

# Duct Burner Systems

# Coen Company, Inc. is a Koch Chemical Technology Group Company

## **KOCH CHEMICAL TECHNOLOGY GROUP LLC**

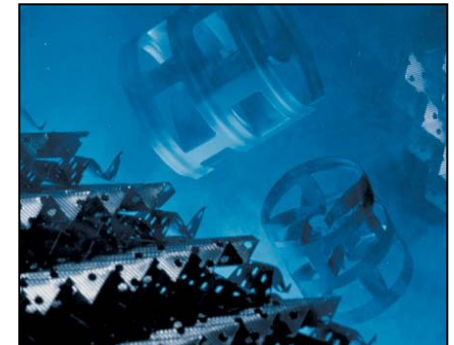
### ■ Combustion



### ■ Heat Exchange



### ■ Separating & Mixing



# Tulsa Manufacturing Facilities



# Common Duct Burner Issues

- **Problems Firing Refinery Fuels**
- **Water Condensation Problems**
- **Problem Solving with CFD Modeling**

# Refinery Fuel Gas Firing “Coke” Formation

# Carbon “Coke” Formation



# Runner Pipe Cracked from Coke Formation



# Fuel Coking in Duct Burner Runners

- **“Coking” or cracking of the fuel molecules occurs at high temperatures, usually > 800 Deg. F**
- **Unsaturated Hydrocarbons (Ethylene, Propylene, etc.) or Hydrocarbon Liquids contained in the fuel will lead to coking.**
- **Coen adds a full layer of external insulation on the runner pipe to reduce the fuel heating.**
- **Far end runner cleanouts are added to remove any coke that may form.**



# Coen Insulated Fuel Gas Manifolds



# Water Condensation and Corrosion Issues

# Water Condensation & Corrosion Issues

- Ambient air water vapor content on a hot, humid, summer day ranges from 1% to 2% by volume.
- Turbine exhaust gases can contain 6% to 14% by volume or higher.
- Water condensation can cause severe problems both outside and inside the HRSG.

# Sagging, Distorted Firing Runner



External Header

Runners

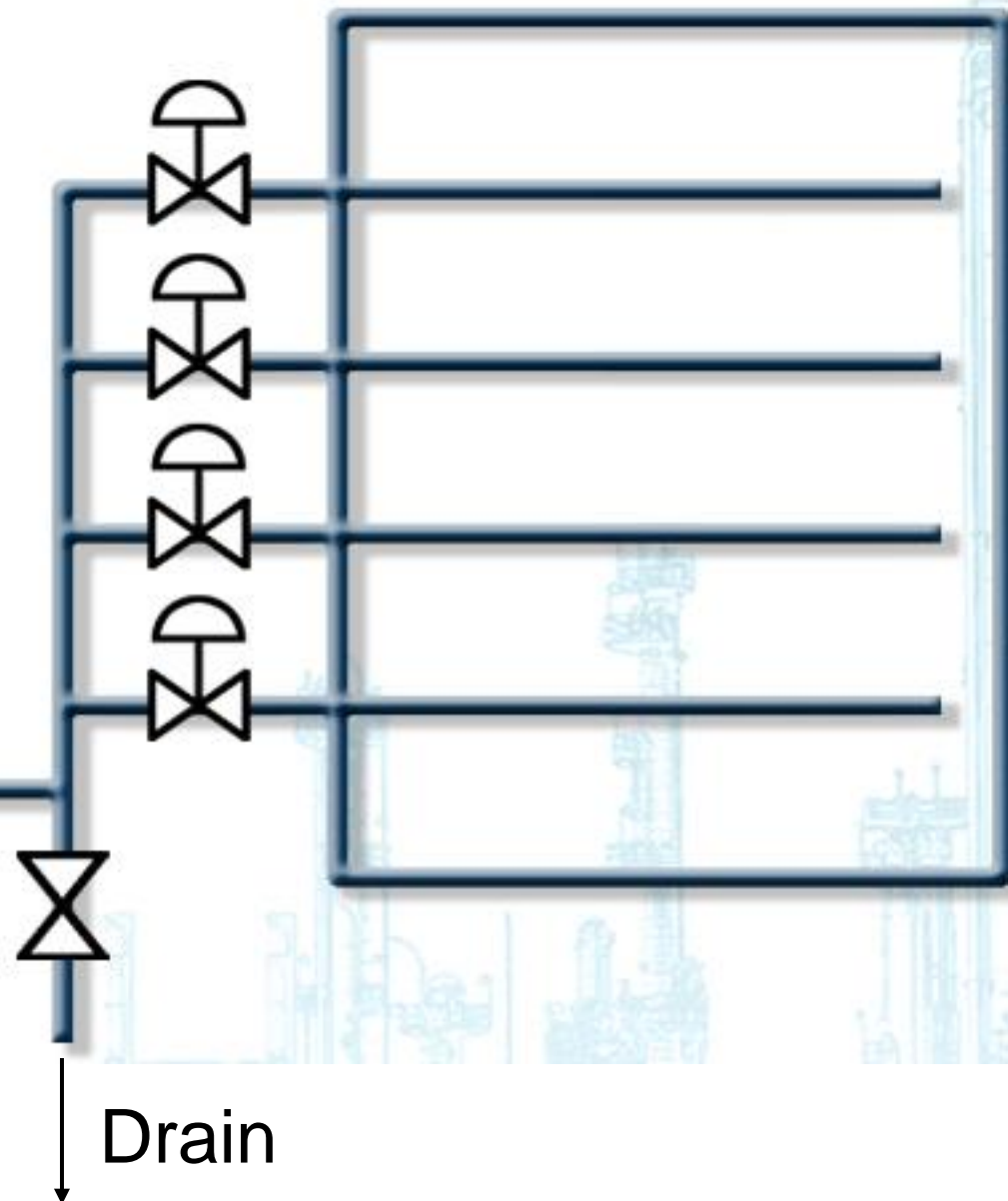
Fuel



Drain

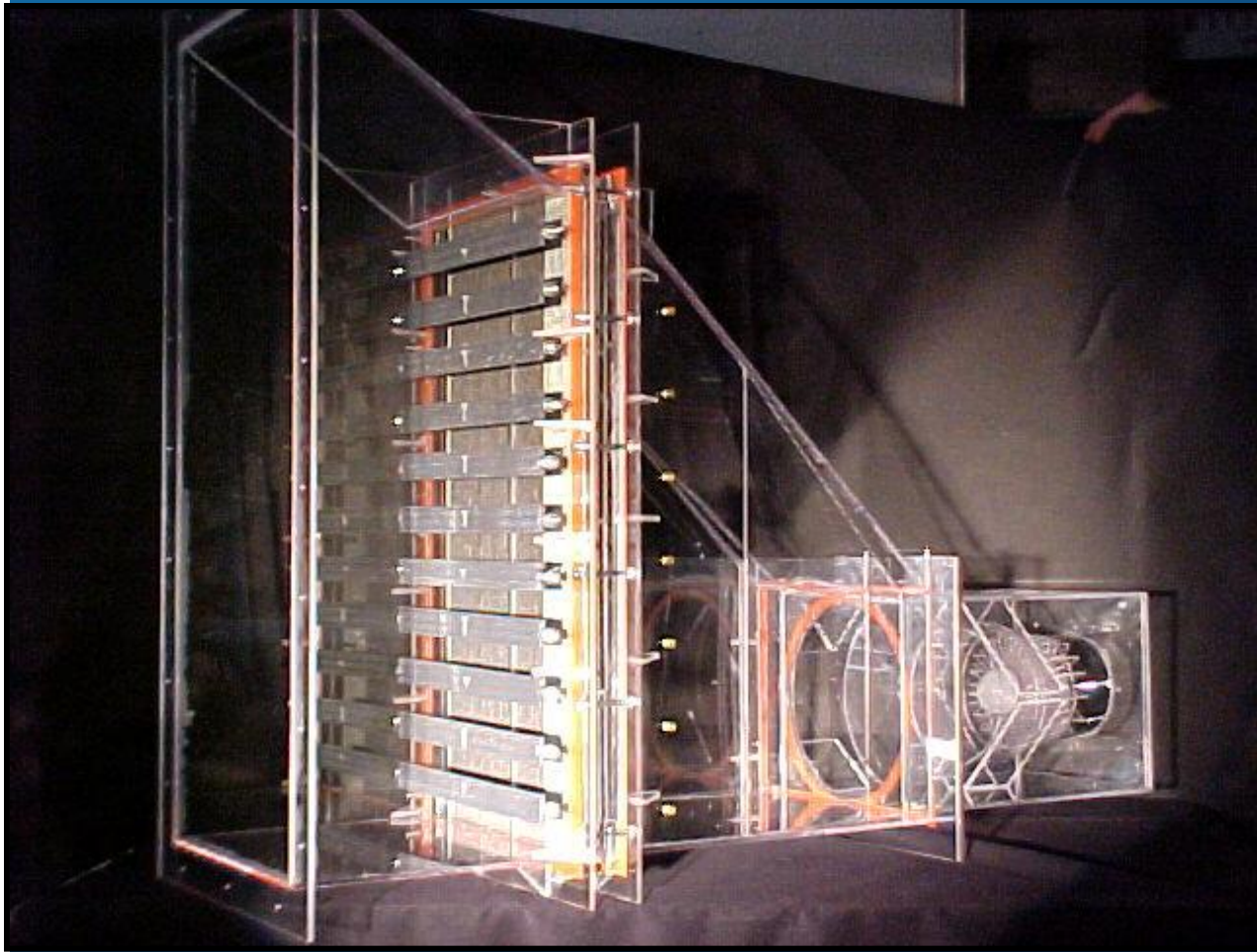
Individual  
Automatic  
Shut Off  
Valves

Fuel →

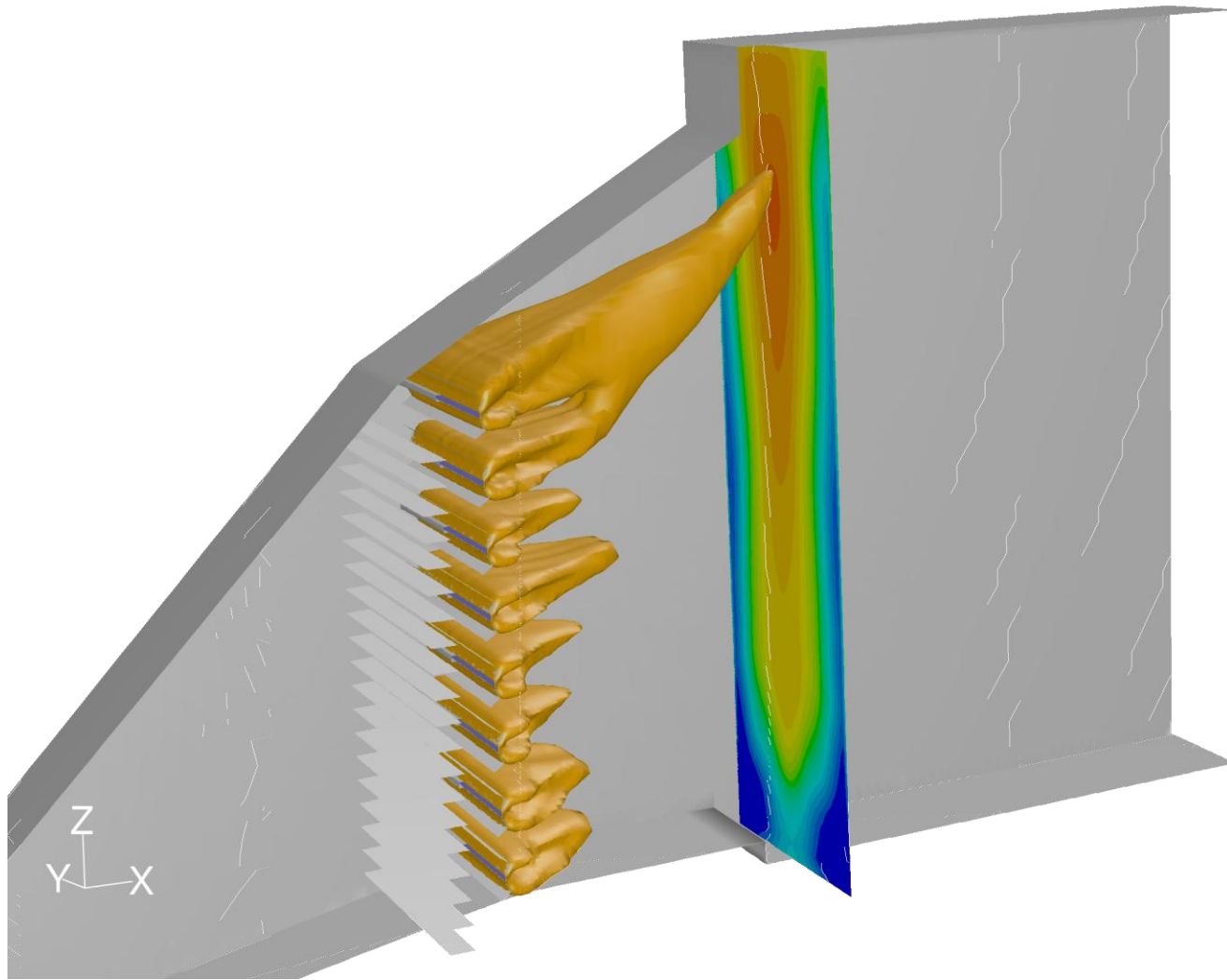


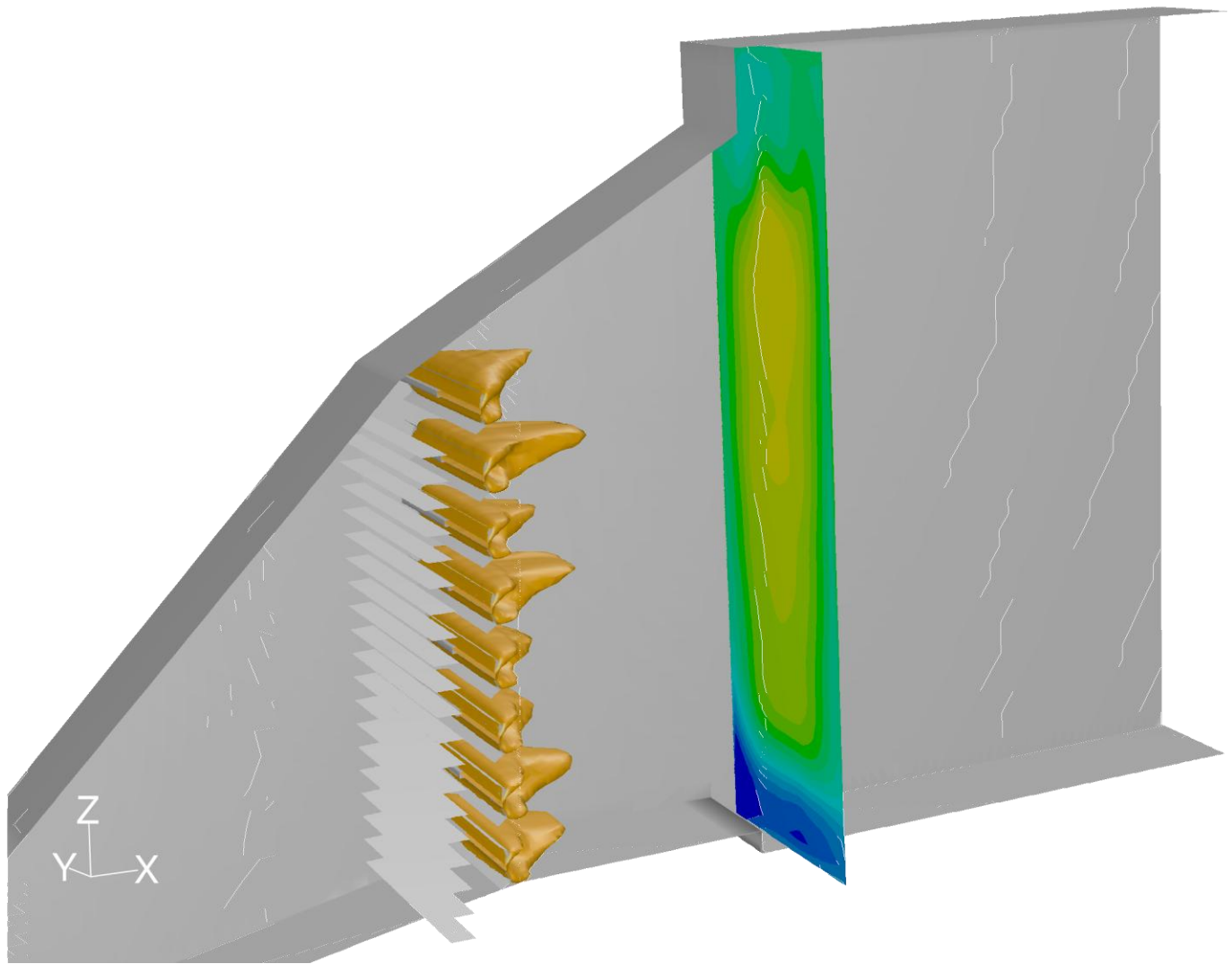
# Problem Solving with CFD Modeling

# LM-6000 Physical Air Flow Model



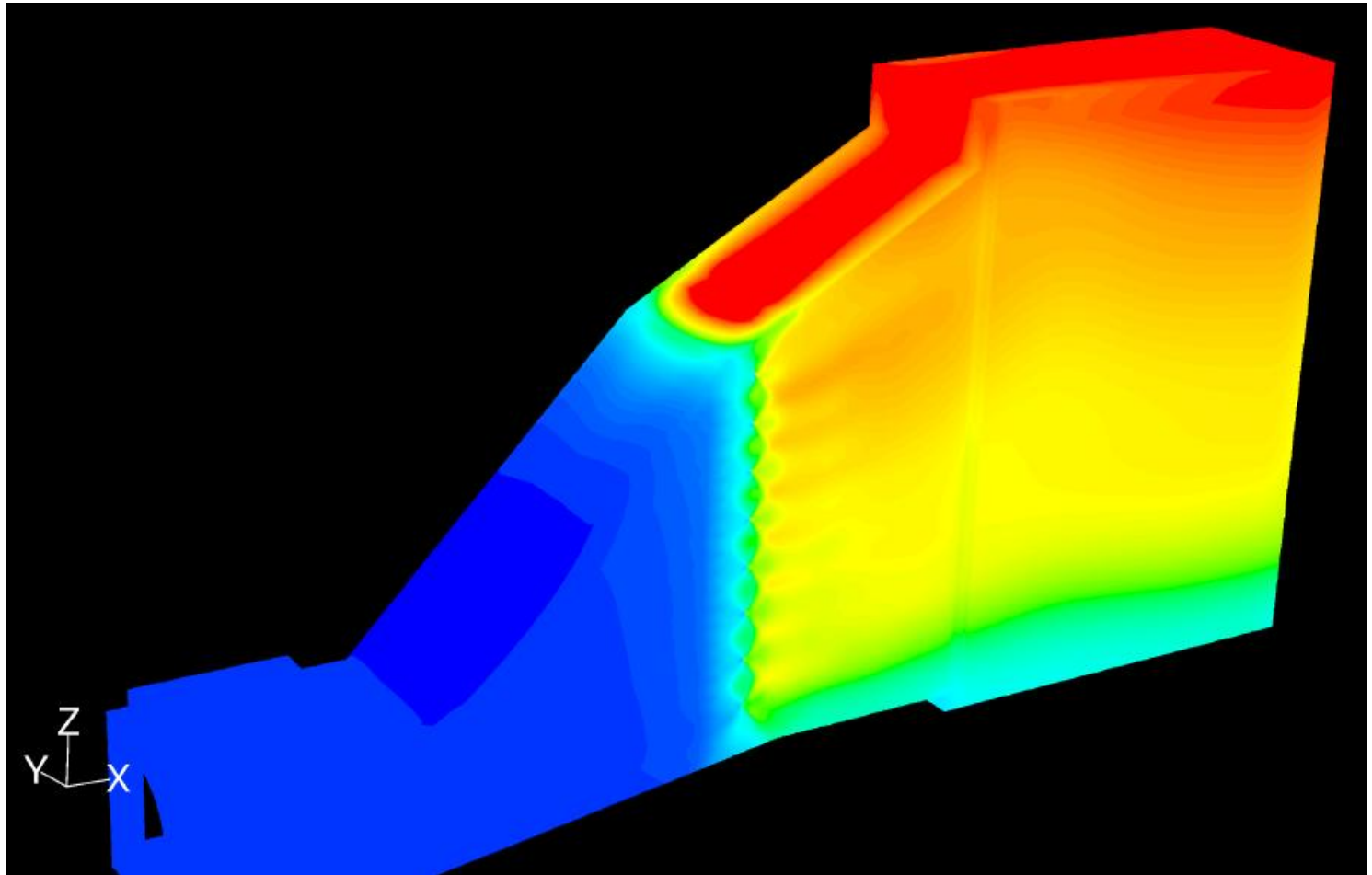
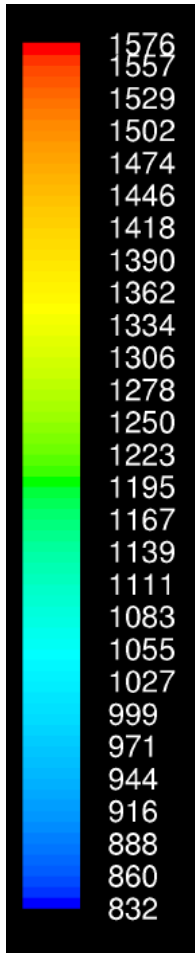






# Liner Temperatures for Duct as Installed

[°F]



# Liner Temperatures & Duct after Modifications

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