

Installation and Commissioning of the Gas Fueled Heater for the STEP sCO₂ Demonstration Pilot Plant

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DESIGN

- Manufacturer - Optimus Industries
- Heater consists of 10 Modules (Sections) and 3 Skid Units
- Burner
 - ~ 93 MW_{th} Duct Burner
 - 700 HP Main Blower
- Multi-pass 740H Coil Heat Exchanger, Designed for 100 kg/s at 255 bar, 715°C
- SCR System for Emissions Control
 - Ammonia Injection System
 - Titanium-tungsten based catalyst
- Tempering and emergency air blowers
- Overall size: 14'W x 133'L x 18'H (Stack 70'H)

INSTALLATION COMPLETED

- 5 Months to complete heater installation – finished in July of 2021.



Heater at STEP Facility

- Heater coil module installed last due to weld crack issues with 740H.
- Required rail to slide module in between installed sections.



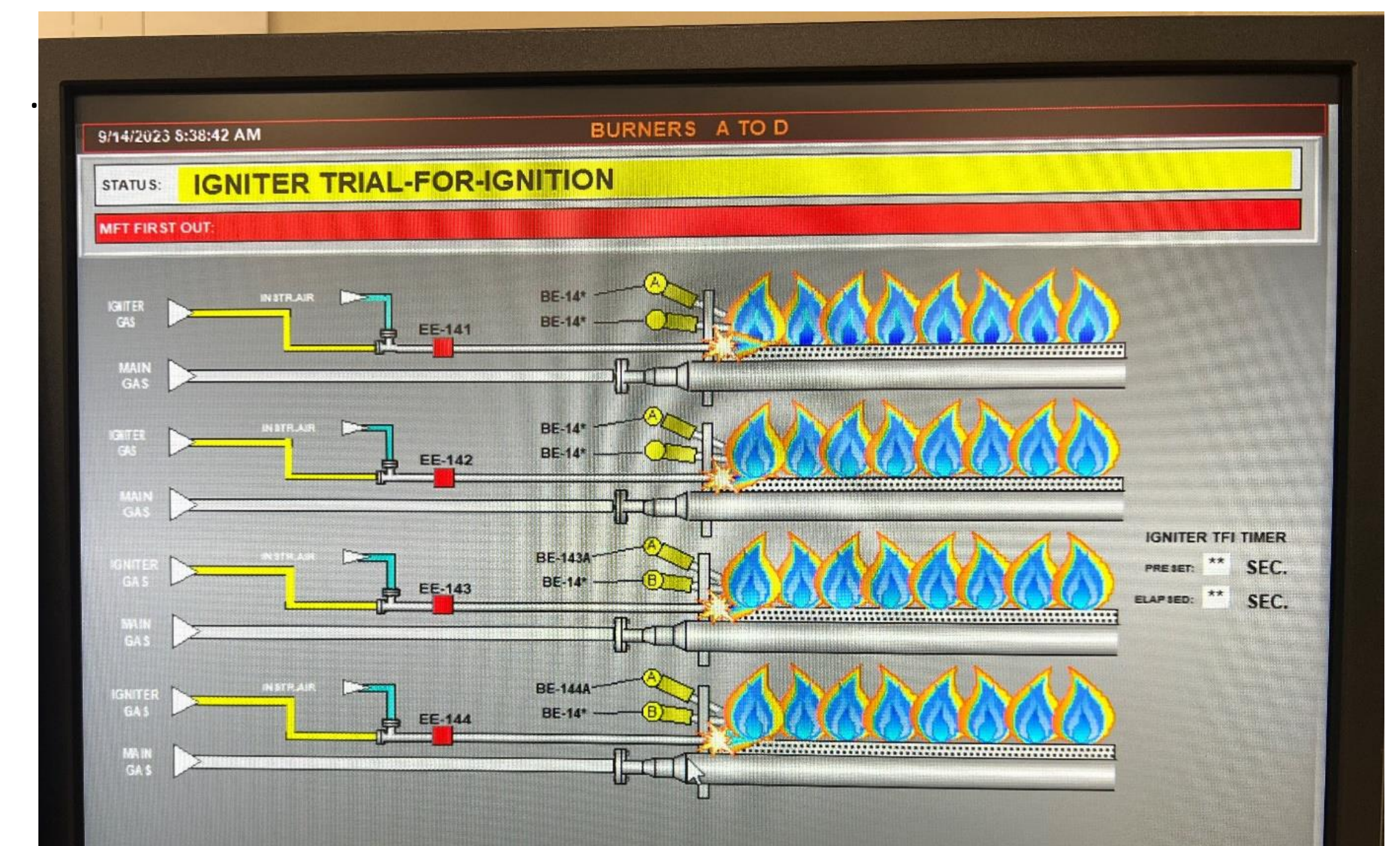
Typical Weld Crack after PWHT



Heater Coil Installation

COMMISSIONING COMPLETED

- PLC and Instrumentation Checkout
- Blower Motor Testing & Checkout
- Pilot Burner & Main Burner Lighting
- Gas Path Burnout – 4 hours of continuous operation of the heater with module temp > 700 °F.



Duct Burners Ignited/Lit

KEY LESSONS LEARNED

- 740H welding required new procedure development
- Utilize air to simulate sCO₂ during commissioning improved schedule, reduced risk/identified issues.