Information Management at Bechtel – A Case Study

XXX

Project

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Key IM Requirements

- Collaboration
  - Document submittal and document sharing across multiple engineering organizations and customer
- Document Management
  - Single repository to facilitate construction, client handover and records
  - Single distribution source for issued project documents
  - Maintain native file formats and renditions (i.e. PDF)
- Data Integration
  - Capture, integrate and aggregate data from multiple engineering organizations
  - Feed construction systems with engineering data augmented with procurement data
- Document and Data Handover
  - Substantial EP handover and construction system turnover requirements
  - Handover schedule derived from mechanical completion
- Data Quality
  - Ensure that EP data is validated so that handover is “flawless’
- Information Security
  - Protect Intellectual Property, Confidential Information, Information Classification, Document and or Drawing copyright protection, Access Controls for multiple proprietary technologies

Critical IM Tools

- **Collaboration** - eRoom (Documentum®)
- **EDMS** - InfoWorks (Bechtel/Documentum®)
- **EDMS** - InfoWorks WebTop (Bechtel/Documentum®)
- **Remote Access** - Citrix
- **Data Integration** - DataBroker (Bechtel)
  - Data exchange amongst EPC toolset
  - Publish/Subscribe or Push/Pull
  - Change management, i.e. Add, Change, Delete
  - Drive to synchronize disparate application datasets
- **Data Integration/Aggregation** - Commodity Staging Tables
  - Central aggregation of multiple project Engineering data sources
  - Data hub to facilitate data integration
  - Augment source Engineering data with Procurement
  - Tag Registry
- **Spare Parts** -
  - Spare Parts Information collection tool
- **Reporting** - SQL Server Reporting Services (SSRS)

Critical IM Processes

- Quality assurance
  - Audits of documents & databases
  - Audit early, audit often
  - Rectify quality issues and alter work process
- Data collection
  - Vendor & manufacturer P&IDs & data sheets (in native format)
  - Progressive collection / turnover
- Tag consistency
- EPC and Vendor expediting and follow-up

Key Lessons Learned: Data

- Anticipate diverse and inconsistent source data and mitigate
- Agree on semantics and content value early in the process
- Consistent application portfolio and standard configurations will not negate a differing work process.
- Single data and document repository to facilitate construction, client handover and records
- Understand the scale and volume of data and scale up accordingly
- Capture, integrate and aggregate data from multiple engineering organizations / sources
- Subcontractors need to be engaged early in data driven requirements

Key Lessons Learned: Organization Structure

- **Early engagement between CAPEX, OPEX and EPC organizations**
- **Requires a full-time IM team**
- **Document Management is an integral part of IM team**
- **Functional work process knowledge essential**
- **Establish a IM QA role early**

Information Management Value Proposition

Hitting the Requirements Definition "Sweet Spot"

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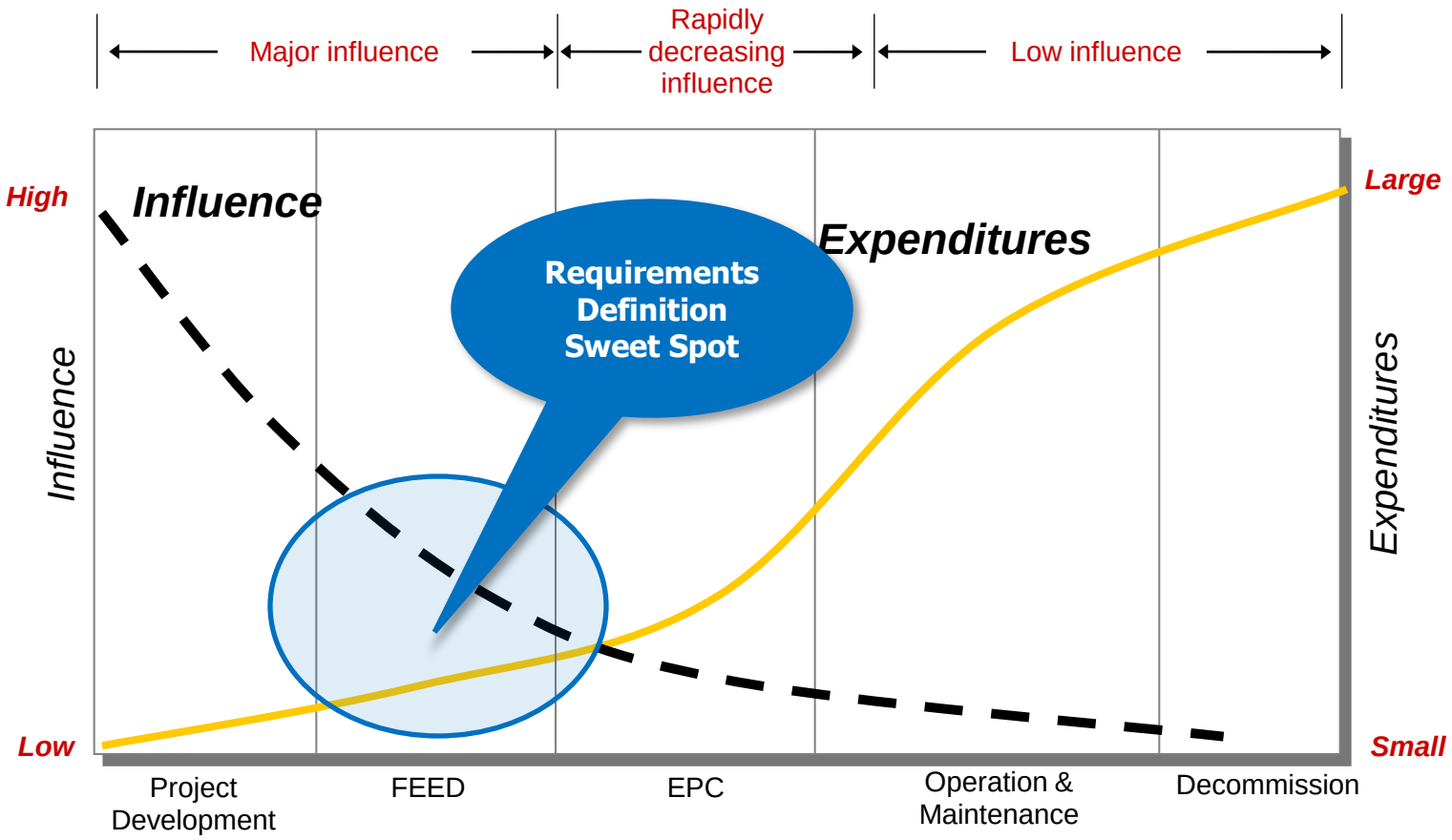
Business Drivers

- Inconsistent internal EPC data/document quality, exchange processes, and multi-function alignment
- Lack of early identification of project information requirements and an execution plan to provide information and align across all invested parties (EPC, owner, suppliers, etc.)
- Typically no single point of accountability for information management on projects – EPC contractor or customer
- Increased project complexity and broader Bechtel and customer requirements for information management, including data/document quality
- Increased focus on information management requirements for operational readiness to facilitate startup, operations and maintenance

Requirements Sweet Spot



The Key to Success

- Mapping customer data and document classes to Bechtel data and document classes – capture for repeat customers and re-use
- Alignment on data and document quality criteria
- Enhance Purchase Order requirements to clearly specify data and document requirements such that it can be easily loaded into applications
- Communicate requirements to the project and assign appropriate QA/QC resources to monitor compliance
- Leverage existing EPC work processes with a key focus on meeting construction needs

- Alignment and agreement with customer on their requirements <u>early in the process</u> and document those agreements so that we can hit the "Requirements Sweet Spot"

Value Proposition - Project

- Enhanced project data visibility and 3D model visualization capability, particularly for construction
- Extended data aggregation capability and quality
- Improved ability to analyze and review project data
- Potential to utilize tools such as SPF for asset data handover
- Lowers the risk on meeting customer requirements
  - Better data and document quality
  - Cross-functional alignment deliverables and quality criteria
- Early exposure and communication of detailed customer requirements to the project
- Exposes risks to execution and allows for mitigating those risk in detailed project execution – factor into bid
- Early identification of Project Handover Requirements for inclusion in estimate

Value Proposition - Engineering

- Early identification of interim and formal issue deliverables to be included in the estimates – better defined scope of work
- Better cross-discipline coordination on EPC deliverables
- Enable better quality deliverables and less rework based on early identification of requirements
- Early incorporation of data and document requirements into supplier Purchase Orders with clearly documented QA/QC criteria for supplier
- Early identification of packaged systems details and deliverables (sub component tagging, supplier design documentation, etc.) and incorporation into estimate

Value Proposition - Procurement

- Better alignment with engineering on data formatting requirements (equipment tagging, etc.)
- Exposing differences between estimated quantities and engineered quantities earlier
- Enable faster reconciliation of procured quantities with design quantities
- More effective use of expediting to ensure supplier compliance with Purchase Order requirements (MR Section 3) with better status and progress reporting

Value Proposition - Construction

- Better consistency and validation of engineering data as delivered to the construction organization
- Use databases such as SPF as viewing tool into design applications and documents in enterprise document management system (InfoWorks) without specialized hardware or software
- Real-time access to 3D model
- Model visualization based on search results

Value Proposition - Customer

- Achieve optimal cost and schedule that is driven by high quality data and documents
- Support for construction, start-up/commissioning and operations addressed early in design
- Meets customer data and document requirements from the beginning leading to minimal data transformation

Summary Observations / Directions

- Information Management is truly cross-functional and necessary to facilitate multi-function alignment on data/document exchange, integration and quality
- Single point of ownership and accountability for information management work processes with focus on data/document quality, data integration, data/document exchange and project handover
- Structured information management organization can operate independently to facilitate and coordinate EPC and owner requirements to improve EPC product delivery
- Emphasis needs to be on project execution performance and information management is a key enabler and a critical success factor as reflected on several recent projects.

Questions and Comments