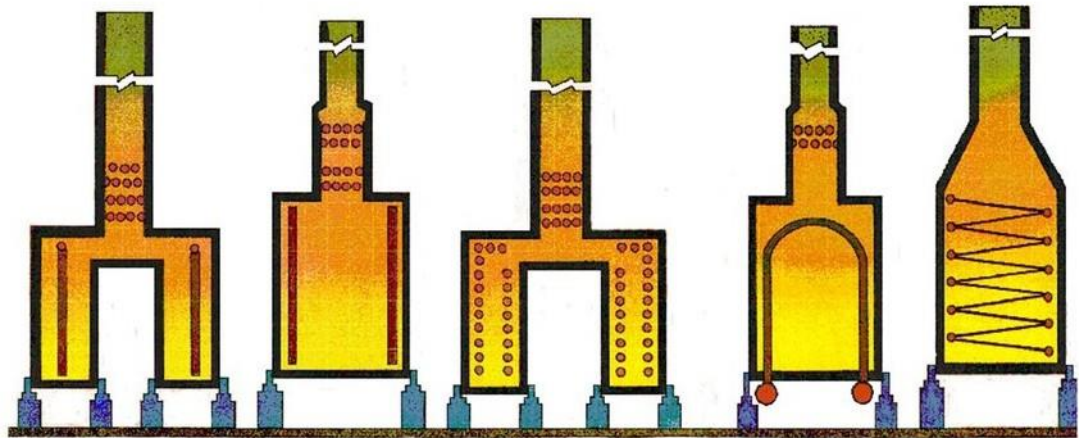


Split Flow Technology



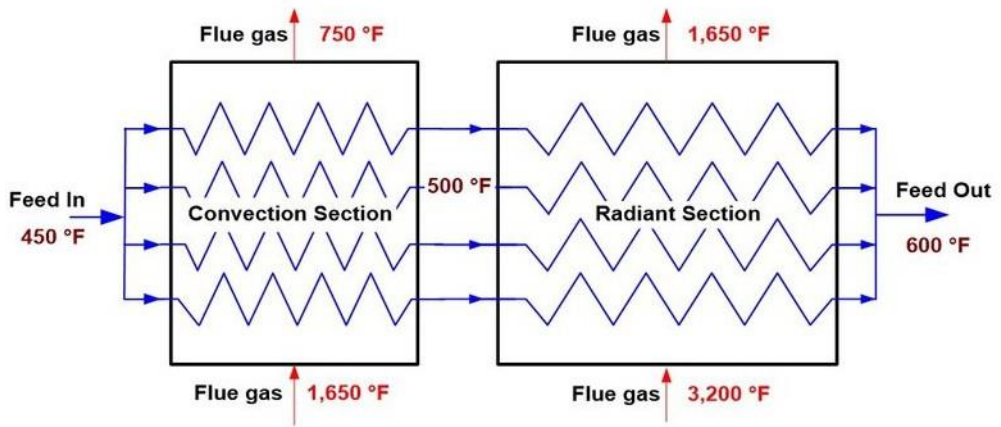
FIS Patented

New Approach for Fired Heaters Revamping

- Low Cost Solution for:
 - Increase Capacity
 - Improve Efficiency
- Lower Pressure Drop
- Lower Revamping Cost



Typical Fired Heater

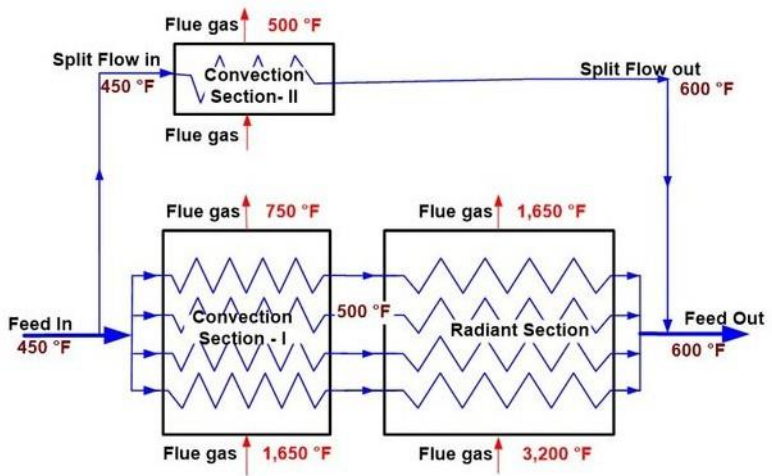


Typical Heater Revamping

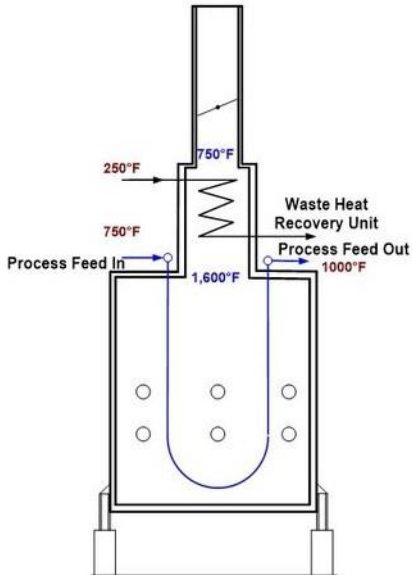
- ❖ Increase charge rate by 10-25%
- ❖ Increase outlet temperature by 50-100F



Split Flow* Fired Heater



Reformer Heater - Conventional



❖ Radiant Section

- Parallel Passes
- Heat process feed
- Maintain low pressure drop

❖ Convection Section

- Waste heat recover
 - HC Reboiler
 - Steam Generation Service



Reformer Heater - Split Flow

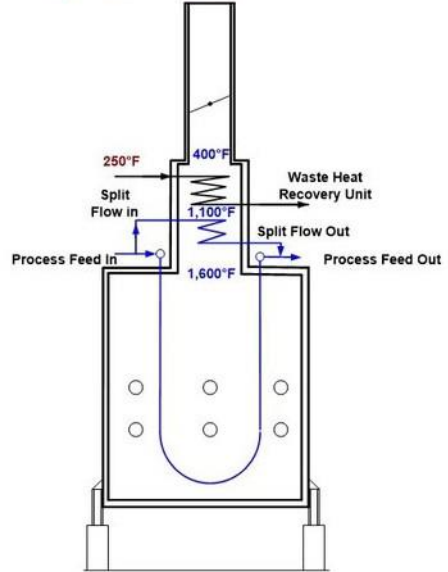
❖ Radiant Section

- Parallel Passes
- Heat 70% + of process feed

❖ Convection Section

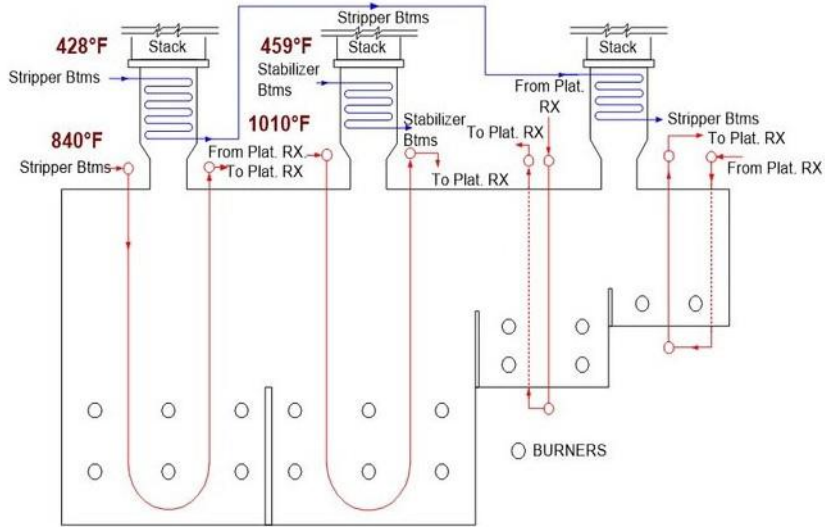
- Heat upto 30% of Process Feed
- Waste heat recover
 - HC Reboiler
 - Steam Generation Service

- ❖ Pressure drop is kept same even at increased charge rate

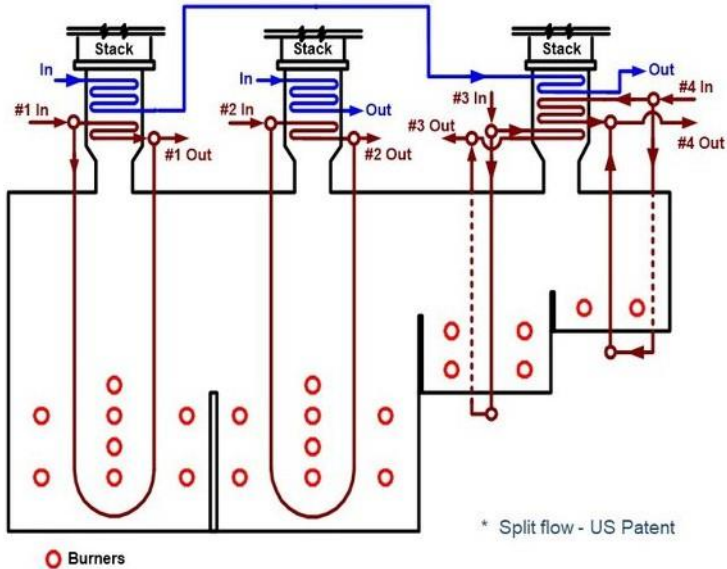


Flow Scheme - Before Revamp

#4 Platformer Heater



FIS Split Flow* Scheme



Comparison (Cell 1)

Parameters at 22,000 BPD

Parameter	Original Design	Split flow Design
Pressure Drop, psi	3.1	2.1
Firebox temperature, °F	1,615	1,551
Radiant flux, Btu/hr ft ²	19,823	15,047
Radiant tube metal temp, °F	1,151	1,120
Firing rate, MMBtu/hr	116.35	82.65



#4 Platformer Heater Data Comparison

Item	Units	Before Revamp	After Revamp
Capacity	BPD	18,500	24,000
Heat Duty	MM Btu/hr	158.0	194.5
Heat Release	MM Btu/hr	234	225
Efficiency	%	67.50	86.60
Stack Temp.	°F	1,092	478
Fuel Savings	\$/annum	5.8 Million*	
		*Based on \$6.0 / MM Btu	



#4 Platformer Heater Before and After Revamp

