

Petrofac Engineering & Construction

&

Roberts Contracts and Claims Consultants Ltd

To FEED or Not to FEED?

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To FEED or Not to FEED



- Definition and purpose of a FEED
- Advantages and disadvantages of a FEED (from both parties points of view)
- Design risks and obligations in EPC/EPIC contracts
- Mitigating disagreements; designing contracts with predetermined contractor obligations and the role this plays on contractor/operator relationships
- Changes in contracting strategies dependant on market economics and its effect on the bargaining power of the parties
- Is there a right answer or was William (or Francis) right in stating that

*'a hope... ...Which pusles the braine, and doth confound the sence,
which makes vs rather beare those euilles we haue, [Is better]
Than flie to others that we know not of'*

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- **Conclusions and questions:**

Introduction:



Introduction:

The use of a FEED phase has grown over the years although its use by Clients is not entirely universal.

It could have been argued a few years ago that an extended feasibility study/FEED was an almost essential stage due to the new technology involved, today it is arguable that there are few if any totally innovative processes necessary to provide a solution to a Client's requirements.

Where processes are patented the necessity for a FEED is possibly more intriguing as it is unlikely (if the holder of the patent or licence is capable of execution) that the contract will be competitively tendered.

In the current climate of cost restraint and the need for quick returns it was considered that the subject of to FEED or not to FEED should be discussed and the risks assessed from both the Client's and Contractor's point of view with the aim of decisions being made on an informed basis rather than just continuing with what has become the norm for most Clients these days

History

In the UK back in the 1970s and 1980s most projects were conducted utilising design contractors and separate execution contractors. It wasn't until about 1984 that the first EPIC contracts in the Oil and Gas Industry were tendered and awarded (Sole Pit followed by Leman and Indy accommodation and control room change out both for Shell).

The driver was in part the vertical integration that had taken place in the industry with engineering contractors buying up fabrication yards and equipment manufacturers.

Clients did have feasibility studies carried out by specialist contractors but eventually most of these companies were bought out by bigger engineering/execution contractor.

Gradually these contractors took the feasibility studies forward into the area of conceptual design, front end engineering and design and frequently into execution either on an EPC/EPIC or an EPCm basis often with no transitional competitive tender

Definition and purpose of a FEED

It is difficult to find a FEED contract in which 'FEED' is a defined term in fact neither of your speakers could find one.

The following definitions are ones obtained elsewhere and include a definition recently provided by a project manager from a major Client and one from the Petrofac procedure they are set out below:

Client Project Manager definition:

'FEED' The phase during which the project selects and defines the best option and ensures the pre-requisite deliverables are in place to deliver a successful Project - within the Sanction budget and schedule.

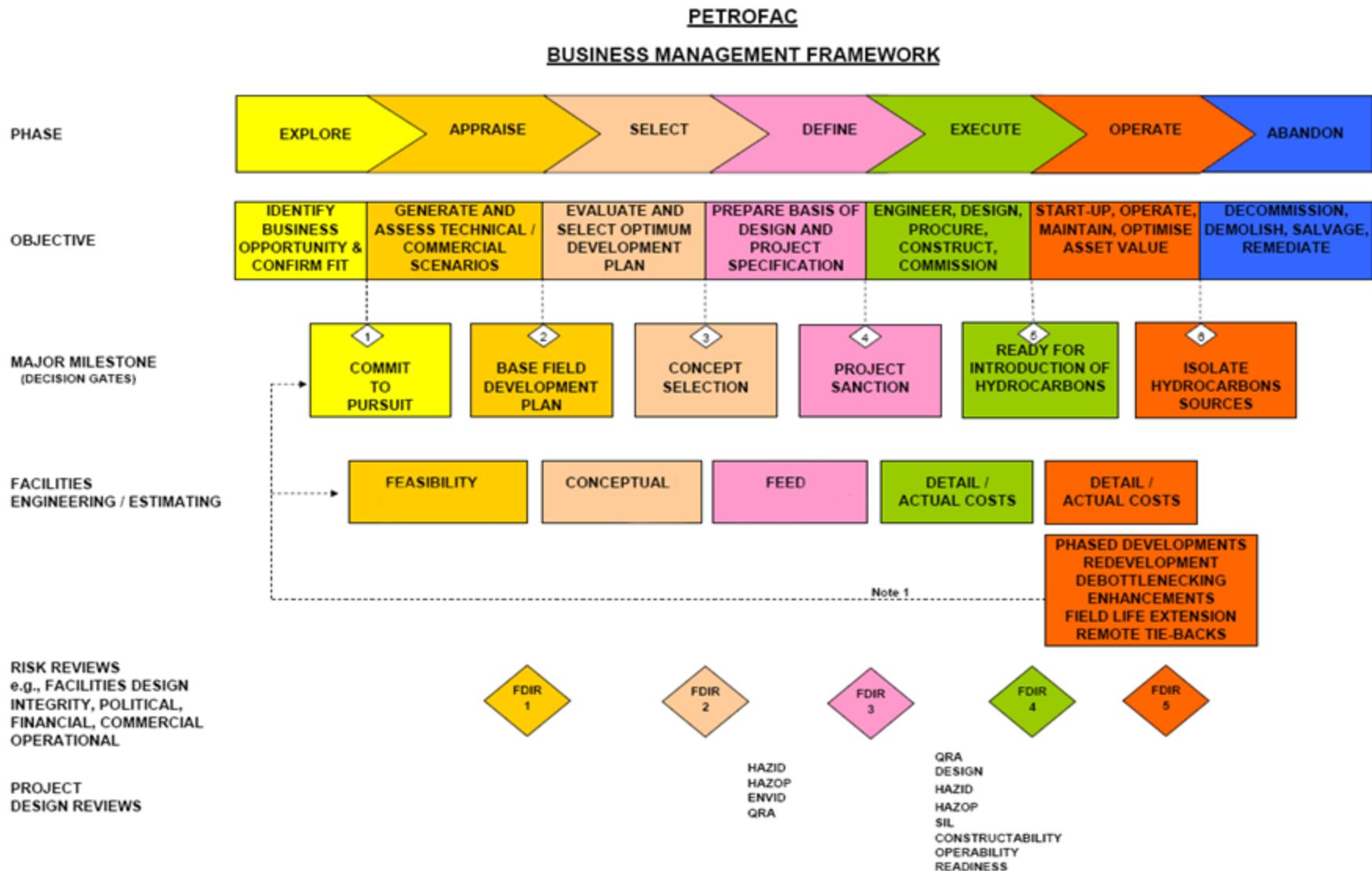
Contractor (Petrofac) definition:

The objective of the FEED phase is to further develop and document the development opportunity based on the selected concept to such a level that the Client can obtain final project sanction, application to authorities can be submitted and basis for contracts can be established.

A FEED typically commences after provisional project sanction and will normally be completed prior to project sanction. Specific issues, sub-options from the concept phase will be resolved as part of normal design development during FEED.

One is looking for the best option the other is working from a selected concept

Typical Progression of a Project from Inception via FEED to Abandonment



Standard Deliverables List for Different Phases of Engineering



- Level 1a: Estimates are prepared during the feasibility phase of a project. The main objective of a feasibility phase is to demonstrate technical and economic feasibility. The level of definition in the feasibility study shall be limited, however in some areas it may be necessary to develop in considerable detail in order to demonstrate feasibility
- Level 2a: The objective of the Concept study is to select and define the facilities concept, and conclude that the profitability and execution risk is satisfactory to Client requirements and business plans. This includes the selection, amongst a wider range of alternatives, typically one technical concept as basis for the FEED in the next project phase
- Level 2b: The objective of the FEED phase is to further develop and document the development opportunity based on the selected concept to such a level that a final project sanction can be made, application to authorities can be submitted and basis for contracts can be established. A Basic FEED utilises budget quotes for equipment and factors for bulks
- Level 2c: The objective of the FEED phase is to further develop and document the development opportunity based on the selected concept to such a level that a final project sanction can be made, application to authorities can be submitted and basis for contracts can be established. A Full FEED utilises budget quotes for both equipments and bulks
- Level 3a to 4a: The objective of the detailed design phase is to further develop and document the development opportunity based on the FEED to such a level that final project Procurement and Construction can commence

| Completion % | Estimate Category | | | | | |
|--------------------------|-------------------|-------------------|-------------------|---------------|---------------|-------------|
| | Level 1a | Level 2a | Level 2b | Level 2c | Level 3a | Level 4a |
| Project definition | % | % | % | % | % | % |
| Technical definition | % | % | % | % | % | % |
| Commercial definition | % | % | % | % | % | % |
| Equipment cost source | in-house database | in-house database | budget quotes / | budget quotes | budget quotes | firm quotes |
| Bulks cost source | factors | factors | factors | budget quotes | budget quotes | firm quotes |
| Civils cost source | factors | factors | factors | budget quotes | budget quotes | firm quotes |
| Pipeline cost source | in-house database | in-house database | in-house database | budget quotes | budget quotes | firm quotes |
| Construction cost source | factors | factors | factors | budget quotes | budget quotes | firm quotes |
| Estimate accuracy % | -15/40 | -15/30 | -10/20 | -5/20 | -5/15 | -5/5 |

Advantages and disadvantages of a FEED (from both part parties point of view



- For the purpose of Project Sanction?
- Definition and Degree of Definition?
- Is Detailed Definition Necessary?
- Commercial Viability;
 - CAPEX (Estimate or Firm Price)?
 - OPEX?
- Programme (elapsed time from Inception to Operation)
- Liabilities of FEED contractor to client, to EPC Contractor, Third Parties

Absolute Duty of EPC/EPIC Contractor

- Fit For Purpose
- Design/Operating/Fatigue Lives

Conceptual Design / FEED / Detailed Design

- Duty of Care or Absolute Duty (Consultant or Contractor)?
- Direct Losses in respect of Reworks by EPC / EPIC / Execution Contractor
- Risks Associated with Processes and or Equipment and/or Materials
- Risks Associated with Performance Guarantees
- Risks Associated with Intellectual Property /Licenses etc.
- Collateral Warranties
- Statutory Obligations (SNIPS & GHOS)

EPCm



Mitigating Disagreements:

Especially with Major Projects is essential that the liabilities and obligations of both parties are clear and unambiguous and that adverserality where possible is avoided or at least clearly dealt with in the Contract wording

Designing Contracts with predetermined Contractor Obligations:

It is essential both Parties but especially the Client are clear as to what they want out of the Contract (for example do they really wish to claim a usually limited sum from the Contractor, generally after much legal, expert and internal cost, or is the prime objective to get the plant repaired/modified and back up running again)

The role this plays on Contractor/Operator (Client) relationships:

Most of those present would agree that a carefully drafted and well thought out Contract by reducing adverserality and ambiguity will significantly enhance the chance of Project delivery on time and on budget

**Changes in contracting strategies dependant on market economics and
its effect on the bargaining power of the parties:**

- Minimising Schedule (shortest period to return for the client)
- Minimising Cost Overrun (lump sum/reimbursable/net cost + target)
- Shared Equity
- Minimisation of OPEX (integrated operate and maintain contracts)
- Incentivisation (schedule/CAPEX/OPEX)
- Life of Field
- Environmental
- Commercial Utilisation of Process By Products
- Risks Associated with Regime Change and available insurances

Is there a right answer or was William (or Francis) right in stating that:



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sence, which makes vs rather beare those euilles we haue, [Is
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Quote from Bacon/Shakespeare (with apologies)



To FEED, or not to FEED, I there's the point,
To FEED, or not to FEED, is that all? I all:
No, to FEED, or not to FEED, I mary there it goes,
For in that dreame of perfection, when wee awake,
And borne before an euerlasting ludge,
From whence no passenger euer retur'nd,
The vndiscouered country, at whose sight
The happy smile, and the accursed damn'd.
But for this, the ioyfull hope of this,
Whol'd beare the scornes and flattery of the world,
Scorned by the right, the right curssed of the draftsman?
The widow being oppressed, the orphan wrong'd,
The taste of hunger, or a tirants raigne,
And thousand more calamities besides,
To grunt and sweate vnder this weary life,
When that he may his full decision make,
With a bare bodkin, who would this indure,
But for a hope something after death?
Which pusles the braine, and doth confound the sence,
Which makes vs rather beare those euilles we haue,
Than flie to others that we know not of.
I that, O this conscience makes cowarde of vs all,
Lady in thy orizons, be all my sinnes and errors of strategy selection be remembered.