

## **Front End Loading Process**

Front-End Loading (FEL) is an industry staged-gate process where Genoil develops adefinition of the scope and cost of a capital project to meet our clients' business objectives. The final products of the FEL process are typically a design-basis package of information that may be used to support the production of detailed engineering design documents and a cost estimate of suitable accuracy to gain project Authorization for Expenditure or Project Authorization.



### Parameters of FEL Phases

Cost estimate accuracy, cumulative engineering hours spent, and the contingency assigned to the cost estimate are important aspects of each phase of FEL. The engineering hours spent during each phase of FEL vary widely between small and large projects. This is also true for those projects where new or emerging technology is being applied or where higher throughput capacities are being applied than previously commercially demonstrated. Projects such as these may require additional engineering to achieve the desired estimate accuracy and project contingency desired.

## Typical Conceptual Phase (FEL-1) deliverables:

The emphasis of FEL-1 is to determine the basic economic viability of the conceptual project before committing to the expense of more definitive engineering and study expenses. Deliverables include:

- Strategic Business Assessment and Risks
- Technology Selection
- · Potential Sites Identified
- Cost Estimate (+/- 40 to 50%)
- Preliminary Project Schedule
- Block Flow Diagrams
- Process Cases Identified
- Long Lead EquipmentIdentified



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## Typical Feasibility Phase (FEL-2) deliverables:

In this phase, the goal is to determine the best technical and economic flow scheme, associated technology, required support systems and a plot plan sufficiently detailed to support the development of a cost estimate.

Deliverables include:

- Updated Strategic Business Assessment
- Project Schedule Level 1
- Cost Estimate (+/-25%)
- Overall Project ExecutionStrategy
- Permitting & Regulatory Compliance Plan
- Process and Utility Flow Diagrams For Selected Option(s)
- Preliminary Sized Equipment List and Specifications
- Process Hazards Analysis Report
- Value Improving Practices (VIPs) Reports

### Typical Definition Phase (FEL-3) deliverables:

The emphasis of FEL-3 is to achieve the best practical level of project definition and a good quality project estimate. This level of project definition and cost estimate quality are normally required in order to present to management a candidate project which has the right combination of overall risk and projected economic performance, and thereby secure an AFE. Deliverables include:

- Updated Strategic Business Assessment
- Detailed EPC Phase Project Execution Plan and Schedule
- Completed Environment PermitSubmittal
- Training, Commissioning & Startup Plans
- Cost Estimate (+/- 10 20%)
- Finalized Utility Flow Diagrams & Balances
- P&ID's Issue IPL (Issue For Plant Layout)
- Plot plans & Critical Equipment Layouts
- Equipment List & Equipment Datasheets
- Single-line Electrical Diagrams
- Pre-Design Hazard Review