



Introduction to Project Management



600-101

PROJECT MANAGEMENT CONCEPTS:

PROJECT DELIVERABLES

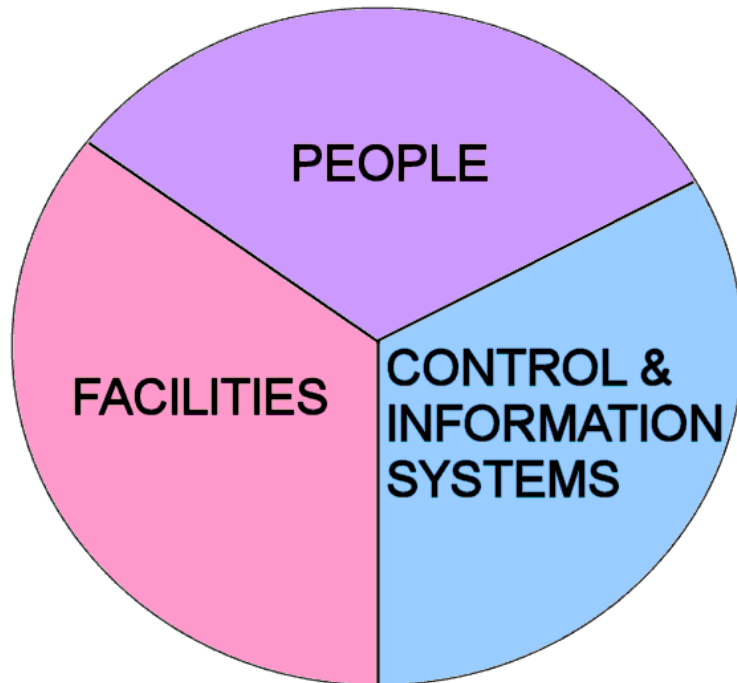
PROJECT DELIVERABLES



- A Deliverable is an item, document, or drawing produced by the effort of the project team *as agreed in the contract*
- Deliverables form the basis of cost estimates and schedules
- Some Deliverables represent intermediate goals between the project phases and the final goals of the project
- Project Payments are made when Deliverables are accepted



PERA DIAGRAM



An Enterprise consists of:

- Physical Facilities
- People and Organization
- Control & Information Systems

PERA Phase	1) Physical Facilities	2) People & Organization	3) Control & Information Systems
Study Phase	<ul style="list-style-type: none"> ▪ Production Facilities Master Plan ▪ Physical Site Survey ▪ Transport Study ▪ Block Process Diagram 	<ul style="list-style-type: none"> ▪ Staffing Master Plan ▪ HR Policies 	<ul style="list-style-type: none"> ▪ Control and Info Systems Master Plan
Conceptual Engineering	<ul style="list-style-type: none"> ▪ Process Description ▪ PFD with Material Balances ▪ Physical Facilities Standards 	<ul style="list-style-type: none"> ▪ Operating Philosophy ▪ HR Standards and Procedures 	<ul style="list-style-type: none"> ▪ Control Philosophy ▪ Control & Information Architecture Diagram ▪ C&IS Standards ▪ Narrative Specifications
Preliminary Engineering	<ul style="list-style-type: none"> ▪ P&IDs ▪ Major Equipment Specifications ▪ Long Lead Item Procurement 	<ul style="list-style-type: none"> ▪ Staffing Levels ▪ Define Key Roles ▪ Work Flow Diagrams 	<ul style="list-style-type: none"> ▪ Control and Information Network Diagram ▪ Control & Info System Specifications
Detailed Engineering	<ul style="list-style-type: none"> ▪ Specification Sheets ▪ Isometric Drawings ▪ Equipment Procurement 	<ul style="list-style-type: none"> ▪ Operating Procedures ▪ Work Processes 	<ul style="list-style-type: none"> ▪ Detailed Data flows mapped to software modules ▪ Procure software & hardware
Construction	<ul style="list-style-type: none"> ▪ Very detailed Project Management ▪ Procure Bulks & Services 	<ul style="list-style-type: none"> ▪ Position Descriptions ▪ Operator & Maintenance Training 	<ul style="list-style-type: none"> ▪ Install and Configure Hardware and Software ▪ Procure Bulks & Services
Operations & Maintenance	<ul style="list-style-type: none"> ▪ Commissioning ▪ As-Built Drawings ▪ O&M Documentation ▪ Debottlenecking 	<ul style="list-style-type: none"> ▪ Operations Organization Chart ▪ Staff Development Plans 	<ul style="list-style-type: none"> ▪ Commissioning, ▪ Final User Documentation ▪ O&M Systems ▪ Upgrades



WHAT TO EXPECT - PHASE 1 EVALUATION / PLANNING PHASE



DELIVERABLE	OWNER	ENGINEER
A potential project which agrees with corporate business strategy	√	
Initial Process Block Diagram	√	√
Level 1 Project Milestones Schedule		√
Class 5 or Class 4 Cost Estimate		√
Economic Feasibility Study with Sensitivity Analysis	√	
Marketing Study	√	



PHASE 2 – CONCEPTUAL ENGINEERING / SELECTION EXAMPLE DELIVERABLES (FROM OWNER)



- Design Basis
- Capacity
- Feed characteristics
- Yield requirements
- Turndown ratio information
- Safety requirements
- Unit location, Climate data, seismic data, other site information
- Contracting Strategy

PHASE 2 – CONCEPTUAL ENGINEERING / SELECTION EXAMPLE DELIVERABLES (FROM TECHNOLOGY LICENSOR)



- Process Description for Normal Operation
- Process Flow Diagram with Material & Heat Balance
- Preliminary P&ID
- Utilities, Chemicals, Catalyst, and Effluents Information
- Equipment Specifications including an equipment list for all major process equipment, instruments, and systems
- Cause and Effect Diagrams
- Guidelines for engineering contractor
- Recommended Key Vendors



PHASE 2 – CONCEPTUAL ENGINEERING

EXAMPLE DELIVERABLES (FROM ENGINEER)



- Project Execution Plan (PEP)
- Procedures Manual (PPM)
- Project Organization Chart(s)
- Project Management Teams Established
- Process Flow Diagrams
- Heat and Material Balances
- Design Philosophies from Major Disciplines
- General Plot Plans
- Major Equipment List and Data Sheets
- Applicable Codes and Standards
- Utility information

PHASE 3 – PRELIMINARY ENGINEERING EXAMPLE DELIVERABLES



- Piping & Instrument Diagrams - Detailed
- Plot Plan Drawings
- Specifications for Major Equipment
- Specifications for Instruments, pumps, etc.
- Major Equipment List
- Piping Line List, Instrument List,
- Class 3 or Class 2 Cost Estimate
- Level 2 or Level 3 Schedule
- Contract Strategy

PHASE 4 – DETAIL ENGINEERING EXAMPLE DELIVERABLES



- Construction drawings
- Purchase Orders
- Construction Contract Procedures & Organization
- Construction Management Team
- Level 3 or Level 4 Schedule
- Class 2 and/or Class 1 Cost Estimate

PHASE 5 – CONSTRUCTION EXAMPLE DELIVERABLES



- A “mechanically complete plant
- As-built drawings
- Manuals, books, and other documentation

PHASE 6 - COMMISSIONING & OPERATIONS EXAMPLE ENGINEERING DELIVERABLES



- Operator Training
- Acceptance Testing of Equipment and Systems
- Performance Run with established parameters of the unit
- Maintenance Schedule Established
- Warehouse Inventory
- Personnel to operate the unit

PROJECT DELIVERABLES APPROACH



Define Deliverables for each Project Phase

- Local International Engineering Project Phases can be “aligned”
- Select a set of standards per phase or combine
- Differences between what is done in each phase between local and International Engineering Practice
- Differences in the documents produced by different engineering systems

@ STANDARDS INTERFACES AND DELIVERABLES (ACCORDING TO STEP / ISO 15926)



Process Plant Engineering Activity Model

