



FCCU Overhaul Safety Options

# CatCracking.com

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#### AGENDA

- Setting the Stage for Safety
- Challenges of conventional techniques
- Technology as a Strategy for Safety Improvement
- Showcase Project Details
  - Project Overview and Challenges
  - Details of Overhaul Process
  - Best Practices / Lessons Learned
- Conclusion



#### Philosophy of Safety

- In the Energy Industry, what is usually the first mentioned aspect in decision criteria?
- How do you judge the safety of a process or contractor?
- What are the consequences of an incident?
- What is a practical, operating philosophy for evaluating safety?



## **Challenges of Conventional Techniques**

- Generally Familiar
- Somewhat predictable
  - Outcome
  - Risk
- Preserves the continuous improvement momentum
- Not disruptive / generally won't get in trouble



#### Technology as Strategy for Safety

- Cutting and Parting of Metal Components
  - Flame Cutting
  - Machine Cutting
  - Hydrocutting
- Welding / Joining of Metal Components
  - Joint design and Prep
  - Automatic vs. Manual
  - Training and Experience



#### FCCU Project – Scope Overview

- Overall Original Scope: Work in four different vessels and modification of plant piping system.
- FCCU Regenerator Refurb: R/R overhead piping, top head, internal cone riser and 20 cyclones.
- Reactor Replacement: Overhead piping, reactor riser, spent catalyst standpipe and life/feed distributor.
- Frac Tower R/R overhead piping and 2 major shell sections.





#### **Regenerator Refurbishment Details**



 Hydrocut removal of Overhead Piping

Hydrocut of Vessel Head



#### **Removal of Internals**











#### Distributor Section Replace





#### **Challenging Accommodations**





#### Reinstallation of Distributor / Cone Riser





## **Regenerator Head Assembly**









# Preparation and Welding of Head





#### **Miscellaneous Modifications and Repairs**

- Section replacement
- Remove / replace or reposition connections
- Reconfigure nozzle sizes and locations









#### Lessons Learned Related to Safety

- Scope expansions
- Schedule disruptions
- Dimensional deficiencies
- Design changes
- Added oversight
- Culture
- Short term employees



### Lessons Learned Related to Technology

- Automation vs. Manual
- Advanced tooling
- Alternative processes
- Alternative and available mix of methods
- Experience, resourcefulness and adaptation



#### Conclusion (Summary)

**Best Practices / Lessons Learned** 

- Pre-Planning / Optimized Coordination
- Utilize Depth of Resources
- Applied Technology / Innovation

#### Value Potential:

- Safety Improvement
- Reduced Schedule Risk and Duration
- Lower Cost
- Improved Quality/Longevity



Questions.....

#### Thanks....

#### **Michael Welch**

Aquilex WSI (678) 412-5336 <u>mwelch@wsi.aquilex.com</u> <u>www.aquilex.com</u>