

A Recipe for Success: Implementing Best Practices In Capital Project Management

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Agenda

- Introduction
- Best Practices Overview
- The Seven Project Stages
- The Stage Gate Review Process
- Project Performance Metrics
- Results to Date
- Next Steps

Introduction

- Who is Covance?
- Where is Covance?
- Capital projects at Covance



Best Practices Overview

- Derived principally from
 - Current Covance practices
 - PMI PMBOK
 - IFMA
 - ISPE
- Focuses on planning and project management



Best Practices Overview

- The 7-stage PM Process:
 - Stage 0: Needs Analysis
 - Stage 1: Feasibility Study
 - Stage 2: Preliminary Engineering
 - Stage 3: Basic Engineering
 - Stage 4: Execution
 - Stage 5: Qualification
 - Stage 6: Close-Out



The Seven Project Stages



The Seven Project Stages

VII

Stage 0: Needs Analysis

- 'Pre-project' stage, concluded by a Go/No-Go decision
- Typically involves a Project Sponsor, Engineering Director, Area V.P.
- Rarely involves external support
- Goal is to establish technical solutions for end-user needs and develop a supporting business case
- Establishes order-of-magnitude boundaries for potential project (cost, schedule)

The Seven Project Stages

VII

Stage 1: Feasibility Study

- Project Leader is identified in this phase
- Project feasibility is assessed with respect to resources, risk
- Options are assessed with respect to benefits, economic justification, functionality

The Seven Project Stages

VII

□ Stage 1: Feasibility Study

- Key activities and deliverables:
 - Project charter
 - Initial User Requirements Specifications
 - Process description
 - Block diagrams
 - Material balances
 - General arrangement diagrams
 - Cost/benefit analysis
 - Early stage risk analysis

The Seven Project Stages

VII

□ Stage 2: Preliminary Engineering

- Project team and steering committee are defined and engaged at this stage
- Objective is to define the project scope
- External resources are assigned
 - Design consultants
 - Construction manager
- This stage (and stage 3) may be subject to capital funding

The Seven Project Stages

VII

□ Stage 2: Preliminary Engineering

- Key activities and deliverables:
 - Team charter
 - Scope statement
 - Preliminary project plan
 - Final User Requirements Specifications
 - Process and utility flow sheets
 - Impact assessment (on site and environment)
 - Preliminary cost estimate and time schedule ($\pm 25\%$)
 - Initial VMP development
 - Initial procurement plan

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VII

□ Stage 3: Basic Engineering

- Objective of this stage is to develop the design based on scope established in Stage 2
- At the completion of this stage, the project is ready for full capital funding

The Seven Project Stages

VII

Stage 3: Basic Engineering

Key activities and deliverables:

- P&ID's
- Architectural layouts
- Material, personnel, product flow diagrams
- Major equipment specifications
- Project reviews:
 - Constructability
 - Maintainability
 - HAZOP
 - FMEA...

The Seven Project Stages

VII

Stage 3: Basic Engineering

Key activities and deliverables (cont.):

- Product impact assessment
- Further development of VMP
- Functional design specifications
- Enhanced design review and qualification
- Finalized project plan with control schedule and cost estimate ($\pm 5\%$)
- Final procurement plan
- Purchase of long lead equipment

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VII

Stage 4: Execution

- Objective of this phase is to complete the design details and carry out construction/installation

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Stage 4: Execution

- Key activities and deliverables:
 - Development of final drawings, specifications and tender packages
 - Implementation of cost and schedule monitoring and control systems
 - Permitting
 - Development of qualification rationales
 - Finalization and approval of the VMP
 - Development of IQ and OQ protocols

The Seven Project Stages

VII

Stage 4: Execution

- Key activities and deliverables (cont.):
 - Development of commissioning plan
 - Construction coordination and inspection
 - Safety inspections
 - Final acceptance of construction works

The Seven Project Stages

VII

Stage 5: Qualification

- The objective of this stage is to start up, commission and qualify the systems constructed and installed in stage 4
- Commissioning and qualification are optimized per ISPE Baseline Guide
- Includes training of end users and maintenance staff

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VII

□ Stage 5: Qualification

□ Key activities and deliverables:

- Pre-start reviews
- Maintenance plans and task lists
- Executed commissioning plan and reports
- Executed IQ and OQ protocols and reports
- Operation and maintenance manuals and SOP's
- Instrument calibration
- Regulatory registrations
- Training

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VII

□ Stage 6: Close-out

- This stage involves the transition from 'Project' status to 'Operational' status
- Includes closure of all external contracts and dissolution of project team
- Includes final reporting and financial closure of the project

The Seven Project Stages

VII

□ Stage 6: Close-out

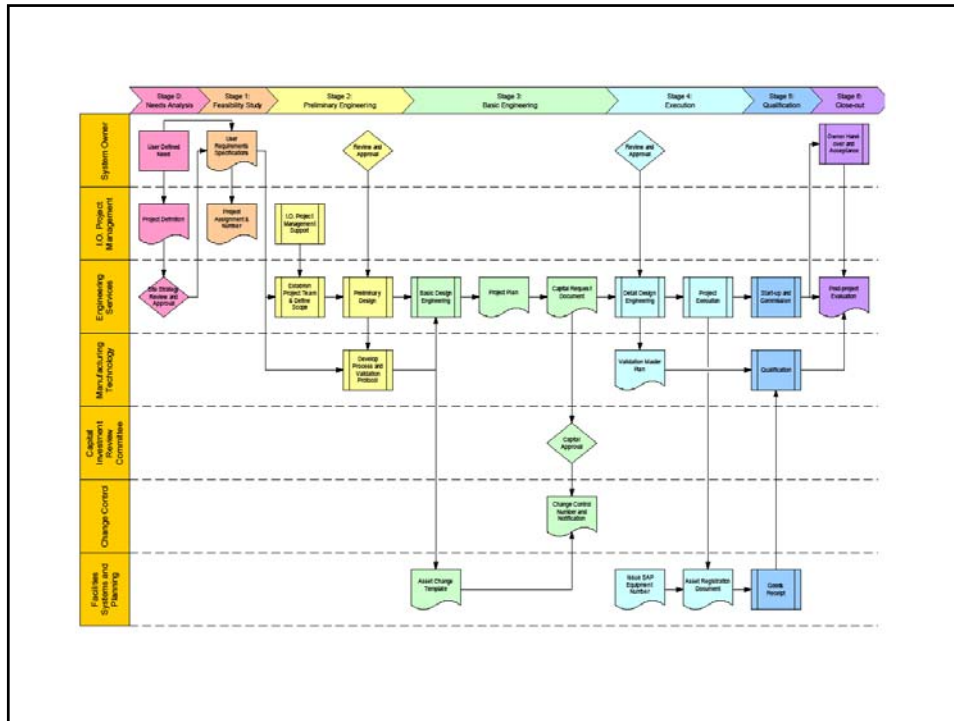
□ Key activities and deliverables:

- Engineering turn-over package (ETOP)
- Lessons Learned
- Registration of assets
- Final project report
- Entry of project data into benchmark database

The Seven Project Stages

□ The Project Management Process Flowchart





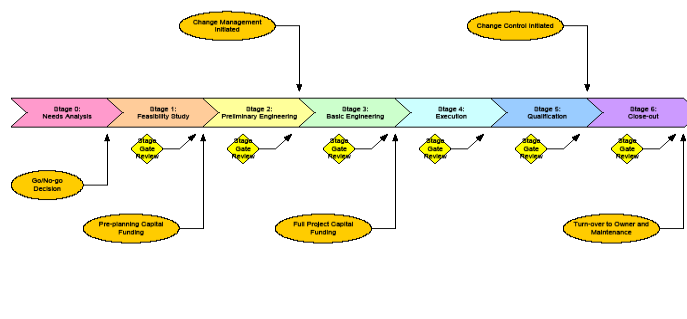
The Stage Gate Review Process



The Stage Gate Review Process

- Performed at the end of key project stages
- Objective is to review activities and deliverables and approve advancement to next stage

The Stage Gate Review Process



Project Performance Metrics

- FEL Index
- Team Development Index
- Project Controls Index



Results to Date

- Overall, annual savings around \$38 MCDN
- Overall, average schedule reduction of 10 months



Next Steps



IPA's Value Improving Processes:

- Predictive Maintenance
- Value Engineering
- Plant Quality
- Process Reliability
- Design to Capacity
- Technology Selection
- Waste Minimization
- Constructability Reviews
- Process Simplification
- Energy Optimization
- 3D CAD
- Customizing Standards

Thank You!

Any questions, please contact:

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