performance tests. Liquidated damages are sometimes levied if the Contractor fails the emissions tests. However, given emissions tests are usually related to environmental approvals, it is likely that the facility will not be able to operate if the emissions tests are failed. Therefore, passing the emissions tests is usually an absolute obligation not linked to liquidated damages.

- **Performance tests**: These test the ability of the facility to meet the performance criteria specified in the contract. There are often minimum and guaranteed levels of performance specified and, as discussed above, providing the minimum levels are met the consequence of failure is normally the payment of PLDs. Satisfaction of the minimum performance guarantees[16] is normally an absolute obligation. The minimum performance guarantees should be set at a level of performance at which it is economic to accept the facility. Lender's input will be vital in determining what this level is. However, it must be remembered that Lenders have different interests to the Sponsor. Lenders will, generally speaking, be prepared to accept a facility that provides sufficient income to service the debt. However, in addition to covering the debt service obligations, Sponsor will also want to receive a return on their equity investment. If that will not be provided via the sale of product because the Contractor has not met the performance guarantees, the Sponsor will have to rely on the PLDs to earn their return. In some projects, the performance tests occur after handover of the facility to the Project Company. This means the Contractor no longer has any liability for DLDs during performance testing.

In our view, it is preferable, especially in project-financed projects, for handover to occur after completion of performance testing. This means the Contractor continues to be liable for DLDs until either the facility operates at the guaranteed level or the Contractor pays PLDs where the facility does not operate at the guaranteed level.[17] Obviously, DLDs will be capped (usually at 20% of the contract price); therefore, the EPC Contract should give the Project Company the right to call for the payment of the PLDs and accept the facility. If the Project Company does not have this right the problem mentioned above will arise, namely, the Project Company will not have received its facility and will not be receiving any DLDs as compensation.

It is common for the Contractor to be given an opportunity to modify the facility if it does not meet the performance guarantees on the first attempt. This is because the PLD amounts are normally very large and most Contractors would prefer to spend the time and the money necessary to remedy performance instead of paying PLDs. Not giving Contractors this opportunity will likely lead to an increased contract price both because Contractors will over-engineer the facility and will build a contingency for paying PLDs into the contract price. The second reason is because in most circumstances the Project Company will prefer to receive a facility that operates at 100% capacity and efficiency. The right to modify and retest is another reason why DLDs should be payable up to the time the performance guarantees are satisfied.

If the Contractor is to be given an opportunity to modify and retest, the EPC Contract must deal with who bears the costs of the additional feedstock and consumables required to undertake the retesting. The cost of the feedstock in particular can be significant and should, in normal circumstances, be to the Contractor's account because the retesting only occurs if the performance guarantees are not met at the first attempt.

16 This can be in the form of steady state testing.

17 If the contract contains a term that handover will not occur until the performance guarantees are met, there will be a regime by which this may be waived.

Technical issues

Ideally, the technical testing procedures should be set out in the EPC Contract. However, for a number of reasons, including the fact that it is often not possible to fully scope the testing programme until the detailed design is complete, the testing procedures are usually left to be agreed during construction by the Contractor, the Project Company's representative or engineer and, if relevant, the Lenders' engineer. However, a properly drafted EPC Contract should include the guidelines for testing.

The complete testing procedures must, as a minimum, set out details of:

- **Testing methodology**: Reference is often made to standard methodologies, for example, the American Society of Mechanical Engineers methodology.
- **Testing equipment**: Who is to provide it, where it is to be located, how sensitive must it be.
- **Tolerances**: What is the margin of error.
- **Ambient conditions**: What atmospheric conditions are assumed to be the base case (testing results will need to be adjusted to take into account any variance from these ambient conditions).
- **Steady state testing**: Using ordinary parameters to avoid running the plant at unsustainable short-term rates.

Provision of consumables and feedstock

The responsibility for the provision of consumables and feedstock required to carry out the performance tests must be clearly set out in the EPC Contract. In general, the Project Company will be responsible for the provision of both consumables and feedstock.

As the proper interpretation of the Project Company's obligation to supply consumables is often a matter of dispute between the Project Company and Contractor, it is important for the EPC Contract to precisely identify the quality and quantity of consumables to be provided as well as the time for provision of those consumables (which should be linked to the progress of the works rather than a specific date). The responsibility for the cost of providing consumables and feedstock must also be clearly identified. This is discussed in more detail in the section on feedstock specification issues.

An example of the performance testing and guarantee regime we have used on a number of projects is included in Appendix 1 of this paper.

These example clauses are only extracts from a complete contract and ideally should be read as part of that entire contract and, in particular, with the clauses that deal with DLDs, PLDs, liability, the scope of the Contractor's obligations, including any fitness for purpose warranties and termination. Nonetheless, they do provide an example of the way a performance testing and liquidated damages regime can operate.

The process is best illustrated diagrammatically. Refer to the flowcharts below to see how the various parts of the performance testing regime should interface.

Key general clauses in EPC Contracts

Delay and extensions of time

The Prevention Principle

As noted previously, one of the advantages of an EPC Contract is that it provides the Project Company with a fixed completion date. If the Contractor fails to complete the works by the required date it is liable for DLDs. However, in some circumstances the Contractor is entitled to an extension of the date for completion. Failure to grant that extension can void the liquidated damages regime and set time at large. This means the Contractor is only obliged to complete the works within a reasonable time.

This is the situation under common law governed contracts due to the Prevention Principle. The Prevention Principle was developed by the courts to prevent Employers, ie project companies, from delaying Contractors and then claiming DLDs.

The legal basis of the Prevention Principle is unclear and it is uncertain whether you can contract out of the Prevention Principle. Logically, given most commentators believe the Prevention Principle is an equitable principle, explicit words in a contract should be able to override the principle. However, the courts have tended to apply the Prevention Principle even in circumstances where it would not, on the face of it, appear to apply. Therefore, there is a certain amount of risk involved in trying to contract out of the Prevention Principle. The more prudent and common approach is to accept the existence of the Prevention Principle and provide for it in the EPC Contract.

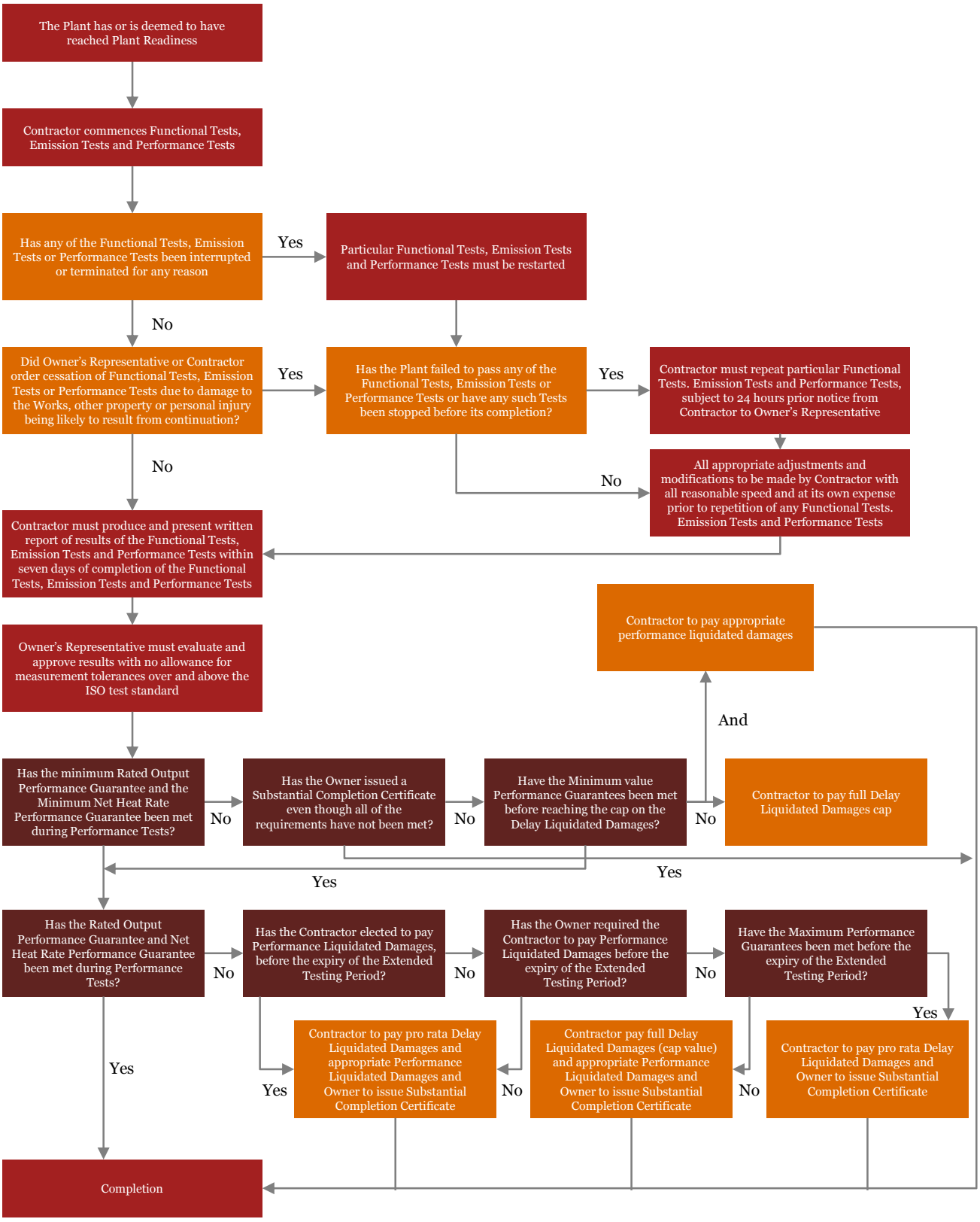
The Contractor's entitlement to an Extension of Time (EOT) is not absolute. It is possible to limit the Contractor's rights and impose pre-conditions on the ability of the Contractor to claim an extension of time. A relatively standard EOT clause would entitle the Contractor to an EOT for:

- an act, omission, breach or default of the Project Company
- suspension of the works by the Project Company (except where the suspension is due to an act or omission of the Contractor)
- a variation (except where the variation is due to an act or omission of the Contractor)
- *force majeure*.

Which cause a delay on the critical path 2 and about which the Contractor has given notice within the period specified in the contract. It is permissible (and advisable) from the Project Company's perspective to make both the necessity for the delay to impact the critical path and the obligation to give notice of a claim for an extension of time conditions precedent to the Contractor's entitlement to receive an EOT. In addition, it is usually good practice to include a general right for the Project Company to grant an EOT at any time. However, this type of provision must be carefully drafted because some judges have held (especially when the Project Company's representative is an independent third party) the inclusion of this clause imposes a mandatory obligation on the Project Company to grant an extension of time whenever it is fair and reasonable to do so, regardless of the strict contractual requirements. Accordingly, from the Project Company's perspective, it must be made clear that the Project Company has complete and absolute discretion to grant an EOT, and that it is not required to exercise its discretion for the benefit of the Contractor.

Similarly, following some recent common law decisions, the Contractor should warrant that it will comply with the notice provisions that are conditions precedent to its right to be granted an EOT.

We recommend using the clause in part 2 of Appendix 1



Concurrent delay

You will note that in the suggested EOT clause, one of the subclauses refers to concurrent delays. This is relatively unusual because most EPC Contracts are silent on this issue. For the reasons explained below we do not agree with that approach.

A concurrent delay occurs when two or more causes of delay overlap. It is important to note that it is the overlapping of the causes of the delays not the overlapping of the delays themselves. In our experience, this distinction is often not made. This leads to confusion and sometimes disputes. More problematic is when the contract is silent on the issue of concurrent delay and the parties assume the silence operates to their benefit. As a result of conflicting case law it is difficult to determine who, in a particular fact scenario, is correct. This can also lead to protracted disputes and outcomes contrary to the intention of the parties.

There are a number of different causes of delay which may overlap with delay caused by the Contractor. The most obvious causes are the acts or omissions of a Project Company.

A Project Company may have obligations to provide certain materials or infrastructure to enable the Contractor to complete the works. The timing for the provision of that material or infrastructure (and the consequences for failing to provide it) can be affected by a concurrent delay.

For example, the Project Company may be obliged, as between the Project Company and the Contractor, to provide a pipeline to connect to the facility by the time the Contractor is ready to commission the facility. Given the construction of the pipeline can be expensive, the Project Company is likely to want to incur that expense as close as possible to the date commissioning is due to commence. For this reason, if the Contractor is in delay the Project Company is likely to further delay incurring the expense of building the pipeline. In the absence of a concurrent delay clause, this action by the Project Company, in response to the Contractor's delay, could entitle the Contractor to an extension of time.

Concurrent delay is dealt with differently in the various international standard forms of contract. Accordingly, it is not possible to argue that one approach is definitely right and one is definitely wrong. In fact, the "right" approach will depend on which side of the table you are sitting.

In general, there are three main approaches for dealing with the issue of concurrent delay. These are:

- **Option one**: The Contractor has no entitlement to an extension of time if a concurrent delay occurs.
- **Option two**: The Contractor has an entitlement to an extension of time if a concurrent delay occurs.
- **Option three**: The causes of delay are apportioned between the parties and the Contractor receives an extension of time equal to the apportionment. For example, if the causes of a 10-day delay are apportioned 60:40 Project Company:Contractor, the Contractor would receive a six-day extension of time.

Each of these approaches is discussed in more detail below.

Option one: Contractor not entitled to an EOT for concurrent delays

A common, Project Company friendly, concurrent delay clause for this option one is:

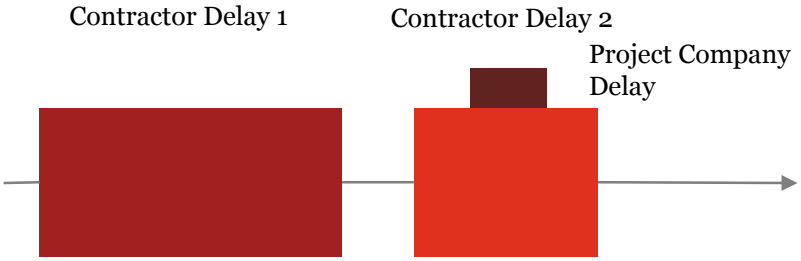
If more than one event causes concurrent delays and the cause of at least one of those events, but not all of them, is a cause of delay which would not entitle the Contractor to an extension of time under [EOT clause], then to the extent of the concurrency, the Contractor will not be entitled to an extension of time.

Nothing in the clause prevents the Contractor from claiming an EOT under the general EOT clause. What the clause does do is to remove the Contractor's entitlement to an EOT when there are two or more causes of delay and at least one of those causes would not entitle the Contractor to an EOT under the general EOT clause.

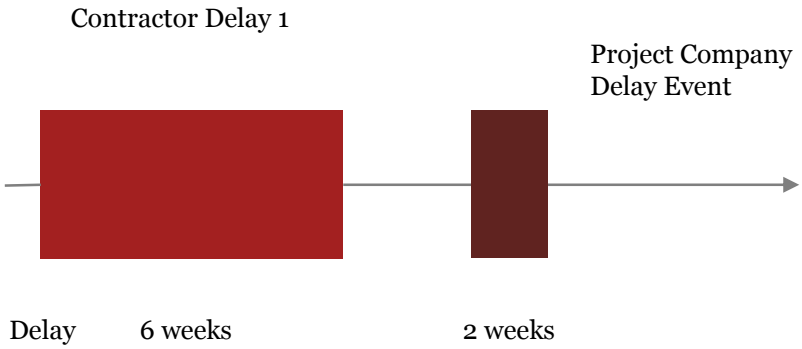
For example, if the Contractor's personnel were on strike and during that strike the Project Company failed to approve drawings, in accordance with the contractual procedures, the Contractor would not be entitled to an EOT for the delay caused by the Project Company's failure to approve the drawings.

The operation of this clause is best illustrated diagrammatically.

Example one: Contractor not entitled to an EOT for concurrent delays

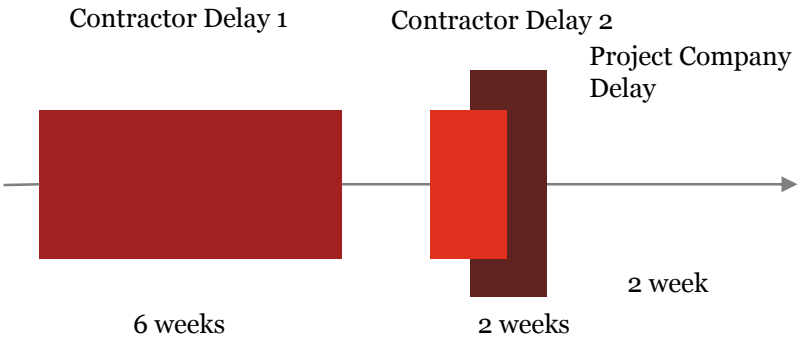


In this example, the Contractor would not be entitled to any EOT because the Contractor Delay 2 overlaps entirely the Project Company Delay. Therefore, using the example clause above, the Contractor is not entitled to an EOT to the extent of the concurrency. As a result, at the end of the Contractor Delay 2 the Contractor would be in eight weeks' delay (assuming the Contractor has not, at its own cost and expense, accelerated the works).



Example 2: Contractor entitled to an EOT for Project Company-caused delay

In this example, there is no overlap between the Contractor and Project Company Delay Event, the Contractor would be entitled to a two-week EOT for the Project Company delay. Therefore, at the end of the Project Company Delay the Contractor will remain in six weeks' delay, assuming no acceleration.



Example 3: Contractor entitled to an EOT for a portion of the Project Company-caused delay

In this example, the Contractor would be entitled to a one-week EOT because the delays overlap for one week. Therefore, the Contractor is entitled to an EOT for the period when they do not overlap ie when the extent of the concurrency is zero. As a result, after receiving the one-week EOT, the Contractor would be in seven weeks' delay, assuming no acceleration.

From a Project Company's perspective, we believe, this option is both logical and fair. For example, if, in example 2, the Project Company Delay was a delay in the approval of drawings and the Contractor Delay was the entire workforce being on strike, what logic is there in the Contractor receiving an EOT? The delay in approving drawings does not actually delay the works because the Contractor could not have used the drawings given its workforce was on strike. In this example, the Contractor would suffer no detriment from not receiving an EOT. However, if the Contractor did receive an EOT it would effectively receive a windfall gain.

The greater number of obligations the Project Company has the more reluctant the Contractor will likely be to accept option one. Therefore, it may not be appropriate for all projects.

Option two: Contractor entitled to an EOT for concurrent delays

Option two is the opposite of option one and is the position in many of the Contractor-friendly standard forms of contract. These contracts also commonly include EOT provisions to the effect that the Contractor is entitled to an EOT for any cause beyond its reasonable control which, in effect, means there is no need for a concurrent delay clause.

The suitability of this option will obviously depend on which side of the table you are sitting. This option is less common than option one but is nonetheless sometimes adopted. It is especially common when the Contractor has a superior bargaining position.

Option three: Responsibility for concurrent delays is apportioned between the parties

Option three is a middle ground position that has been adopted in some of the standard form contracts. For example, the Australian Standards construction contract AS4000 adopts the apportionment approach. The AS4000 clause states:

34.4 Assessment

When both non-qualifying and qualifying causes of delay overlap, the Superintendent shall apportion the resulting delay to WUC according to the respective causes' contribution.

In assessing each EOT the Superintendent shall disregard questions of whether:

a) WUC can nevertheless reach practical completion without an EOT, or

b) the Contractor can accelerate, but shall have regard to what prevention and mitigation of the delay has not been effected by the Contractor.

We appreciate the intention behind the clause and the desire for both parties to share responsibility for the delays they cause. However, we have some concerns about this clause and the practicality of the apportionment approach in general. It is easiest to demonstrate our concerns with an extreme example. For example, what if the qualifying cause of delay was the Project Company's inability to provide access to the site and the non-qualifying cause of delay was the Contractor's inability to commence the works because it had been black-banned by the unions. How should the causes be apportioned? In this example, the two causes are both 100% responsible for the delay.

In our view, an example like the above where both parties are at fault has two possible outcomes. Either:

- the delay is split down the middle and the Contractor receives 50% of the delay as an EOT; or
- the delay is apportioned 100% to the Project Company and therefore the Contractor receives 100% of the time claimed.

The delay is unlikely to be apportioned 100% to the Contractor because a judge or arbitrator will likely feel that that is unfair, especially if there is a potential for significant liquidated damages liability. We appreciate the above is not particularly rigorous legal reasoning, however, the clause does not lend itself to rigorous analysis.

In addition, option three is only likely to be suitable if the party undertaking the apportionment is independent from both the Project Company and the Contractor.

Exclusive remedies and fail safe clauses

It is common for Contractors to request the inclusion of an exclusive remedies clause in an EPC Contract. However, from the perspective of a Project Company, the danger of an exclusive remedies clause is that it prevents the Project Company from recovering any type of damages not specifically provided for in the EPC Contract.

An EPC Contract is conclusive evidence of the agreement between the parties to that contract. If a party clearly and unambiguously agrees that their only remedies are those within the EPC Contract, they will be bound by those terms. However, the courts have been reluctant to come to this conclusion without clear evidence of an intention of the parties to the EPC Contract to contract out of their legal rights. This means if the common law right to sue for breach of EPC Contract is to be contractually removed, it must be done by very clear words.

Contractor's perspective

The main reason for a Contractor insisting on a Project Company being subject to an exclusive remedies clause is to have certainty about its potential liabilities. The preferred position for a Contractor will be to confine its liabilities to what is specified in the EPC Contract. For example, an agreed rate of liquidated damages for delay and, where relevant, underperformance of the facility. A Contractor will also generally require the amount of liquidated damages to be subject to a cap and for the EPC Contract to include an overall cap on its liability.

Project company's perspective

The preferred position for a Project Company is for it not to be subject to an exclusive remedies clause. An exclusive remedies clause limits the Project Company's right to recover for any failure of the Contractor to fulfil its contractual obligations to those remedies specified in the EPC Contract. For this reason, an exclusive remedies clause is an illogical clause to include in an EPC Contract from the perspective of a Project Company because it means that the Project Company has to draft a remedy or exception for each obligation – this represents an absurd drafting position. For example, take the situation where the EPC Contract does not have any provision for the recovery of damages other than liquidated damages. In this case, if the Contractor has either paid the maximum amount of liquidated damages or delivered the facility in a manner that does not require the payment of liquidated damages (ie it is delivered on time and performs to specification) but subsequent to that delivery the Project Company is found to have a claim, say for defective design which manifests itself after completion, the Project Company will have no entitlement to recover any form of damages as any remedy for latent defects has been excluded.

The problem is exacerbated because most claims made by a Project Company will in some way relate to performance of the facility and PLDs were expressed to be the exclusive remedy for any failure of the facility to perform in the required manner. For example, any determination as to whether the facility is fit for purpose will necessarily depend on the level and standard of the performance of the facility. In addition to claims relating to fitness for purpose, a Project Company may also wish to make claims for, amongst other things, breach of contract, breach of warranty or negligence. The most significant risk for a Project Company in an EPC Contract is where there is an exclusive remedies clause and the only remedies for delay and underperformance are liquidated damages. If, for whatever reason, the liquidated damages regimes are held to be invalid, the Project Company would have no recourse against the Contractor as it would be prevented from recovering general damages at law, and the Contractor would escape liability for late delivery and underperformance of the facility.

Fail safe clauses

In contracts containing an exclusive remedies clause, the Project Company must ensure all necessary exceptions are expressly included in the EPC Contract. In addition, drafting must be included to allow the Project Company to recover general damages at law for delay and underperformance if the liquidated damages regimes in the EPC Contract are held to be invalid. To protect the position of a Project Company (if liquidated damages are found for any reason to be unenforceable and there is an exclusive remedies clause), we recommend the following clauses be included in the EPC Contract:

*[ ].1 If clause [**delay liquidated damages**] is found for any reason to be void, invalid or otherwise inoperative so as to disentitle the Project Company from claiming delay liquidated damages, the Project Company is entitled to claim against the Contractor damages at law for the Contractor's failure to complete the works by the date for practical completion.*

[ ].2 If [ ].1 applies, the damages claimed by the Project Company must not exceed the amount specified in item [ ] of Appendix [ ] for any one day of delay and in aggregate must not exceed the percentage of the EPC Contract price specified in item [ ] of Appendix [ ].

These clauses (which would also apply to PLDs) mean that if liquidated damages are held to be unenforceable for any reason, the Project Company will not be prevented from recovering general damages at law. However, the amount of damages recoverable at law may be limited to the amount of liquidated damages that would have been recoverable by the Project Company under the EPC Contract if the liquidated damages regime had not been held to be invalid (see discussion above). For this reason, the suggested drafting should be commercially acceptable to a Contractor as its liability for delay and underperformance will be the same as originally contemplated by the parties at the time of entering into the EPC Contract.

In addition, if the EPC Contract excludes the parties' rights to claim their consequential or indirect losses, these clauses should be an exception to that exclusion. The rationale being that the rates of liquidated damages are likely to include an element of consequential or indirect losses.

Force Majeure

What is force majeure?

Force majeure clauses are almost always included in EPC Contracts. However, they are rarely given much thought unless and until one or more parties seek to rely on them. Generally, the assumption appears to be that "the risk will not affect us" or "the *force majeure* clause is a legal necessity and does not impact on our risk allocation under the contract". Both of these assumptions are inherently dangerous, and, particularly in the second case, incorrect. Therefore, especially in the current global environment, it is appropriate to examine their application.

Force majeure is a civil law concept that has no real meaning under the common law. However, *force majeure* clauses are used in contracts because the only similar common law concept – the doctrine of frustration – is of limited application. For that doctrine to apply, the performance of a contract must be radically different from what was intended by the parties. In addition, even if the doctrine does apply, the consequences are unlikely to be those contemplated by the parties. An example of how difficult it is to show frustration is that many of the leading cases relate to the abdication of King Edward VIII before his coronation and the impact that had on contracts entered into in anticipation of the coronation ceremony.

Given *force majeure* clauses are creatures of contract, their interpretation will be governed by the normal rules of contractual construction. *Force majeure* provisions will be construed strictly and in the event of any ambiguity the *contra proferentem* rule will apply. *Contra proferentem* literally means "against the party putting forward". In this context, it means that the clause will be interpreted against the interests of the party that drafted it and is seeking to rely on it. The parties may contract out of this rule.

The rule of *ejusdem generis*, which literally means "of the same class", may also be relevant. In other words, when general wording follows a specific list of events, the general wording will be interpreted in light of the specific list of events. In this context it means that when a broad catch-all phrase, such as "anything beyond the reasonable control of the parties", follows a list of more specific *force majeure* events the catch-all phrase will be limited to events analogous to the listed events. Importantly, parties cannot invoke a *force majeure* clause if they are relying on their own acts or omissions.

The underlying test in relation to most *force majeure* provisions is whether a particular event was within the contemplation of the parties when they made the contract. The event must also have been outside the control of the contracting party. There are generally three essential elements to *force majeure*:

- it can occur with or without human intervention.
- it cannot have reasonably been foreseen by the parties.

- it was completely beyond the parties' control and they could not have prevented its consequences.

Given the relative uncertainty surrounding the meaning of *force majeure*, we favour explicitly defining what the parties mean. This takes the matter out of the hands of the courts and gives control back to the parties. Therefore, it is appropriate to consider how *force majeure* risk should be allocated.

Drafting force majeure clauses

The appropriate allocation of risk in project agreements is fundamental to negotiations between the Project Company and its Contractors. Risks generally fall into the following categories:

- risks within the control of the Project Company.
- risks within the control of the Contractor.
- risks outside the control of both parties.

The negotiation of the allocation of many of the risks beyond the control of the parties, for example, latent site conditions and change of law, is usually very detailed so that it is clear which risks are borne by the Contractor. The same approach should be adopted in relation to the risks arising from events of *force majeure*.

There are two aspects to the operation of *force majeure* clauses:

- the definition of *force majeure* events.
- the operative clause that sets out the effect on the parties' rights and obligations if a *force majeure* event occurs.[18]

The events which trigger the operative clause must be clearly defined. As noted above, given the common law meaning of the term *force majeure* is not certain and is open to interpretation of the courts, it is in the interests of both parties to ensure that the term *force majeure* is clearly defined.

The preferred approach for a Project Company is to define *force majeure* events as being any of the events in an exhaustive list set out in the contract. In this manner, both parties are aware of which events are *force majeure* events and which are not. Clearly, defining *force majeure* events makes the administration of the contract and, in particular, the mechanism within the contract for dealing with *force majeure* events simpler and more effective.

An example exhaustive definition is:

An Event of Force Majeure is an event or circumstance which is beyond the control and without the fault or negligence of the party affected and which by the exercise of reasonable diligence the party affected was unable to prevent provided that event or circumstance is limited to the following:

a) Riot, war, invasion, act of foreign enemies, hostilities (whether war be declared or not), acts of terrorism, civil war, rebellion, revolution, insurrection of military or usurped power, requisition or compulsory acquisition by any governmental or competent authority

b) Ionising radiation or contamination, radioactivity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive assembly or nuclear component

c) Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds

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18 A common failing of *force majeure* in some negotiations is to focus on the definitional issues rather than the consequences. Both issues are important.

d) *Earthquakes, flood, fire or other physical natural disaster, but excluding weather conditions regardless of severity*

e) *Strikes at national level or industrial disputes at a national level, or strike or industrial disputes by labour not employed by the affected party, its sub contractors or its suppliers and which affect an essential portion of the Works but excluding any industrial dispute which is specific to the performance of the Works or this Contract.*

An operative clause will act as a shield for the party affected by the event of *force majeure* so that a party can rely on that clause as a defence to a claim that it has failed to fulfil its obligations under the contract.

An operative clause should also specifically deal with the rights and obligations of the parties if a *force majeure* event occurs and affects the project. This means the parties must consider each of the events it intends to include in the definition of *force majeure* events and then deal with what the parties will do if one of those events occurs.

An example of an operative clause is:

[ ].1 Neither party is responsible for any failure to perform its obligations under this Contract, if it is prevented or delayed in performing those obligations by an Event of Force Majeure

[ ].2 Where there is an Event of Force Majeure, the party prevented from or delayed in performing its obligations under this Contract must immediately notify the other party giving full particulars of the Event of Force Majeure and the reasons for the Event of Force Majeure preventing that party from, or delaying that party in performing its obligations under this Contract and that party must use its reasonable efforts to mitigate the effect of the Event of Force Majeure upon its or their performance of the Contract and to fulfil its or their obligations under the Contract

[ ].3 Upon completion of the Event of Force Majeure the party affected must as soon as reasonably practicable recommence the performance of its obligations under this Contract. Where the party affected is the Contractor, the Contractor must provide a revised programme rescheduling the Works to minimise the effects of the prevention or delay caused by the Event of Force Majeure

[ ].4 An Event of Force Majeure does not relieve a party from liability for an obligation which arose before the occurrence of that event, nor does that event affect the obligation to pay money in a timely manner which matured prior to the occurrence of that event

[ ].5 The Contractor has no entitlement and the Project Company has no liability for:

a) Any costs, losses, expenses, damages or the payment of any part of the Contract Price during an Event of *Force Majeure*.

b) Any delay costs in any way incurred by the Contractor due to an Event of *Force Majeure*.

In addition to the above clause, it is critical to deal appropriately with other issues that will arise if a *force majeure* event occurs. For example, as noted above, it is common practice for a Contractor to be entitled to an extension of time if a *force majeure* event impacts on its ability to perform the works. Contractors also often request costs if a *force majeure* event occurs. In our view, this should be resisted. *Force majeure* is a neutral risk in that it cannot be controlled by either party. Therefore, the parties should bear their own costs and neither party should be penalised.

Another key clause that relates to *force majeure* type events is the Contractor's responsibility for care of the works and the obligation to reinstate any damage to the works prior to completion. A common example clause is:

[ ].1 The Contractor is responsible for the care of the Site and the Works from when the Project Company makes the Site available to the Contractor until 5.00pm on the Date of Commercial Operation.

[ ].2 The Contractor must promptly make good loss from, or damage to, any part of the Site and the Works while it is responsible for their care.

[ ].3 If the loss or damage is caused by an Event of Force Majeure, the Project Company may direct the Contractor to reinstate the Works or change the Works. The cost of the reinstatement work or any change to the Works arising from a direction by the Project Company under this clause will be dealt with as a Variation except to the extent that the loss or damage has been caused or exacerbated by the failure of the Contractor to fulfil its obligations under this Contract.

*[ ].4 Except as contemplated in clause **[ ]**.3, the cost of all reinstatement Works will be borne by the Contractor.*

This clause is useful because it enables the Project Company to, at its option, have the damaged section of the project rebuilt as a variation to the existing EPC Contract. This will usually be cheaper than recontracting for construction of the damaged sections of the works.

Operation and Maintenance

Operating and maintenance manuals

The Contractor is usually required to prepare a detailed Operating and Maintenance Manual (O&M manual). The EPC Contract should require the Contractor to prepare a draft of the O&M manual within a reasonable time to enable the Project Company, the Operator and possibly the Lenders to provide comments, which can be incorporated into a final draft at least six months before the start of commissioning.

The draft should include all information which may be required for start-up, all modes of operation during normal and emergency conditions and maintenance of all systems of the facility.

Operating and maintenance personnel

It is common for the Contractor to be obliged to train the operations and maintenance staff supplied by the Project Company. The cost of this training will be built into the contract price. It is important to ensure the training is sufficient to enable such staff to be able to efficiently, prudently, safely and professionally operate the facility upon commercial operation. Therefore, the framework for the training should be described in the Appendix dealing with the scope of work (in as much detail as possible). This should include the standards of training and the timing for training.

The Project Company's personnel trained by the Contractor will also usually assist in the commissioning and testing of the facility. They will do this under the direction and supervision of the Contractor. Therefore, absent specific drafting to the contrary, if problems arise during commissioning and/or testing the Contractor can argue they are entitled to an extension of time etc. We recommend inserting the following clause:

[ ].1 The Project Company must provide a sufficient number of competent and qualified operating and maintenance personnel to assist the Contractor to properly carry out Commissioning and the Commercial Operation Performance Tests.

[ ].2 Prior to the Date of Commercial Operation, any act or omission of any personnel provided by the Project Company pursuant to GC [ ].1 is, provided those personnel are acting in accordance with the Contractor's instructions, directions, procedures or manuals, deemed to be an act or omission of the Contractor and the Contractor is not relieved of its obligations under this Contract or have any claim against the Project Company by reason of any act or omission.

Spare parts

The Contractor is usually required to provide, as part of its scope of works, a full complement of spare parts (usually specified in the appendices (the scope of work or the specification)) to be available as at the commencement of commercial operation.

Further, the Contractor should be required to replace any spare parts used in rectifying defects during the defects liability period, at its sole cost. There should also be a time limit imposed on when these spare parts must be back in the store. It is normally unreasonable to require the spare parts to have been replaced by the expiry of the defects liability period because that may, for some long lead time items, lead to an extension of the defects liability period.

The Project Company also may wish to have the option to purchase spares parts from the Contractor on favourable terms and conditions (including price) after the expiry of the defects liability period. In that case it would be prudent to include a term which deals with the situation where the Contractor is unable to continue to manufacture or procure the necessary spare parts. This provision should cover the following points:

- written notification from the Contractor to the Project Company of the relevant facts, with sufficient time to enable the Project Company to order a final batch of spare parts from the Contractor.

- the Contractor should deliver to, or procure for, the Project Company (at no charge to the Project Company), all drawings, patterns and other technical information relating to the spare parts.

- the Contractor must sell to the Project Company (at the Project Company's request) at cost price (less a reasonable allowance for depreciation) all tools, equipment and moulds used in manufacturing the spare parts, to the extent they are available to the Contractor provided it has used its reasonable endeavours to procure them.

The Contractor should warrant that the spare parts are fit for their intended purpose, and that they are of merchantable quality. At worst, this warranty should expire on the later of:

- the manufacturer's warranty period on the applicable spare part; or

- the expiry of the defects liability period.

Dispute resolution

Dispute resolution provisions for EPC Contracts could fill another entire paper. There are numerous approaches that can be adopted depending on the nature and location of the project and the particular preferences of the parties involved.

However, there are some general principles which should be adopted. They include:

- having a staged dispute resolution process that provides for internal discussions and meetings aimed at resolving the dispute prior to commencing action (either litigation or arbitration)

- obliging the Contractor to continue to execute the works pending resolution of the dispute

- not permitting commencement of litigation or arbitration, as the case may be, until after commercial operation of the facility. This provision must make provision for the parties to seek urgent interlocutory relief ie injunctions and to commence proceedings prior to the expiry of any limitations period. If the provision does not include these exceptions it risks being unenforceable

- providing for consolidation of any dispute with other disputes which arise out of or in relation to the construction of the facility. The power to consolidate should be at the Project Company's discretion

We have prepared a paper which details the preferred approach to be taken in respect of dispute resolution regimes in various Asian jurisdictions including the PRC, Philippines, Thailand, Vietnam and Taiwan. You should consult this paper if you want more information on this topic.

Appendix 1 Example clauses

Part 1 – Performance testing and guarantee regime

Tests and Inspections

[ ].1 The Contractor must, at its own expense, carry out at the place of manufacture and/or on the site all tests and/or inspections of the equipment and any part of the works as specified in this contract or as required by any applicable laws, and as necessary to ensure the facility operates safely and reliably under the conditions specified in the schedule of scope of work and the schedule of tests. [Appendix 1 should specify all the categories of tests other than the tests (eg test at manufacturers plant, test on site, functional test etc.)]

[ ].2 The Contractor must also comply with any other requirements of the Owner in relation to testing and inspection.

[ ].3 The Owner and the Lenders' representative are entitled to attend any test and/or inspection by its appointed duly authorised and designated inspector.

[ ].4 Whenever the Contractor is ready to carry out any test and/or inspection, the Contractor must give a reasonable advance notice to the Owner of the test and/or inspection and of the place and time. The Contractor must obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Owner's inspector and the Lenders' representative to attend the test and/or inspection.

[ ].5 The Contractor must provide the Owner's representative with a certified report of the results of any test and/or inspection within five days of the completion of that test or inspection.

[ ].6 If the Owner or the Lenders' representative fails to attend the test and/or inspection, or if it is agreed between the parties that the Owner or the Lenders' representative will not attend, then the Contractor may proceed with the test and/or inspection in the absence of the Owner's inspector and provide the Owner and the Lenders' representative with a certified report of the results.

[ ].7 The Owner may require the Contractor to carry out any test and/or inspection not described in this contract. The Contractor's extra costs necessarily incurred, which do not include head office or corporate overheads, profit or loss of profit, in the carrying out of the test and/or inspection will be added to the contract price only if the test shows that the relevant works conform with the requirements of the contract, but otherwise all costs will be borne by the Contractor.

[ ].8 If any equipment or any part of the works fails to pass any test and/or inspection, the Contractor must either rectify to the Owner's satisfaction or replace such equipment or part of the works and must repeat the test and/or inspection upon giving a notice under GC **[ ]**.4.

[ ].9 The Contractor must afford the Owner and the Lenders' representative access at any time to any place where the equipment is being manufactured or the works are being performed in order to inspect the progress and the manner of manufacture or construction, provided that the Owner gives the Contractor reasonable prior notice. The Owner, Owner's representative and the Lenders' representative will have the right to examine and have access to documents relating to the manufacture and assembly of the equipment including the quality control and inspection documentation.

[ ].10 The Contractor agrees that neither the execution of a test and/or inspection of equipment or any part of the works, nor the attendance by either or both the Owner and the Lenders' representative nor the issue of any test report pursuant to GC **[ ]**.5 releases the Contractor from any other responsibilities under this contract.

[ ].11 No part of the works are to be covered up on the site without carrying out any test and/or inspection required under this contract and the Contractor must give reasonable notice to the Owner whenever any part of the works are ready or about to be ready for test and/or inspection.

[ ].12 The Contractor must uncover any part of the works or make openings in or through the same as the Owner may from time to time require at the site and must reinstate and make good that part.

[ ].13 If any part of the works have been covered up at the site after compliance with the requirement of GC **[ ]**.12 and are found to be performed in accordance with the contract, the Contractor's extra costs, which do not include head office or corporate overheads, profit or loss of profit, necessarily incurred in uncovering, making openings in or through, reinstating and making good the same will be added to the contract price.

Performance tests, procedures and guidelines

[ ].14 The performance tests must be conducted by the Contractor after commissioning to ascertain whether the facility can achieve completion and to ascertain whether the facility can meet the performance guarantees.

[ ].15 All performance tests must be conducted in a professional, timely, safe and environmentally responsible manner and in accordance with the schedule of scope of work and the schedule of tests, all other terms and conditions of this contract, applicable standards, laws, government approvals and must be accomplished at no additional cost or expense to the Owner.

[ ].16 The facility must not be operated during any performance test in excess of:

a The limits allowed by any manufacturer to maintain its warranty

b The limits imposed by the law and government approvals applicable standards

c The limits stated in the schedule of tests

[ ].17 The Contractor agrees that the Owner and the Lenders' representative will monitor the conduct of the performance testing to ensure compliance with the terms and conditions of this contract.

[ ].18 The Contractor agrees that an inspection pursuant to GC **[ ]**.17 by the Owner and/or the Lenders' representative does not release the Contractor from any other responsibilities under this contract, including meeting the performance guarantees.

[ ].19 If a performance test is interrupted or terminated, for any reason, such performance test, must be re-started from the beginning, unless otherwise approved by the Owner or the Lenders' representative.

[ ].20 The Owner or the Contractor is entitled to order the cessation of any performance test if:

a Damage to the works, the facility or other property or personal injury

b Breach of the conditions specified in the relevant environmental laws or government approvals, is likely to result from continuation

[ ].21 If the Contractor fails to pass a performance test (or any repetition in the event of prior failure) or if a performance test is stopped before its completion, such performance test must, subject to 24 hours' prior notice having been given by the Contractor to the Owner and the Lenders' representative, be repeated as soon as practicable. All appropriate adjustments and modifications are to be made by the Contractor with all reasonable speed and at its own expense before the repetition of any performance test.

[ ].22 The results of the performance tests must be presented in a written report, produced by the Contractor and delivered to the Owner and the Lenders' representative within five days of the completion of the tests. Those results will be evaluated by the Owner and the Lenders' representative. In evaluation of the results, no additional allowance will be made for measurement tolerances over and above those specified in the applicable ISO standard or other relevant test standard.

[ ].23 Despite any other provision of this contract, the Owner is entitled to all products and revenues generated or earned during precommissioning, commissioning and the performance tests.

Mechanical completion, precommissioning and commissioning

[ ].1 Mechanical completion

(a) As soon as the facility, in the opinion of the Contractor, reaches the stage of mechanical completion the Contractor must give a notice to the Owner's representative.

(b) The Owner's representative must, promptly, and no later than five days after receipt of the Contractor's notice under GC **[ ]**.1(a), either issue a certificate of mechanical completion stating that the facility has reached mechanical completion or notify the Contractor of any defects and/or deficiencies.

(c) If the Owner's representative notifies the Contractor of any defects and/or deficiencies, the Contractor must then correct those defects and/or deficiencies and the procedures described in GCs **[ ]**.1(a) and (b) must be repeated until the Owner issues a certificate of mechanical completion.

[ ].2 Precommissioning

After the Owner's representative has issued a certificate of mechanical completion to the Contractor under GC **[ ]**.1(b), the Contractor must commence precommissioning of the facility in accordance with the Owner's requirements and procedures in relation to precommissioning as set out in the schedule of scope of work.

[ ].3 Commissioning

(a) After the successful completion of precommissioning under GC **[ ]**.2 the Contractor must give the Owner a notice that the facility is ready for commissioning.

(b) The Contractor must, as soon as reasonably practicable after receipt of a notice under GC **[ ]**.3(a), issue a notice to the Contractor specifying the date for commencement of commissioning.

(c) On the date specified in the notice issued under GC **[ ]**.3(b), the Contractor must commence commissioning of the facility in accordance with the Owner's requirements and procedures in relation to commissioning as set out in the schedule of scope of work.

Performance tests, completion and final completion

[ ].1 Performance tests

(a) After the successful completion of commissioning, the Contractor must give a notice to the Owner's representative that the facility, or that part, is ready for the performance tests and the emissions test.

(b) The Owner's representative must, as soon as reasonably practicable, after receipt of a notice under GC [ ].1(a), issue a notice to the Contractor specifying the date for commencement of those performance tests if that date is not already identified in the programme and the schedule of tests.

[ ].2 Completion

(a) As soon as the facility has passed the performance tests and the emissions test and, in the opinion of the Contractor, the facility has reached the stage of completion, the Contractor must give a notice to the Owner's representative.

(b) The Owner's representative must, promptly, and no later than five days after receipt of the Contractor's notice under GC **[ ]**.2(a), either issue a certificate of completion stating that the facility has reached completion or notify the Contractor of any defects and/or deficiencies.

(c) If the Owner's representative notifies the Contractor of any defects and/or deficiencies, the Contractor must then correct those defects and/or deficiencies and the procedures described in GCs **[ ]**.2(a) and (b) must be repeated until the Owner issues a certificate of completion.

(d) Despite any other provision of this contract, no partial or entire use or occupancy of the site, the works or the facility by the Owner, whether during the performance tests, or otherwise, in any way constitutes an acknowledgment by the Owner that completion has occurred, nor does it operate to release the Contractor from any of its warranties, obligations or liabilities under this contract.

(e) Upon the issue of the certificate of completion, the Contractor must hand over care, custody and control of the facility to the Owner.

(f) Notwithstanding that all the requirements for the issuing of a certificate of completion have not been met, the Owner may at any time, in its absolute discretion, issue a certificate of completion. The issue of a certificate of completion in accordance with this GC **[ ]**.2(f) will not operate as an admission that all the requirements of completion have been met and does not prejudice any of the Owner's rights, including the right to require the Contractor to satisfy all these requirements.

[ ].3 Final completion

(a) As soon as the facility, in the opinion of the Contractor, reaches the stage of final completion the Contractor must give a notice to the Owner.

(b) The Owner's representative must, promptly, and no later than five days after receipt of the Contractor's notice under GC **[ ]**.3(a), either issue a certificate of final completion stating that the facility has reached final completion or notify the Contractor of any defects and/or deficiencies.

(c) If the Owner's representative notifies the Contractor of any defects and/or deficiencies, the Contractor must then correct those defects and/or deficiencies and the procedures described in GCs **[ ]**.3(a) and (b) must be repeated until the Owner issues a certificate of final completion.

(d) Despite any other provision of this contract, no partial or entire use or occupancy of the site, the works or the facility by the Owner, whether during the performance tests or otherwise, in any way constitutes an acknowledgment by the Owner that final completion has occurred, nor does it operate to release the Contractor from any of its warranties, obligations or liabilities under this contract including the satisfactory performance of its obligations during the defects liability period, the carrying out of the performance tests and meeting the performance guarantees and the emissions guarantee.

Performance guarantee

[ ].1 Performance guarantees

(a) The Contractor guarantees that the facility and all parts will meet the performance guarantees and emissions guarantee as specified in the schedule of performance guarantees and the schedule of tests.

(b) The Contractor agrees that the emissions guarantee is an absolute guarantee the meeting of which is a condition precedent to achieving completion.

[ ].2 Minimum performance guarantees not met

(a) If, for reasons not attributable to the Owner, the minimum performance guarantees are not met, the Contractor must at its cost and expense make changes, modifications and/or additions to the facility or any part as may be necessary to meet at least the minimum performance guarantees. The Contractor must notify the Owner upon completion of the necessary changes, modifications and/or additions and must, subject to the Owner's rights under GCs **[ ]**.2, **[ ]**.14 and **[ ]** [**Termination**], repeat the overall performance test until the minimum performance guarantees have been met. Nothing in this GC **[ ]**.2 derogates from the Contractor's obligation to meet the performance guarantees.

(b) Despite this GC **[ ]** or any other provision of this contract, if for reasons not attributable to the Owner, the Contractor does not meet the minimum performance guarantees after two repetitions of the overall performance test the Owner may:

(i) Reject the facility or any part of the facility and the provisions of GC **[ ]**.3 will apply.

(ii) Require the Contractor to: (A) replace the facility or any part of the facility with all due dispatch and in compliance with the requirements of the contract; and (B) repeat the performance tests and the overall performance test.

(iii) Terminate the contract and, at the Contractor's risk, complete or procure completion of the works in accordance with the contract; or

(iv) Require the Owner's representative to issue a certificate of completion notwithstanding that the minimum performance guarantees have not been met. The contract price will then be reduced by such amount as determined by the Owner's representative.

[ ].3 Consequences of termination or rejection

(a) If the Owner rejects the facility or any part of the facility under GC [ ].2(b)(i), the Owner will be entitled to recover:

(i) All sums paid by the Owner in respect of such part(s) of the facility.

(ii) The cost of dismantling those part(s) of the facility.

(iii) The cost of clearing the site as appropriate and returning the facility or part thereof to the Contractor.

(b) If the Owner terminates the contract pursuant to GC **[ ]**.2(b)(iii), then in addition to any delay liquidated damages which may be due for delay under GC **[ ]**.2, it will be entitled to recover from the Contractor any loss (including but not limited to any construction and financing costs whether or not determined to be direct loss) it suffers in completing the relevant works to the extent that such loss exceeds the amount that would have been paid by the Owner to the Contractor under the contract had the relevant works been completed by the Contractor in accordance with the contract as well as any amounts payable under the financing agreements, as a result of the Contractor failing to meet the minimum performance guarantees.

[ ].4 Satisfaction of performance guarantees

Provided the minimum performance guarantees have been met, the payment of performance liquidated damages under GCs, **[ ]**.6, **[ ]**.7 and/or **[ ]**9 (as the case may be) will be in satisfaction of the relevant performance guarantee.

[ ].5 Minimum performance guarantees met, but not performance guarantees

Subject to GCs **[ ]**.4, **[ ]**.6 and **[ ]**.7, if, for reasons not attributable to the Owner, the performance guarantees are not met, but the minimum performance guarantees are met during the same overall performance test, the Contractor must, prior to the expiration of the extended remediation period:

(a) At its cost and expense make changes, modifications and/or additions to the facility or any part as may be necessary to meet the performance guarantees.

(b) Notify the Owner upon completion of the necessary changes, modifications and/or additions.

(c) Repeat the overall performance test until the performance guarantees have been met during the same overall performance test.

[ ].6 Performance liquidated damages

If the Contractor does not, for reasons not attributable to the Owner, during the same overall performance test, meet the performance guarantees by the expiration of the extended remediation period, but the minimum performance guarantees are met, the Contractor must pay performance liquidated damages calculated in accordance with schedule of performance liquidated damages.

[ ].7 Extended remediation period

(a) Despite GCs **[ ]**.5 and **[ ]**.6, the Contractor may at any time during the extended remediation period elect to pay performance liquidated damages in respect of the failure to meet any or all of the performance guarantees (for reasons not attributable to the Owner) provided the minimum performance guarantees and the emissions guarantees have been met.

(b) Despite GCs **[ ]**.5 and **[ ]**.6, the Owner may at any time, one month after the date for completion, require the Contractor to pay performance liquidated damages in respect of the failure to meet any or all of the performance guarantees (for reasons not attributable to the Owner) provided the minimum performance guarantees have been met.

[ ].8 Aggregate liability

The aggregate liability of the Contractor for performance liquidated damages under GC **[ ]**.9 will not exceed the amount calculated in accordance schedule of performance liquidated damages.

[ ].9 General

Performance liquidated damages must be invoiced by the Owner and payment must be made within 15 days of the date of the invoice. At the expiration of 15 days, the amount involved will be a debt due and payable to the Owner on demand and the Owner may also have recourse to the security provided under this contract.

[ ].10 Fair and reasonable pre-estimate

The parties agree that the performance liquidated damages in the schedule of performance liquidated damages are a fair and reasonable pre-estimate of the damages likely to be sustained by the Owner if the Contractor meets the minimum performance guarantees but fails to meet the performance guarantees.

[ ].11 Completion

Provided the minimum performance guarantees have been met and subject to **[ ]**.1(b), the payment of performance liquidated damages in relation to the performance guarantees under this [ ].11 is in complete satisfaction of the Contractor's guarantees under GC **[ ]**.1. Upon the payment of the performance liquidated damages by the Contractor, the Owner must, subject to all other conditions to achieving completion having been satisfied, issue the certificate of completion for the facility or any part in respect of which the performance liquidated damages have been paid.

[ ].12 Performance liquidated damages additional to delay liquidated damages

The payment of performance liquidated damages and the Contractor's other obligations and liabilities under this GC **[ ]** are in addition to any liability of the Contractor for delay liquidated damages under GC **[ ].**

[ ].13 Rights at law

If this GC **[ ]** (or any part) is found for any reason to be void, invalid or otherwise inoperative so as to disentitle the Owner from claiming performance liquidated damages, the Owner is entitled to claim against the Contractor for damages at law for the Contractor's failure to meet the performance guarantees. Those damages must not exceed the amounts specified in the schedule of performance liquidated damages.

[ ].14 No benefit

The Contractor is not entitled to the benefit of the exclusion in GC **[ ] [Prohibition on claiming consequential loss]** in any claim for damages at law by the Owner against the Contractor pursuant to GC **[ ]**.13 for the Contractor's failure to meet any or all of the performance guarantees.

Part 2 – Extension of time regime

[ ].1 The Contractor must immediately give notice to the Project Company of all incidents and/or events of whatsoever nature affecting or likely to affect the progress of the works.

[ ].2 Within 15 days after an event has first arisen the Contractor must give a further notice to the Project Company which must include:

(a) the material circumstances of the event including the cause or causes.

(b) the nature and extent of any delay.

(c) the corrective action already undertaken or to be undertaken.

(d) the effect on the critical path noted on the programme.

(e) the period, if any, by which in its opinion the date for commercial operation should be extended.

(f) a statement that it is a notice pursuant to this GC **[ ]**.2.

[ ].3 Where an event has a continuing effect or where the Contractor is unable to determine whether the effect of an event will actually cause delay to the progress of the works so that it is not practicable for the Contractor to give notice in accordance with GC **[ ].**2, a statement to that effect with reasons together with interim written particulars (including details of the likely consequences of the event on progress of the works and an estimate of the likelihood or likely extent of the delay) must be submitted in place of the notice required under GC **[ ].**2. The Contractor must then submit to the Project Company, at intervals of 30 days, further interim written particulars until the actual delay caused (if any) is ascertainable, whereupon the Contractor must as soon as practicable but in any event within 30 days give a final notice to the Project Company including the particulars set out in GC **[ ]**.2.

[ ].4 The Project Company must, within 30 days of receipt of the notice in GC **[ ]**.2 or the final notice in GC **[ ].**3 (as the case may be), issue a notice notifying the Contractor's representative of its determination as to the period, if any, by which the date for completion is to be extended.

[ ].5 Subject to the provisions of this GC **[ ]**, the Contractor is entitled to an extension of time to the date for completion as the Project Company assesses, where a delay to the progress of the works is caused by any of the following events, whether occurring before, on or after the date for completion:

(a) Any act, omission, breach or default by the Project Company, the Project Company's representative and their agents, employees and Contractors.

(b) A variation, except where that variation is caused by an act, omission or default of the Contractor or its sub contractors, agents or employees.

(c) A suspension of the works pursuant to GC **[ ]**, except where that suspension is caused by an act, omission or default of the Contractor or its sub contractors, agents or employees.

(d) An event of *force majeure*.

(e) A change of law.

[ ].6 Despite any other provisions of this GC **[ ]**, the Project Company may at any time and in its absolute discretion make a fair and reasonable extension of the date for completion.

[ ].7 The Contractor must constantly use its best endeavours to avoid delay in the progress of the works.

[ ].8 If the Contractor fails to submit the notices required under GCs **[ ]**.1, **[ ]**.2 and **[ ]**.3 within the times required then:

(a) The Contractor has no entitlement to an extension of time.

(b) The Contractor must comply with the requirements to perform the works by the date for completion.

(c) Any principle of law or equity (including those which might otherwise entitle the Contractor to relief and the Prevention Principle) which might otherwise render the date for completion immeasurable and liquidated damages unenforceable, will not apply.

[ ].9 It is a further condition precedent of the Contractor's entitlement to an extension of time that the critical path noted on the programme is affected in a manner which might reasonably be expected to result in a delay to the works reaching completion by the date for completion.

[ ].10 If there are two or more concurrent causes of delay and at least one of those delays would not entitle the Contractor to an extension of time under this GC **[ ]** then, to the extent of that concurrency, the Contractor is not entitled to an extension of time.

[ ].11 The Project Company may direct the Contractor's representative to accelerate the works for any reason including as an alternative to granting an extension of time to the date for completion.

[ ].12 The Contractor will be entitled to all extra costs necessarily incurred, by the Contractor in complying with an acceleration direction under GC **[ ]**.11, except where the direction was issued as a consequence of the failure of the Contractor to fulfil its obligations under this contract. The Project Company must assess and decide as soon as reasonably practical, the extra costs necessarily incurred by the Contractor.

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