



# Facility Assessment for Improving Reliability and Profitability

Coking.com Conference  
Calgary 2007



## What is New?

- Less technical depth in the workforce of operating companies
- Fewer project oversight personnel for new facilities
- Lack of corporate standards
- Fast.... Typically 2-3 months, start to finish, with specific recommendations documented
- Task formatted results to facilitate implementation and early capture of benefits

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## New Paradigm in Reliability



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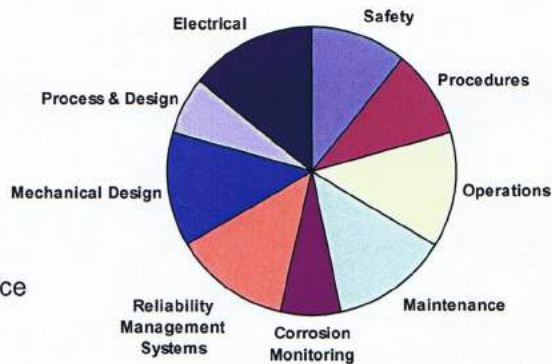
## Structured Work Process

- Team approach
  - Multidisciplinary team works with all levels of refinery operations and management
- Scope
  - Operations and integrity standards
  - Operation procedures and practices
  - PSM & safety standards
  - Process design issues
  - Rotating Equipment Reliability and Maintenance programs
  - Inspection programs and practices for pressure vessels and piping
  - Incident analysis procedures and follow up actions

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## Breakdown of Findings

- 50-120 gaps which span all areas of operation and maintenance
- Detailed summary of each gap provided including
  - Observation
  - Finding
  - Gap
  - Recommended Practice



Assessment Areas

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## Example 1 – Safety

Scalding Hazard

Falling Hazard

No Coke Fallout Protection

### Solutions

#### No Cost

- + PPE Upgrade
- + Procedure Review

#### Low Cost

- + Relocation Chute Operator

#### More Cost

- + Remote Operator Station
- + Autodeheading

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## Example 2 - Safety

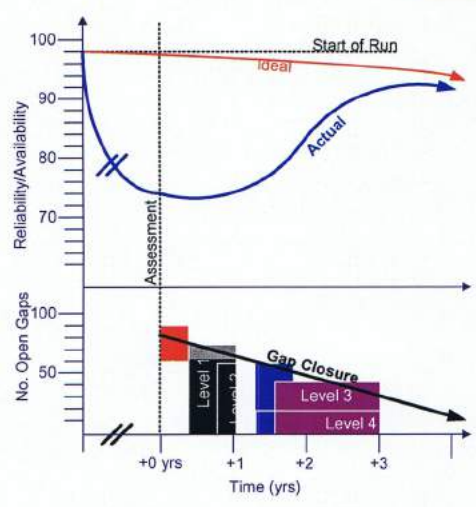
**Solutions**

- No Cost**
  - + Procedure Review
- Low Cost**
  - + Remote Piping
  - + Operator Use of H2S monitors
  - + Addition Block Valve
- More Cost**
  - + Drum Modification
  - + Autodeheading

## Closure Plan

Gap Prioritization

Safety	Highest Priority
Level 1	High Probability of Event with High Consequence
Level 2	Medium Probability of Event with High Consequence
Level 3	Medium Probability of Event with Lower Consequence
Level 4	Lower Probability of Event with Lower Consequence



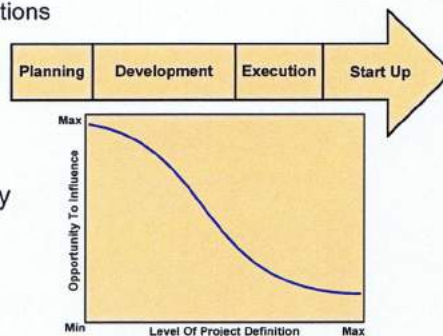
## Results Take Time

- After 3 years
  - Additional 8% average throughput, +3 kbd
  
- After 2 year
  - Closed most level 1-2 gaps
  - No unplanned downtime
  
- After 1 year
  - Management driven structured gap closure plan

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## Start Reliability Early – Project Phase

- Review of Contractor Engineering Quality (RCEQ)
  - Act as owners QC representatives
  
  - In-depth review of critical portions of
    - Project and Equipment specifications
    - EPC's detailed engineering
  
  - Spot check only
  
  - Reviewer does not have authority to initiate changes. All recommendations go through the proper project management channels



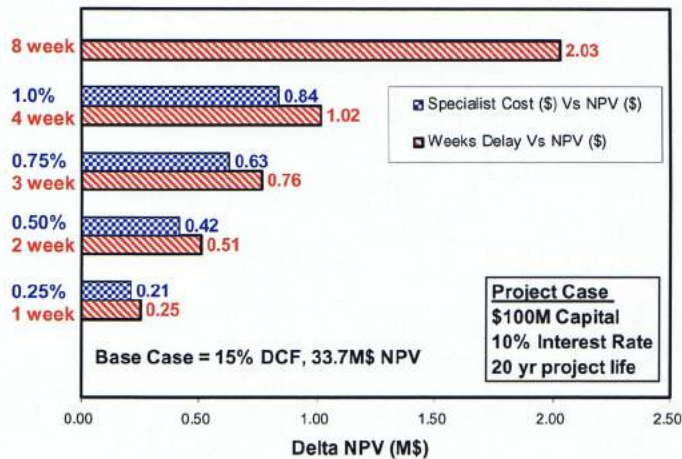
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## What has been found during RCEQ?

- Removed additional vacuum tower stiffening rings from work scope
- Nozzle loading exceeded maximum specifications
- During a DBM and P&ID review of a multi-unit FEED project, 48 comments were found.
- Hydrostatic pressure test for a vessel was not equivalent to the surrounding piping.

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## Effect of Delays and Specialist Costs on Project Economics



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## Modular Construction Expertise

- Review and revision of modular construction plans for efficient use of onsite resources
- Record setting heavy lift planning and execution



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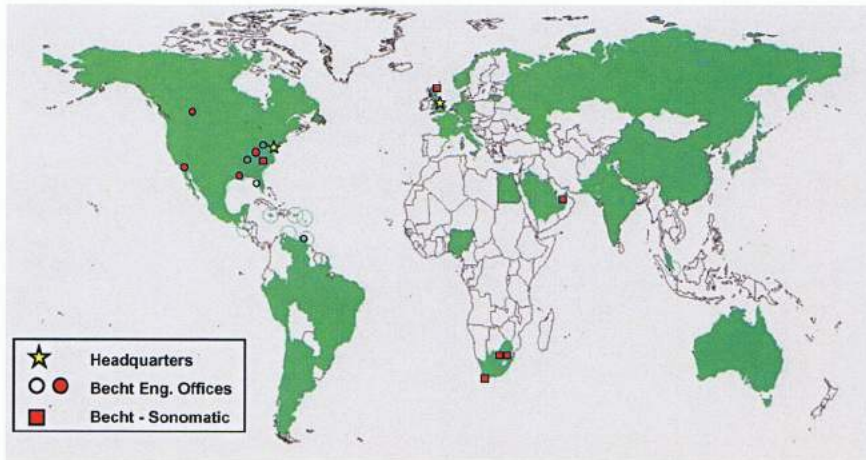
## Coke Drum Re-Leveling

- Performed on 16 drums
- Online
  - Complex lift plan
  - Oversight and coordination of bolting and concrete repair contractors
- Shutdown
  - Accelerated repairs during turnaround
  - Shortened a projected repair from 5 weeks to 6 days during a shutdown



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## Becht's Local Service, Global Reach



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