



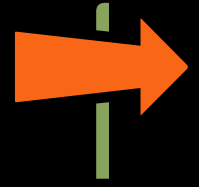
Coking.com[®]

Alberta, Canada September 13-17, 2010

Stop Plugging Those Coker Lines!

*Jim Hartman
Controls Southeast, Inc.*

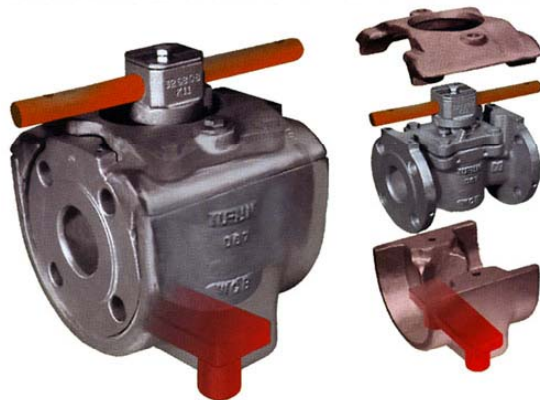
Agenda



1. CSI overview
2. End-user feedback on heating problems
3. Reasons for the problems
4. Potential for enhanced value proposition

CSI overview

1. Heated piping systems
2. Engr. services
3. Process piping
4. Specialty fabrication



CSI bolt-on refinery successes

- **BP** – [Carson](#), Cherry Point, [Texas City](#), [Whiting](#)
- **Chevron** – [El Segundo](#), [Pascagoula](#), Salt Lake City
- **ConocoPhillips** – Borger, Rodeo, [Sweeny](#), Trainer
- **Exxon** – Baton Rouge, [Baytown](#), Beaumont, Sid Richardson, Torrance
- **Flint Hills** – Corpus Christi, Pine Bend, [Rosemount](#)
- **Lyondell** – Houston
- **Marathon** – Canton, [Cattlettsburg](#), [Detroit](#), [Garyville](#), Robinson, St. Paul
- **Opti/Nexen** – [Fort MacMurray](#)
- **PetroCanada** – Edmonton
- **Shell** – Anacortes, Caroline, Deerpark, Fort McMurray, Martinez, Shantz
- **Sinclair** – Tulsa, [Wyoming](#)
- **Sincor & Petrozuata** – Venezuela
- **Suncor** – Commerce City, Fort McMurray, Sarnia
- **Sunoco** – Eagle Point, Marcus Hook, Philadelphia
- **Syncrude** – Fort McMurray
- **TCO** – Kazakhstan
- **Valero** – Ardmore, Corpus Christi, Houston, Lima, Memphis, Norco/ St. Charles, Paulsboro, Three Rivers, Wilmington



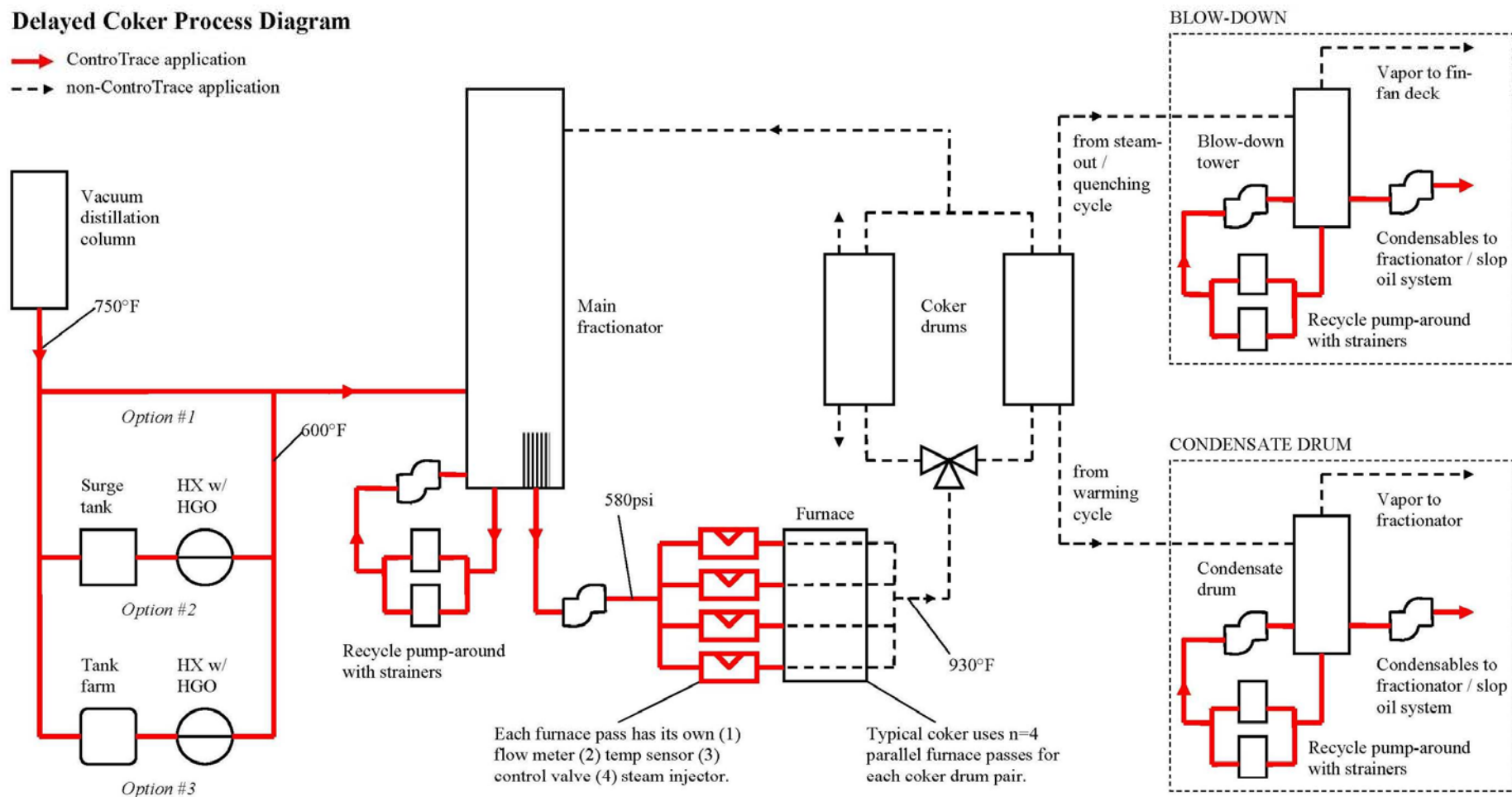
General problem in cokers =
Heavy process subject to “plugging”



Specific problem areas

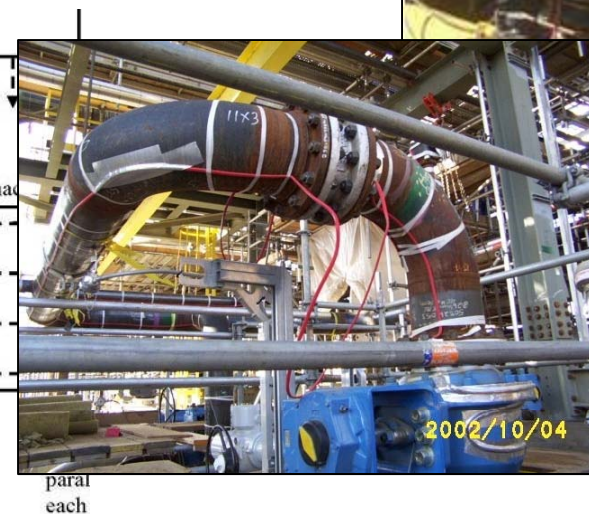
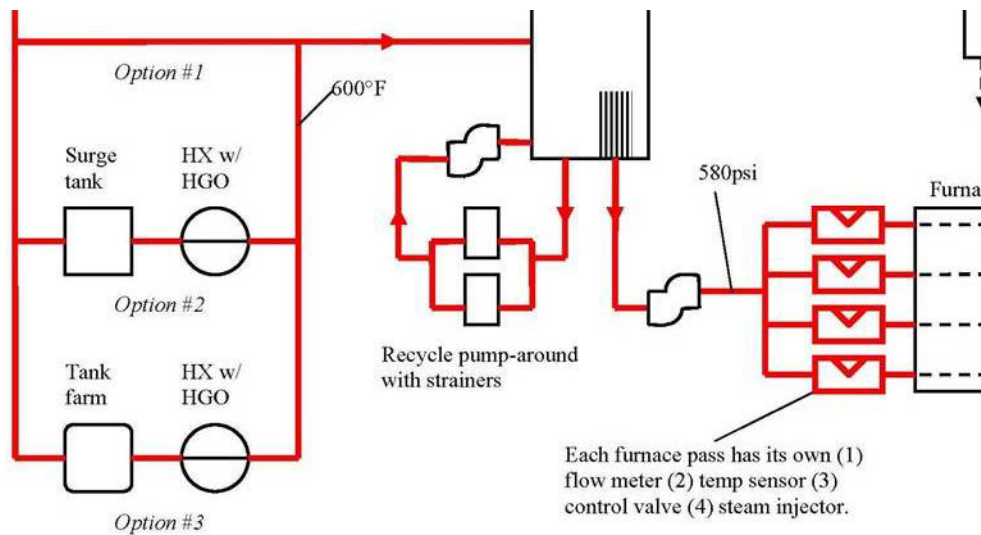
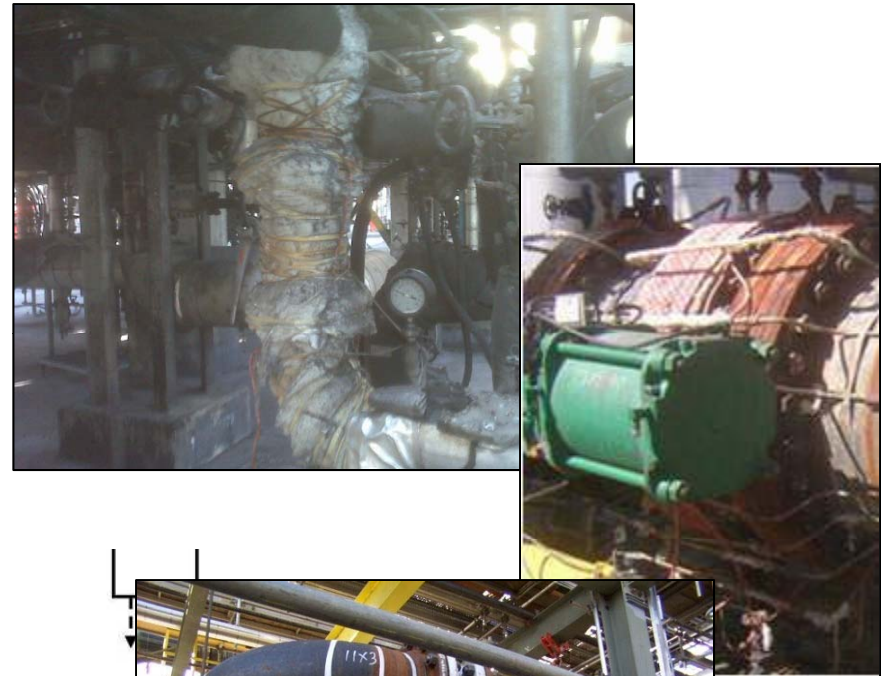
Delayed Coker Process Diagram

- ControTrace application
- - - non-ControTrace application



End-user feedback

1. Those who have problems
2. Those who used to have problems

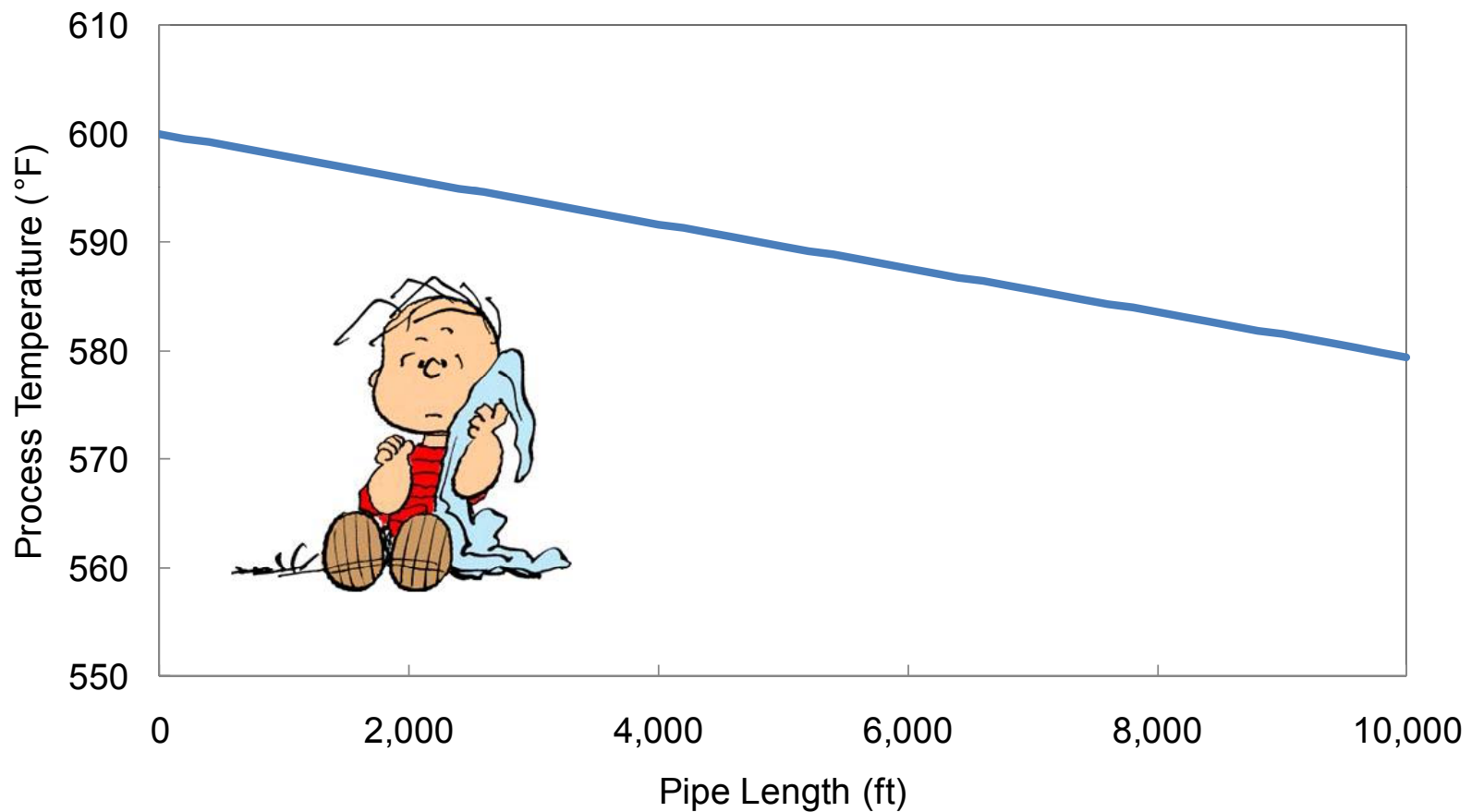


Why are they having problems?

- No problem when flowing
- Heavier products are worse
- Historical heating methods are ineffective

Flow = false sense of security

Coker Feed Flowing Through 8" Line Without Heating



No flow = real design condition

- NNF lines such as bypass lines
- Turnarounds
- Upsets



Low expectations of heating system

- Flushing oil procedures to clear lines
 - Send product to slop system for future re-treat
- Ceramic heat blankets
- Hydro-blasting or other mechanical removal

Workarounds Common – Why Tolerated?

Resid is getting heavier

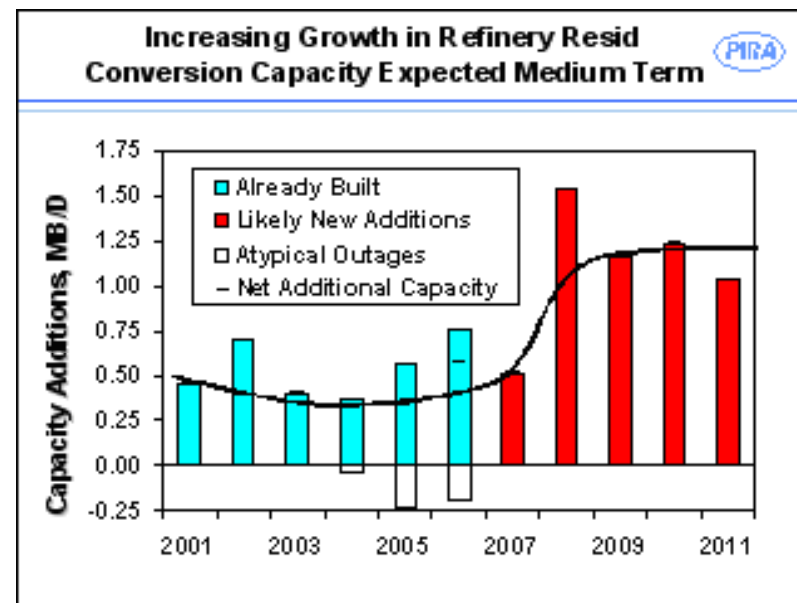
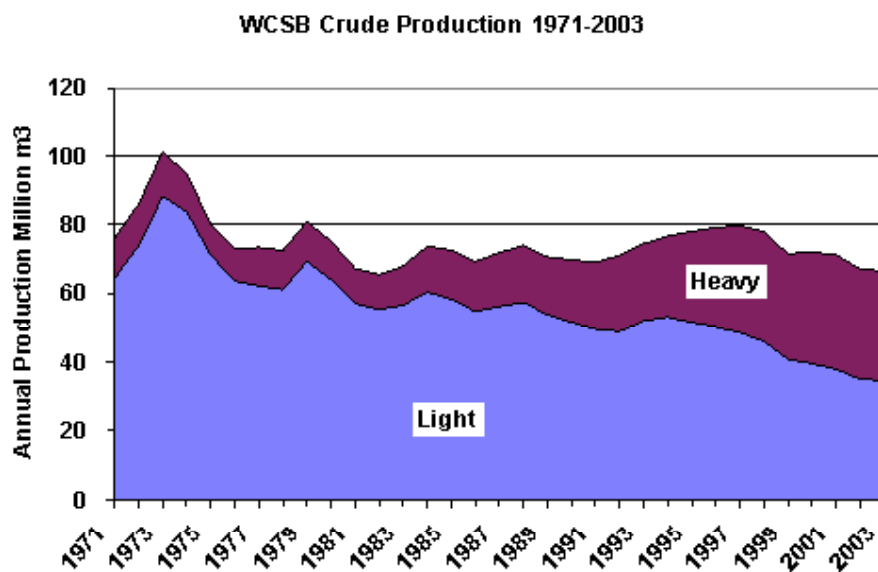
**HEAVIER
CRUDE
SOURCES**



**MORE
EFFICIENT
PROCESSING**



**HEAVIER
RESID
TO COKER**



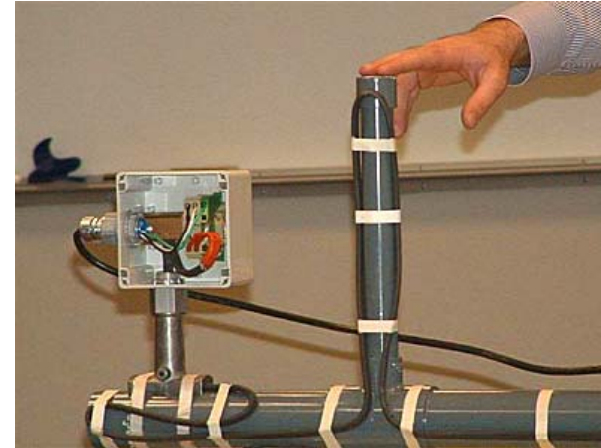
Historical heating methods

Tube Tracing



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

Electric Tracing



$$q = \text{Constant} = q_{\text{ambient_loss}} + q_{\text{process}}$$

Historical heating methods

Tube Tracing	Electric Tracing
Poor conductive heating	Lower inherent reliability due to number of active components
Usually requires HP steam	Crossed cables can lead to coking in line
Difficult to contact valves	Difficult to contact valves
High installer variability	High installer variability
Frequently distorted during maintenance actions	Temperature controlled only at thermostat points

Both give the illusion of “working” when lines are flowing!

ControTrace

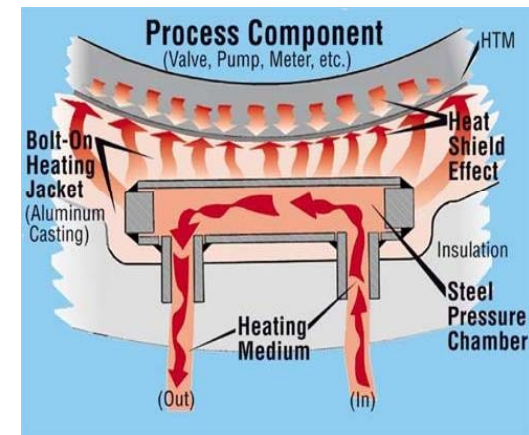
- Process flows through piping
- 2"X1" rectangular tubing is banded onto piping
- Designed with ASME Section VIII
- Contoured to fit pipe OD
- Heating medium flows through tracing
- Use mastic to remove air gaps
- Add elements for more heat



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

ControHeat

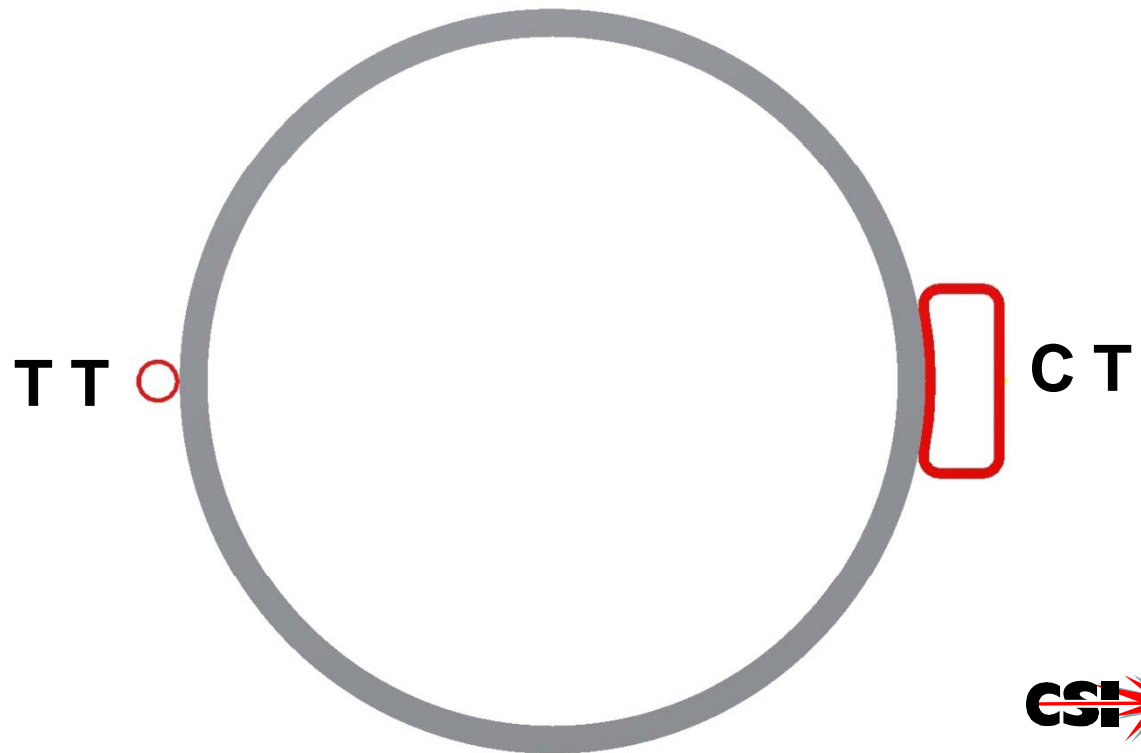
- ControHeat for valves, pumps, instrumentation



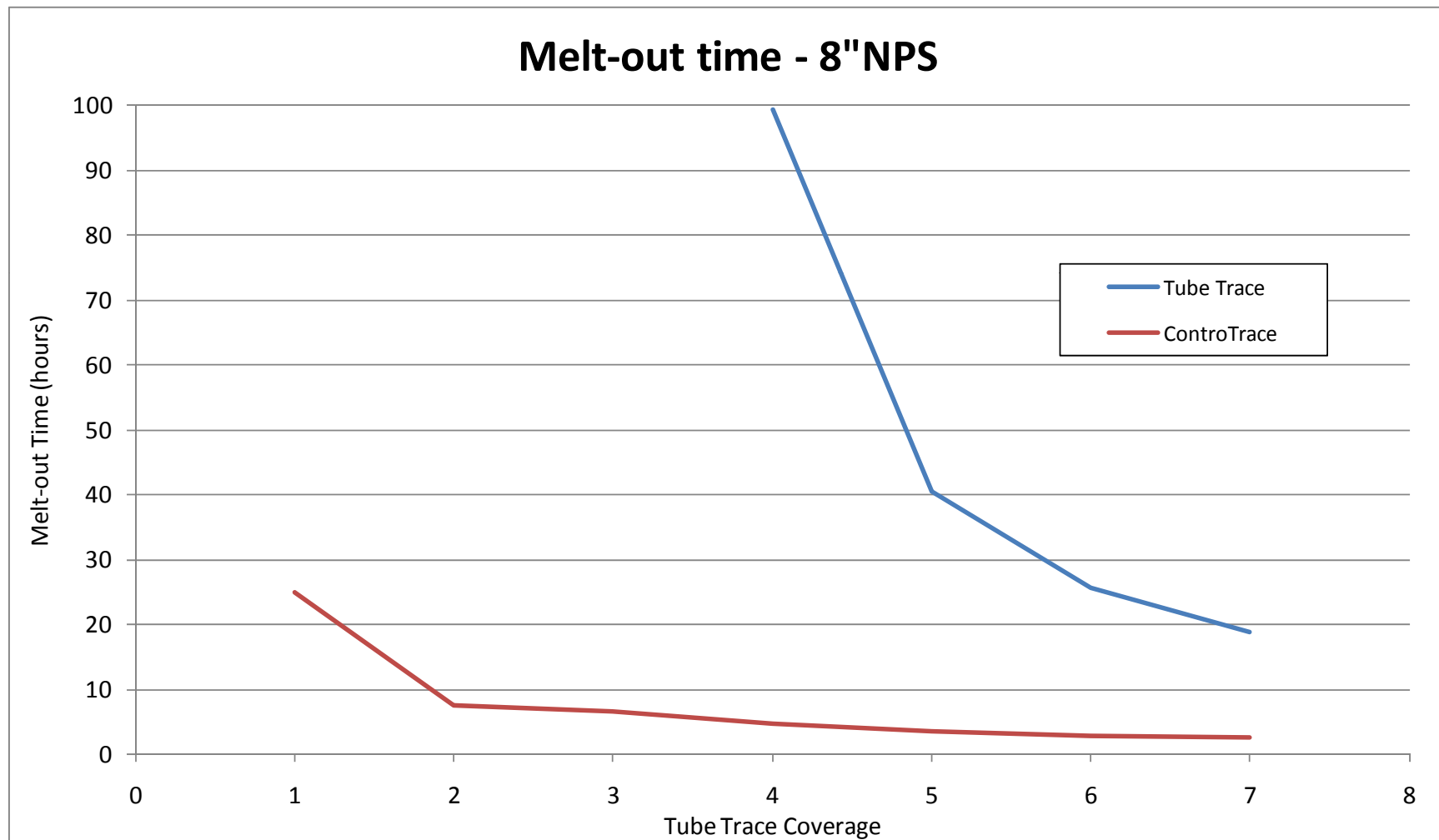
Higher U and A with ControTrace

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

TT	$U = 1$
CT	$U = 40$



Impact on melt-out time



Enhanced technology value



Heating system

HP (600psig) steam

Flushing oil

Ceramic heat blankets

Thermal downtime

Summary

- End-users are having heating problems
 - Not designed for no-flow
 - Worsening with trend towards heavier feeds
 - Historical heating methods are ineffective
- ControTrace solves the heating problems and eliminates costly coping mechanisms

Thank you!



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www.csiheat.com

