Under Planned and Over Budget: Been There?

FEED+ Study

*How to Execute a Project and Still Sleep at Night*

Presenter – Greg Graves
Topics to Cover

- The Client’s Problem
  - Case Study
- FEED+ Gives You a Plan
- Essential Elements
- Remove Unknowns, Insert Success
The Client’s Opportunity

Modernize a 1970s era Power Plant
New Controls - New Network - Motor Controls

- Power plant – **Second of two identical units**
- New control system – 3000 I/O per Plant
- 1st unit completed & operational
- Access to 1st unit drawings
- All equipment on-site
- Same construction crew
- 8 months to complete
The Clients Problem

The undocumented Reality

- Documentation Provided:
  - P&ID’s – Inaccurate
  - Schematic Diagrams – No Document Control
  - Original Instrument Specification – No Revisions in 40 years
  - Physical Plot Plans – All scans of hand drawings
  - Preliminary I/O List Based Upon P&IDs
  - Scheduling Constraints - Ambitious
The Client’s Problem Compounded

The Unacknowledged Reality

- Identical units, right?
- T&M contract crew
- PM = fired
- No site audit notes
- The 1st unit drawings – inaccurate
- LDs in contract
- Relationships…..Kaput!
The Outcome

- Meet the design deadline – **Check**
- Have installation finished on time - **Check**
- Spend < 50% of the budget on half the project - **Check**
- **Our team did a great job, but…**
  - Budget was 90% spent when we started
  - The first phase outcome had sunk the project

**There are no heroes on a bad project!**

We understand the risk of the unknown.  
We’ve felt the pain.
The Six Phases of a Project

1. Enthusiasm
2. Disillusionment
3. Panic
4. Search for the Guilty
5. Punishment of the Innocent
6. Praise for the Uninvolved
Lessons Learned

• Totally preventable by good FEED+ on 1st unit:
  • The Wrong Team
    • Lacked controls-centric execution plan
  • No Guidance
  • Poor Methodology
• Poor Communication Victims = ALL
• Lack of Teamwork Victims = ALL
• The Devil is in the Details (or in the LACK of details)
Where there is no vision, the people perish
Proverbs 29:18

There must be a VISION... and Teamwork!
MORE THOROUGH adaptation of traditional “FEED”

- Developed by Necessity – we’ve been there
- Developed to Reduce Risk
  - Eliminate Risk-Enabling Catch Phrase
    - “And Other Instruments Required for Automation of the Process”
    - “Include Reporting as Required”
- Refined with client input
- Focus on clarity and constructability
- Added focus of HOW in addition to WHAT
- Tools and methods for measuring execution success
What are key elements of FEED+?

1. The Right Team
2. Clear Goals – Identify the WIN
3. Expectations
4. No Assumptions
5. Dive Deep
6. Documentation
7. Communications
8. The What *and the How*
When is the **FEED+** Executed

Clearly Defined Goals

Corporate and Local Operational Objectives

Audit / SOW:
- Site Audits
- Prioritization
- Strategic Alignment
- FEED+
- Detailed SOW
- FEL3+ level Estimate

Development:
- Kick-off
- Schedule & Plan
- Design
- Communication
- Standards
- Testing
- Verification
- As Built Docs
- Commissioning
- Support Plan

Deployment:
- Work Pkgs
- Mobilization
- Work Pkgs
- Verification
- Support Plan

Project Management / Implementation Expertise Developed

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What is the cost of FEED+?

- Site: xx weeks by xx people (x days/week)
- FEED+ finalized offsite
- Develop Work Breakdown Structure (WBS)
- Develop Resource Plan and Schedule
- Appropriation Grade Proposal with a Guaranteed Price to Execute the SOW

**FEED+ Cost: 20% of Total Engineering**

**What is the cost of not doing FEED+?**
The Beginning – FEED+ Kickoff

- Every Stakeholder
  - Offsite
- Success Goals Stated & Understood
- Schedule Milestones Set
- Communications Defined
- Access to Documentation
- Bilateral Escalation Plan
- Permission for Photographs
Site Survey – Collaboration

Site Survey Team
- Controls Engineer
- Field Engineering /Technician
  - Field-savvy
- Constructability SME
- Plant Support Personnel

As-Is Operations
- Safety
- Stakeholder Interviews
- Manual Operations
- Desire for Automation
- Existing Devices
Site Survey – P&ID Walkdown

- Located (Dwg/Physical)
- Current Mfg/Model
- Range/Service/Connections
- Tagging – Color Coded
- Photographs
- Evaluate
- Create As-Founds
The Right Skill Set/Experience

- ID ALL control panel devices
- ID ALL inbound, outbound and inter-panel connections
- Schematics – “As Found” mark-ups
- Work package development
- Photographs
Site Survey – Develop I/O List

**Develop I/O List**
- Device Path
- Installation Notes
- Plant Area J-Box / Marshalling Panel Locations
- Type of Device
- I/O Type & Comms
- Unique Identification #s

**Drawings**
- Master Drawing Index
- Reviewed Every Existing Drawing
- Path Forward (Revise, No Change, Obsolete)
- Identified New Drawings Required
FEED+ delivery

- Control Architecture
- I/O List
- Drawing Index
- As-found drawings
  - P&ID’s
  - Schematics
- Future P&ID’s
- Plots (high level)
- Schedule
- Scope “Holes” ID/Exclude + SOW Docs

Peace of mind that you fully understand your project’s process and requirements – no surprises!
Constructability Plan
- Panel Locations
- ID Devices
- Major Raceways
- Network Design
- Marshaling
- Equipment Replacement Detail
- Equipment Modification Detail

Control Architecture
- Controller
  – Model / Series / Revision
- Communication Devices
- Power Supplies
- Reliability Strategy
- Support Strategy
- HMI
  – Revision Support
- Operability Goals

Peace of mind that you fully understand your project’s process and requirements – no surprises!
How does FEED+ plan for success?

Plan Fulfillment
- Project Management
- Site Leadership
- Expertise
- WBS for the project
- Work Package Development
- Measurement
- Methodology
- Collaboration and Communication Daily
Copllaboration– REX

- Scanned Field Data
- Photographs
- As Found Drawings
- Drawing Index
- Daily Back-up
- Accessible by the entire team
Your Project’s Outcome - Success

- Appropriation Worthy Estimate
  - Supported by Work Breakdown Structure
  - Risk Identification and Counter Measures
- Implemented per FEED+ SOW – Contractual
- Scope “Creep” <0.5%
  - On-Time
  - On Budget