United Laboratories International, LLC

Coking.com®

ZymeFlow®

Cost Effective Solutions For The Efficient Decontamination Of a Coker Unit

Düsseldorf, Germany 2011

Today's Agenda

1. **Coker Decontamination Project Overview**
   - ULI Product Applications
   - Coker Vessel Decontamination
   - Preventing Pyrophorics
2. **Other Applications**
   - Visbreaker Decontamination
   - Packing Bed Treatment
3. **Advantages Over Conventional Decontamination Methods**
4. **Conclusions and Recommendations**

WHAT IS DECONTAMINATION?

Process of making equipment ready for personnel entry.

Removal of all hydrocarbons, gases and pyrophoric compounds that can cause danger to personnel and the unit itself

Zyme-Flow® UN657

United Laboratories International, LLC #1 product for decontamination of all types of equipment.

- **No hazardous materials & no VOC's**
- **HMIS rating 0-0-0**
- **Wastewater friendly with inherent separation**
- **Apply in water or steam (Vapour-Phase®)**
- **Mild oxidizer of H_2S and FeS**
- **Excellent penetrant of sludge, scale, and surfaces to free hydrocarbon and benzene from vessels**
- **Measurable throughout the process**

Zyme-Ox® Z-20

Less surfactant then Zyme-Flow® but more oxidation strength:

- **Concentrated Oxidizer**
- **Demisters and Packed Bed Pre-Flushes**
- **Sulfides/Pyrophoric Iron Sulfide Oxidation**
- **Aqueous/Water Only Applications**
- **Effective on Mercaptans**

Rezyd-X® Z-67 Organic Solvent

- **Can be used in oil to improve effectiveness during cutter wash**
- **Can be used in water flushes or circulations with Zyme-Flow® to break down and mobilize heavy hydrocarbon, solids and polymers**
- **Can be used in steam to break down heavy hydrocarbon and polymers**

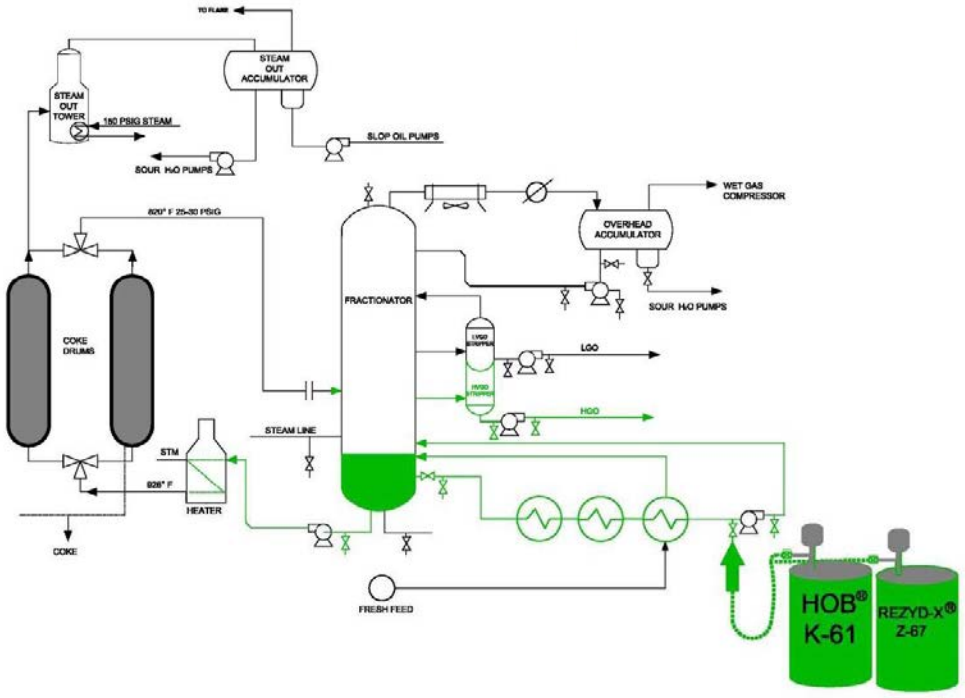
Decontamination Project (October 2010)

- Heavy Asphaltenes
- Pyrophoric Iron Sulfide
- Hydrogen Sulfide
- Benzene & Hydrocarbon
- Towers and Drums
- Heat Exchangers and Lines

Coker Decontamination Project (October 2010)

PROCEDURE

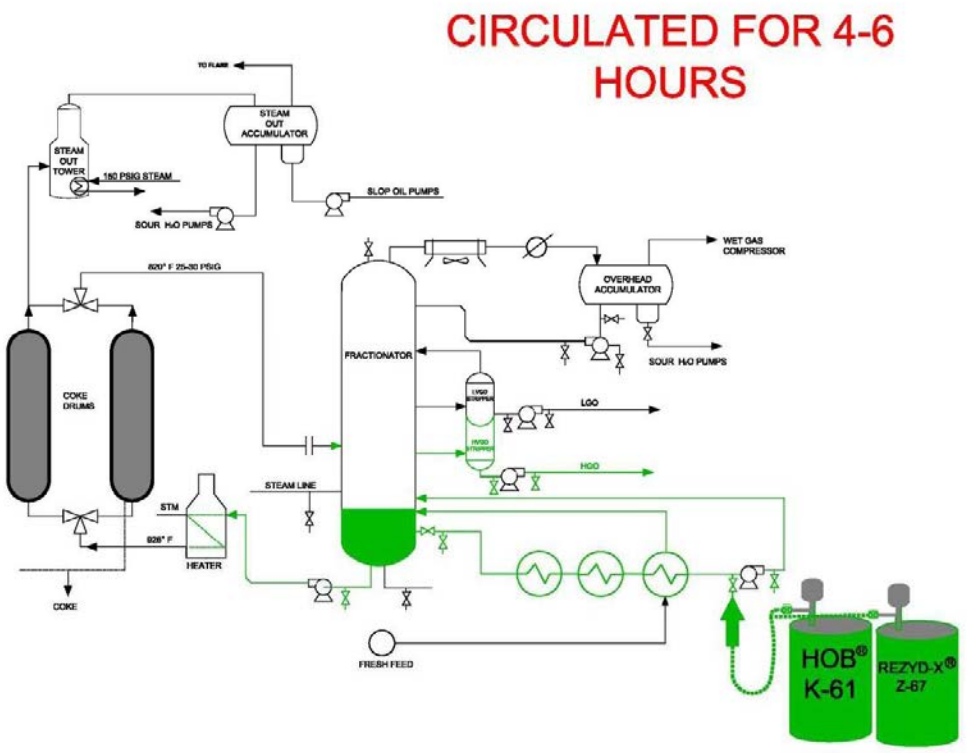
- **Coker Unit Viscosity Flush**
  - **Reduction Of Heavy Asphaltenes From Feed and Heavy Ends Equipment**



Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Includes Injection Of Rezyd-X®**



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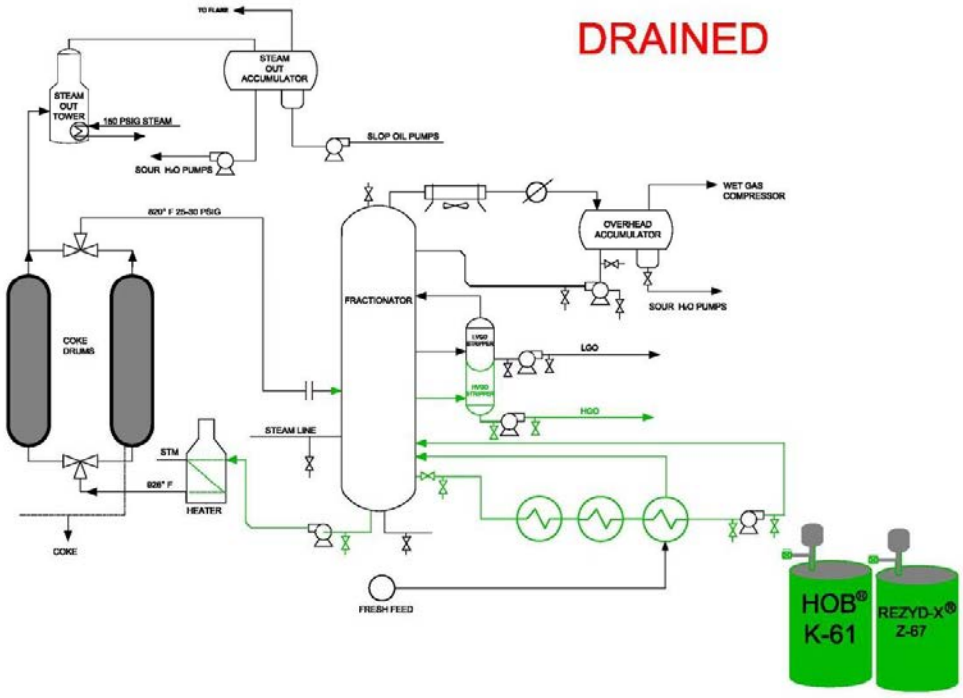
Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**

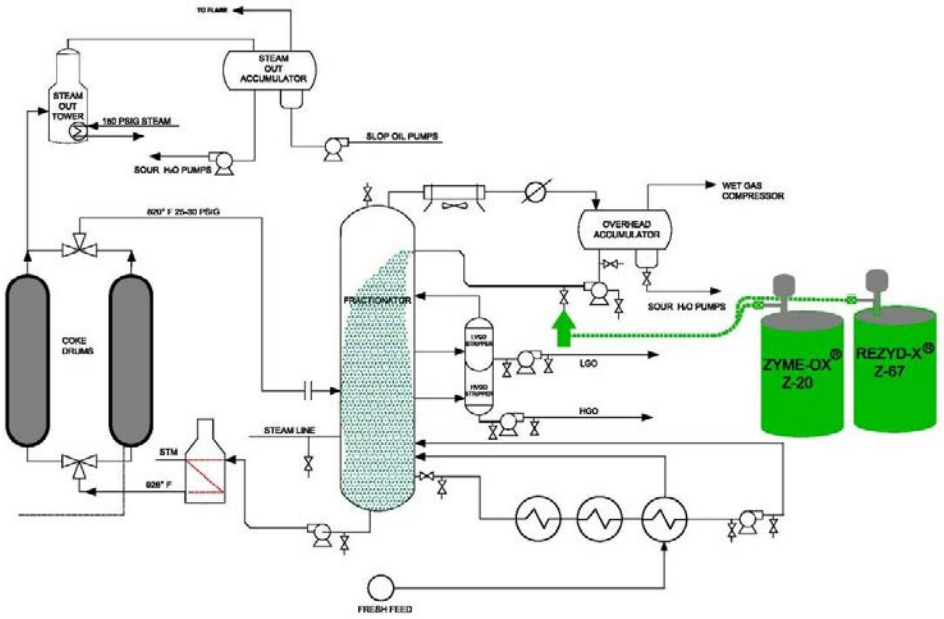


Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
  - **Decontamination Of Pyrophoric Iron Sulfide In Packing Beds**

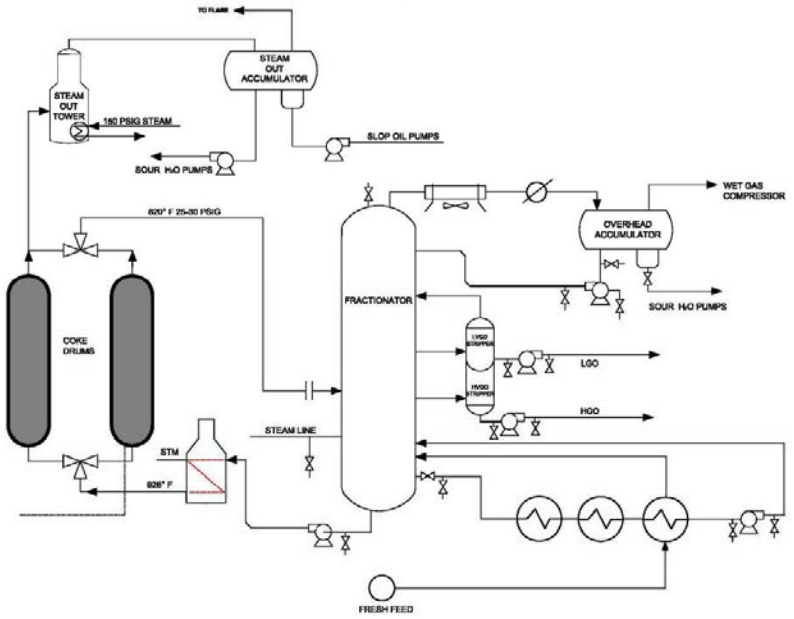
H_2O FLUSH



Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
- **Coker Unit Decontamination**



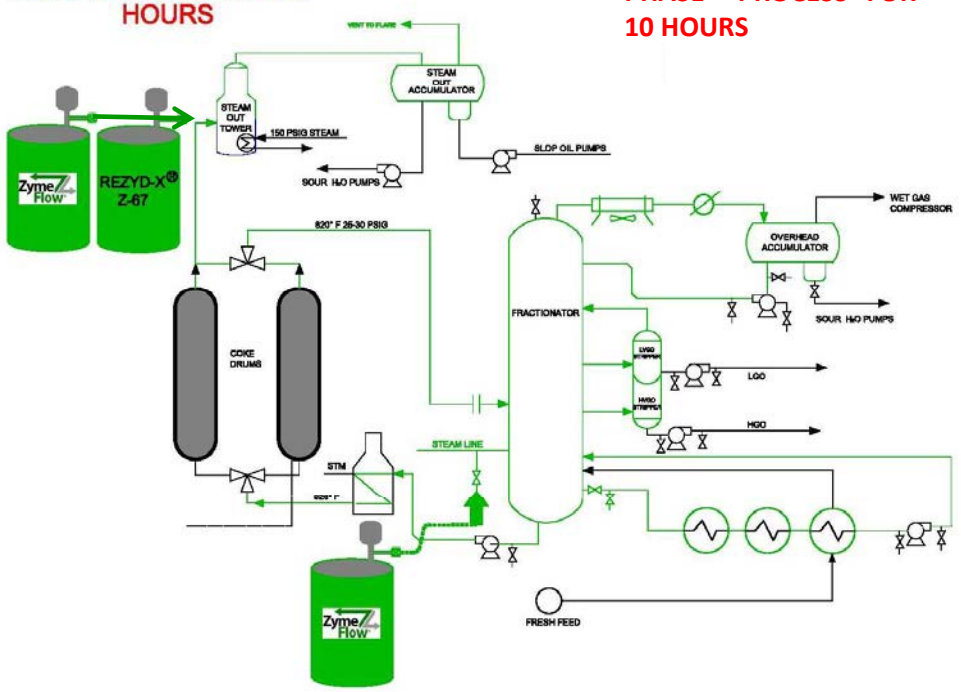
Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
- **Coker Unit Decontamination**

BEGAN BOIL-OUT / CIRCULATION FOR 8-10 HOURS

BEGAN ZYME-FLOW® INJECTION & VAPOUR PHASE® PROCESS FOR 10 HOURS

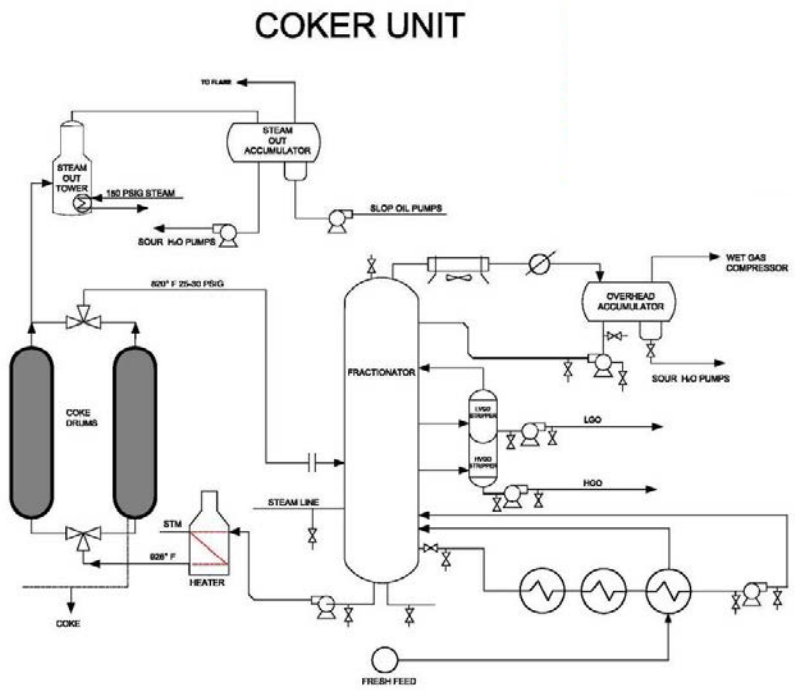


Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
- **Coker Unit Decontamination**

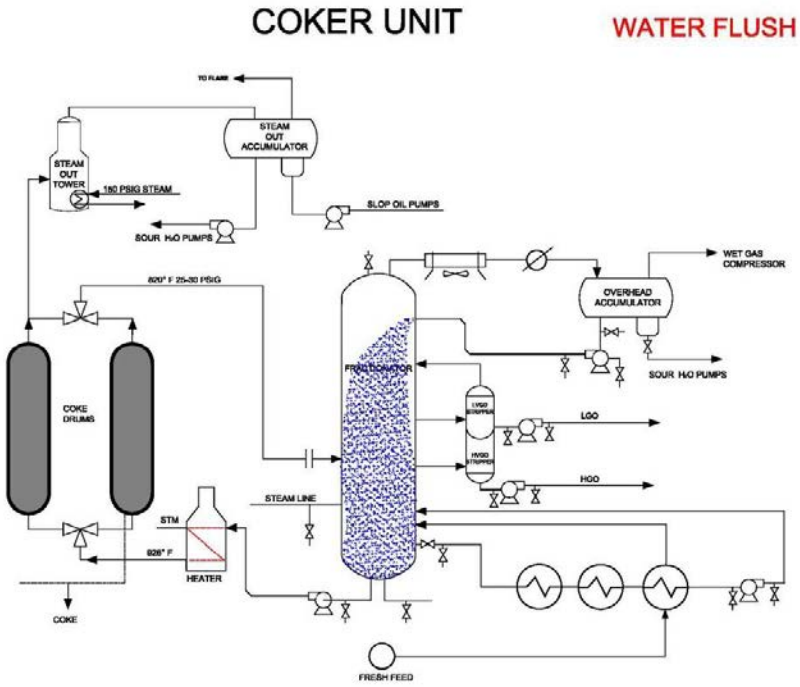
Readings of H_2S = 0 ppm
Benzene = 0 ppm, LEL = 0%
Zyme-Flow® = 300-800 ppm



Coker Decontamination Project (October 2010)

PROCEDURE

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
- **Coker Unit Decontamination**
- **Fractionation Tower Post-Rinse**
  - ➢ **Targeting any Remaining Pyrophoric Iron Sulfide Scale and Solids**

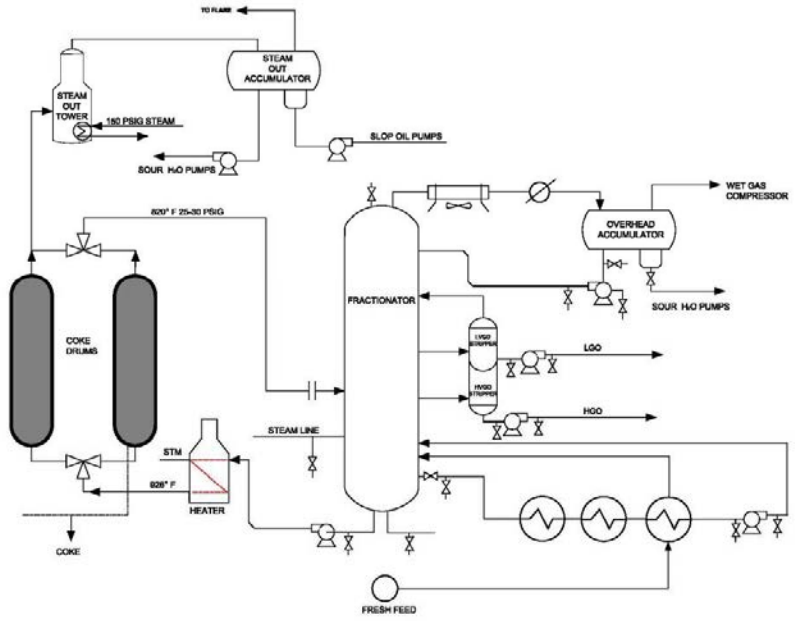


Coker Decontamination Project (October 2010)

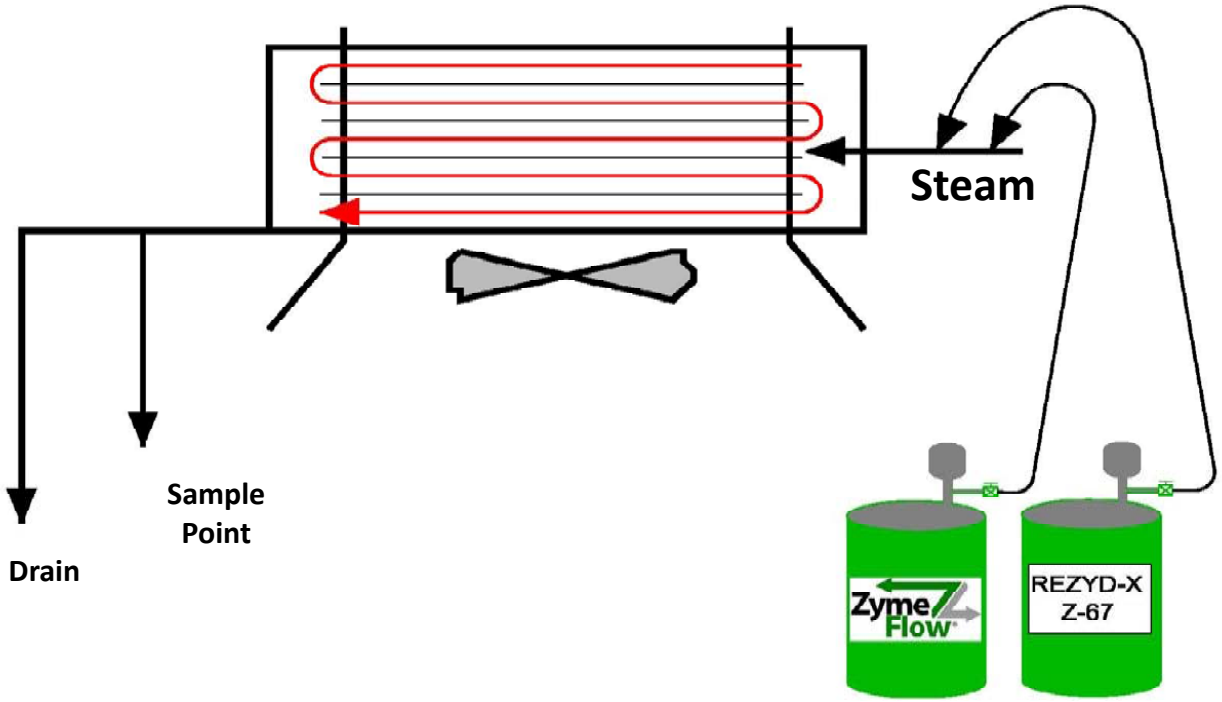
PROCEDURE REVIEW

- **Coker Unit Viscosity Flush**
- **Fractionation Unit Pre-Treatment**
- **Coker Unit Decontamination**
- **Fractionation Tower Post-Rinse**
  - ➢ **Customer very satisfied with the results and with the time frame in which the decontamination was completed**

READY FOR ENTRY



Fin Fan Heat Exchanger Efficiency Recovery

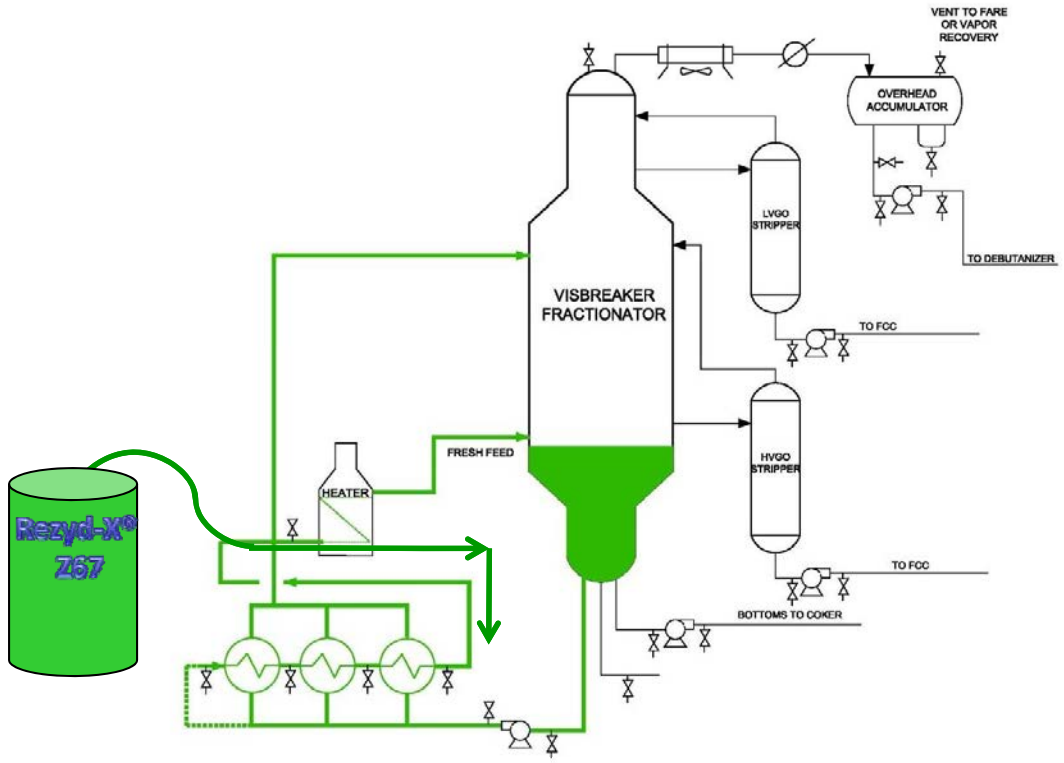


Difficult problems can mean simple applications

Visbreaker Unit Decontamination

Circulate 4-6 Hours

Rezyd-X® LIGHT OIL VISCOSITY WASH



3.

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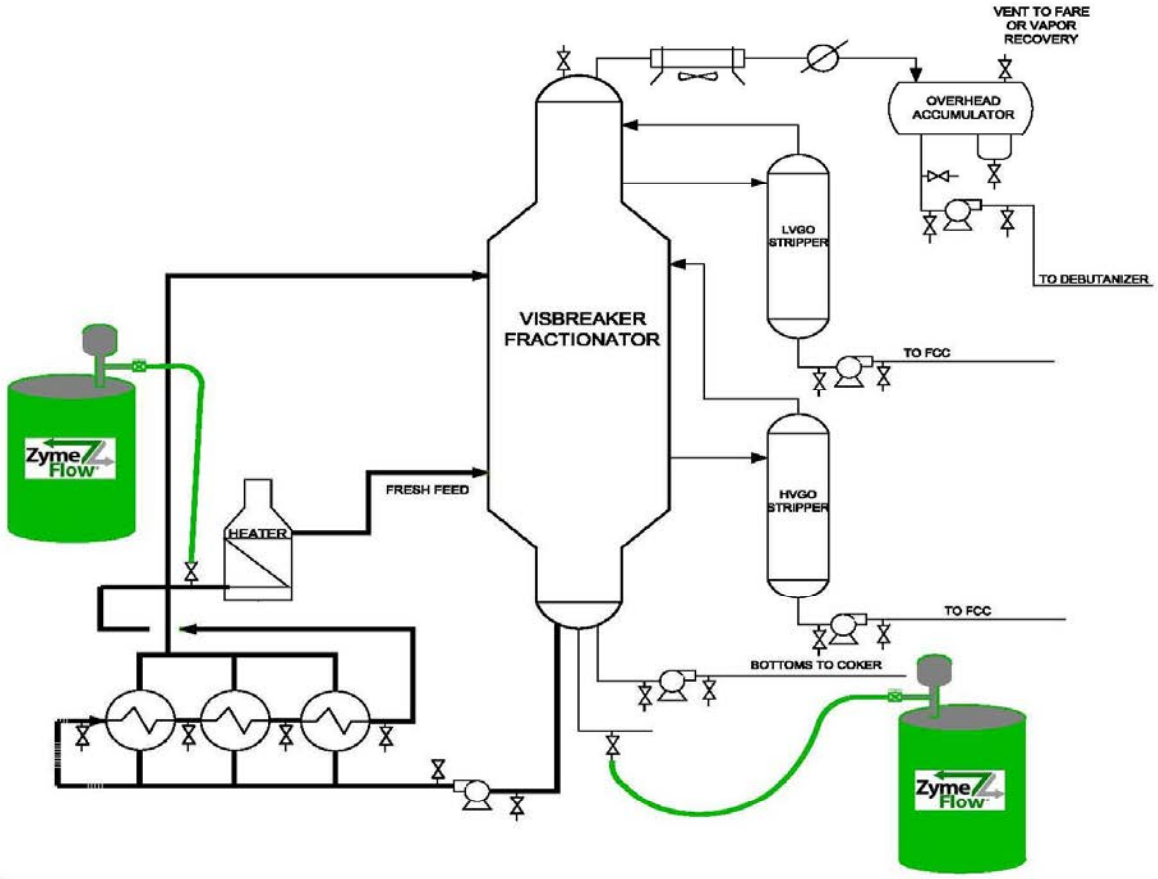
Visbreaker Unit Decontamination

Vapour-Phase® 7-10 Hours



Visbreaker decontamination

Additional Coker Unit Vessels Decontaminated

- Blowdown Tower
- Settling Drum
- Flare Drum

Combination of Vapour-Phase® and Circulation

- 7-10 hours to decontaminate for entry
- Hydrocarbon free
- H_2S, LEL free
- No issues with pyrophoric iron sulfide
- Equipment entered safely for final clean-out
- Remaining decontaminated scale/ debris quickly and safely removed

Feed Pre-Heat Exchangers

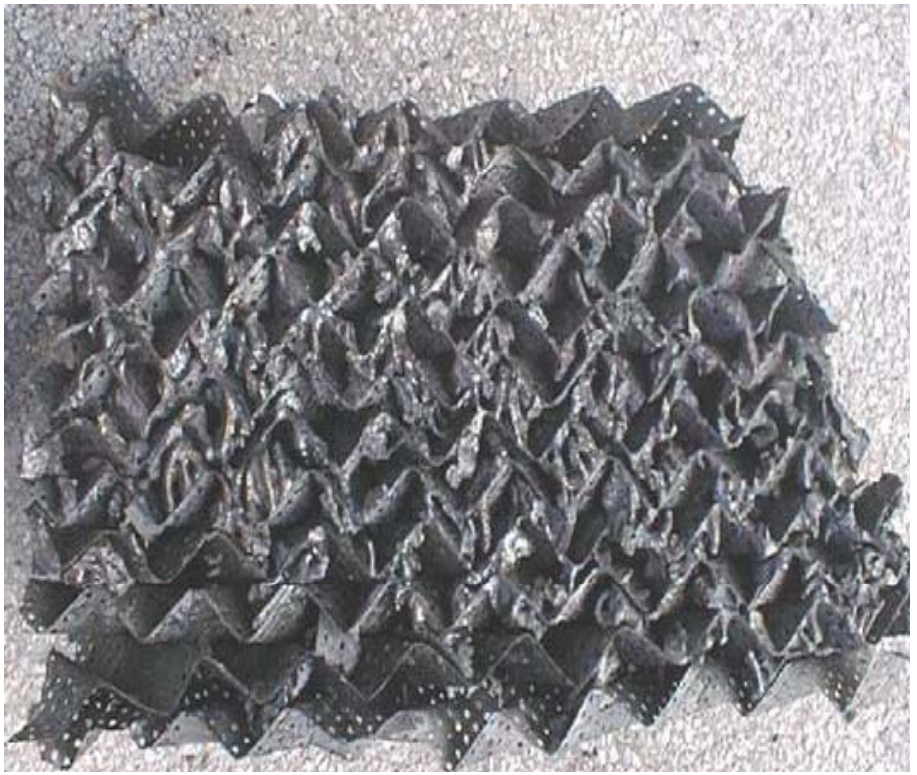
- **Treat heavy asphaltenes**
- **LCO wash with Rezyd-X®**
- **Softens and breaks up hydrocarbon deposits**
- **Makes it easier to pull and clean exchangers**

Coker Pre-Heat Train Exchangers

"The exchanger bundles were much easier to pull out of the shells than they have ever been before using this cleaning technique. The carbon buildup that was left in the bundles was also easier to clean with water blasting than it had ever been before."

Prevent Pyrophoric Iron Sulfide Fires

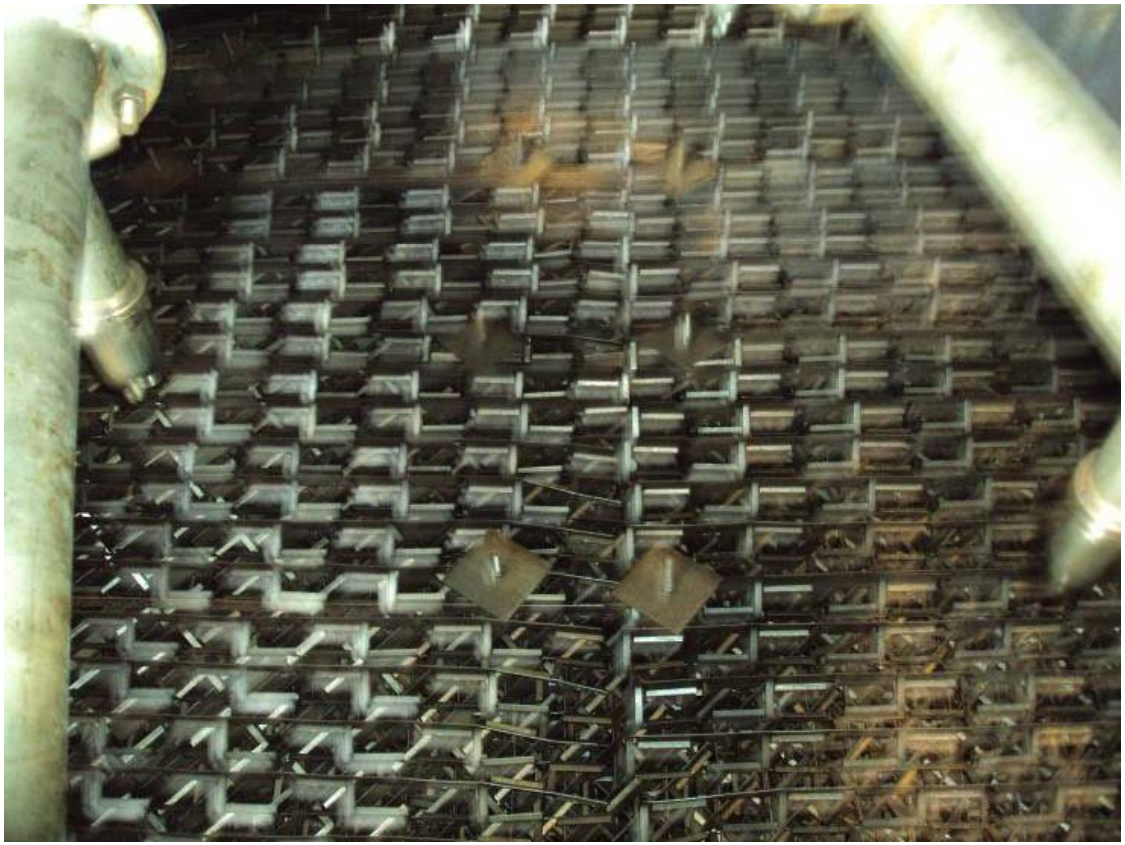
- Tight packing traps small particles of FeS, polymer, and heavy oil
- Oil & Polymer protects FeS from common oxidizer solutions
- When dry and in contact with air—a fire!



Safety from Pyrophoric Iron Sulfide

- **Pre-Flush over Packing Beds using Rezyd-X® and Zyme-Flow®**
- **Zyme-Flow® + Steam to finish the oxidation during normal decontamination (Vapour-Phase®)**
- **Post-rinse with Zyme-Ox® and water as final step of pyrophoric oxidation**

Coker Fractionator– Bed 3



Coker Fractionator – Bed 4

Coker Fractionator– Bed 4 Distributor

This could be you . . .

Customer Comments:

From Nova:

"All areas did an outstanding job bringing the plant down. There were no significant loss of process containment issues and no significant personnel exposures to chemicals. Upon opening all units are reporting that the equipment is the cleanest we have ever seen. The effort spent to improve our de-inventory systems, develop shutdown procedures and the execution by the operations people and those supporting them really set the stage for a successful turnaround."

From Conoco Operations:

"Paul, United's Tech support once again did a wonderful job and were very professional. I appreciate their attention to detail and working safely. The wet Gas Compressor had no issues with LEL or H_2s. Typically in the past they would dismantle the system in breathing air but not this time. Tower and C5's believed to have turned out very well also. Du-2 is being blinded off today. I will let you know how the systems turned out first chance I have to drop a note. Have a good day."

Contact Information

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QUESTIONS?