

**Case Studies (FIS-183)**

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## **No. 4 Platformer Heater Efficiency Improvement and NO<sub>x</sub> Reduction (Split Flow)**

In October 2002, FIS carried out a Platformer Heater Revamp Project for a refinery in Corpus Christi, TX.

The four-cell UOP Reformer Heater was originally designed for a heat duty of 181.32 MMBtu/hr in 1970. The heater was operating at 67% thermal efficiency. The refinery wanted to improve the efficiency of this heater and reduce NO<sub>x</sub> emissions. However, steam generation or combustion air preheating was not desired.

The refinery approached the original designers of the heater. They provided them with a conventional scheme to preheat the feed in the convection section. The scheme had four major drawbacks:

- Increased fluid pressure drop
- Required grade mounted stack
- Required large diameter piping
- Very high cost

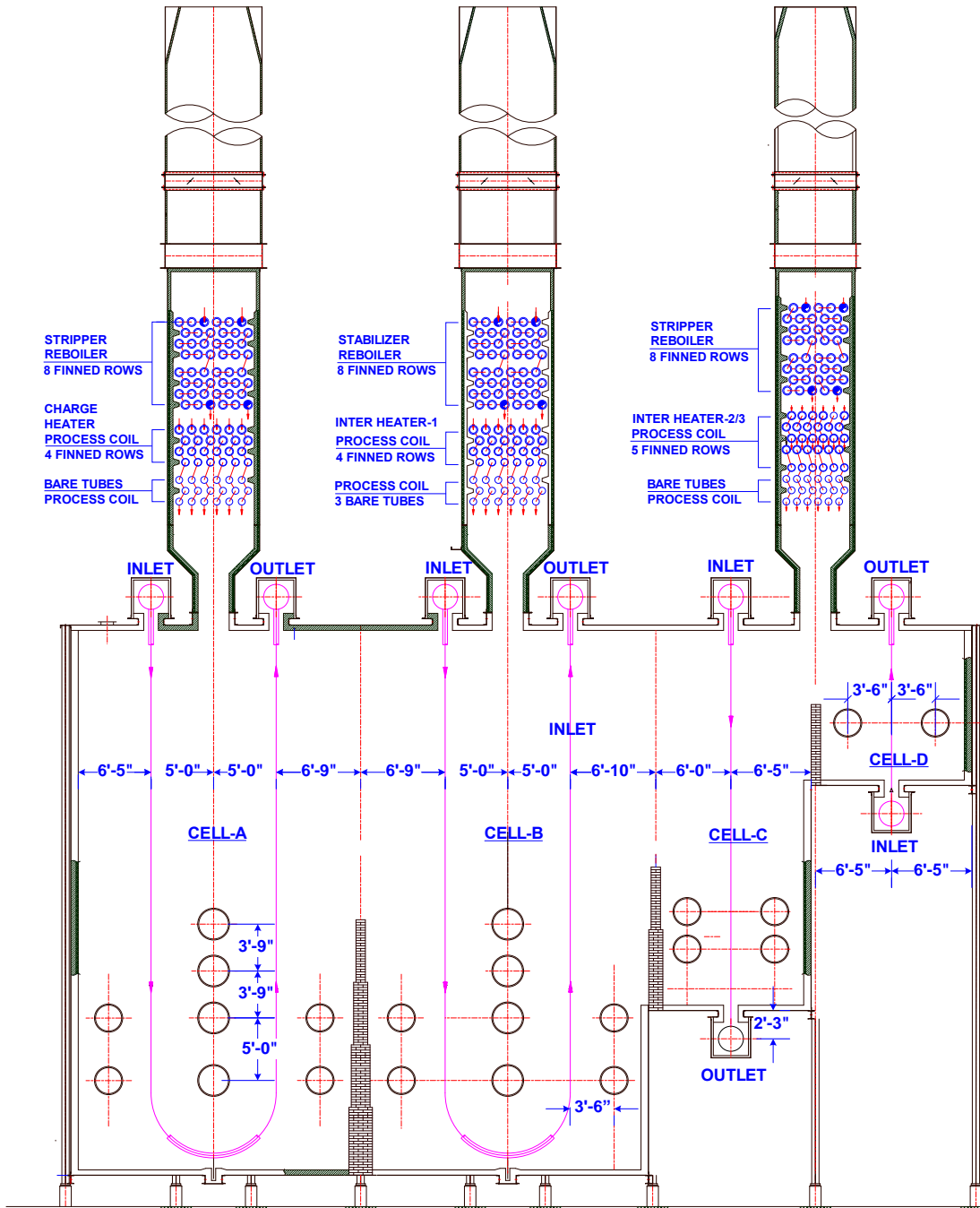
FIS was solicited by the refinery to develop an economical scheme to improve the efficiency of the heater. FIS redesigned the convection sections with the “Split Flow Technology” scheme. In this scheme, the feed was heated parallelly in the convection and radiant sections. The pressure drop across the heater remained the same even at higher capacity, due to this parallel processing. The additional piping used was only half the size of the manifolds, and the existing stacks were reused. This scheme was nearly half the cost of conventional revamp.

For NO<sub>x</sub> emissions reduction, FIS evaluated different schemes and arrived at the conclusion of replacing the existing burners with Ultra Low NO<sub>x</sub> burners with internal

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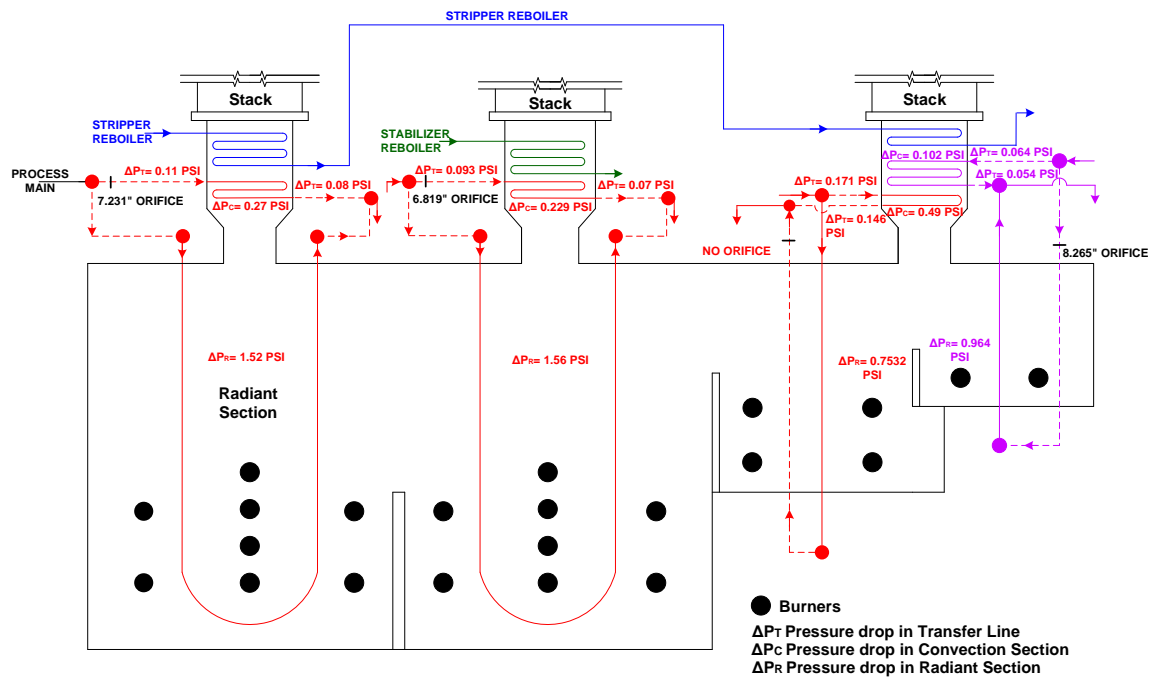
flue gas recirculation.



**Reformer Heater Before Revamp**

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**Reformer Heater After Revamp**

**Reformer Heater Data Comparison**

Item	Units	Before Revamp (Operating)	After Revamp
Capacity	BPD	18,000	24,000
Heat Release	MM Btu/hr	234	225
Stack Temp.	°F	1,092	478
Fuel Consumption	MSCFH	244	242.8
Fuel Savings	\$/annum	5.8 Million * * Based on \$6.0 / MMBtu	

FIS carried out the entire scope of activities from conceptualization to commission of this heater revamp. The heater was successfully commissioned in October 2002. After the revamp, the thermal efficiency of this heater was increased from 66% to 87% and the NOx emissions were reduced to less than 0.035 lb/MMBtu (HHV). The client was very

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pleased with the heater performance and decided to go ahead with a similar revamp for their second reforming furnace.