

# MSI PROJECT LIFECYCLE DELIVERABLES & OFFERINGS



**Description**

Owner and EPC defining project scope and boundaries (WBS), systems, estimates, construction and procurement planning, conducting studies, aligning all EPC execution.

Technical Docs (IFD)

Work with Owner, EPC, and/or Vendors to develop Level 3 or Level 4 budgetary estimates for draft scopes of work and submit in accordance with the project specifications/requirements.

- Deliverables**
- Finalize Specification
  - Budgetary Estimate
  - Total MSI Lifecycle, Preliminary Products, Engineering, and Services
  - Zippering Plan with Owner
  - MSA Discussion

**Description**

An OWNER has awarded to an EPC Contractor. Project is working detailed design and early procurement of major equipment (typically in home office)

Technical Documents (IFD and IFC)

Work with Owner, EPC, and/or Vendors to develop Level 1 or Level 2 proposals for approved scopes of work and submit in accordance with the project specifications/requirements.

- Deliverables**
- Flowdown of Specification
  - Estimates/Proposals
  - Total MSI Lifecycle Offerings (Technology, Products, Engineering, and Services)

**Description**

Pre-Construction commences, EPC Contractor mobilizes and starts temporary facility build out, site work and undergrounds.

Engineering and Procurement will complete and Construction direct and indirect work will continue through completion, as defined by their Prime Contract (Mechanical Completion/Substantial Completion/RFSU)

Technical Documents (IFC)

- Deliverables**
- Final Contract Approved
  - Product Supply, Engineering & Installation as required
  - AIM Implementation

**Description**

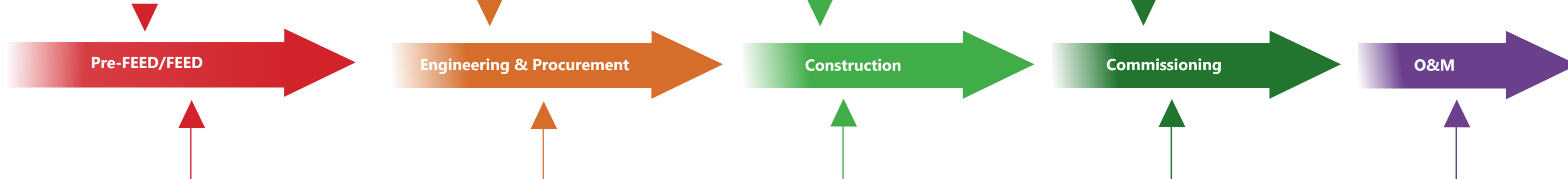
Pre-Commissioning - Systems are being turned over to the Owner and commissioning commences

Commissioning - Systems are being turned over to the Owner and commissioning is underway and systems are going "live"

Post Commissioning & Startup - EPC contractor is performing walkdowns and punchlist in conjunction with project turnover

Technical Documents (As-Built)

- Deliverables**
- Final as-built
  - AIM/Data Turnover
  - Validation/Gap Analysis of 3rd Parties



- Offerings**
- Specification Development to Standardize Facility Identification for Regulatory Compliance.
  - Early Project Planning and Budgetary Estimating for Direct and Indirect Labeling & Signage Products, Services, and Asset Management Technology.
  - QR Code coordination for use, location, and content for assets under various mechanical, electrical and instrumentation, and piping subcontractors.
  - Consulting for asset management technology, engineering services, supply and installation of labeling products for Advanced Work Packaging, System Turnover and Facility Operations/Management.
  - 3D Laser Scanning Services for Project Design and Removing and Replacing Major Equipment.

- Offerings**
- Define asset management technology and turnkey scope of work for Advanced Work Packaging and System Turnover requirements during Construction, Commissioning, and into Facility Operations.
  - Define Engineering services, product supply, and installation plans in accordance with project schedule and turnover requirements at Mechanical Completion (MC) or other key milestone points.
  - Collaborate with Key Project Vendors and Subcontractors for Consistent Implementation of Labeling Products and Asset Management Technology.

- Offerings**
- Field Survey and supply of Temporary Construction and Safety Signage, including customized Barricade Tape and Accident Prevention Tags throughout construction execution.
  - Perform Turnkey Services for Engineering, supply and installation of labeling for Mechanical and Piping identification in accordance with the standardized specification, construction work packages, project schedule, and turnover requirements.
  - Supply E&I and Telecom contractors with Electrical asset and cable identification products in accordance with the project's standardized specification, Construction Work Packages, project schedule, and turnover requirements.
  - 3D Laser Scanning Services for removing and replacing major equipment.

- Offerings**
- Engineering Services
    - Validation of Project P&IDs and or Redlines.
    - Engineering Services to develop As-Built P&IDs from Project Redlines.
    - Engineering Services for on-site, 3D Laser Scanning for As-Built Record.
  - Validation Services
    - Validate the integration of Asset Management Technology, including Digital Form Creation and Document Tracking for Project Turnover.
    - Smart tag validation of QR code use, location, and content for assets under various mechanical, electrical and instrumentation, and piping subcontractors.
    - Schedule Validation Services of Asset Installations and Project Progress for Mechanical Completion (MC) or other key milestones

**Description**

The site has been turned over to the OWNER, and EPC is demobilizing or has demobilized from the site.

Warranty Period is in accordance with the Prime

Ongoing maintenance of facility for OWNER

Customer Relations continue

- Deliverables**
- Project integrity with the owner.

- Offerings**
- Provide ongoing support services for the facility's Maintenance and Management of Change (MOC) which includes:
    - Supply/installation of labeling products.
    - Update P&IDs to As-Built for facility changes and new or modified assets.
    - Additional data mining or linking documents to new or modified assets.

**MDR HOME OFFICE ACTIVITIES TYPICALLY PERFORMED FOR PROJECT HANDOVER TO OWNER AT RFSU BASELINE DOR**

- Contract Analysis & Clarification (MDR)
- ▲ **Project DOR Matrix (MDR/Owner)**
- ▲ **Execution Plan (MDR/Owner)**
- ▲ **Completions Plan (MDR/Owner Review)**
- ▲ **Staffing Plan (MDR)**
- ▲ **Training Plan (In accordance with contract)**
- Start-up Sequence (In accordance with contract)
- Systemization (MDR/Owner Review)
- Boundary Mark-ups (MDR/Owner Review)
- Commissioning Schedule & Integration (MDR/Owner Review)
- ▲ **Participate in Project Reviews (MDR/Owner)**
- ▲ **Systems Completion Database (MDR/Owner Review)**
- Operating Manual (In accordance with contract)
- ▲ **Presevation Procedure**

- ▲ **Training Materials (In accordance with contract)**
- ▲ **Pre-Commissioning Procedures (MDR)**
- ▲ **Commissioning Procedures (MDR)**
- ▲ **Start-up Procedures (Owner)**
- ▲ **Performance Test (MDR)**
- ▲ **CSU Spares (MDR)**
- ▲ **Operational Spares (Owner/Support by MDR)**
- First Fills (In accordance with contract)
- ▲ **Lubrications List Review (MDR)**
- ▲ **Catalyst & Chemicals List (MDR)**
- Temporary Tools & Equipment to RFSU (MDR)
- ▲ **Subcontracts to RFSU (MDR)**
- Vendor Site Services Schedule to RFSU (MDR)
- FATs (Owners/CSU Participation)



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**Where can MSI support your project, from award to RFSU?**

A MC Notification is issued on a subsystem basis. A Tri-Party MC Walk Down is performed and official "A, B, C" Punch List are registered in the SCDB. All "A&B" Check Sheets & "A&B" Punch Items and Pre-Comm. Procedures must be complete prior to issuing an MC Certificate and commencement with Commissioning activities for the subsystem.

Upon achieving MC certificate of the final subsystem, the Project MC Milestone is achieved.

Upon achieving RFSU Certificate of the final Subsystem, the project RFSU Milestone is achieved.

Upon achieving the Performance Test and Contractual Obligations for PA, the Project PA Certificate is issued.

ITEMS SHOWN INSIDE THE GRAY AREA ARE OUTSIDE CONTRACTORS SCOPE (with exceptions in red)

EPC Contract Award

Engineering Design & Procurement Completion

Mechanical Completion (Construction & Pre-Commissioning)

Ready for Start-Up (Commissioning)

PA (SU & Performance Test)

A construction completion notification is issued on a subsystem basis. An internal walk down is performed and a construction work list is generated utilizing the "A, B, C" punch list categorization. When all "A" check sheets & "A" work list items are complete for a subsystem, a construction completion certificate is issued and pre-commissioning activities may be progressed for that subsystem.

Commissioning typically starts with energization and testing of electrical systems, the DCS SIT, balance of ICSS, telecomms, utilities, process systems.

Pre-Comm. Starts Approximately 60% into MC

**PRE-CONTRACT PHASE**

- Contract Analysis
- Risk Review
- Lessons Learned Review
- ▲ **Project Execution Plan**
- ▲ **Quality Plan**
- ▲ **HSES Plan**
- ▲ **Engineering Plan**
- ▲ **Procurement Plan**
- ▲ **Construction Plan**
- ▲ **Commissioning Plan**
- ▲ **Completions**
- Cleanliness Requirements
- ▲ **Preservation Requirements**
- Plot Plan Reviews
- PFD Reviews
- Constructability Reviews
- PHA & SIMOPS Reviews
- ▲ **Lev II/III Schedule Reviews**
- ▲ **Estimate Reviews**
- Bridging Activities

**BUILD CLEAN PROGRAM**

Engineering, Quality, Procurement, Materials, Management, Construction and Commissioning all have responsibilities associated with implementation of a successful BIC Program.

**BENEFITS OF BIC PROGRAM**

- Establish alignment of cleaning requirements for each project phase
- Reduction of Pre-Commissioning Duration
- ▲ **Supports equipment inspection and preservation requirements**

**CONSTRUCTION INSTALLATION PHASE**

- Ground Works
- Foundations
- ▲ **Buildings**
- ▲ **Equipment Setting**
- ▲ **Pipe Racks/Modules**
- ▲ **Field Run Pipe/Interconnects**
- ▲ **Tie-Ins**
- Piping Test-Packs
- Cold Alignments
- Switchgear
- ▲ **Cable Pull/Termination**
- ▲ **Continuity Checks**
- ▲ **Telecomm Installation**
- ▲ **Preservation**
- Uncoupled Motor Runs (shared)\*\*
- ▲ **"A" Completion Forms**
- ▲ **"A" Punch Items Cleared**
- ▲ **Walk Downs & Turnover**
- ▲ **Construct Completion Certificates Issued**

**Pre-Commissioning Activities (to Achieve MC)**

- ▲ **System Walk Downs**
- ▲ **"B" Punch List Clearing**
- ▲ **Electrical Pre-Energized Checks**
- ▲ **Instr. & Control Pre-Energize Checks**
- Catalyst Loading
- Vessel Inspection & Final Closure
- Initial Lubrication/Grease Fills
- Lube Oil Flushing
- Hydraulic System Flushing
- Mechanical Cleaning
- HP Hydro-Jetting
- Air Blows
- Water Flushing
- Steam Blows\*\*
- Chemical Cleaning/Degreasing
- ▲ **System Reinstatements**
- ▲ **Preservation**
- Uncoupled Motor Runs (Shared)\*
- Gross Leak Test (Air/N2)
- ▲ **"B" Completion Forms**
- ▲ **Pre-Commissioning Procedure Sign-offs**
- ▲ **MC Certificates Issued**

**SITE COMMISSIONING ACTIVITIES (TO Achieve RFSU)**

- ▲ **Electrical Energize & Test**
- ▲ **ICSS Energize & Test**
- ▲ **DCS Site Acceptance Test**
- ▲ **Telecoms Energize & Test**
- ▲ **Perform Hot Loop Test**
- ▲ **Perform Cause & Effect Test**
- Perform Refractory Dry Outs
- Perform Uncoupled Mtr. Runs (Shared)\*\*
- ▲ **Re-certify PSVs (as applicable)**
- Perform Tightness Test
- Perform Functional Test Utility Systems
- Perform Final Alignments
- Perform Energized Mechanical Run-Ins
- Perform Final Fills Inventory
- Perform System Dry Outs
- Inert Systems as Applicable
- ▲ **Preservation**
- ▲ **Execute Commissioning Procedures "C" Punch Items (By MDR - Prior to Final Acceptance)**
- ▲ **Perform PSSR's (Owner/MDR)**
- Issue System RFSU Certificate

**START-UP ACTIVITIES (TO Achieve SC)**

- Startup support by MDR (In accordance with contract)
- Introduction to Feedstock
- Start-up Process Equipment
- Perform Mechanical Test and Tuning
- Ramp-up Rates & Stabilize Process at Designed Criteria
- Achieve On-Spec Products
- Perform Successful Completion of Performance Tests (MDR/Licensor)
- Issuance of Provisional Acceptance Certificate
- Start Warranty
- Start of Commercial Operations