



Engineered Heating Solutions

www.csiheat.com

*ControTrace*TM

and SxSeal

The Above-Ground Sulfur Seal from the Makers of ControTrace®

CSI solves thermal problems

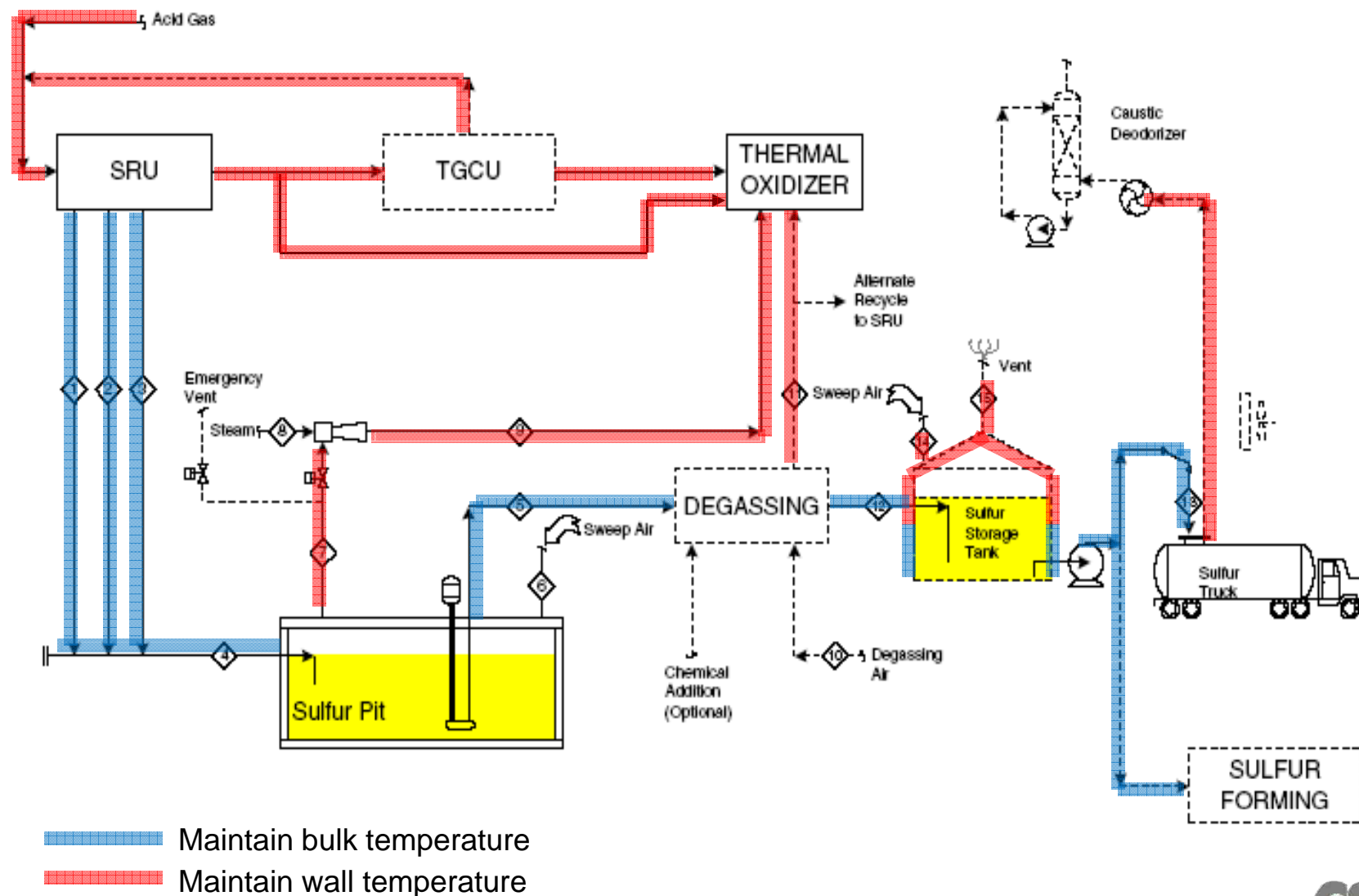
- Process heating is critical
- Root cause of issues often not well understood
- CSI approach = form fits function
- Match heating system to thermal objective



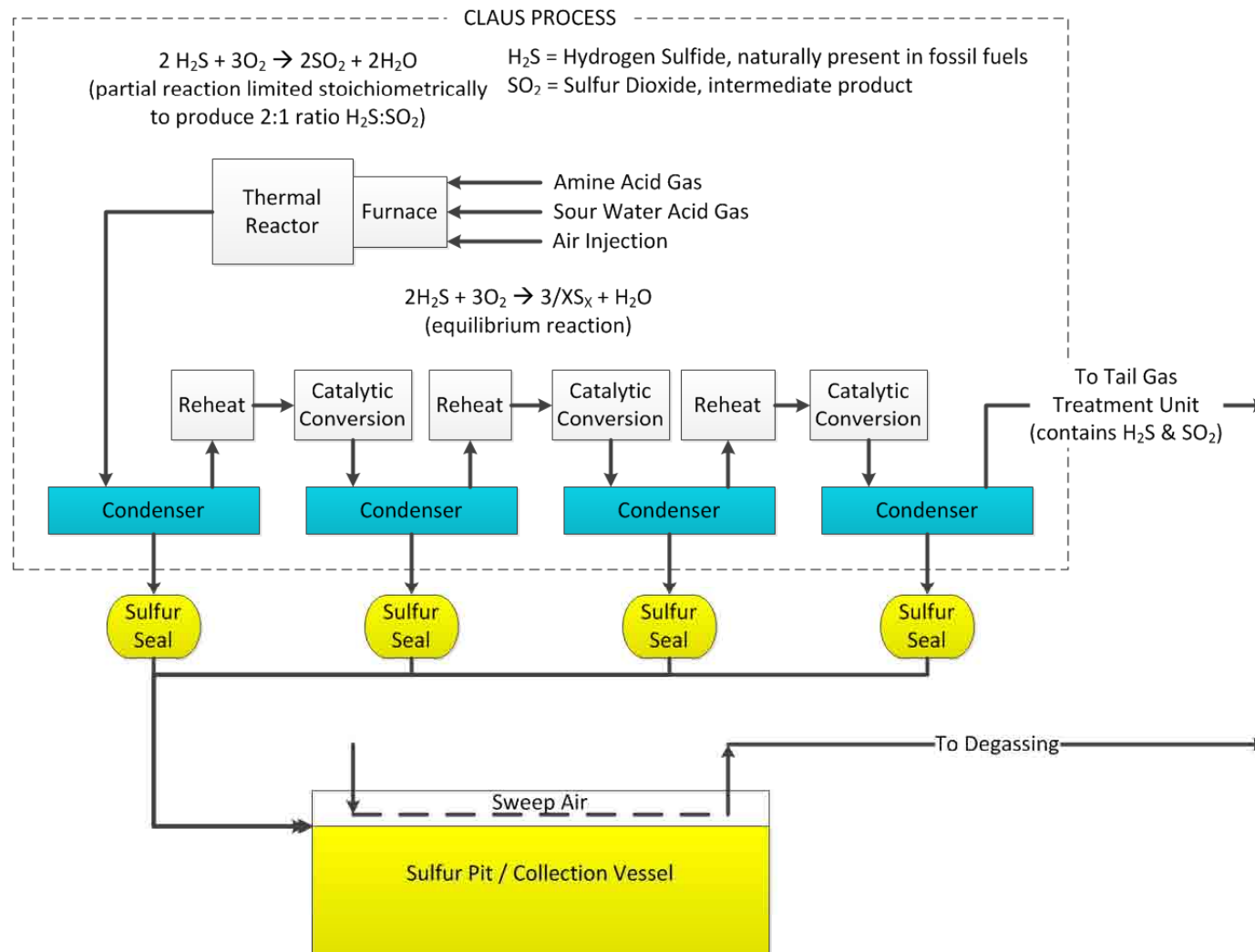
CSI customers



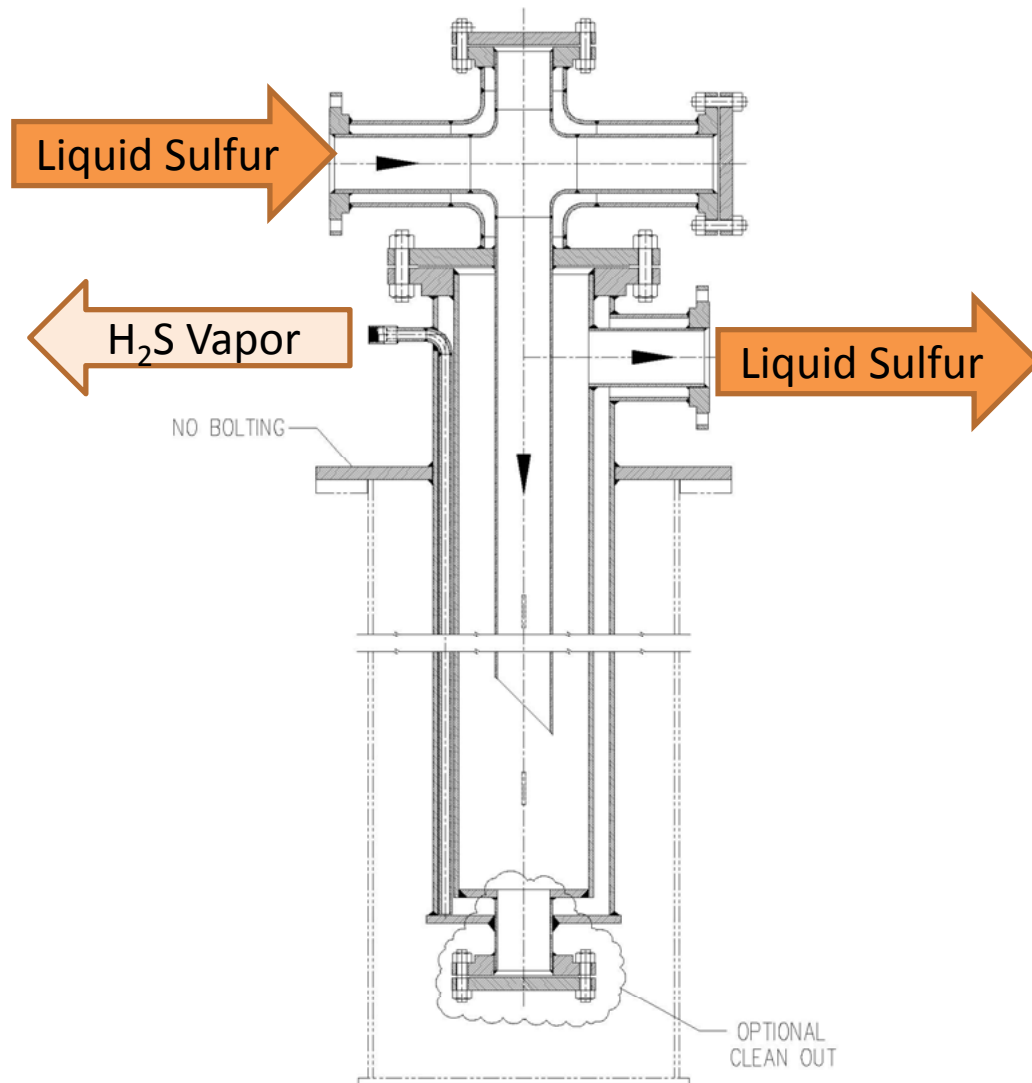
SRU thermal maintenance needs



Sulfur seal purpose

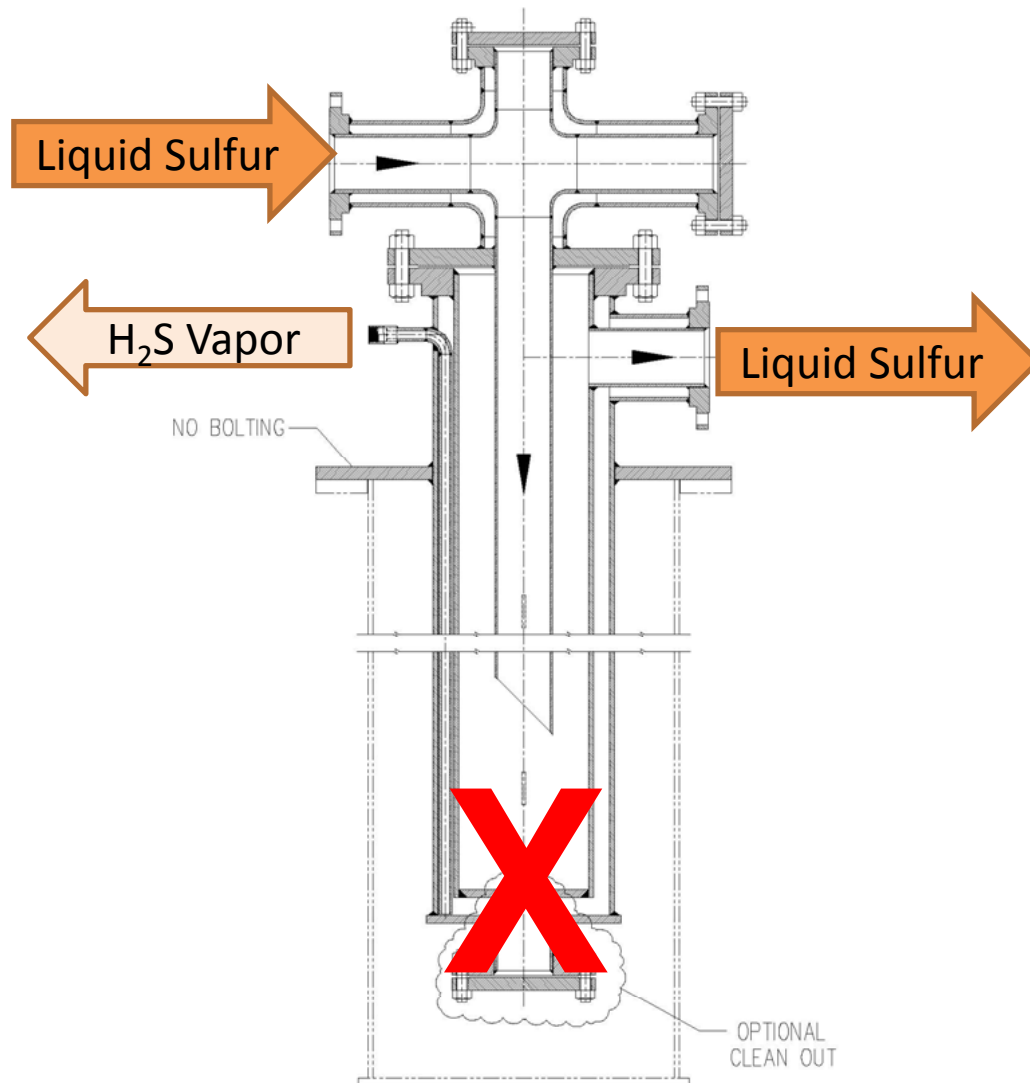


Traditional solution: Seal leg



- Traditional, below-grade sulfur seal
- Jacketed piping heating technology
- Sealing mechanism operates on hydrostatic pressure
- Liquid sulfur creates a vapor seal

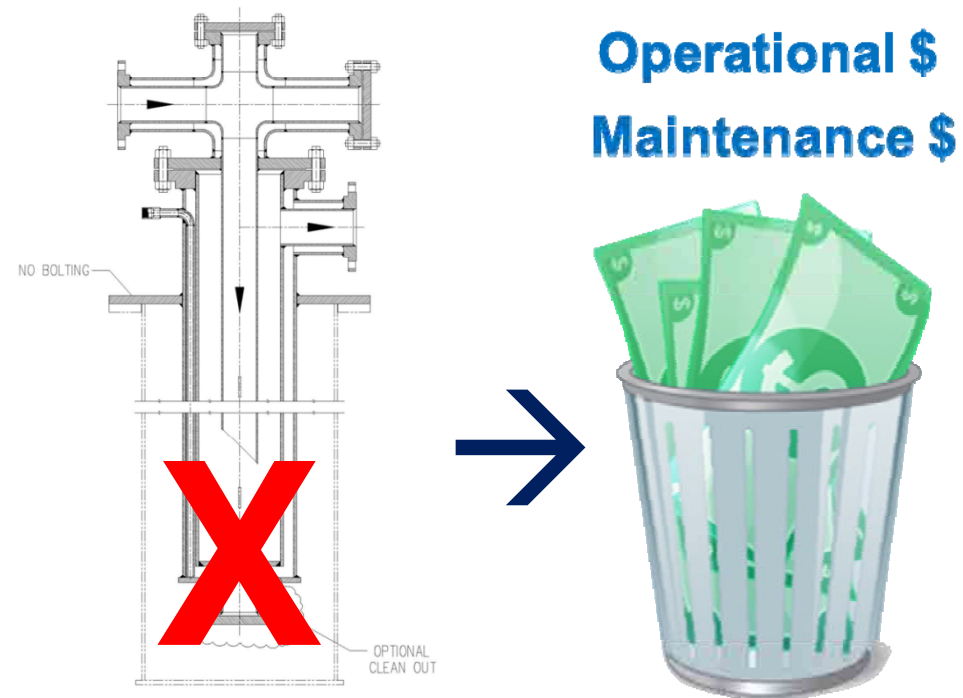
Seal leg: Prone to plugging



- Debris collects at the bottom of the seal leg
- Seal leg typically plugs in as soon as 3 years of service
- Costly maintenance

Seal leg: Unplanned downtime

- Unscheduled SRU shutdown
- Downtime measured in days or weeks of lost production



SxSeal™ 1000

Design Goals:

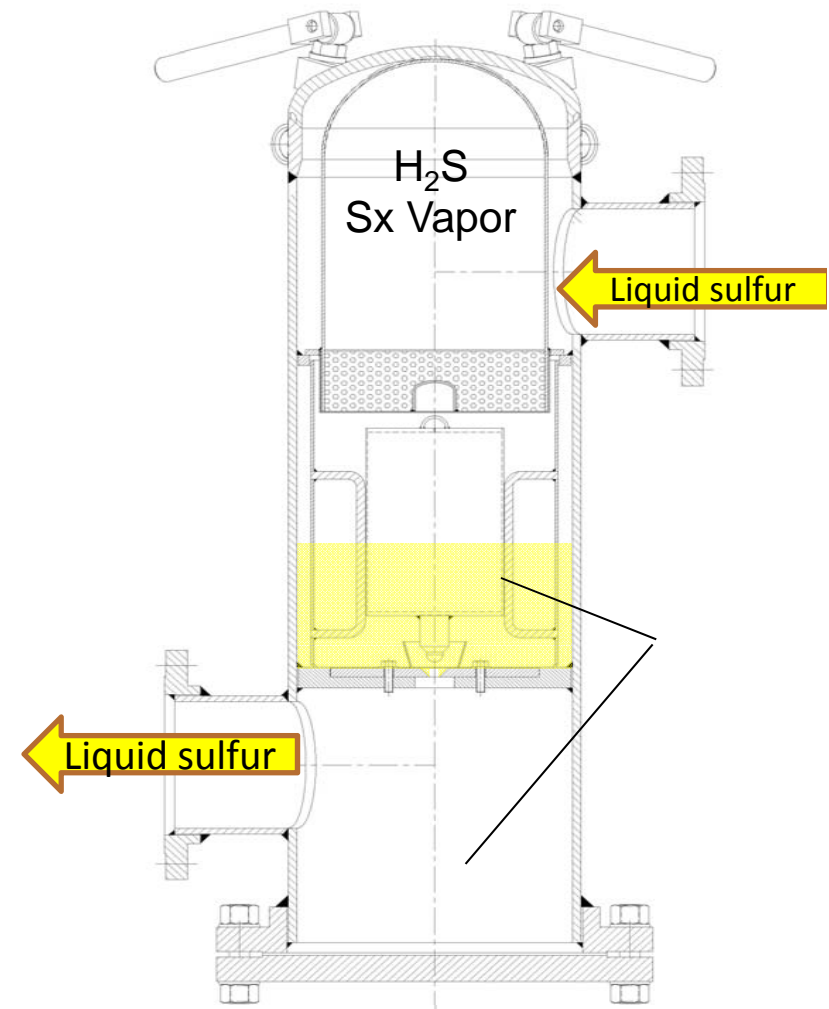
- Provide improved alternative to familiar float design
- Ensure Float does not crack
- Eliminate H₂S “Blow Through”
 - Alignment
 - Orifice Sealing
- Maintenance bypass
- Provide Competition/Better Customer Service



Sxシール1000の構造です。地上に置ける事と構造的にメンテナンスが楽になることが利点との事です。

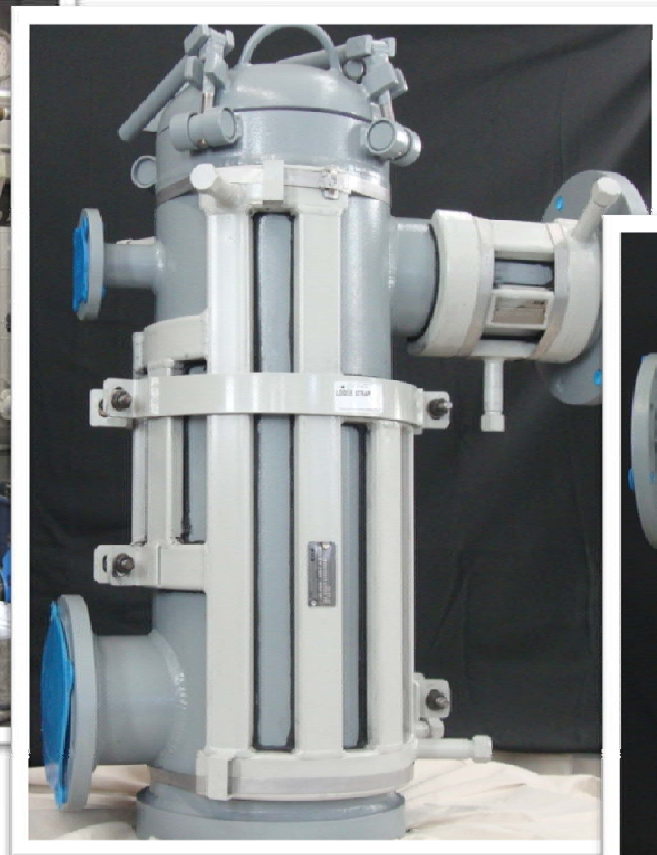
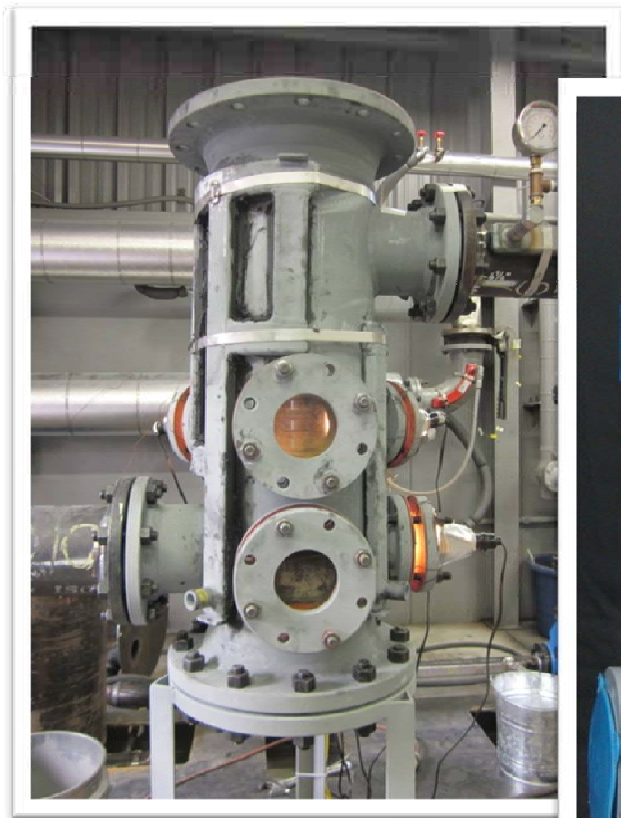
SxSeal™ 1000

- CSI Design Innovations
 - Basket Capture
 - Eliminated stress point
 - Slow release design
 - Cylinder Float
 - Alignment Rods
 - Sealing Orifice
 - Castle Wall
 - Maintenance pressure relief



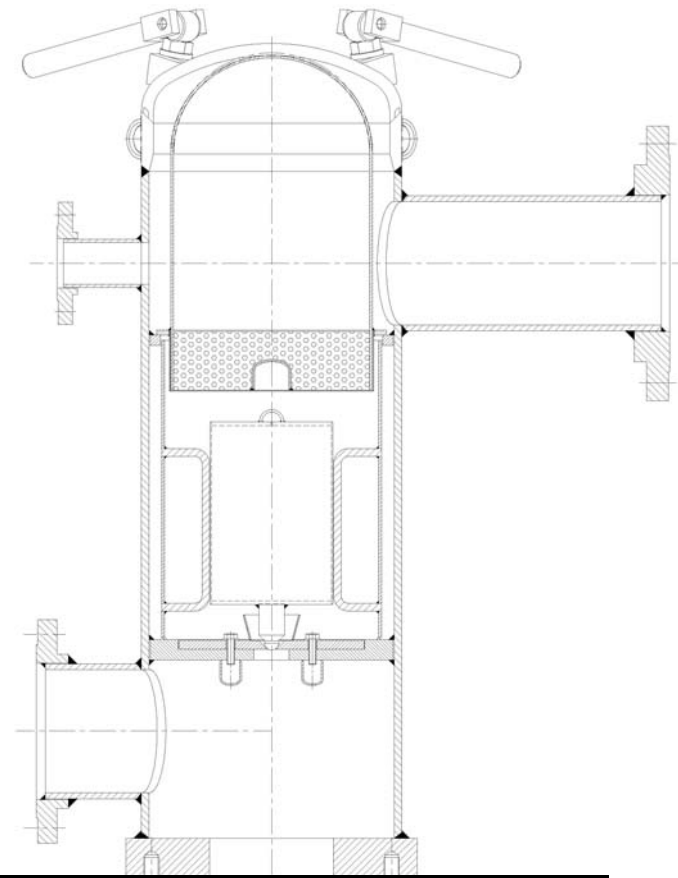
Flow condition

CSI's above-ground sulfur seal

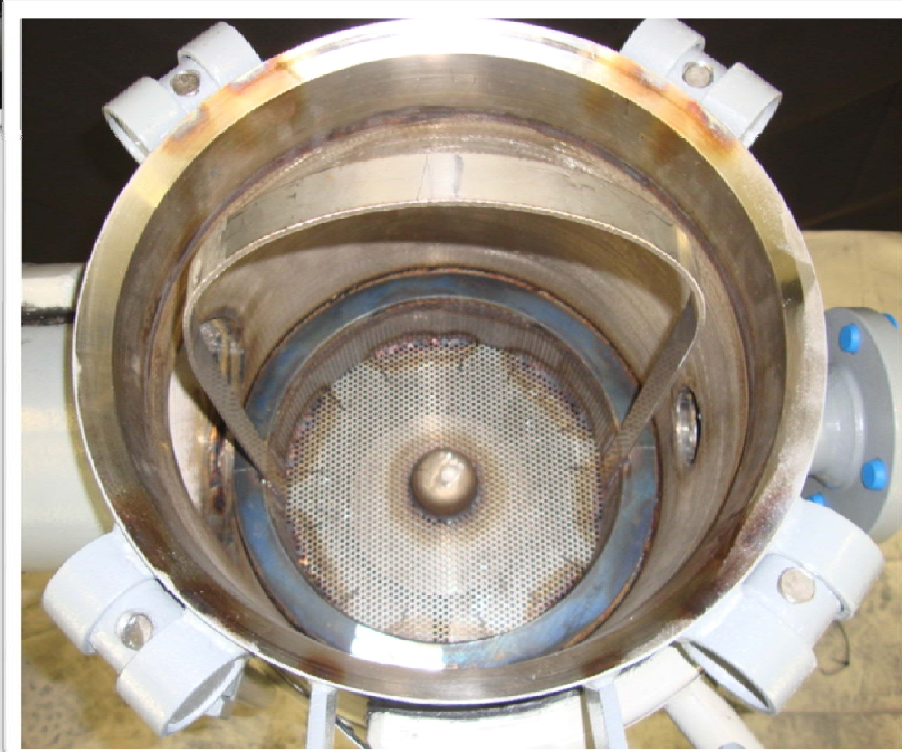


Easy installation

- Above-grade design
- No concrete casing
- Standard flange connections
- ControTrace is pre-installed
- Pre-fitted ControCover



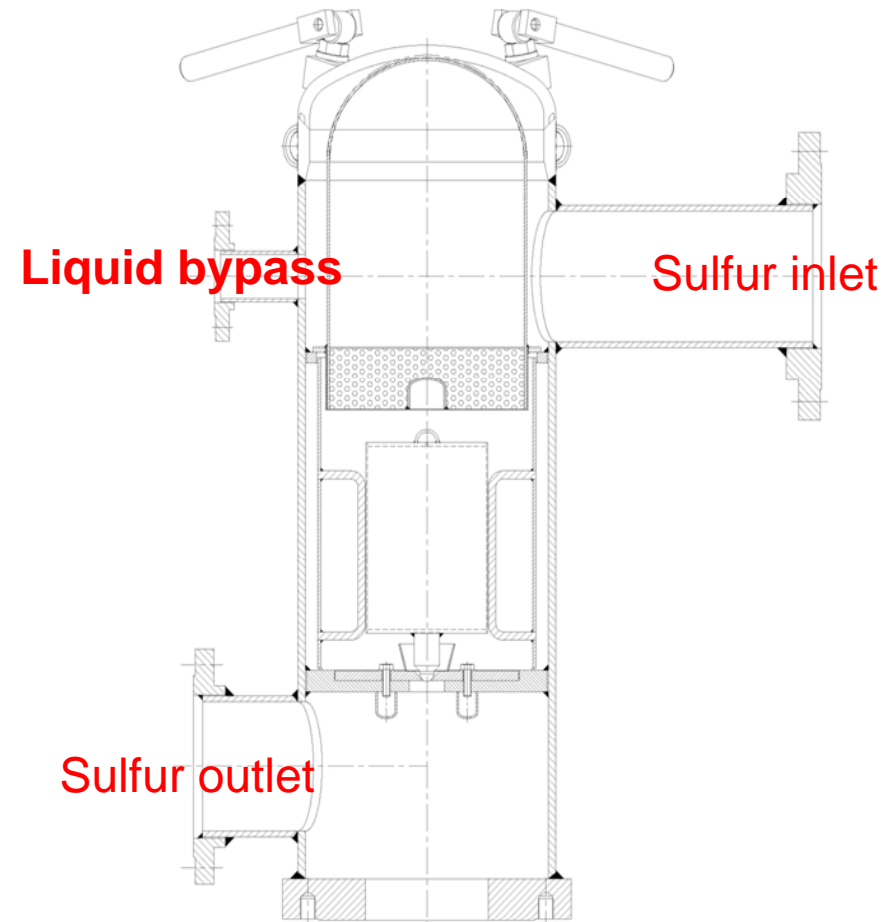
Easy maintenance



- ControCover insulation easily removed
- Easy access to internal components
- Strainer basket easily cleaned or replaced

Continuous SRU operation

- Liquid bypass line in all SxSeal configurations

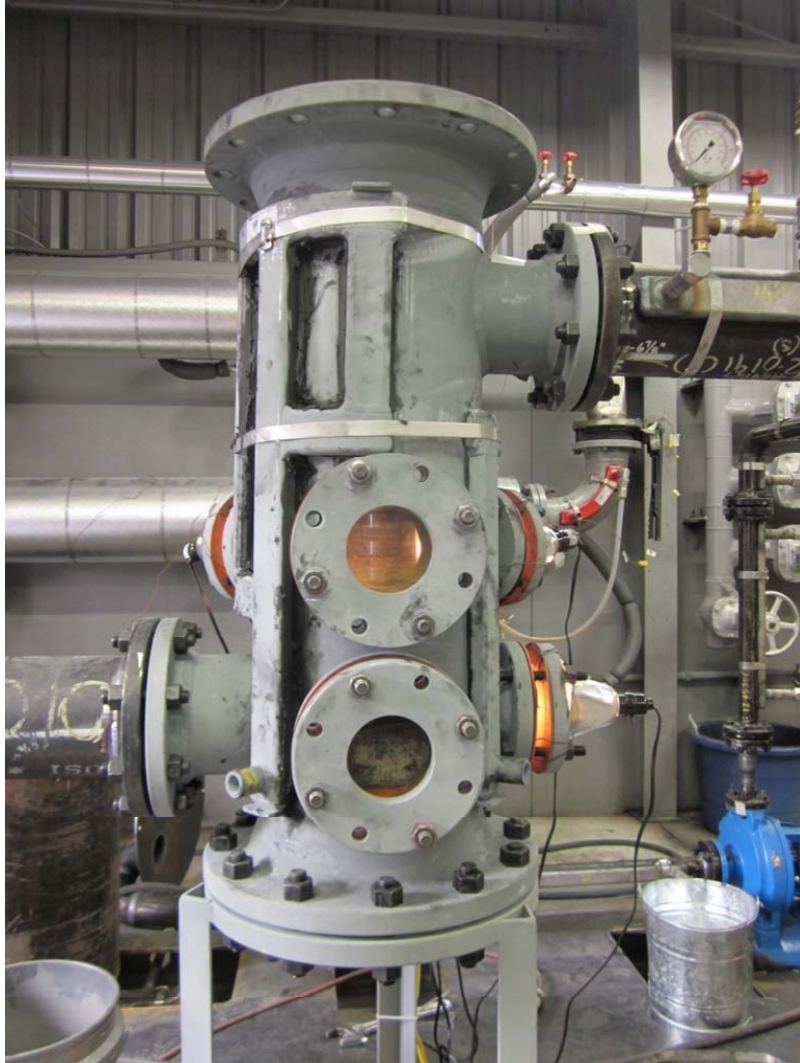


Proven sealing performance

- Repeatedly created and held liquid seal
- Plug/seat geometry designed for:
 - Minimal wear & long life
 - Self-correcting alignment
- Developed model for sizing orifice, float & unit based on:
 - Flow rate
 - Condenser pressure



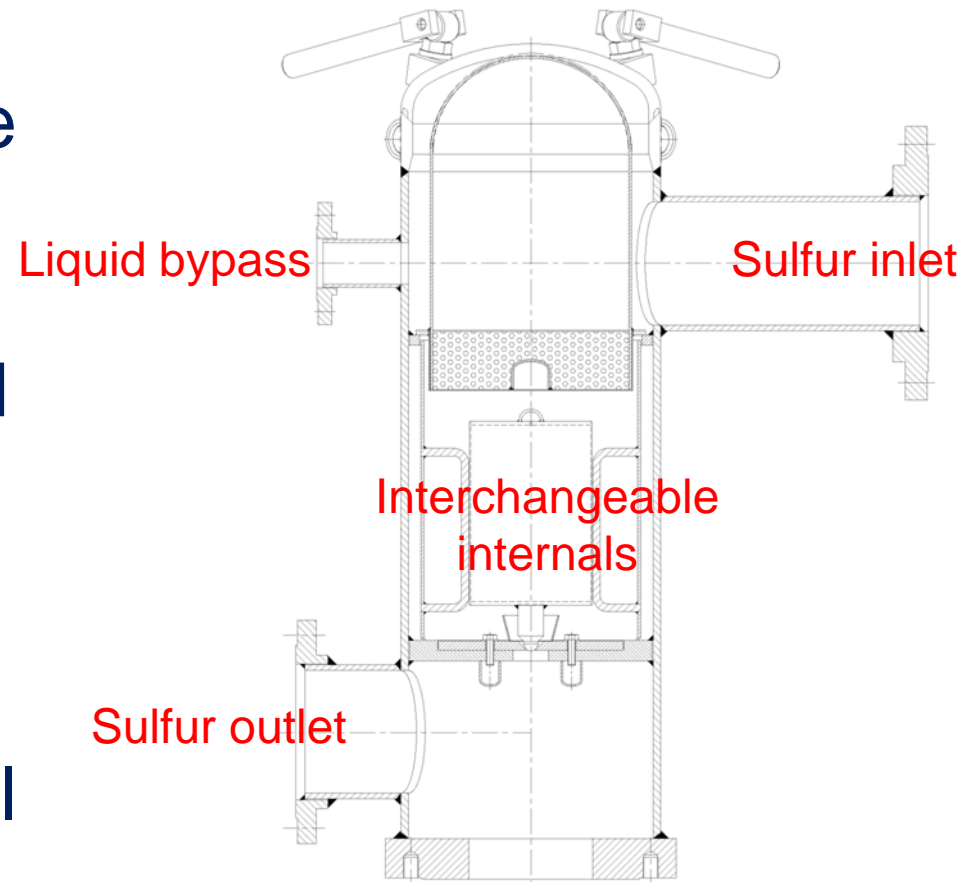
Superior sulfur sealing



- Repeatedly created and held liquid sulfur seal
- Mechanically prevented debris from entering orifice area
 - Minimal wear & long life
 - Self-correcting alignment

Base configuration

- Upper side inlet nozzle
- Lower side outlet nozzle
- Liquid bypass
- Quick-opening top head
- Patent-pending internal sealing mechanism
- Interchangeable internal components



Optional components



- All SS steel parts
- Sight glass
- Look box
- Pressure bypass with rupture disc for pressure relief
- Vertical discharge

CSI's sulfur seal solution

SxsSeal™

- Easy to install
- Easy to maintain
- Continuous SRU operation
- Safe, reliable sealing performance



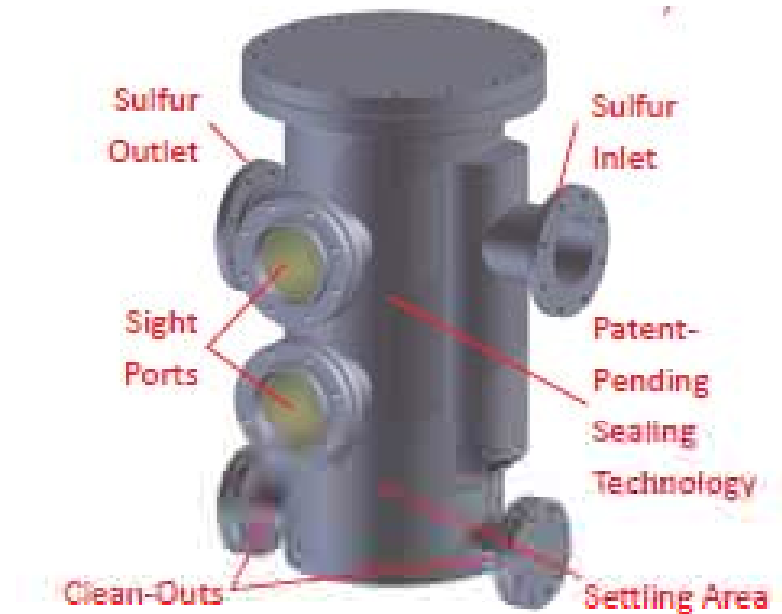
SxSeal™ 2000

- See Video



SxSeal™ 2000

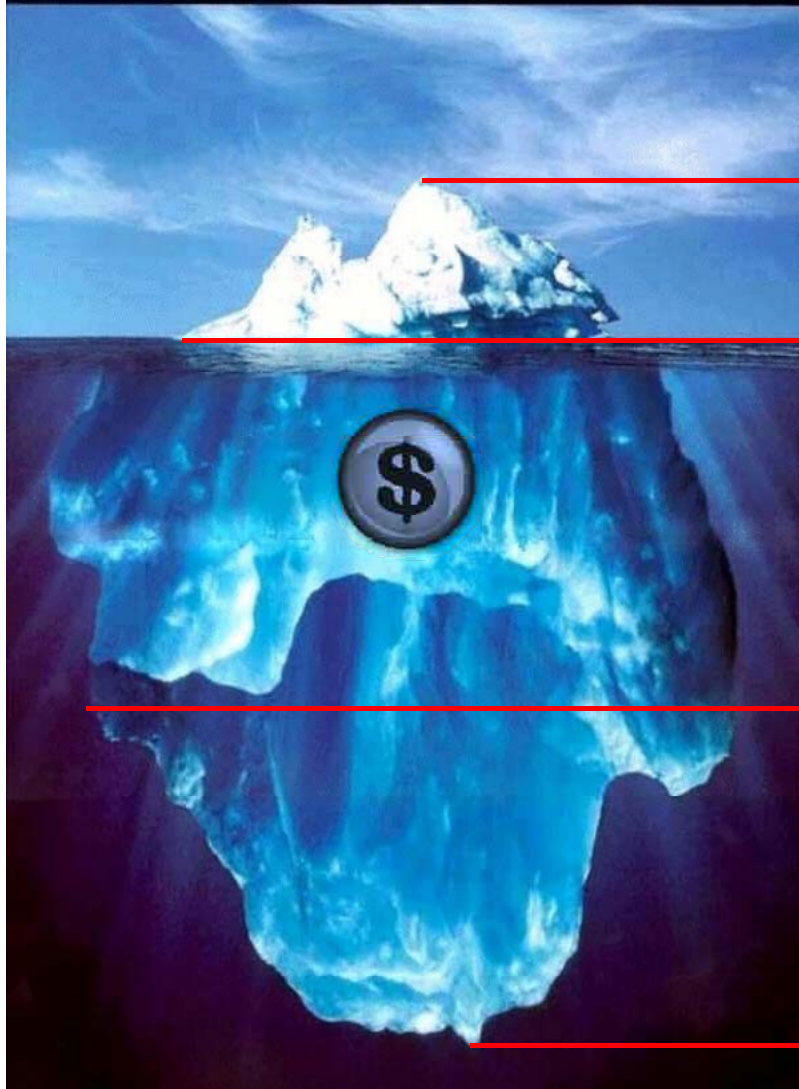
- Launched Jan 2013
- Industry likes innovation
- Industry likes choice
- Pressure relief of interest to some
- “Upward Flow” relieves “Stuck Open” concern
- Short vertical offset makes retrofits easy
- No Maintenance
- Site Ports eliminate look box
- Easy clean-out, if needed
- Short Lead times





- Interest level higher than anticipated:
 - In operation: Lyondell (1000 – Oct 2012)
 - Ordered:
 - Ultramar/Valero,
 - P66
 - Conoco-Phillips
 - Petrobras
 - DCP Midstream
 - Quoted/Discussions
 - Husky, Northwest Redwater, General Chemical, BP, Valero, Lyondell, Placid Refining, Saudi Aramco, Exxon Mobil, KNPC, Lukoil, Eagle Rock

Evaluate Total System Cost



Heating system (Cap-Ex)

Utilities infrastructure— S/C manifolds, pre-ins. tubing, field labor (Cap-Ex)

Ongoing operational expenses to maintain system/utilities (Op-Ex)

Thank you!

