BEST PRACTICES FOR INTEGRATED SCHEDULING
Agenda

- Introduction
- Background
- Best Practices for Integrated Scheduling
- Next EPC Roundtable Topic – May 2014
Introduction
Scott Diehl, P.ENG, M.ENG, PMP

- Executive Associate at Pathfinder Project Consultants Canada. Provides customized PM training, independent project reviews, facilitation.
- Active member in PMI, AACE, CII, COAA
- 28 years Industry experience in Project Management to improve outcomes through project cost and schedule control, and effective project team management
- Diverse experience: gas and oil production/processing, electric generation and transmission, gas transmission pipelines, water and wastewater utilities, alternative energy sector, mining and oil sands, pulp and paper, food & beverage production

- Education:
  - Project Management Professional (PMP) Certified 2001
  - Masters of Engineering, University of Calgary, 1995
  - B. Sc., Mechanical Engineering, University of Waterloo, 1984
Introduction

Pathfinder LLC

- International Project Management Consulting Firm
- Established in 1975, executed over 3,750 Chemical Process Industry project Assignments representing over $575B of Capital Project Investment
- Focused on assisting owner organizations in executing capital project more efficiently/effectively
- Has supported $75B worth of Canadian capital project investment since the mid 1990s
- Has executed over 60,000 people hours in region on various consulting & training assignments
Background
EPC Roundtable Background

- PMI- SAC Sponsors EPC Roundtable (meets face to face 2 times a year).
- Six sessions held from 2010 to 2013
- Forum for open discussions about methods to improve outcomes of Capital Projects
- Participation from Owners, Engineering Contractors, Construction Contractors, Academics
May 2013 EPC Roundtable Session

- May, 2013 – PMI SAC EPC Roundtable special session to address topic of:
  
  *Integrated Scheduling for Large Capital Projects*

- 25 industry experts participated in open discussion

- Key findings are best practices that can be applied within Alberta’s Oil & Gas Industry
Roundtable Observations on Schedule

- Members concluded: It is **essential** to have a resource-loaded, integrated schedule that is maintained throughout life of project
- Needed as communication tool to coordinate activities of Construction and Engineering contractors, Owner stakeholders and core project team members
- Failure to do so places major projects at risk:
  - Failure in terms of schedule and cost objectives
  - Increased likelihood of claims/disputes between parties
Best Practices for Integrated Scheduling
Every Scheduler I hired needed retraining from scratch. Our project team needs a scheduler that hits the ground running!
Practice 1 - Develop Competent Resources

- Some Alberta projects currently lack competent resources – particularly schedulers and planners
- Must develop competency through formal training, on-the-job mentoring and practical experience, Communities of Practice
- Present career as a viable/interesting option, so best and brightest gravitate to profession
Practice 1 - Develop Competent Resources

- Scheduling resources must know more than just how to use software
  - Should experience “tour of duty” – exposure to construction sites, engineering shops, and other activities
  - Assists in transition from scheduling role to planning role
- AACE International Recommended Practice (Non 14R-90) – Responsibility and Required Skills for a Project Planning and Scheduling Professional
Our project has five different schedules being updated by different companies at different times. Who is in control of the Master Schedule?
Practice 2 - Follow a Realistic Scheduling Plan

- Use a Schedule Plan that defines:
  - Roles, responsibilities of the schedulers/planners
  - Activity ID coding
  - Structure of the schedule
  - Software to be used to develop and maintain schedule
Practice 2 - Follow a Realistic Scheduling Plan

- For Scheduling Plan to be followed during Execution, contracts must encourage the ‘right’ behavior
  - Have a budgeted activity included in contract for developing a proper resource and cost loaded schedule
  - If contractor fails to produce proper schedule – funds can be withheld
  - Like other “deliverables”, contractor’s schedule must follow specs defined in contract
Our Project Director approved a baseline schedule that the Project Team does not understand. It’s missing critical activities that are needed to deliver the agreed to scope. There are activities that are out of sequence and have incorrect durations!
Practice 3 - Perform Detailed Schedule Reviews

- During schedule development, hold Interactive Planning Workshops with project team, key stakeholders
  - Document key points of discussion, agreements, information requirements, action items and responsible parties
  - Focus on understanding risks/opportunities that influence schedule
Use Independent 3rd party schedule reviews at key points in project lifecycle

‘Cold Eye’ reviews – identify risks and improve schedule quality

Example - Prior to issuing a Request for Proposal for a Construction Contract, the Owner engaged a construction consultant to review a baseline schedule
We hired an Engineering Consultant to develop a schedule for the overall project. When we started work we realized there were activities done by the Owner that were missed! Our project quickly fell off the rails!
Practice 4 - Involve Stakeholders During Schedule Development

- Owner organizations must invest time and resources to develop schedule
  - Other participants should not perform this task on Owner’s behalf.
  - Only the Owner has perspective of all activities and potential impacts on schedule and business/project goals
Our Project is in Construction. When we integrate all the subordinate schedules into the Master Schedule, we are finding major inconsistencies and flaws. The subordinate schedules have not been updated correctly with actual progress. 

Garbage In = Garbage Out!
Practice 5 - Integrate Subordinate Schedules During Execution

- Flawed “subordinate” schedules result in a flawed Master Schedule
- Root causes of failed schedule integration?
  - Inexperienced personnel
  - “Crunched” time allotment
  - Insufficient and/or inaccurate information on which to base schedule(s) and schedule forecasts
Practice 5 - Integrate Subordinate Schedules During Execution

Practice 5a – Quality Check Subordinate Schedules

- Rigorous quality control can identify flaws and correct them
- Checklists to assess schedule quality can identify:
  - Incomplete logic
  - Inappropriate constraints
  - Incomplete use of relationships
  - Lack of resource loading
Practice 5 - Integrate Subordinate Schedules During Execution

Practice 5a – Quality Check Subordinate Schedules

- Foster a project environment that allows collaboration between owner & contractor resources
  - When practical, co-locate Owner & Contractor schedulers
  - Include detailed schedule update requirements in contract – helps to clarify method to be used
Our Project Team developed a Preliminary Schedule during FEL-1. We set the expectation to the Stakeholders for an In Service date. The subsequent schedules we issued did not alter this expectation although we showed slippage. What can we do to communicate the schedule next project so that there are no misunderstandings?
Practice 6 - Educate Stakeholders on Scheduling Practices

- Creating awareness within our stakeholders of the scheduling practices
- Carefully/consistently communicate to stakeholders, so they understand uncertainties of published schedule
- Communicate the of concept of Schedule Reserve for the “known unknowns” that can impact schedule.
Practice 6 - Educate Stakeholders on Scheduling Practices

- Use Probabilistic Scheduling to communicate the schedule to stakeholders
  - “Our Monte Carlo technique indicates we have 50% chance of meeting April In Service; 70% chance of meeting July.”

- Use a Change Log during FEL to trace schedule changes to scope changes

- Schedule changes can be traced to:
  - Scope additions during project development (FEL)
  - More detailed understanding of schedule constraints as project progresses though planning. (Ex. - Construction Windows changed by Environmental Constraints)
Benefits of Best Practices for Scheduling
Benefits of Best Practices for Scheduling

In the opinion of EPC Roundtable members, adoption of these Scheduling Best Practices can:

- Improve coordination and reduce conflicts between owners, contractors & stakeholders.
- Improve predictability of project in-service dates.
- Improve ability to forecast resource constraints through resource-loaded schedules.
- Better decisions by Project Management to steer the project to the best possible outcome.
Next EPC Roundtable

- May 2014 in Calgary
- Focused Session on Best Practices for Project Development
- FEL 1 and 2 activities in Owner Organizations
- Invitees
  - PMs
  - Business Development
  - Project Controls
  - Engineering
  - Functional Groups – Regulatory, Environment, etc.
Question & Answer
Contact Information

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