DELAYED COKING SAFETY

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Process Advisor

Delayed Coking Safety

Managing Safety

Who are the managers of coker safety?

- We are
- Coker operators, engineers, supervisors and managers
### Delayed Coking Safety

#### What is a Doctor of Delayed Coking (DDC)?

- Anyone who works in a coker unit
- Analogy of human body from Basic Operating training video in 1960's and 70's
  - Heart: pumps and valves
  - Arteries: pipelines, large bore pipes
  - Veins: small bore pipes

*The refinery is a complete body and functions as such*

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### Delayed Coking Safety

#### Coker Body

**Needs**

- Food (residue feedstock)
- Water (BFW, cutting, condensate and steam)
- Clothing (insulation)
- Heat (furnaces, exchangers)
- Cooling (air fans, condensers, coolers)
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Coker Body

Heart of the Coker is the Charge Pump and Heater

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Coker Body

Training and safety

- Would you trust your body to an UNTRAINED MEDICAL STUDENT?
- If human body were sold for parts, it is worth less than $1MM
- Minimum cost of a new Delayed Coker unit is around $150 MM
- Average cost of new refinery is around $4 to 6 billion

And who is running the plant?
## Delayed Coking Safety

### Managing Safety

#### Coker safety
- How to manage?
  - Changes to our industry
- What is needed?
  - Experience
  - Back to basics
  - Safe startups

### Changes to Our Industry

Changes in the last 20 years
- Air tugger, sled cart & manually hoisted chutes replaced by automation
- Automatic unheading, interlocks, motorized valves, ESD’s and computerized controls
- Slide valves

Technology we are seeing today is necessary for a better industry
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Changes To Our Industry

Barrier walls

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Changes To Our Industry

Operator Friendly Layout
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Changes To Our Industry

Bolt-free Graylock Connections

Automatic Unheading
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Changes To Our Industry

Automatic Switching

Slide Valves

Photos courtesy of DeltaValve
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#### Changes To Our Industry

What else has changed?

- Lack of progress in operator training
- Cutbacks in training funds
- Reductions in workforce
  - Solomon 250 bbl/man rule
  - Natural attrition
- More hours (OT)
- Refinery expansions

A clear need for operator training
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**Experience**

- What price do we put on experience?
- What price do we put on safety?
- Cost is figured into the bottom line
- Result is reduced training costs
- Experienced retired operators brought back as advisors and trainers

But what about the future?

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**Delayed Coking Safety**

**Coker Safety**

Back to basics

- Well-trained operator is the key to a safer coker
- Automation alone is not enough
- Clear, concise procedures needed for operators to follow and use as a training tool
- Opportunity and time to practice emergency drills
- Continuous improvement in safe work practices
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#### Coker Safety

**Back to basics cont’d**
- Validation of procedures regularly
- Use of outside consulting for up-to-date practices and procedures
- Emergency and crisis prevention
- Equipment isolation and preparation for maintenance
- Troubleshooting (listening to your unit)
- Process knowledge (empowering the operator)

### Delayed Coking Safety

#### Safe Startups

- Without accidents or incidents
- No loss time injuries
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Safe Startups

Reliance – Jamnagar, India

![Reliance - Jamnagar, India](image)

Photo courtesy of Reliance

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Delayed Coking Safety

Safe Startups

Valero – Port Arthur, TX (formerly Clark, Premcor)

![Valero - Port Arthur, TX](image)
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<td>Safe Startups</td>
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<td><strong>MOL Hungarian Oil Co. – Szazhalombatta, Hungary</strong></td>
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![Image of a coking tower]

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![Image of another coking tower]
Delayed Coking Safety

Safe Startups

Pemex – Cadereyta, Mexico

Delayed Coking Safety

Safe Startups

Valero – Texas City, TX
Delayed Coking Safety

Safe Startups

Sincor – Jose, Venezuela

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Conclusions

- Well-trained operators are necessary for safe coker operations
- It is essential to update procedures and make sure they are followed
- We are the managers of coker safety
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Coker Body

The End...

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Questions?
Thank you

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