

Player Design, Inc.

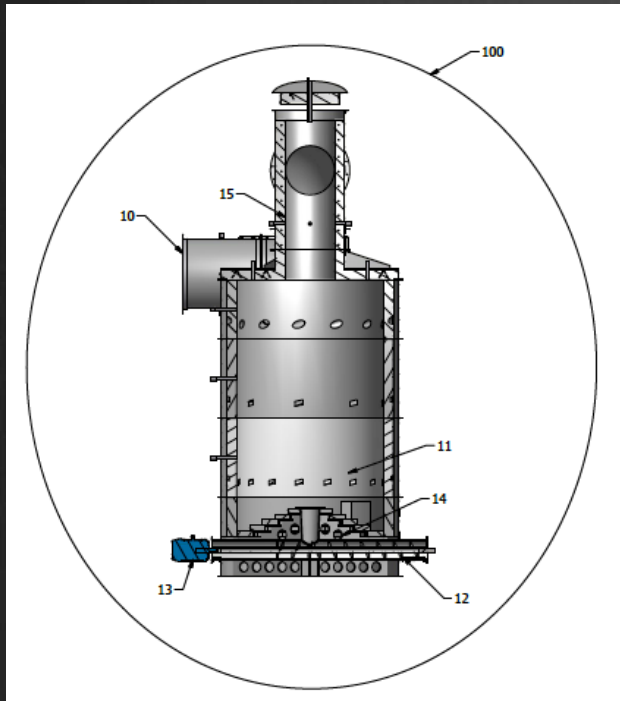
Drying and Process Heating Solutions

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Player Design, Inc.
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Burner Technology

- ❁ Fixed Grate Economical Combustion
 - ❁ US Patent #8,997,666 B2 for elevated grate combustion



Burner Technology

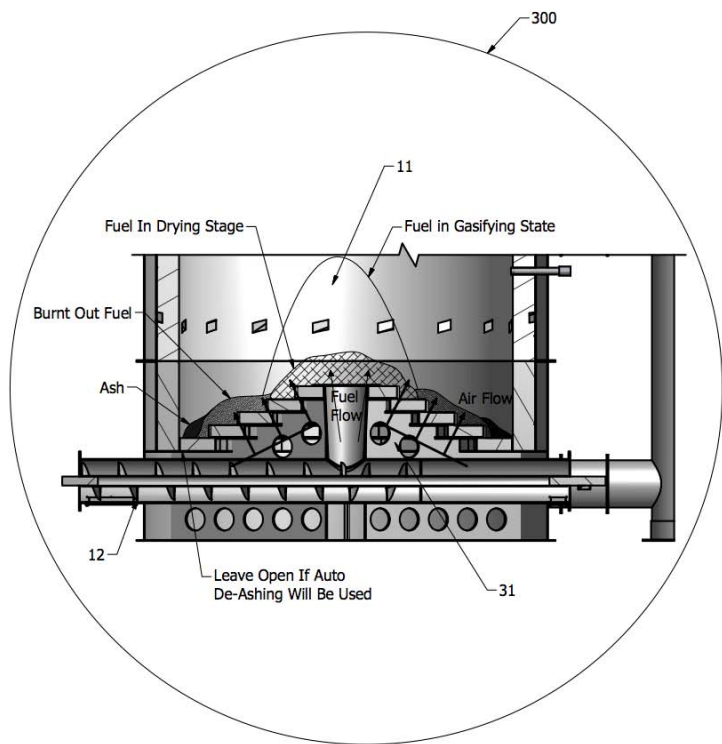


FIGURE 3

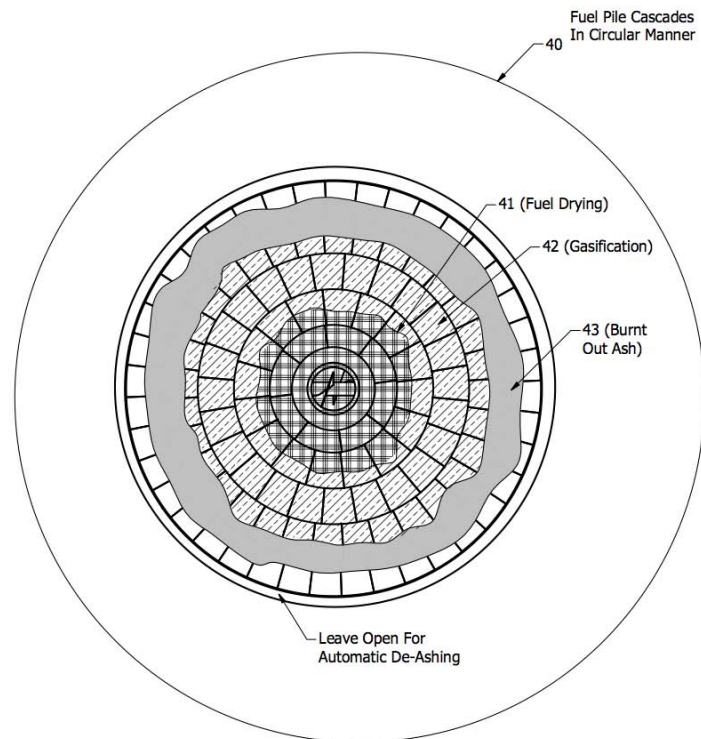


FIGURE 4

Underfire Air Section



- Underfed Stoker Design
- 3200F Bricks
- Moisture Range to 60%
- Fuel size 3" minus



Overfire Air Section



- Radial openings around entire perimeter
- Engineered angles to optimize combustion
- Utilize gasification and burn out to maximize fuel efficiency

Tertiary Air



- Stable Outlet Temperature
- Improved Drying Performance
- Increased Heat Release

Dryer Ductwork



- 6" Refractory Lining
- 3" Hardface – 135 lbs/cuft density for alkali attack of wood combustion
- 3" Insulating castable to keep surface of steel cool on the outside



Test Case #1

- 100% Hardwood
- Southern US
- Shavings, Sawdust, Chips
- Replace Previous bark combustor
- New 45MM BTU green fuel combustion system
- Capacity of dryer increased by 35%
- Emissions reduced by 28%
- Capacity of drying now exceeds other equipment in plant



Test Case #2

- 100% Southern Yellow Pine
- Shavings, Sawdust, Chips
- Replace existing dryers & dust burner
- New green fuel combustion system
- New single pass process technology
- Currently running 30,000 OD PPH
- No VOC Control, tested <100TPY
- No formal PM Control



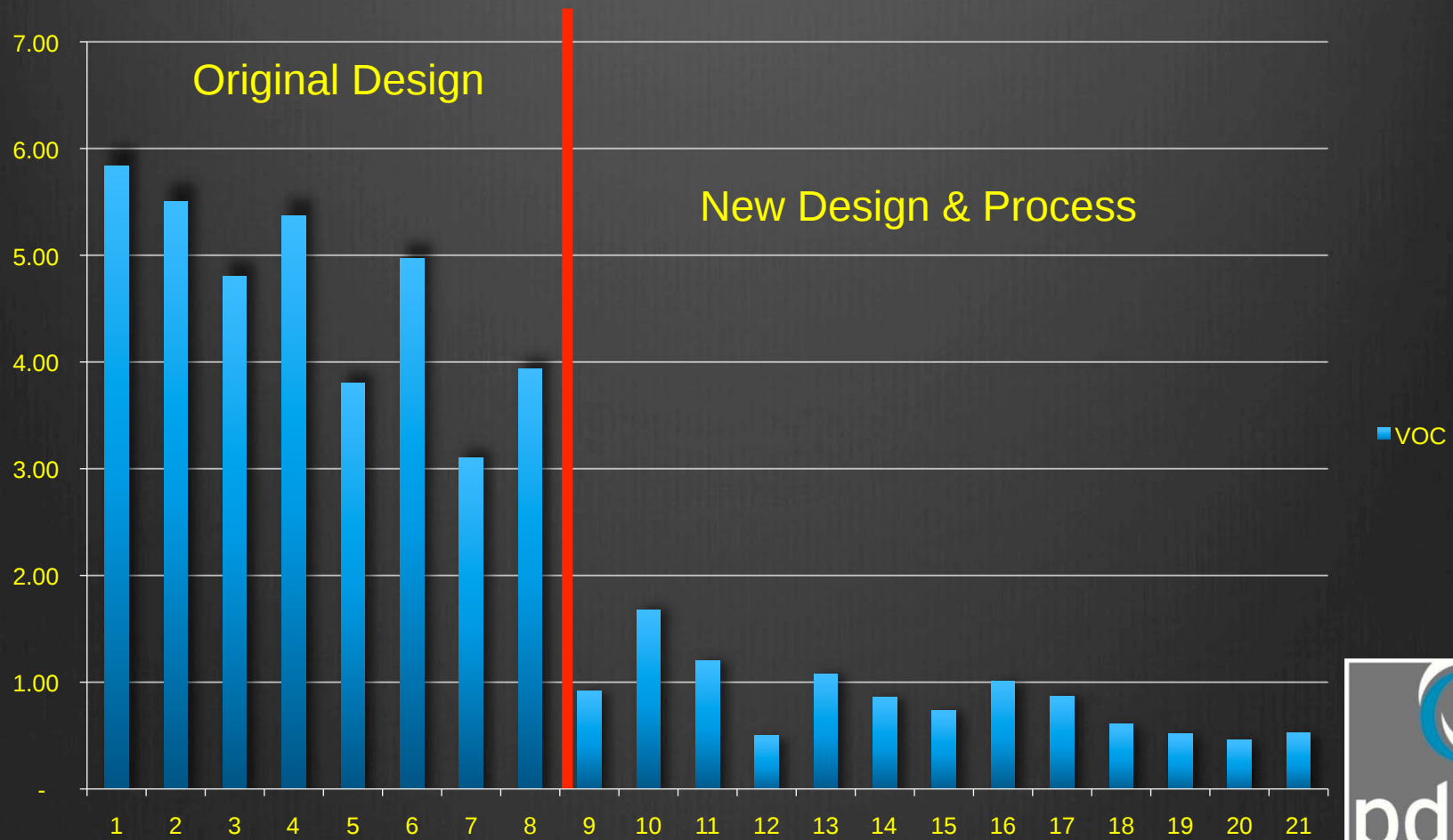
Test Case #3

- Mixed Eastern White Pine, Spruce and Fir
- Shavings, Sawdust, Chips
- Replace 2 dryers & dust furnace
- New green fuel combustion system
- New single pass process technology
- Currently running 35,000 OD PPH
- No VOC Control, tested 100% DV
- No formal PM Control



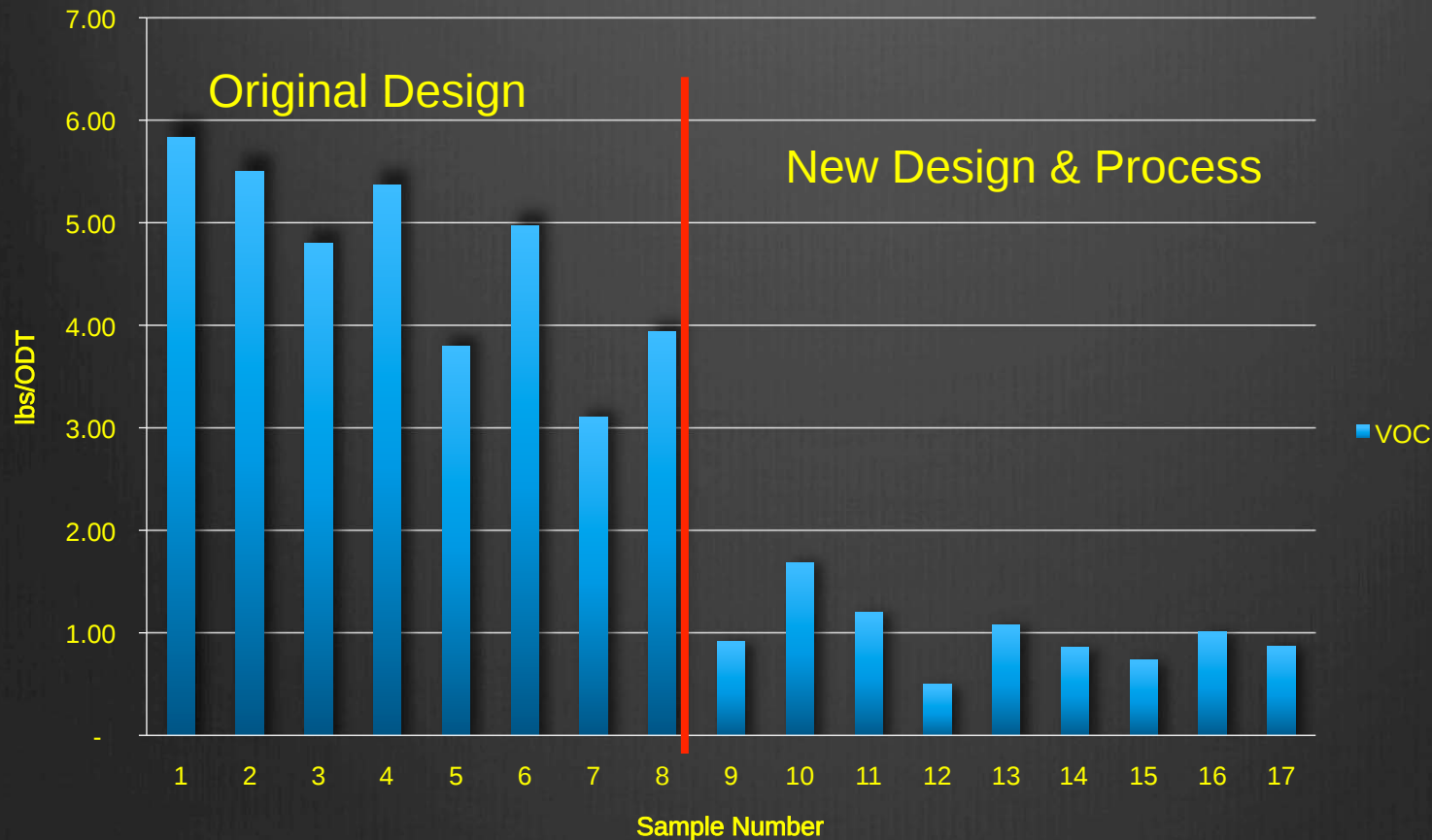
VOC Emissions

All Wood Species Combined



VOC Emissions Pine Only

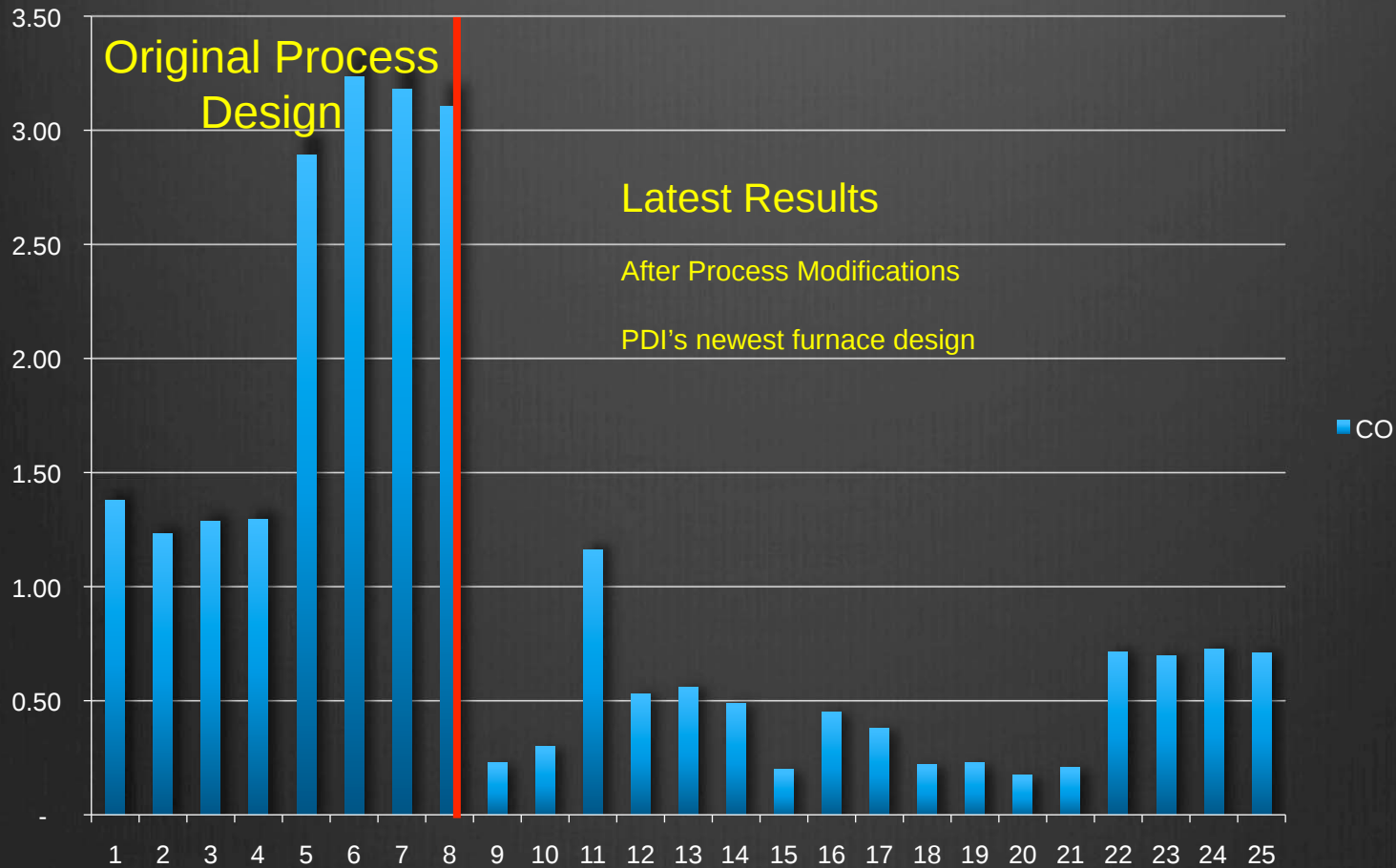
VOC Results Pine Only



CO Emissions

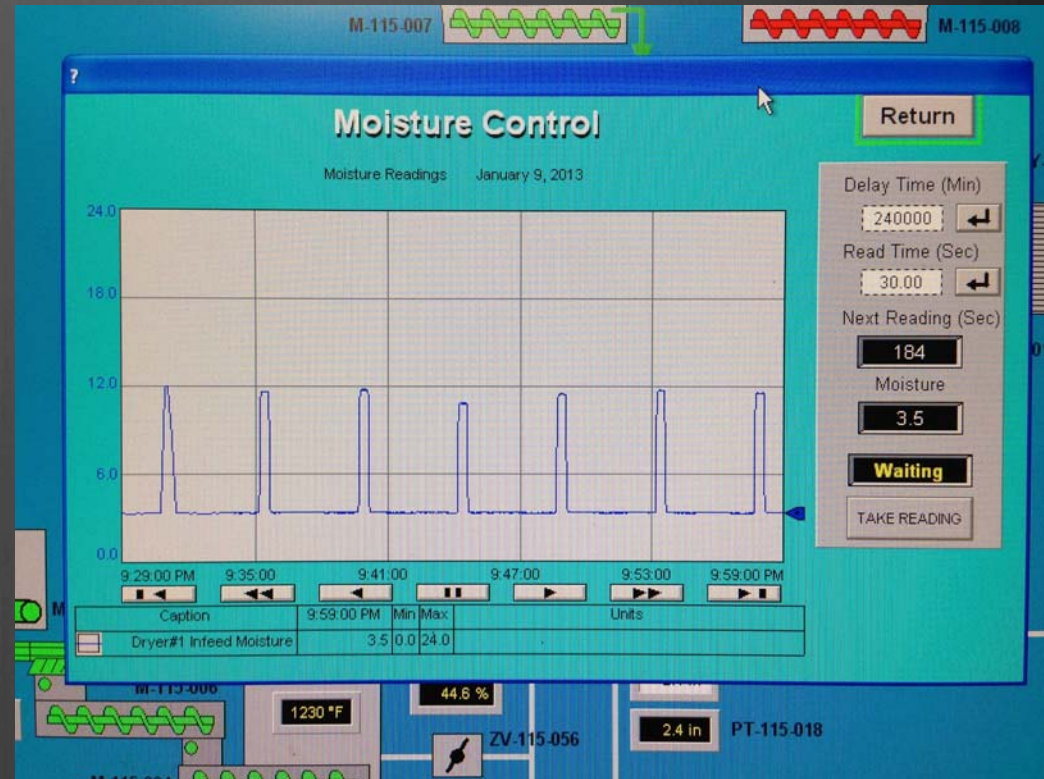
- ⦿ Unexpected Benefit of process redesign
- ⦿ Stability in furnace and efficiency of combustion
- ⦿ Lower CO emissions by over 50%
- ⦿ Less sparking
- ⦿ Better drying control

CO Emissions



Moisture Control

- Moisture stabilized in this new process
- +/- 1% variation in 24 hours
- Stability in process also reduced swings over time created by operator adjustments



Questions

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