

Impacts of New SSI Standards on Mattabassett District's New FBI System Design



Presented by:

Melissa Hamkins, P.E.
Wright-Pierce

Brian Armet
Mattabassett District

WRIGHT-PIERCE 
Engineering a Better Environment

Presentation Overview

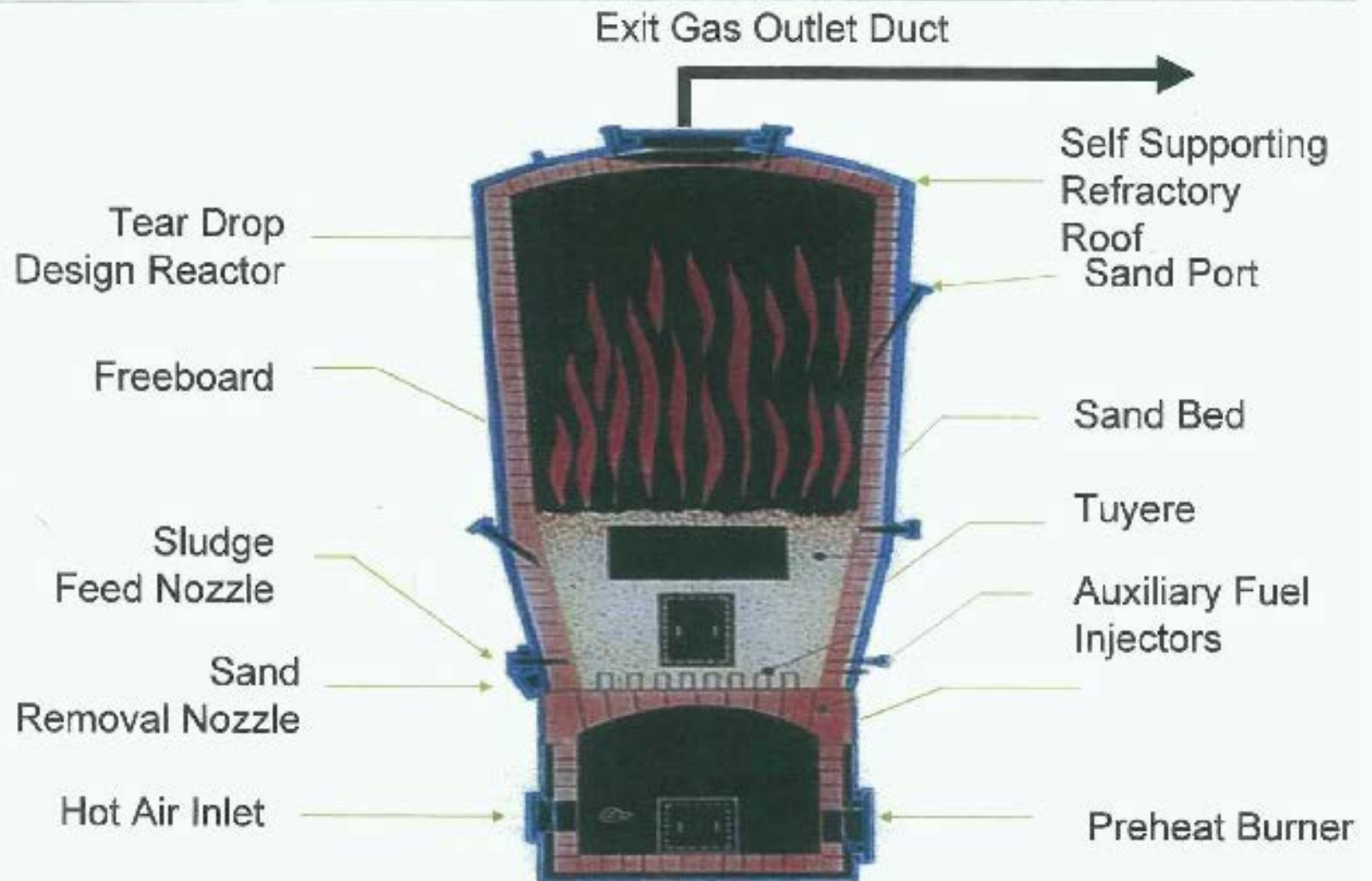
- Background
- Original Design
- New Regulations
- Changes in Design

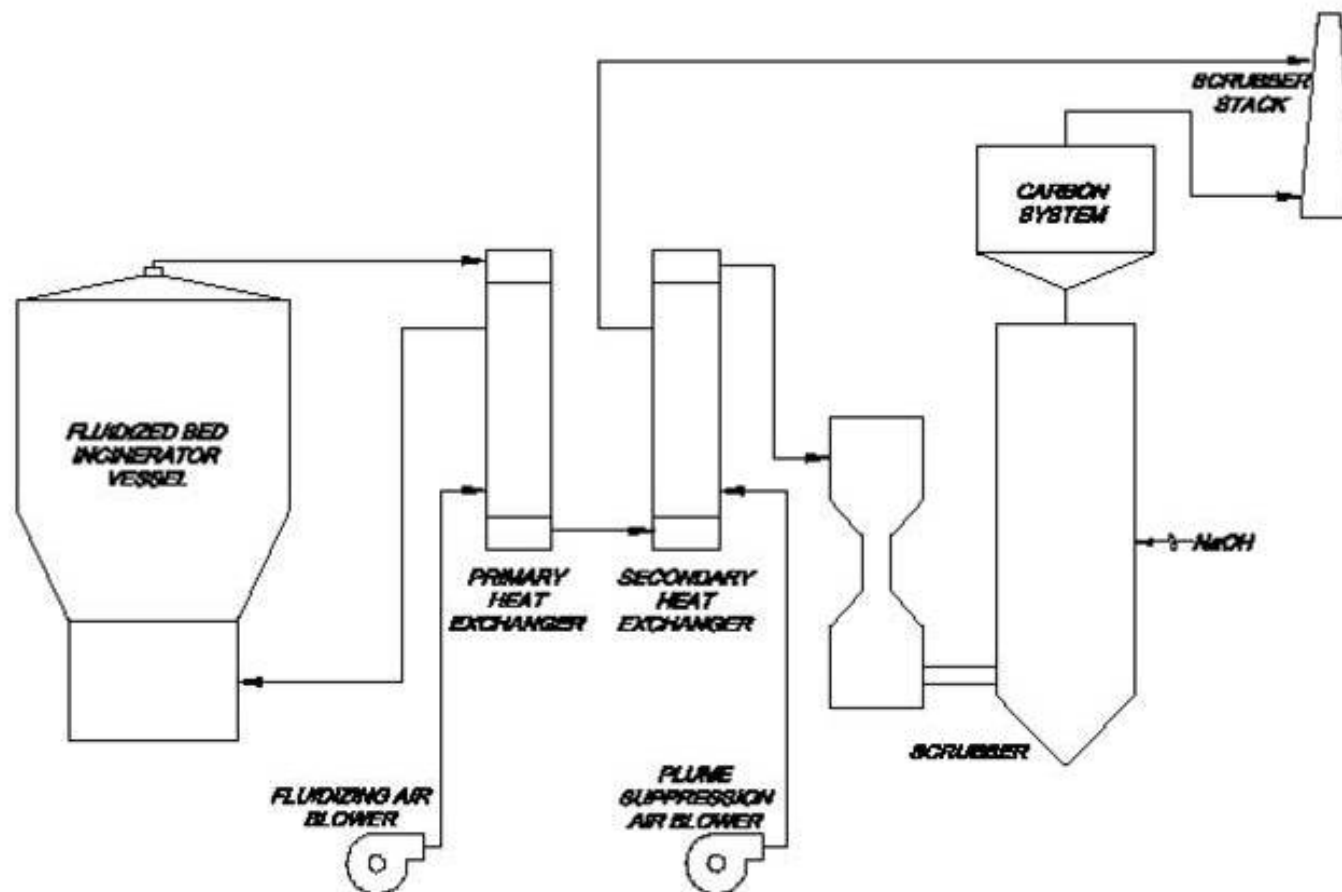


Mattabassett District FBI Background

- Currently operates a FBI
- Piloted Carbon System
- Planned to install a new FBI and use existing FBI as a backup
- Planned to use new Carbon system for both existing and new FBI systems.







EXISTING FLUIDIZED BED INCINERATOR SYSTEM

Background Continued

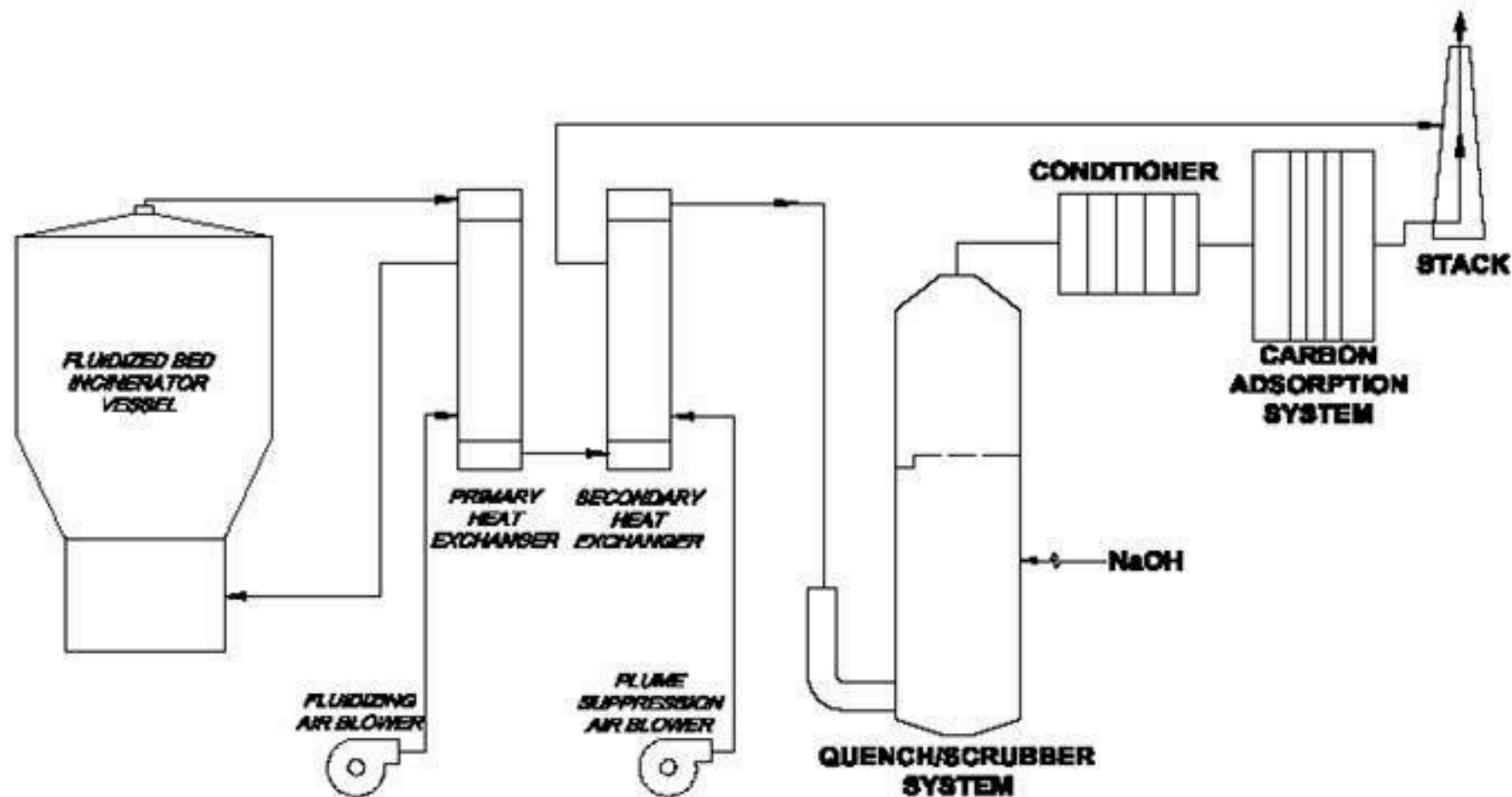
- Procurement part of a Plant Wide Upgrade
 - Prebid FBI system to identify Vendor
 - Vendor develop design
 - Incorporate Vendor design in Plant Upgrade documents.

Timeline



New FBI System Pollution Control

- Designed to meet BACT standards
- FBI bed designed for CO and NO_x control
 - 6.5 second freeboard residence time
- Quench followed by multi-venturi tray scrubber
 - Removal of particulate and associated metals
 - Acid gases
 - Add caustic to scrubber to have neutral wastewater
- Carbon bed system
 - Mercury and dioxin removal
 - Designed to be used with New and Existing FBI system



**NEW FLUIDIZED BED INCINERATOR SYSTEM
(PRIOR TO NEW REGULATIONS)**



Compare BACT to New SSI Limits



Criteria Pollutants	BACT	NEW SSI Limits
PM , mg/dSCM	24	9.6
SO _x , ppmvd	26	5.3
NO _x , ppmvd	155	30
CO, ppmvd	100	27
Cd, mg/dSCM	0.106	0.0011
Pb, mg/dSCM	0.46	0.00062
Hg, mg/dSCM	0.142	0.001

All at 7% Oxygen

Particulate

- New Regs: 9.6 mg/dscm
- Multi-venturi Scrubber: 6.9 mg/dscm
- FBI Vendor less comfortable with new limit
- Recommended Wet ESP



Metals

- Generally considered related to particulate
 - Ionized forms are bound to particulate
 - Elemental forms are not bound to particulate
- Cadmium and Lead
 - Using max historical Metal data
 - Scrubber does not meet limits
- Requires WESP to attain limits
- Carbon system needed to meet Pb limits

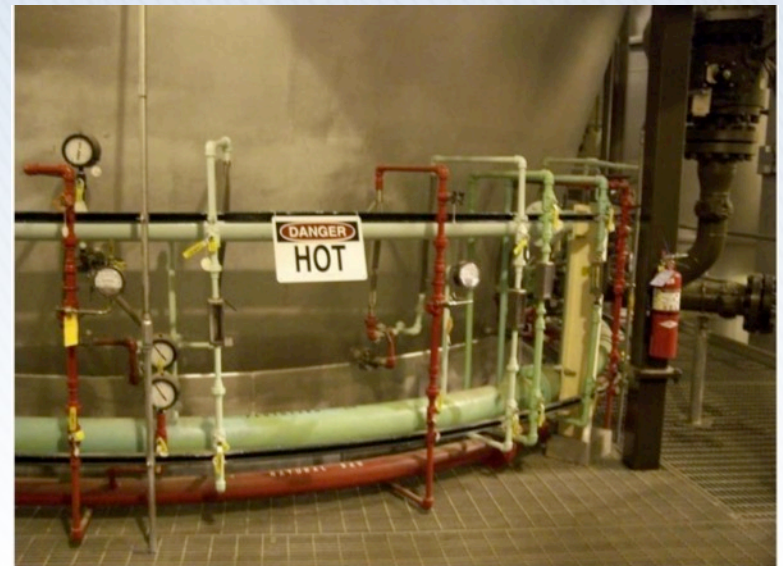
Carbon Monoxide

- New Regulations:
 - 27 ppmvd @7%O₂
 - Original Design approx. 100 ppmvd
- Required a larger Freeboard to attain
- Requires a different burner for startup



Nitrogen Oxides (NO_x)

- New Regulation: 30 ppmvd @7%O₂
- Amount generated depends on Sludge
 - Hot localized burning generates more NO_x
- New Low NO_x Burner
- NH₃ Injection (SNCR)
 - Tank and pump
 - Ammonia Bustle
 - 6-8 injectors
 - Controls



Mercury



- New Regs: 0.0010 mg/dscm@7%O₂
- Original design was robust.
- Vendor verified performance
- More frequent carbon change.

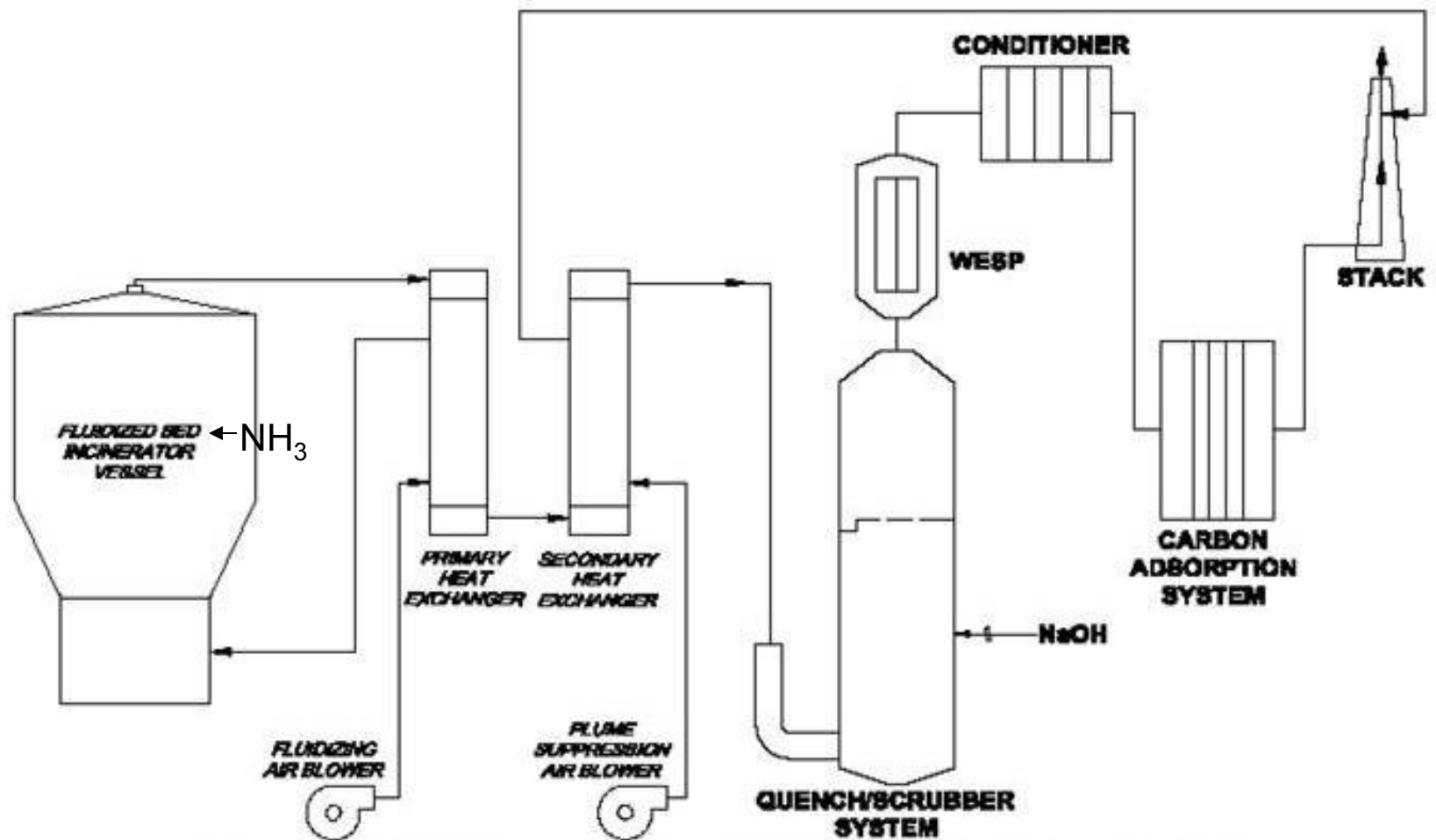


Sulfur Oxides (SO_x)

- New Regulations: 5.3 ppmvd @7%O₂
- Addition of Caustic to Scrubber
 - Increase in amount of Caustic needed
 - Control to pH of 8.5 std pH units.

Impact to New FBI Design

- Increased size of freeboard (CO)
- Added Ammonia injection (NO_x)
- Increased rate of Caustic addition to Scrubber (SO₂)
- Added WESP (Cd, Pb, PM)
- Changed Burner (NO_x, CO)



**NEW FLUIDIZED BED INCINERATOR SYSTEM
(REVISED TO MEET REGULATIONS)**

Questions?

