

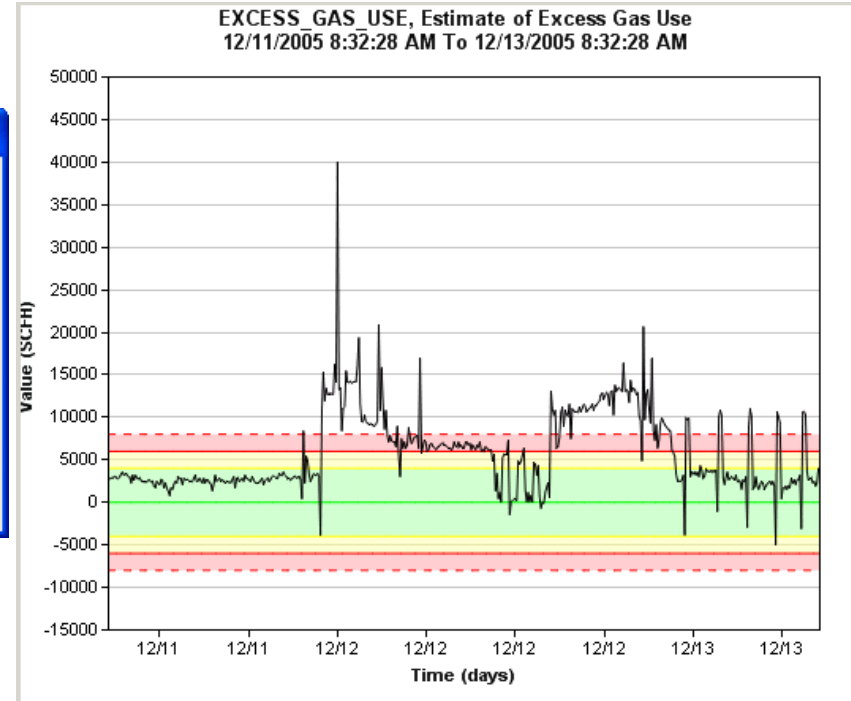
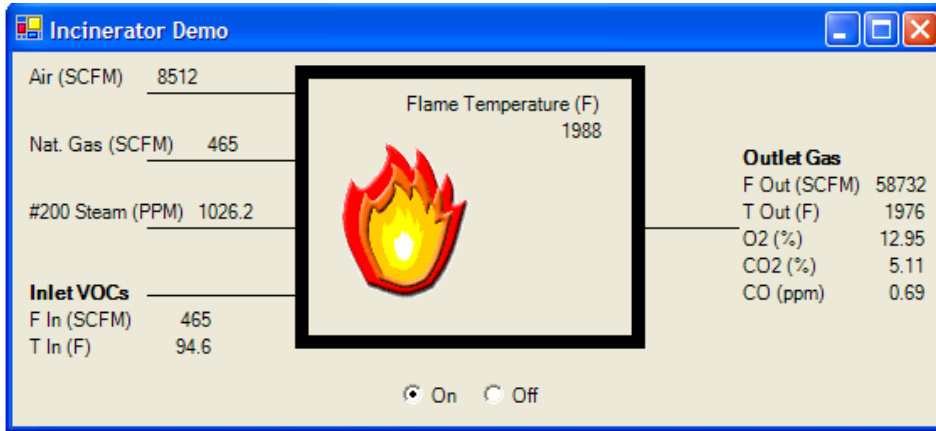
FALCONEER Technologies



*Enhancing Incinerator Operation Cost
& Reliability with Virtual Workforce!*

INDUSTRIAL or MUNICIPAL

- Incinerator



- Digital Dashboard / KPIs

- Excess Gas Use & Cost
- Flue Gas Composition & Temperature (Environmental & Operational)
- Excess Oxygen Use & Cost (Blower Energy)

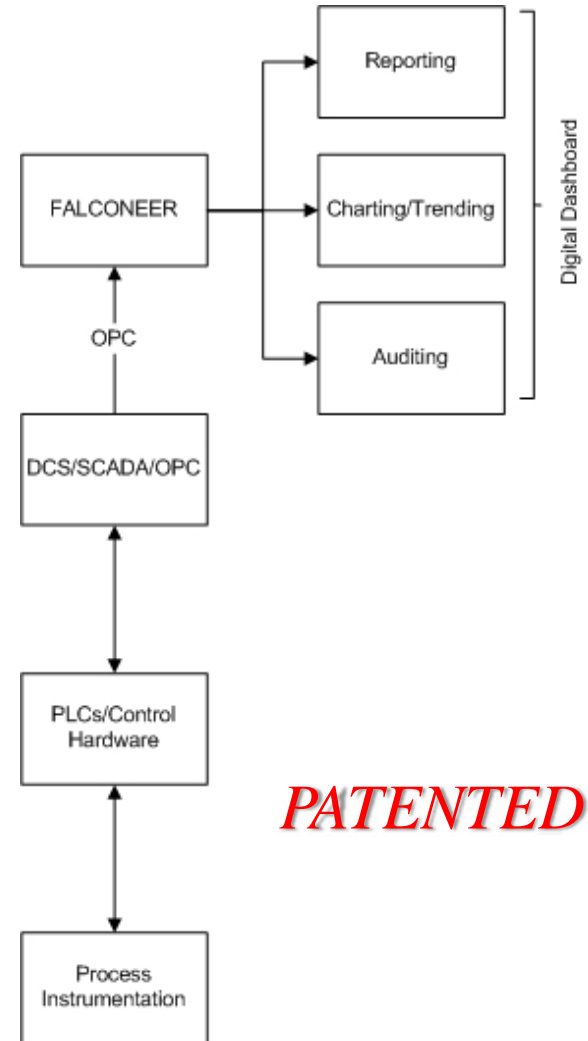
What is FALCONEER™

THE VIRTUAL ENGINEER / OPERATOR

The Right Information Automatically
Provided at the Right Time!

Watching Your Back – Not Big Brother

- Automated & unified system for data collection, analysis, advising
 - Eliminate labor intensive plant performance spreadsheets
- Monitor assets, manage dynamic situations
- Identify Abnormal Conditions and Pending Failures
- Optimize operations for performance, regulatory & contractual compliance

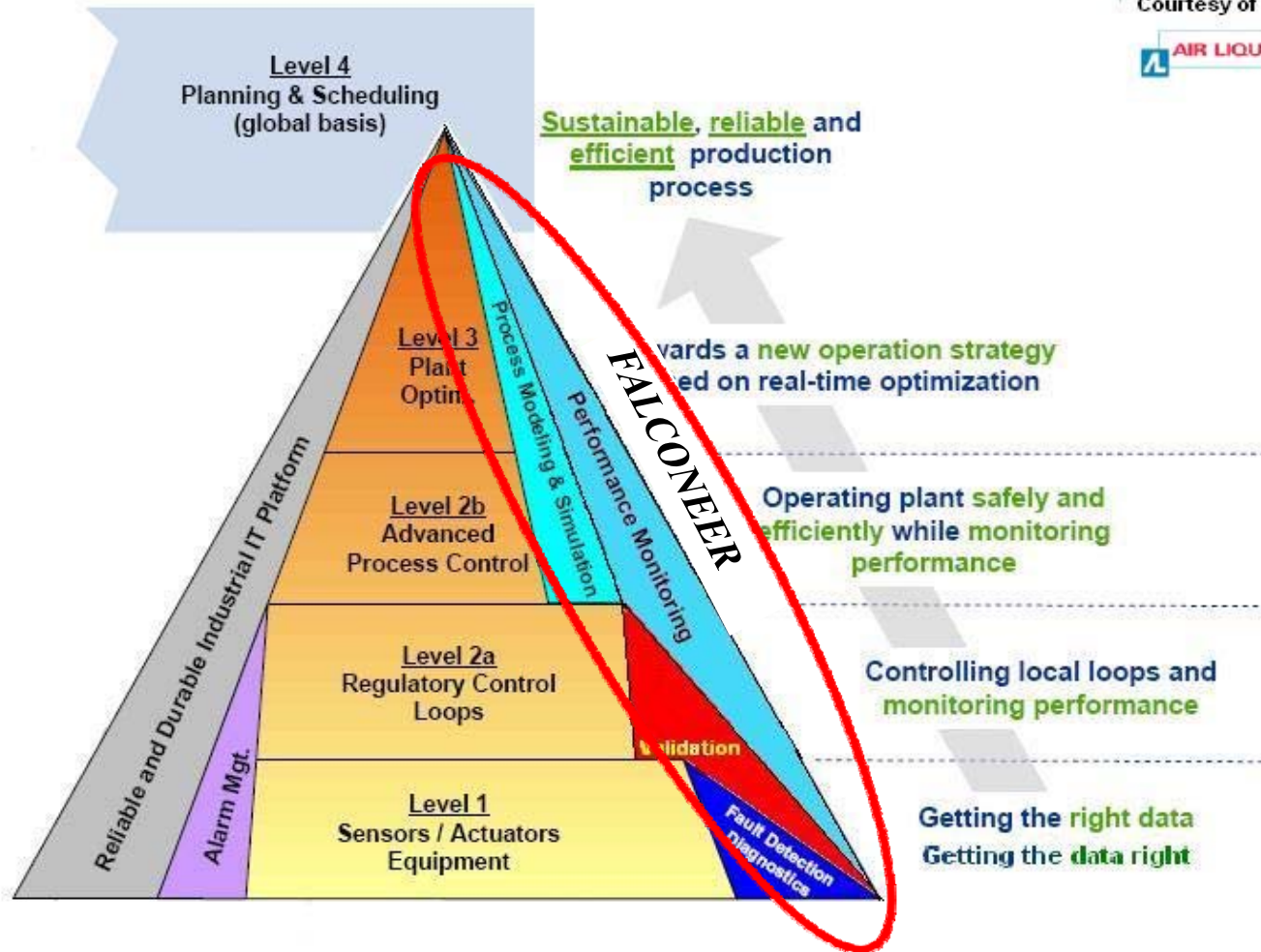


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Operational Performance - Production Processes

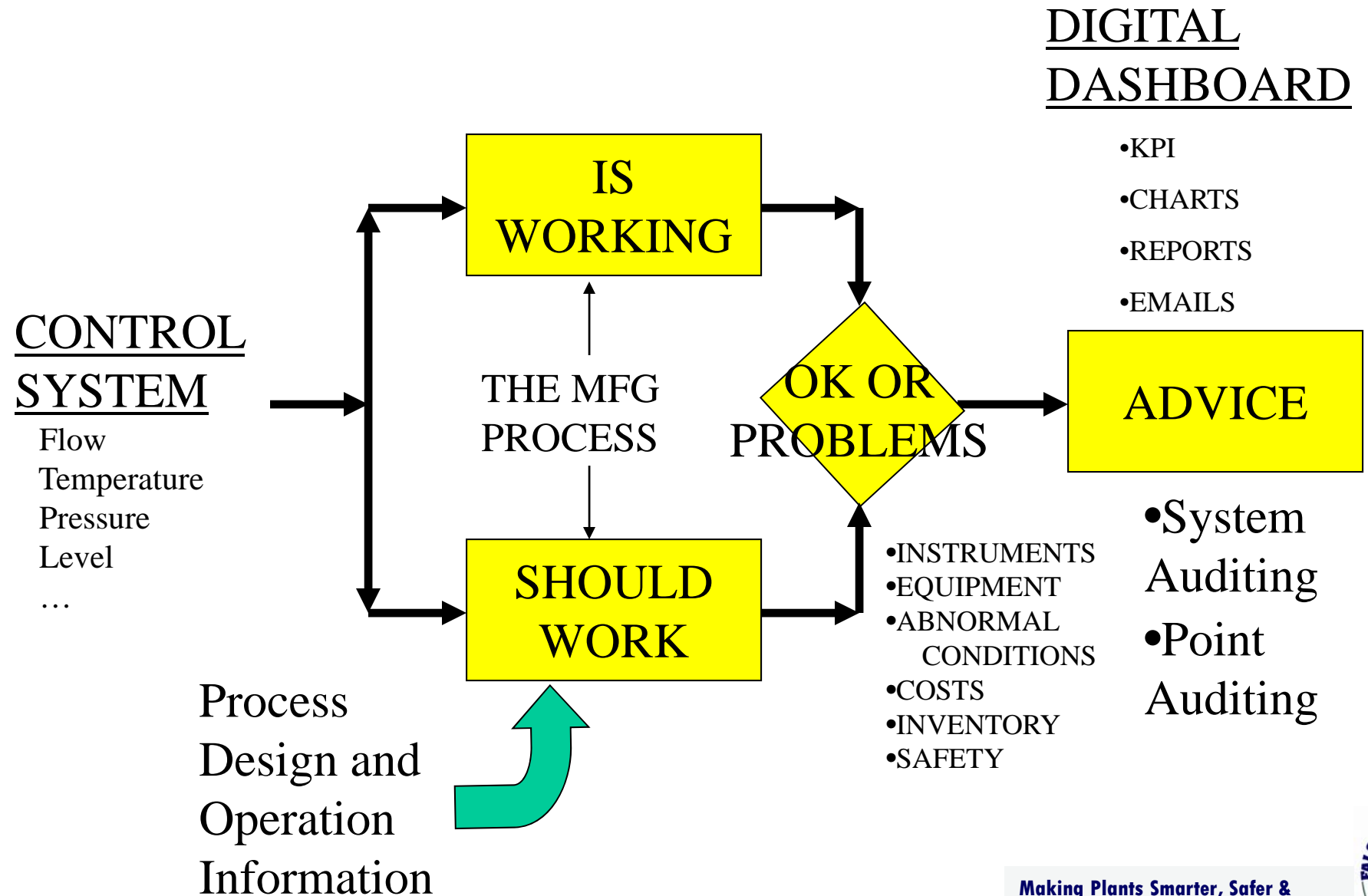
Courtesy of



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HOW DOES FALCONEER™ IV WORK?



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Optimize Gas Usage & Cost

- **GOAL:** Continue to reduce Natural Gas Use and Cost
- **HOW:**
 - Track natural gas use on incinerator
 - Track total incinerator heat requirements & compare to actual heat use
 - ALARM, ADJUST and INFORM on excess gas use
- **OPPORTUNITY:**
 - At least 20% Additional Savings (Based on study of actual actual gas use)



Incorporate Virtual “Tags”

- Not available on Control System
- Total Water into Incinerator based on % Solids and Sludge Feed
- Total Heat Requirements vs. Total Actual Heat Input based on Heating Value of
 - Incoming sludge
 - Natural gas
 - Evaporation
 - THC/temperature control requirements
- Total Digester Gas Flow to Incinerators based on Sphere Pressure Changes
- Total Air Flow through Incinerator based on Fan Curve
- Total Fuel Target based on % Solids



Key Gas Savings Assumptions

- Natural Gas HV 1000 BTU/CFM
- Digester Gas HV 650 BTU/CFM
 - Higher Gas HV will yield higher \$\$ savings
 - Dry Solid HV 4400 - 7000 BTU/lb
 - Higher Solid HV will yield higher \$\$ savings
- Sludge Feed % Solids 21 – 28%
 - Higher % Solid will yield higher \$\$ savings
- Natural Gas Pricing 2010
 - \$10.33/MCF to \$3.46/MCF
 - \$9.61/decatherm (MCF)



FALCONEER CASE STUDIES

A manager understands - “It’s not Big Brother, it’s helping our engineers and operators watch our backs and get the most out of our investment in information!”

CHEM \ PETROCHEMICAL

- Electrolytic Cell Plant (Oxidizer)
- EO Plant
- Polymerization Plants
- **Incinerators**
- Pipeline (Gas, Oil)

WATER & WASTE WATER

- Energy
- Utilities / **Incinerators**
- Chemicals

PULP & PAPER

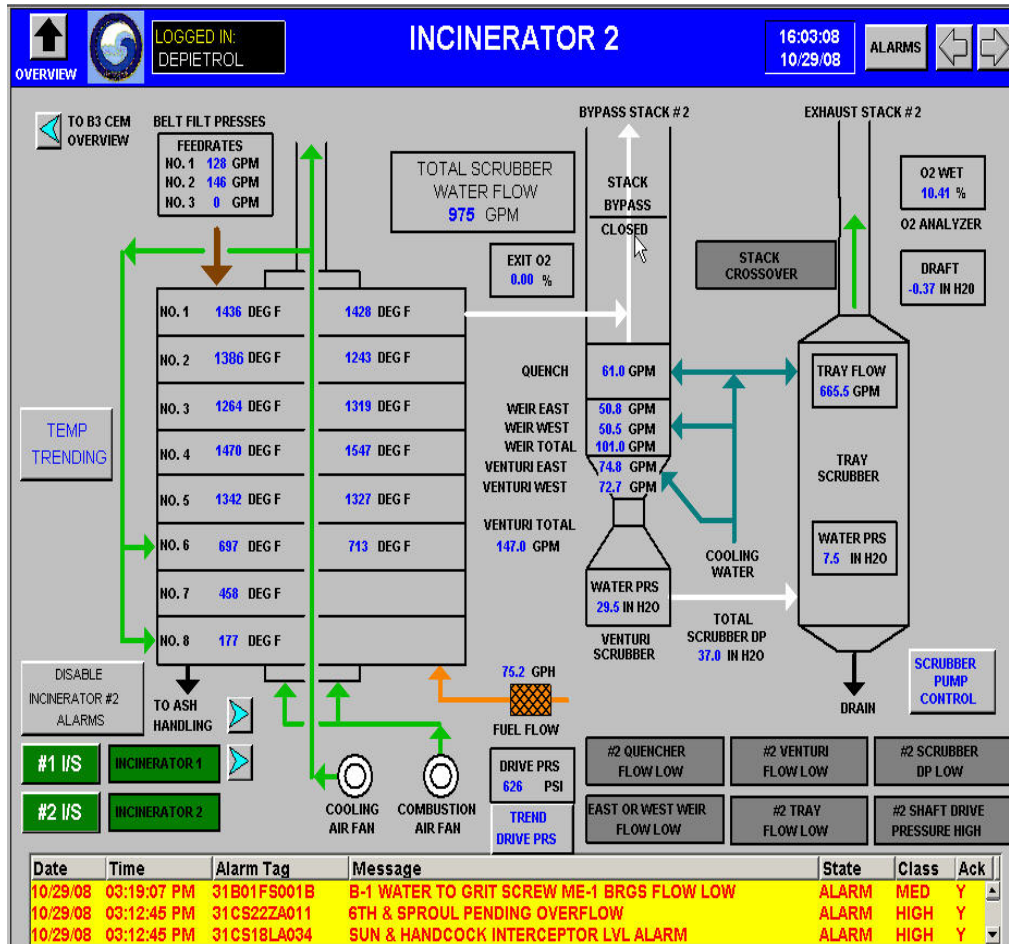
- Paper Machine

POWER GENERATION

- Boiler Systems
- Turbines
- Co-Generation



Multiple Hearth Incinerator

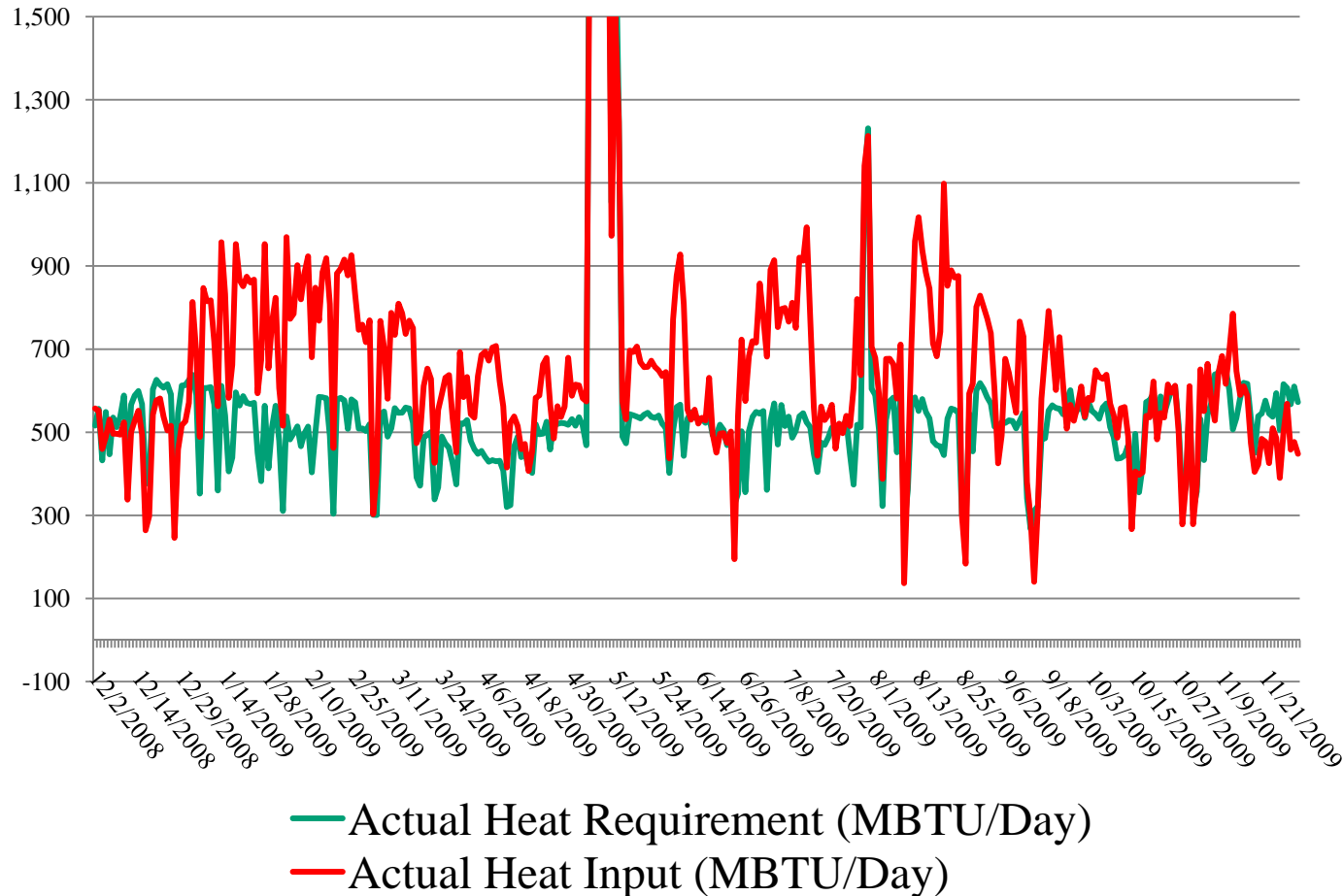


- Digital Dashboard / KPIs
 - Fuel Oil Cost / Sludge Feed Ratio
 - Total Dry Ton Sludge Feed
 - Heating Value at different Hearth Levels
 - Daily Cumulative & Forecast Total Sludge Feed
 - Filter Press Feed Rate Targets
 - Electricity and Fan Cost



Multiple Hearth Incinerator Fuel 2009

- Req Heat @
 - 1100 F
 - 17000 CFM

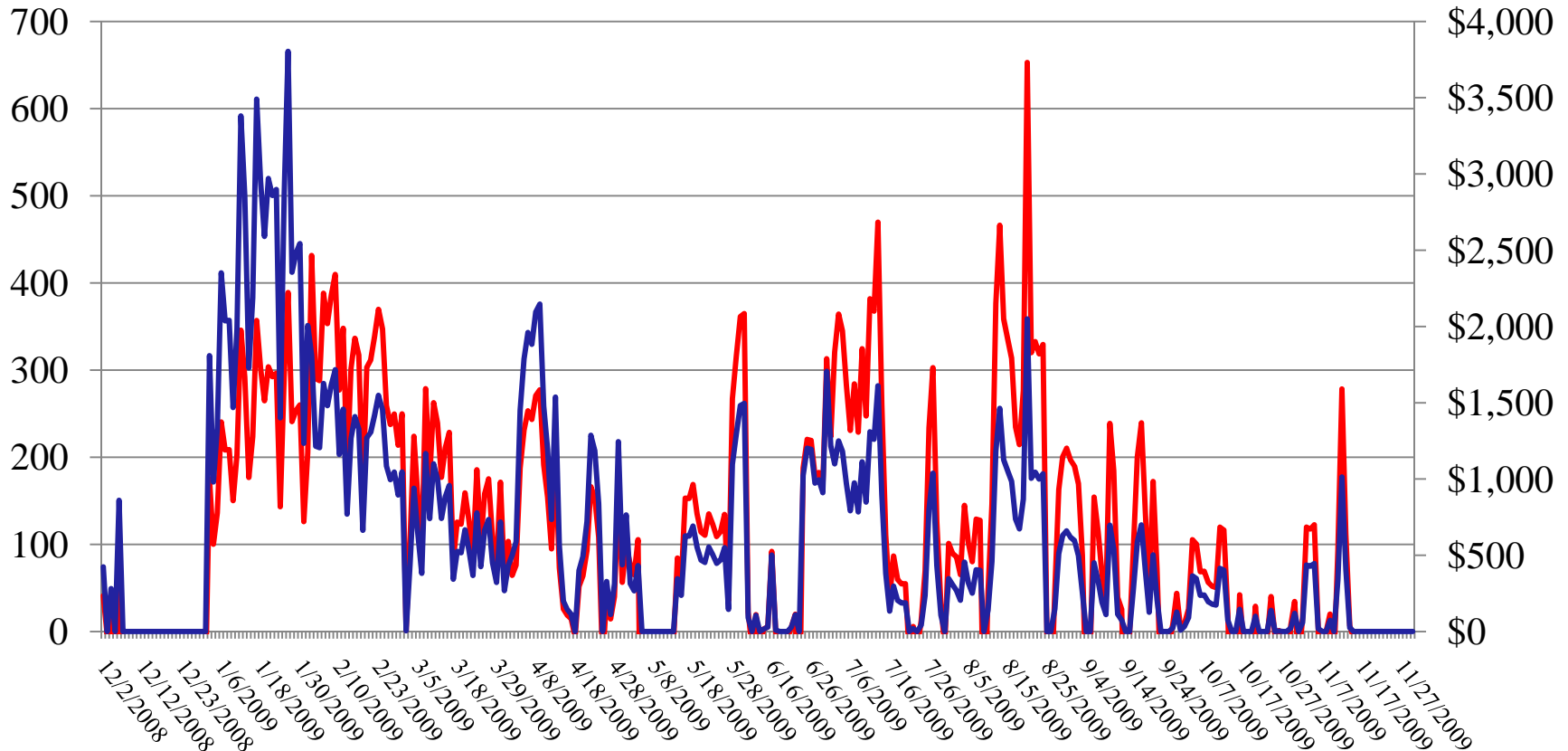


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Gas Savings Opportunity 2009

- 1100 F
- 17000 CFM



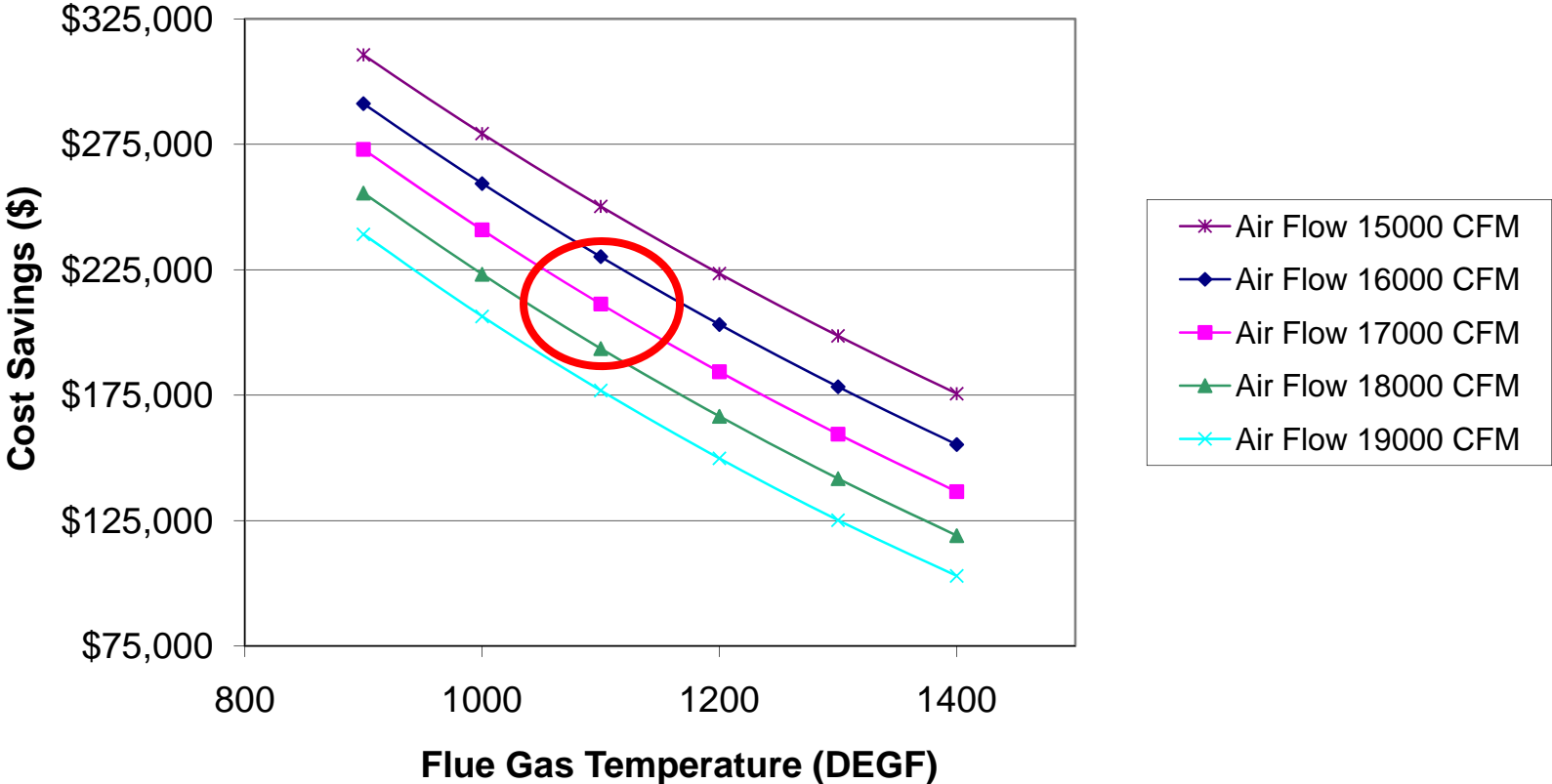
— Excess Natural Gas Use (Therms/Day)
— Excess Natural Gas Cost (\$/Day)

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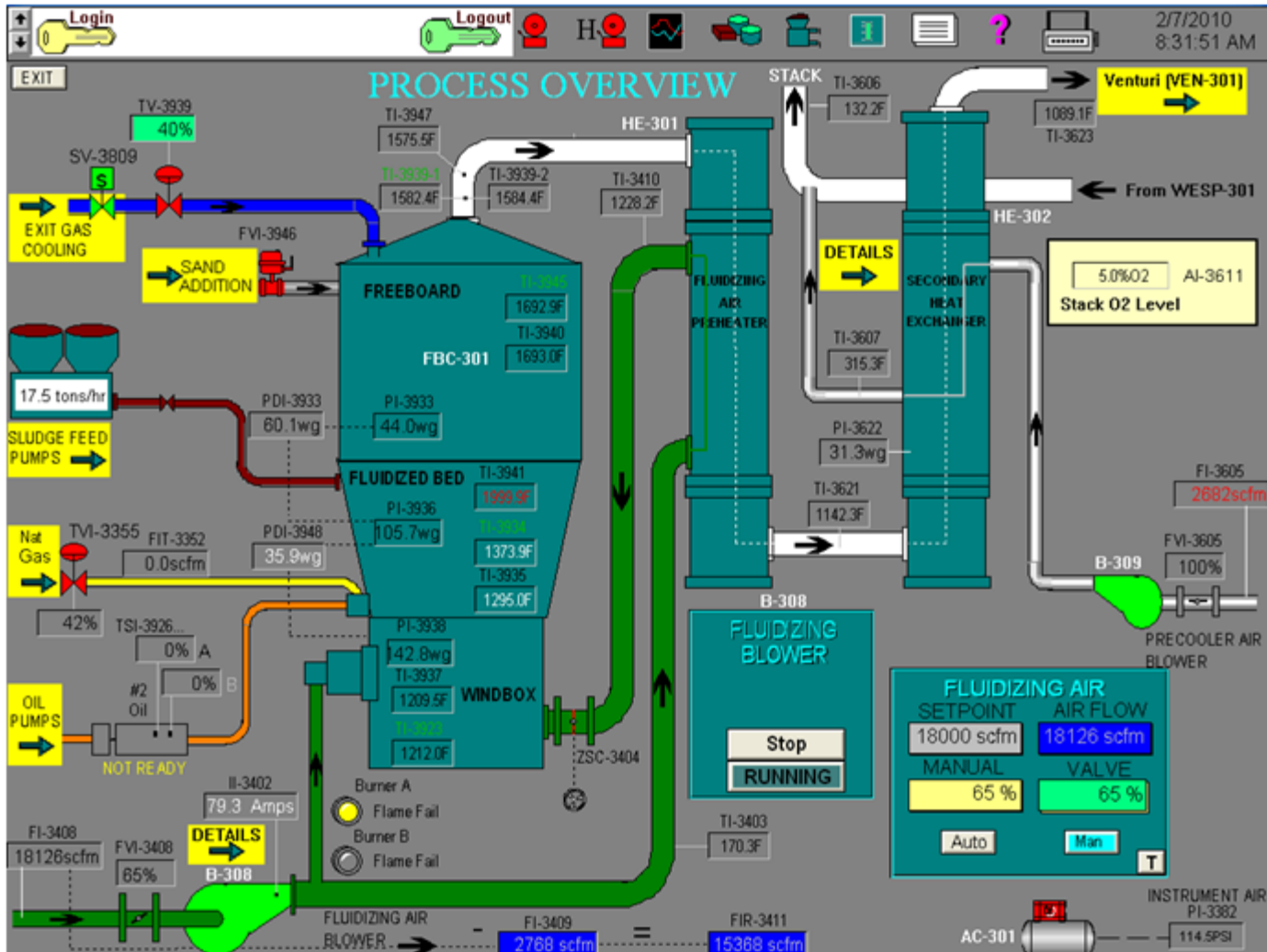


Gas Saving Opportunity 2009 and Future

Cost Savings for Natural Gas with Variation of Flue Gas Temperature and Combustion Air Flow



Fluidized Bed Incinerator



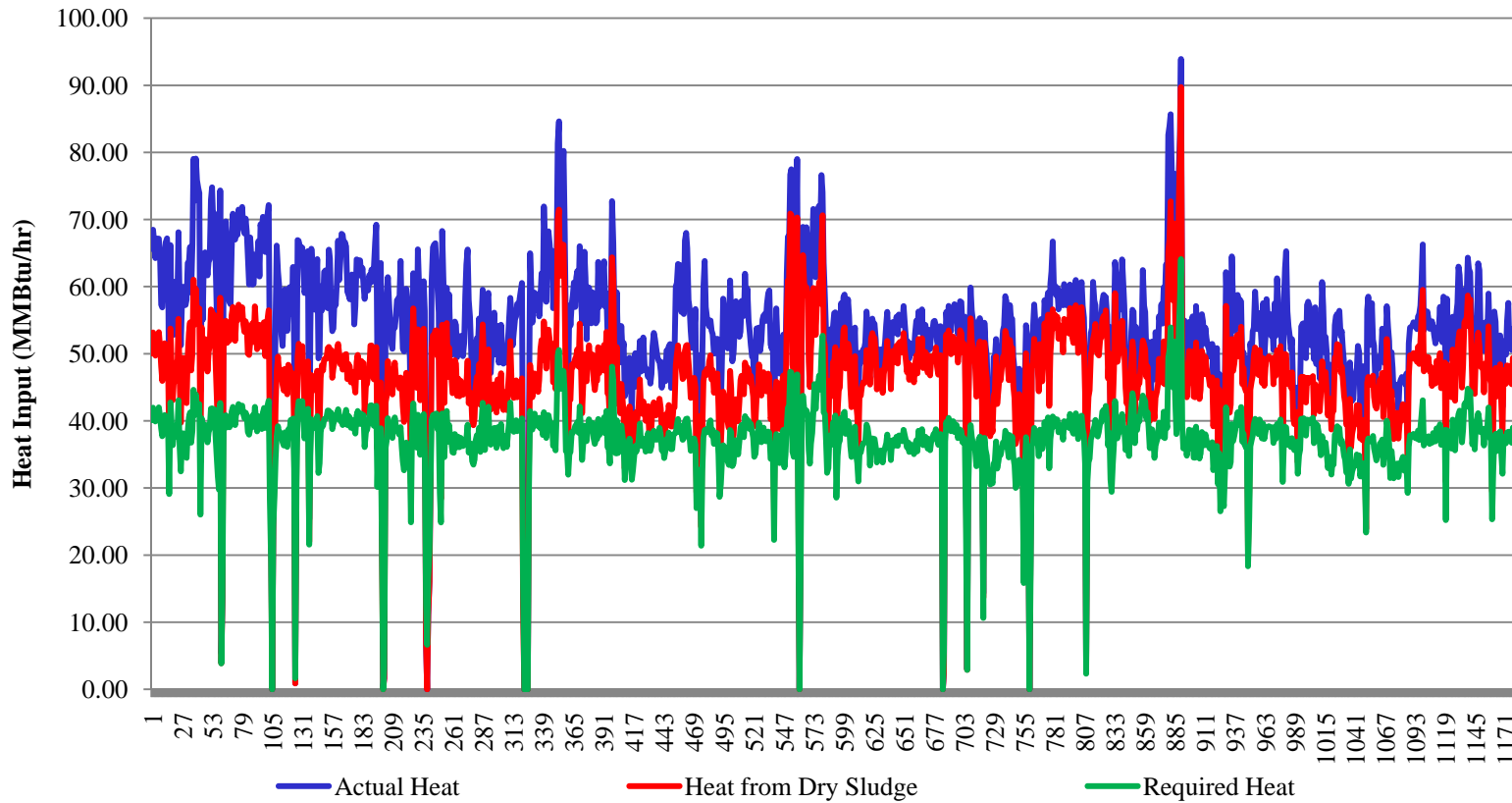
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Fluid-Bed Incinerator Fuel 2010

- Cake HV @ 6000 Btu/lb
- 24.5% Solids

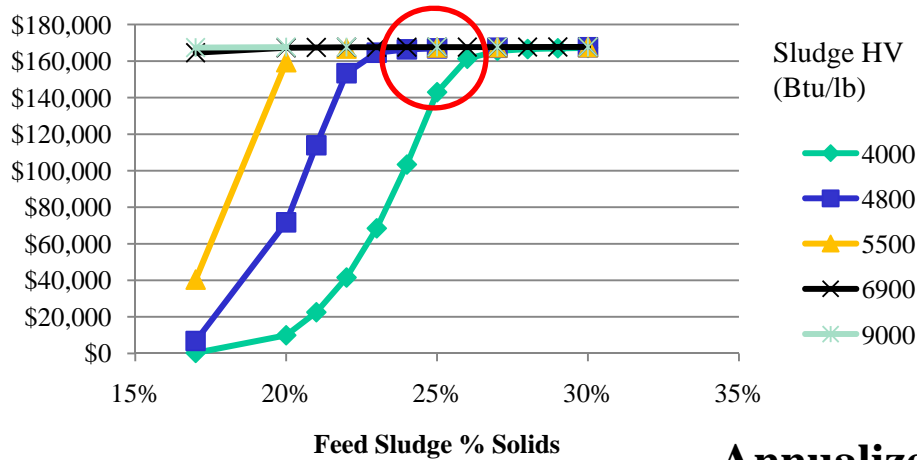
Incinerator Heat Input (MMBtu/hr)



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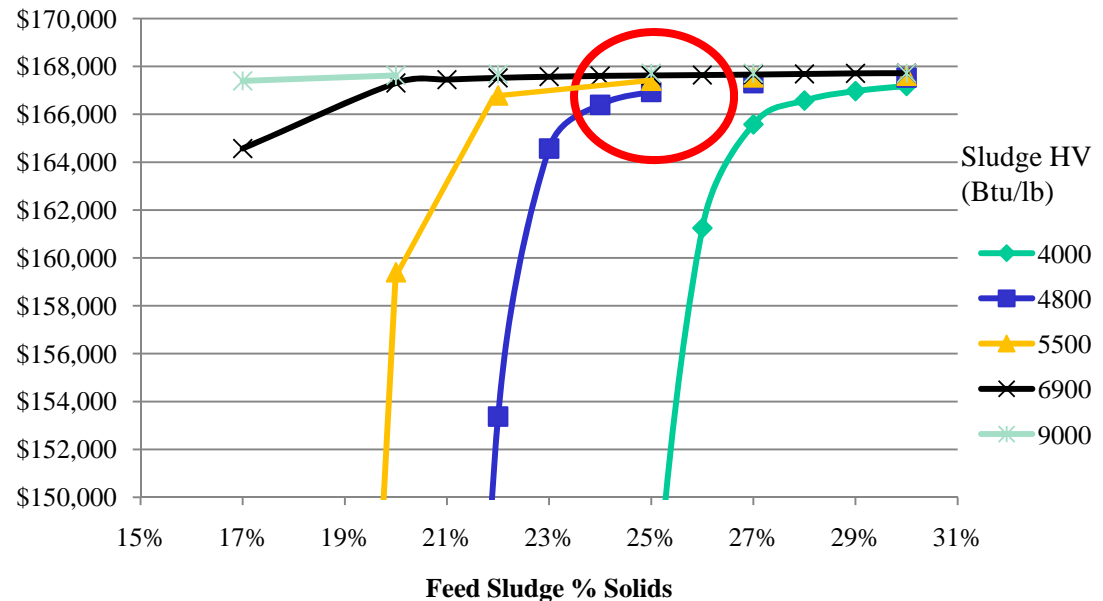


Annualized Excess Gas Cost Savings



Gas Saving Opportunity 2010 and Future

Annualized Excess Gas Cost Savings

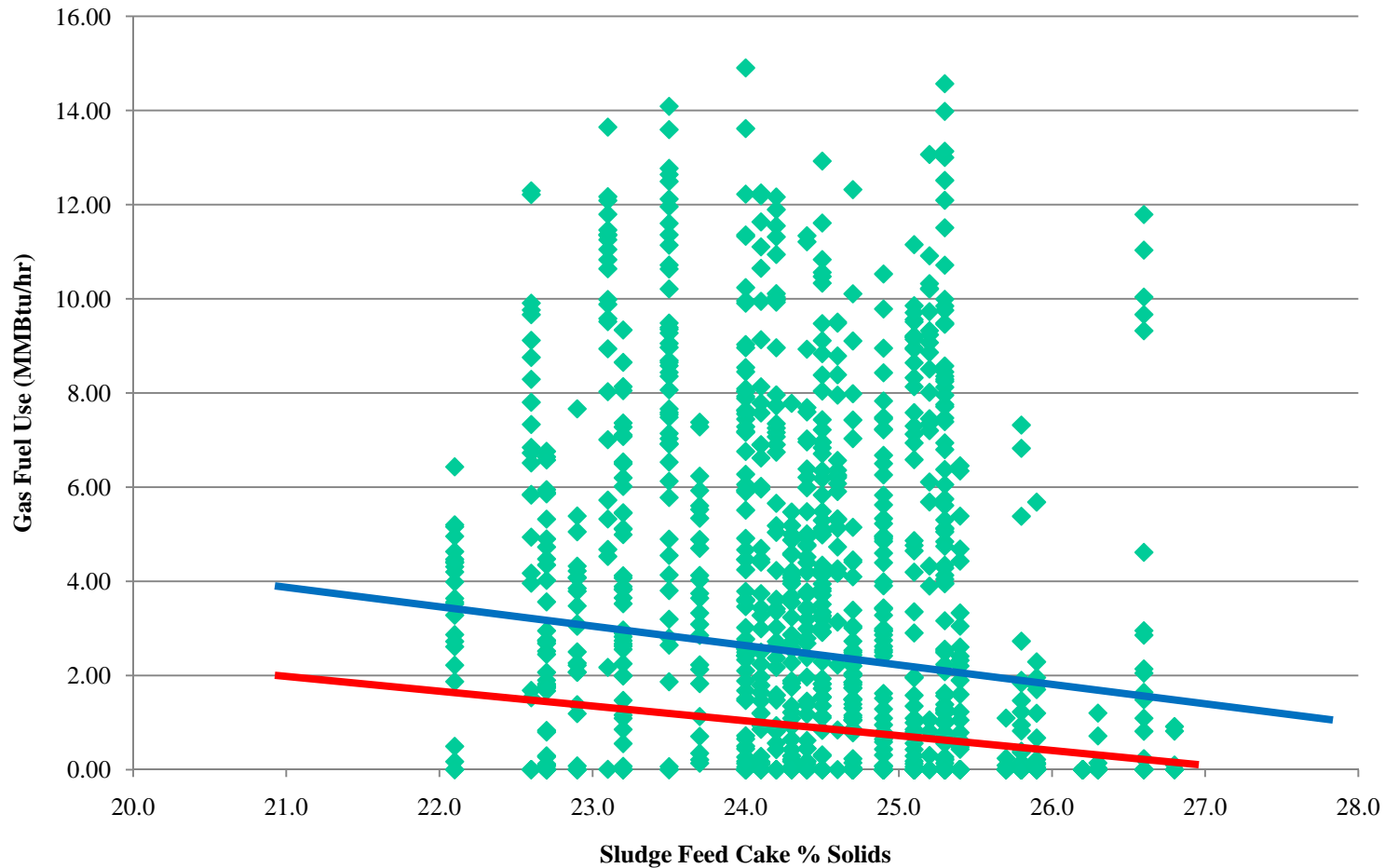


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Gas Savings Opportunity 2010

Example Fuel Performance Goal



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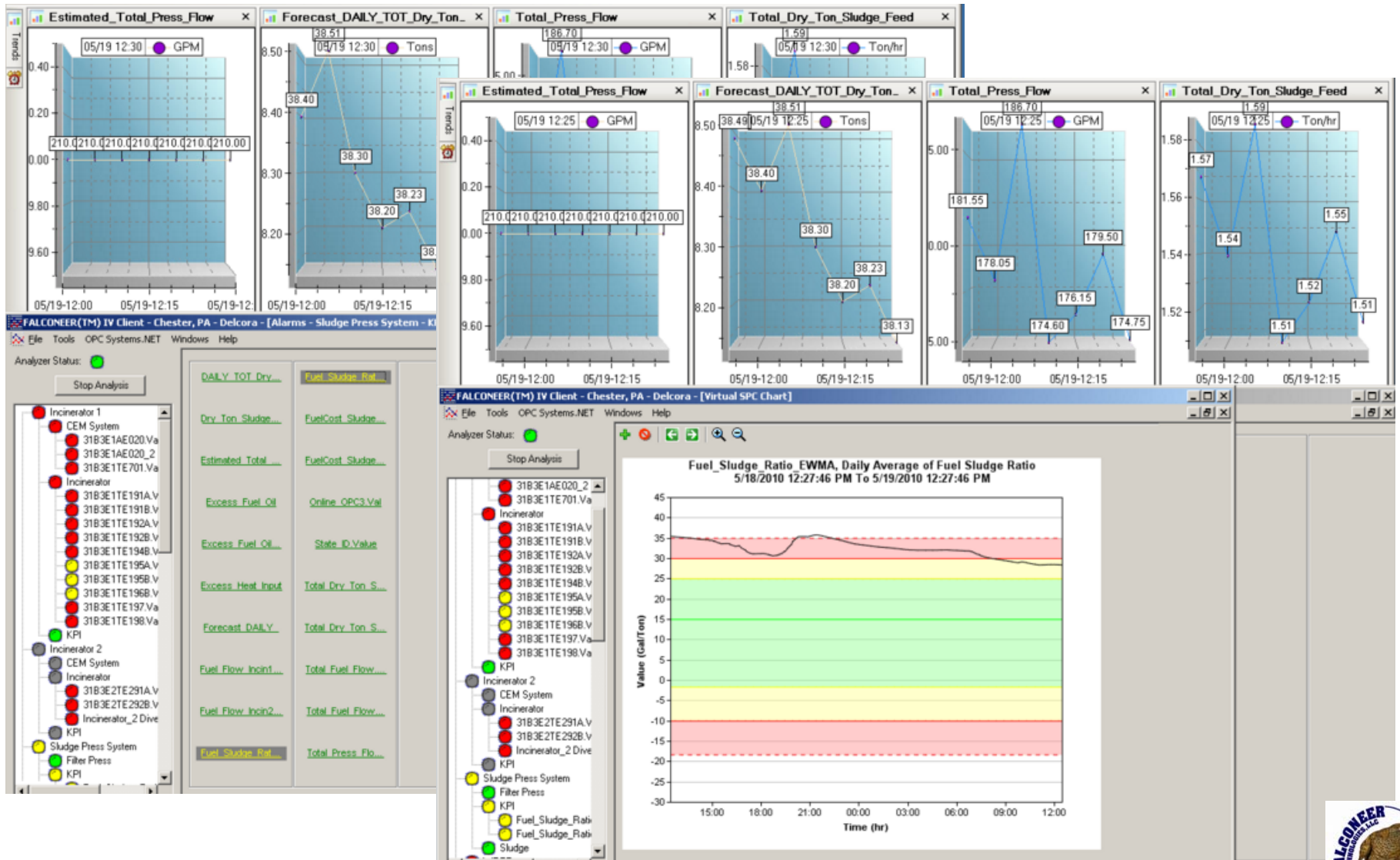


Optimize Gas Usage & Cost

- FALCONEER Virtual Workforce
 - ENGINEER TOOL - OPTIMIZE
 - Track natural gas use on incinerators
 - Track total incinerator heat requirements & compare to actual heat use
 - OPERATOR TOOL
 - IDENTIFY, ALARM on Excess Gas Use
 - ADJUST with online SOPs or Troubleshooting Manual
 - PROMOTE Uniform Operator Response and Knowledge
 - SUPERVISOR/MANAGER TOOL
 - INFORM & REPORT – Automated Event Based and Daily on Excess Gas Use
 - Track, Investigate, Educate, Control



FALCONEER Dashboard – Operator Tool

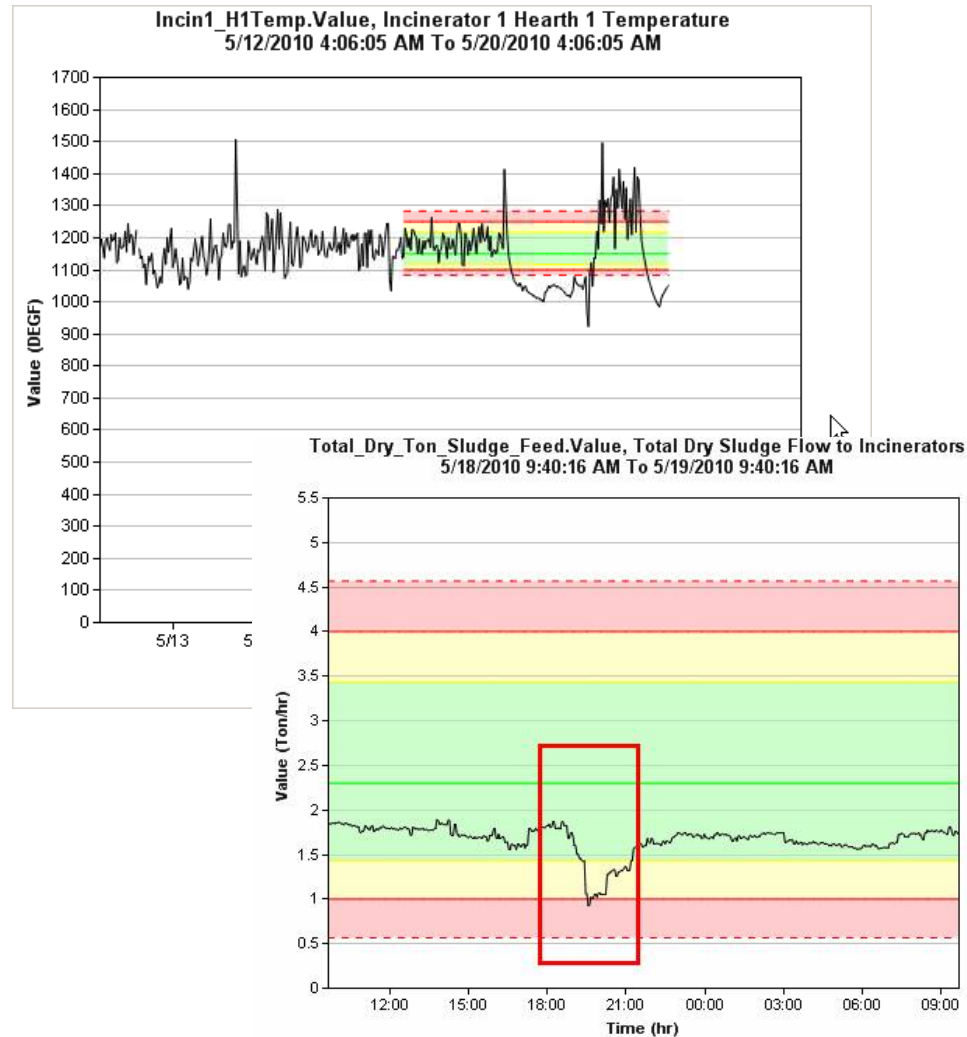


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Supervisor / Engineer Tool

- TRACK & MONITOR
- INFORM & REPORT – Automated Event Based and Daily on Key Conditions
- Investigate, Educate, Control



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FUTURE GOALS – FALCONEER HELP?

- Current Plant Incinerators
 - Use existing information to optimize operation
 - Excess Gas Use Monitoring and Alarming
 - Temperature and Heat Profiles
 - Dry Ton Current & Forecast Throughput
 - THC Mandate
 - Operate more consistently, reliably at increased throughputs (Sludge Feed & Incinerators)