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MORE PRODUCTION - LESS RISK!

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Stop Plugging Those Coker Lines!

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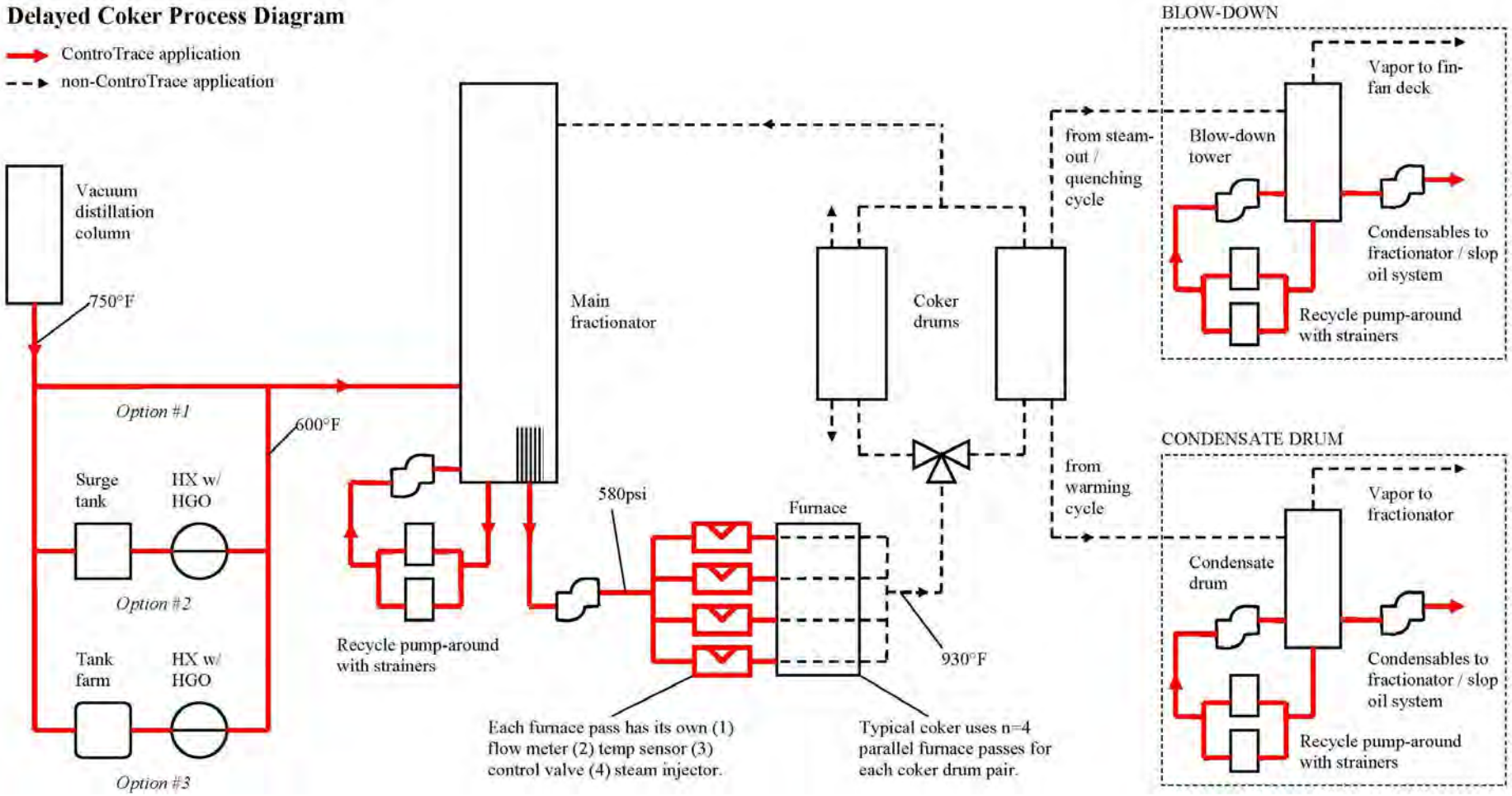
Controls Southeast, Inc.

Heavy process subject to “plugging”

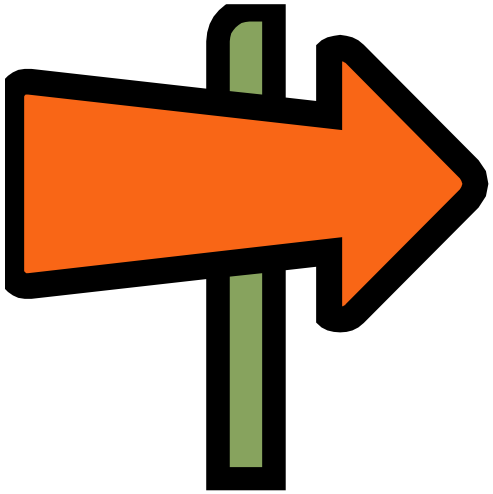
False sense of security

Specific problem areas



Overview

PROCESS FLOW STOPS + HEAVIER FEEDSTOCK = INCREASED "PLUGGING" RISK



1. Game changer
2. Available heating technologies
3. ControTrace usage
4. Concern areas

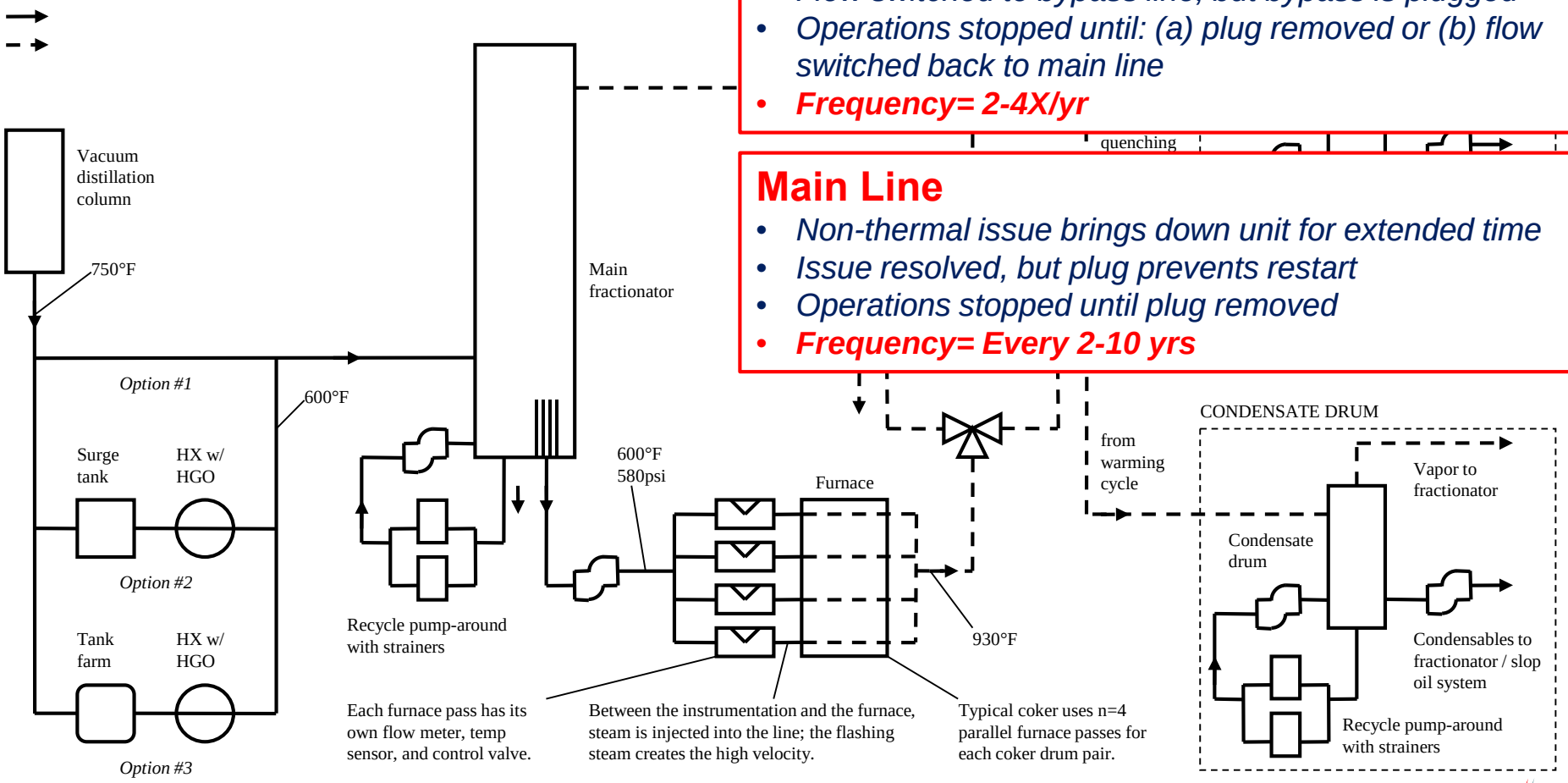
2 main types of plugging

Bypass Lines

- *Piping, valves, instruments, pumps*
- *Flow switched to bypass line, but bypass is plugged*
- *Operations stopped until: (a) plug removed or (b) flow switched back to main line*
- ***Frequency= 2-4X/yr***

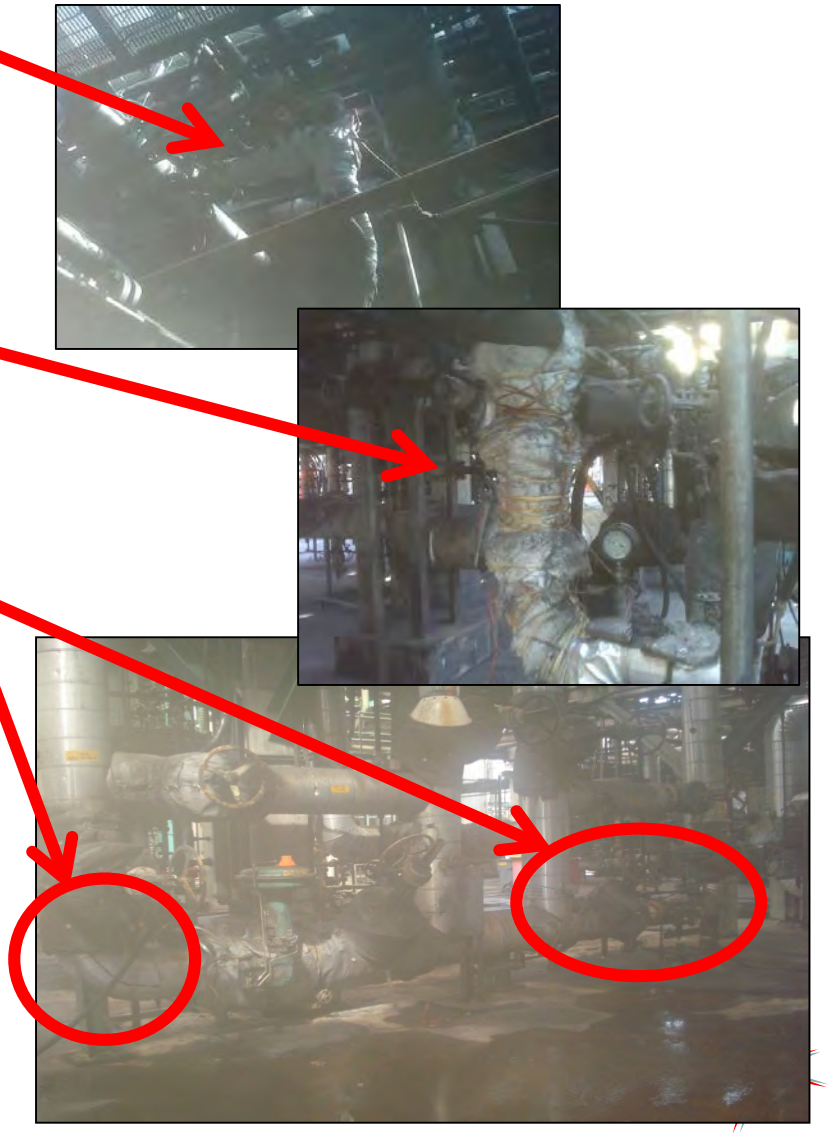
Main Line

- *Non-thermal issue brings down unit for extended time*
- *Issue resolved, but plug prevents restart*
- *Operations stopped until plug removed*
- ***Frequency= Every 2-10 yrs***



Typical Specific Problem Areas

- Wedge meters in front of Furnaces
  - Trouble with plugging
  - Need to use flushing oil to keep free
  - Use of Ceramic heat blankets to operate
- Redundant pump lines
  - No-flow side plugs, can't operate when needed
- Resid feed lines plug
  - Ceramic heat blankets - Flushing oil
  - Hydroblasting - Steam hoses
  - Ram pumping
- ET Lines
  - Pre-mature coking from crossed lines
  - Uneven temperature distribution
  - Failed systems allow plugged lines



Have you done this to melt out a line?

If you need a Rosebud, ceramic heat blanket, steam hose, etc. to melt out your lines, your heating system is not working!

Have you had to remove a plug with mechanical means?

Plug

What value is this heat tracing providing?

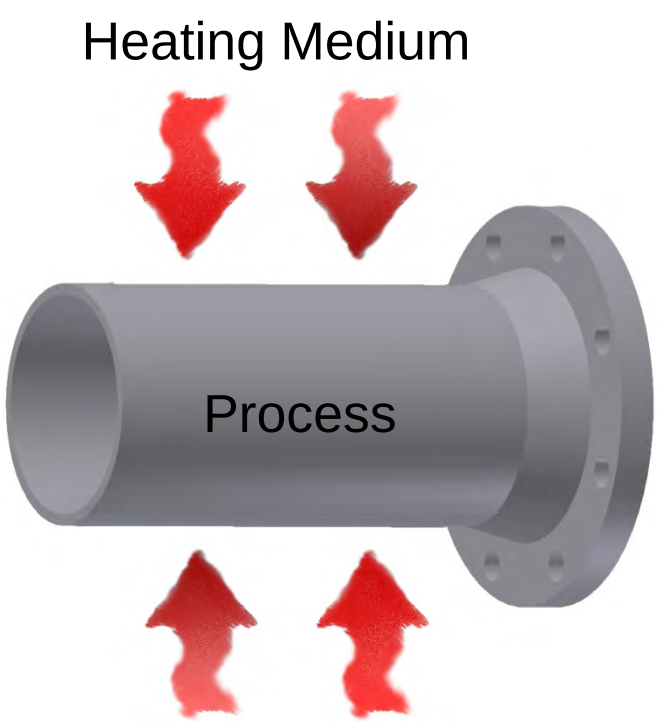
- It allowed the resid to plug
- It can't melt it out
- What is the difference between this tracing and having no tracing at all?

Pipe heating technologies

- Foundation is:

$$q = U \times A \times \Delta T$$

- Create **ΔT** with high-temp heating medium
- Difference is in **U, A**
- 3 steam/oil heating technologies
  - Jacketed piping
  - Conventional tube tracing
  - ControTrace



Jacketed piping

- Process flows through core piping
- Jacket completely surrounds core
- Heating medium flows through annular space
- Maximum U and A → best thermal capability
- >2X material of process piping
- 3-5X labor of process piping
- Cross-contamination risk

$$q = U \times A \times \Delta T$$

Tube tracing

- Process flows through piping
- ½” tubing is banded onto piping
- Heating medium flows through tubing
- Can use mastic to improve heat transfer
- Add tubes for more heat
- Two circles touching at a point– maybe

$$q = U \times A \times \Delta T$$

Tube tracing

Common coker complaints

- Poor heat transfer contact
- Uneven heating
- Required steam pressure is very high
- Breaks easily (walked on)
- Could make it work until received heavier feed
- Can be tough to service valves

$$q = U \times A \times \Delta T$$

ControTrace

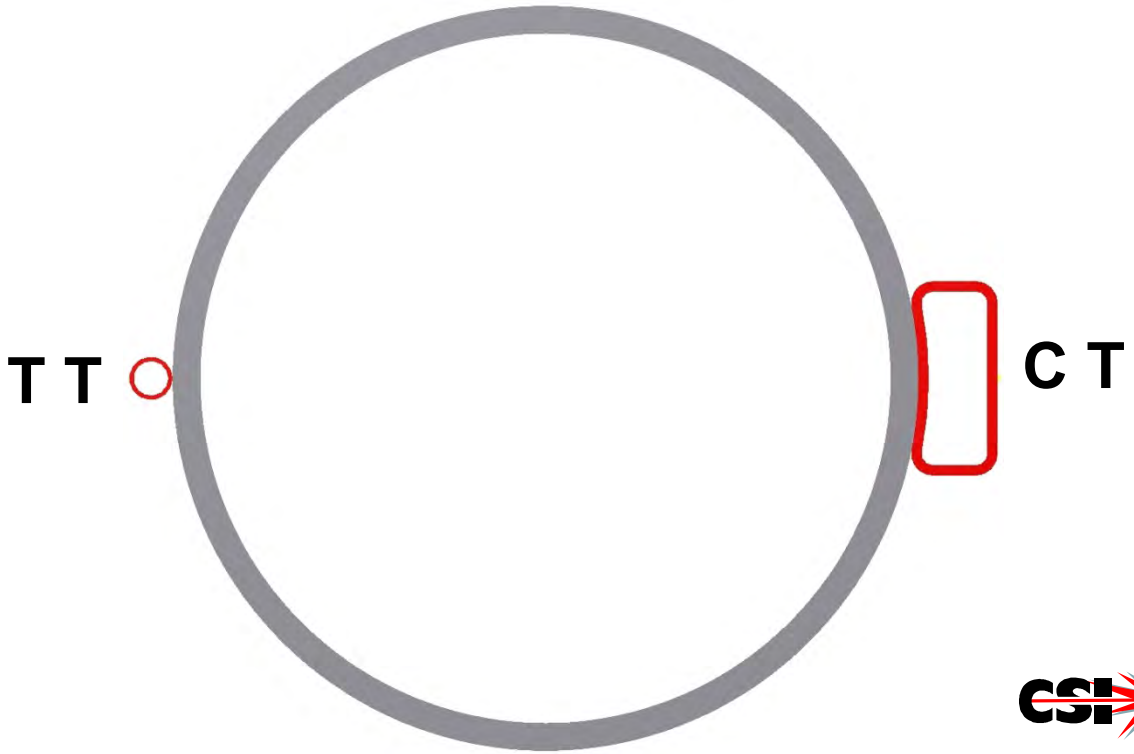
- Process flows through piping
- 2”X1” rectangular tubing is banded onto piping
- Designed with ASME Section VIII
- Contoured to fit pipe OD
- Heating medium flows through tracing
- Use mastic to remove air gaps
- Add elements for more heat

$$q = U \times A \times \Delta T$$

Higher U and A

$$q = U \times A \times \Delta T$$

T T	U = 1
C T	U = 40

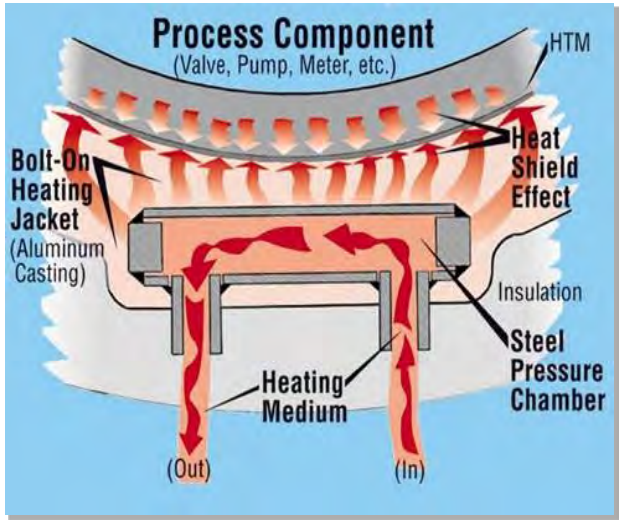


ControHeat

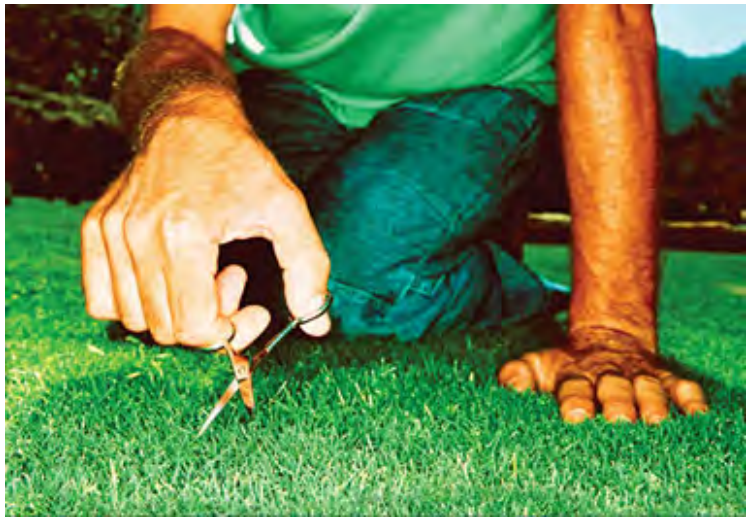
- ControHeat for valves, pumps, instrumentation

ControHeat

- **Steel pressure chamber embedded in aluminum** casting for excellent heat transfer
- Designed, built, and tested in accordance with ASME Section VIII, Division 1
- Jacket for valves, pumps, meters, fittings, flanges – virtually any type of process equipment



Choose the right technology



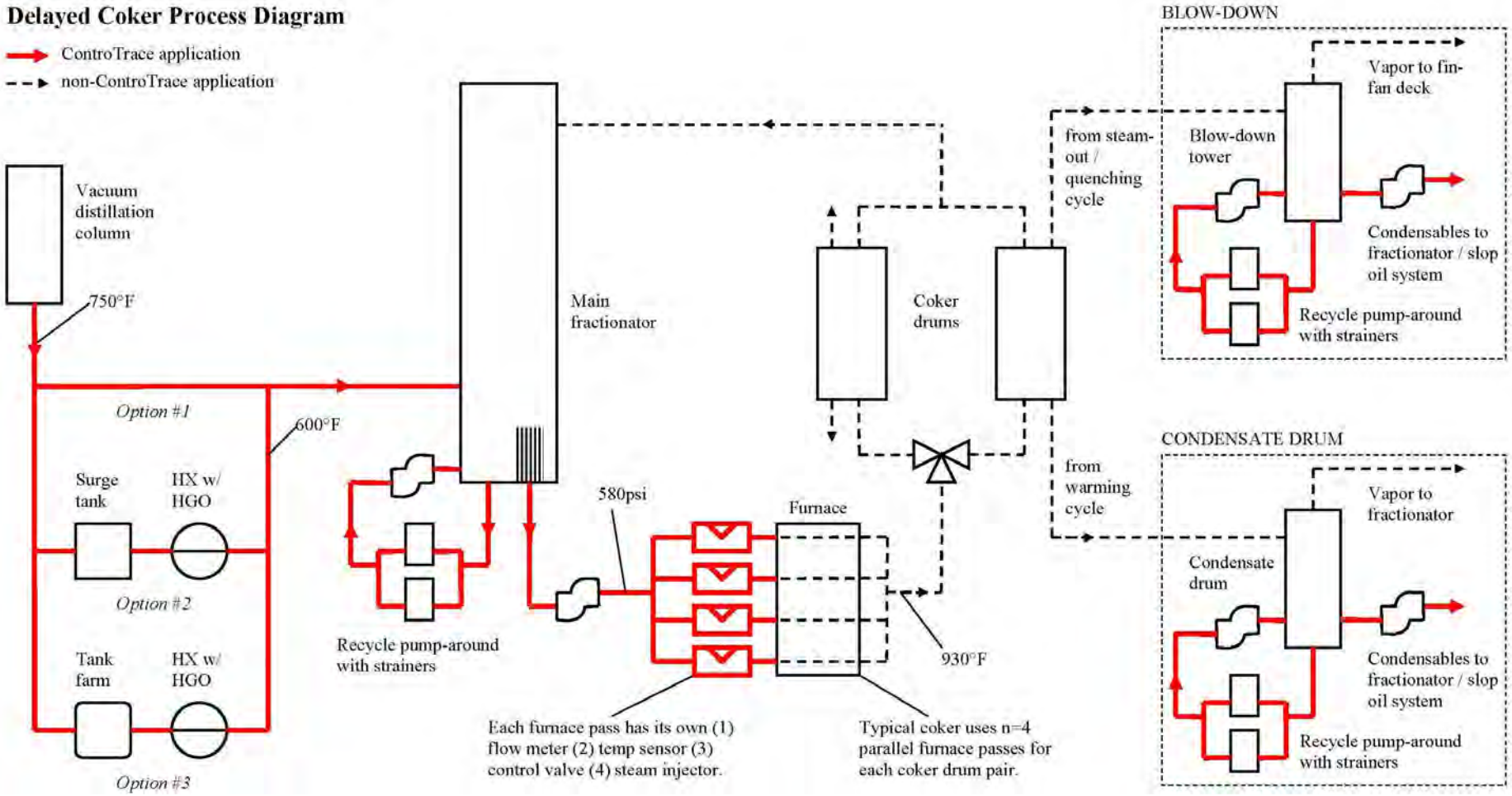
VS.

Conventional tube tracing

ControTrace

Choose the right technology

CT in the Coker Unit



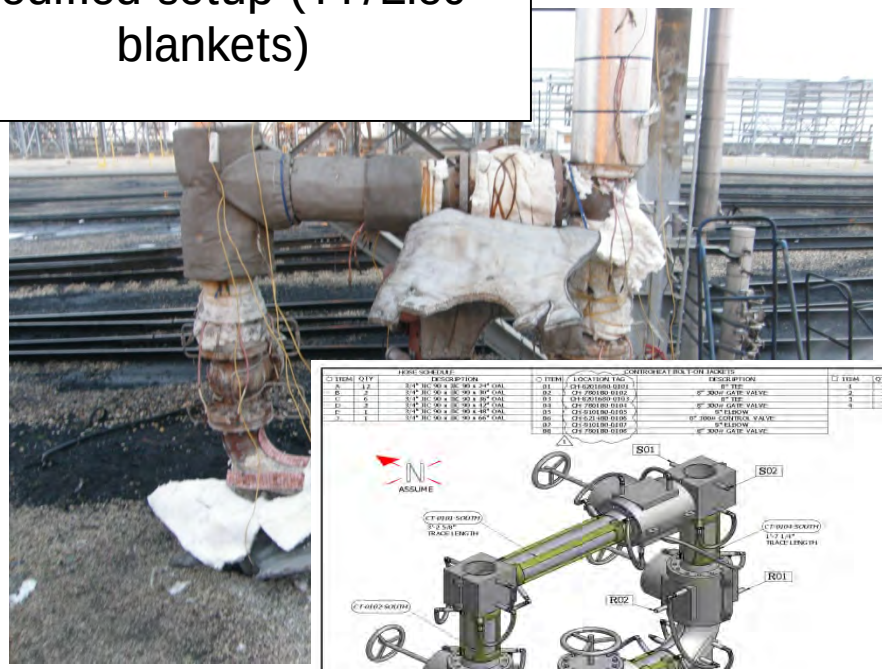
General recommendations

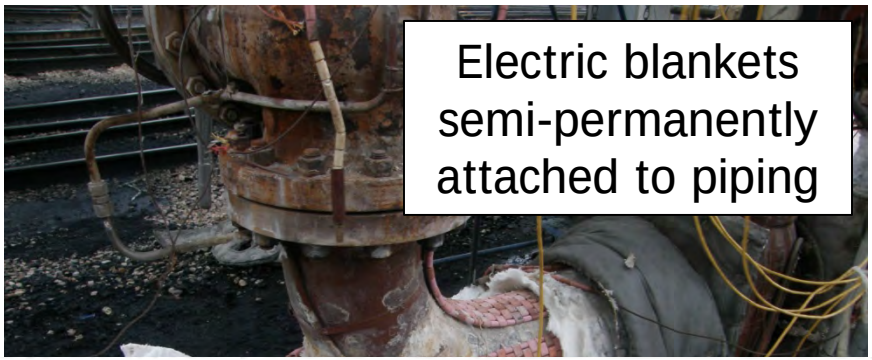
Use ControTrace for…

1. Lines between vac tower and coker furnace
2. No-flow lines
3. Heavier product
4. Critical components

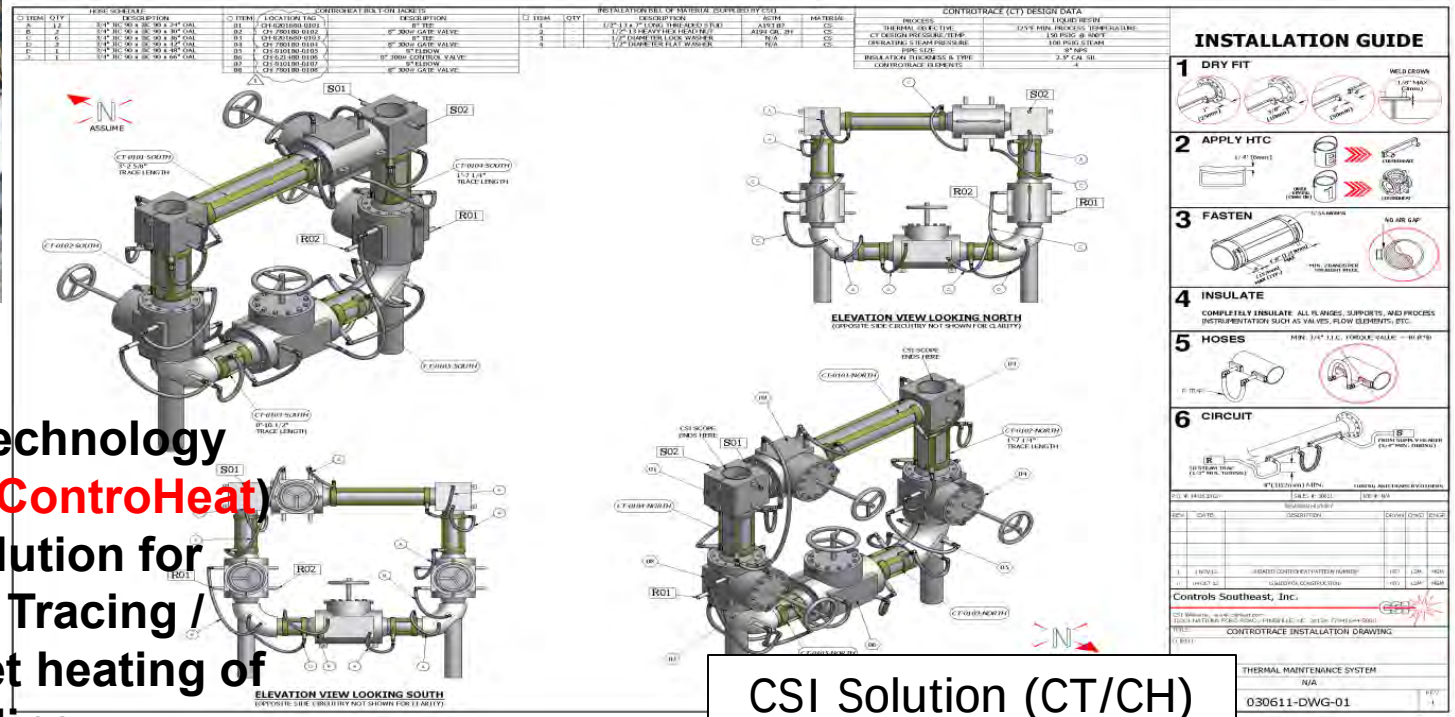
Coker Issue Resolution

Modified setup (TT/Elec blankets)





Electric blankets semi-permanently attached to piping



CSI bolt-on technology (ControTrace / ControHeat) provides solution for hybrid Tube Tracing / Electric Blanket heating of coker line

CSI Solution (CT/CH) Installation Drawing

Specific target areas

1. Wedge flow meters prior to coker furnace
2. Bypass/recirculation lines/strainers
   a. Fractionator
   b. Coke condensate drum
   c. Blow-down area
3. Drains to OWS throughout the unit

Summary

- Flowing process gives a false sense of security
- Heavier feedstock changes the game
- Coking experts are turning to more robust heating system (ControTrace)
- Specific target areas:
  - Wedge flow meters prior to coker furnace
  - Bypass/recirculation lines/strainers
  - Drains to OWS throughout the unit
- Call us if we can help

Thank you!

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