An Introduction to AO4

Delivered the fourth linear alpha olefins (AO) unit to the Shell manufacturing site in Geismar, Louisiana

- Provide additional 425,000 ton per year capacity
- Shell Geismar to be largest AO producer in the world
- Shell’s AO products are used in household consumer products and industrial products
- Utilized local relationships, resources, and contractors

Scope Split

- 60% ISBL (Main Unit)
- 40% OSBL (400+ tie-ins, tankage/ rail, and upgrades)

"With safety and quality at the forefront, the Tiger AO4 project is committed to set the standard for our industry."
Construction Strategy

Key Initiatives
- Develop construction work areas
- Start-Up Driven Design in early FEL3
- Utilization of AWP methods leading to “end-in-mind” thinking
- Built pre-assembled modules on-site
- Engineering and procurement followed construction sequence
- Start-Up sequence drove OSBL PoC
- Owner driven implementation of AWP
- Early funding above just long lead equipment

High Level Breakdown
- 91 Construction Work Areas
- 1,745 Installation Work Packages
- 343 Handover Systems

Results
- Materials on site to support construction sequence
- Held peak work force to 2,000 personnel
- Limited nights, weekends, and overtime
People, Process, Tools

Digital tools enable competent people to execute good processes more efficiently.
People, Process, Tools

Top-down Alignment
- “Leadership driven” rather than “management endorsed”

Doing “old work” a new way
- WFP Software allowed team to build work packages more efficiently
  - Main Works Contractor utilized WFP Software – 6 Work Face Planners for 5.5mm man hours
  - Nested Contractor did not utilize WFP Software – 6 Work Face Planners for 700k man hours

On-site Support
- Partnered with software providers to build AWP/ Digital competency to enhance the capabilities of WFP team
- On site training from technology companies to contractor employees
- AWP/ WFP training course administered through provider
People, **Process, Tools**

30/60/90 Process
- Developed a process to stay ahead of field construction
- Time to catch potential “fires” before they happen
- Develop deliverables important to your job
- Provides Discipline to work correct sequences

IWP Release/Approval Plan
- Ensure key stakeholders are involved – HSSE, discipline supervision, WFP and Client (when necessary)

90 Days Out
- IFC Drawings Issued
- Material ROS in support
- Special Procedures Identified?

60 Days Out
- Material Onsite?
- JHA Developed
- ITRs Identified

30 Days Out
- Foreman Assigned
- Constraint Free?
- Const Equipment Onsite?
People, Process, Tools

- Engineering & Procurement
  - Material Procurement System
  - 3D Engineering Design Model
- Track and Trace
  - Material Data
  - Engineering Data
  - Work Face Planning
  - Material Management System
  - Packaging Software
  - Estimating & Progress
- Construction
  - Completion Tracking Software
  - % Complete

P6 Schedule Master - Shell
Realized Benefits

Structural Steel, Equipment, and Piping >1.0 efficiency through bulk construction
- All three disciplines utilized WFP software

Had the tools to enable a disciplined team to make informed, *timely* decisions
- Hazard analysis with execution team by IWP
- Real-time material status overlaid into 3D model

Software automated repeatable tasks
- 5x more efficient for use in estimation
- Removed “middle man” to reduce human error in packaging
- Time to develop or modify packages greatly reduced
- Consistent, constructible work packaging
Lessons on Implementation

Data management is mandatory to avoid data integration issues affecting field productivity

- Establish the AWP procedure early (during FEED) to enable strategic planning to implement tools
- Integrating multiple software tools requires a strong data integrity plan
- Invest early in digital data exchange

Introducing new hardware/software is possible, but requires commitment

- Letting go of paper-based methods requires effort and time – start training early and often
- Immediately resolve data discrepancies to avoid distrust in the system
- Ensure the AWP process (and tools) have clear lines of accountability within the Owners team

Understanding the practicality of how and when to apply software solutions is difficult

- Applying technology earlier in the project lifecycle (i.e., barcodes applied at fabricator vs. on site) enables data visibility and simplifies execution of new tools, but it can add cost
Questions and Answers

Please go to slido.com using your smartphone, tablet or laptop, join the event #COAA19, select room “Pre-Conference Seminar: AWP SUMMIT” and view “QUESTIONS” to submit a live question to the panel now!

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