Plant Wide Energy Management and Reporting Systems (EMRS) Provide Sustainable Results

Cliff McClain
Vice President
DES Canada, Corporation
DES America, LLC

What is an EMRS Control System?

- A new class of “Rule Based” process control system and execution philosophy.
- Goes beyond traditional control methods to integrate best operator behavior and management oversight into the control system for 24 / 7 benefit.
- Presented Case Studies:
  - Powerhouse EMRS valued at a minimum C$4.5 million/year fossil fuel reduction
  - Process Unit EMRS valued at C$11 million/year energy reduction and a C$44 million/year production increase.

What is an EMRS Control Project?

- A low cost, high return engineered solution and services project for powerhouse cost reduction programs.
- Improves utility process stability and reliability while reducing energy costs.
- Provides the means to address process variability and improve operator discretionary action when operating multiple and complex process units.

What is EMRS Control Philosophy?

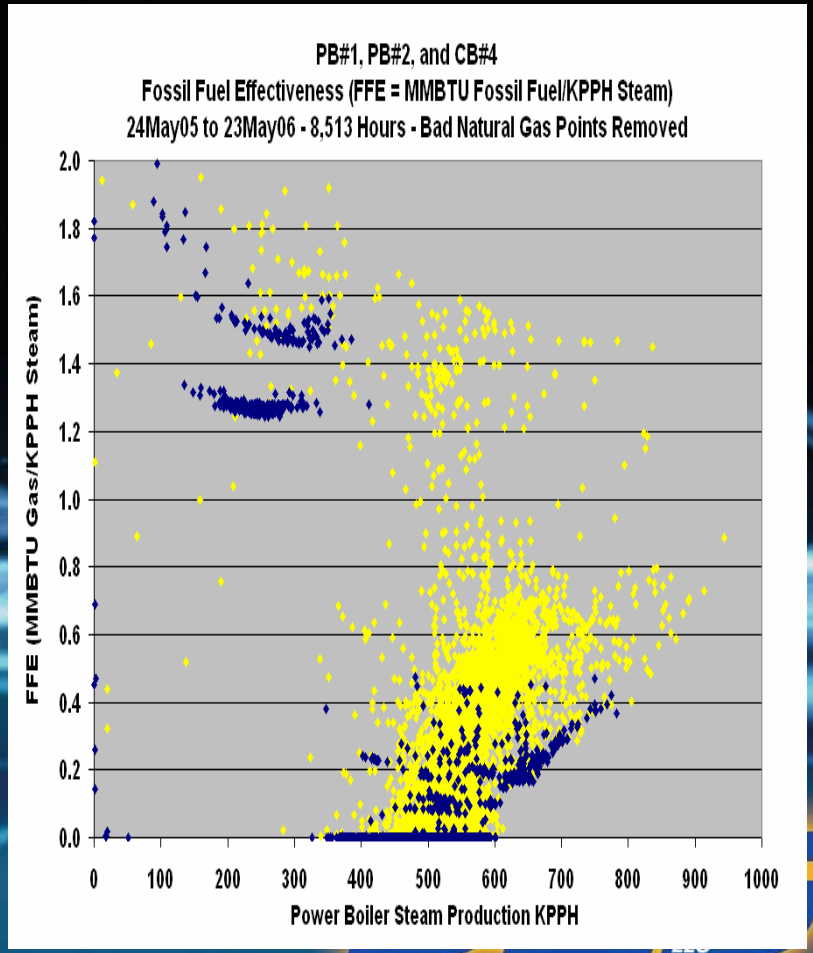
- A control strategy “Rule Set” for best operating practice based upon operator, engineering, and management input.
- Seamless integration into model-reference and advanced regulatory control to maintain process performance over a broad range of operating conditions.

How are Improvements Measured?

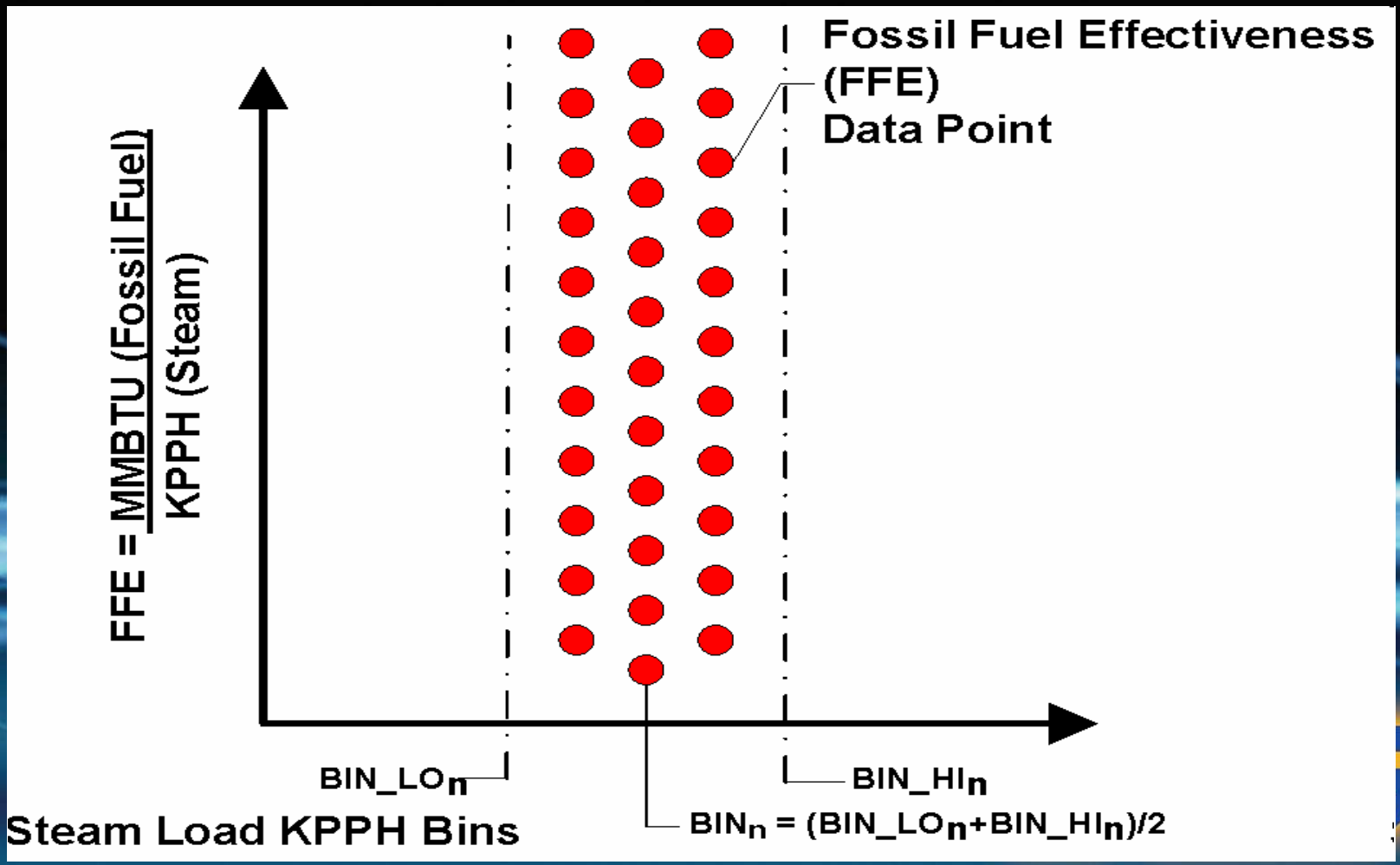
- Select a KPI = example Fossil Fuel Effectiveness (FFE)

$$FFE = \frac{MMBTU\ (Fuel)}{KPPH\ (Steam)}$$

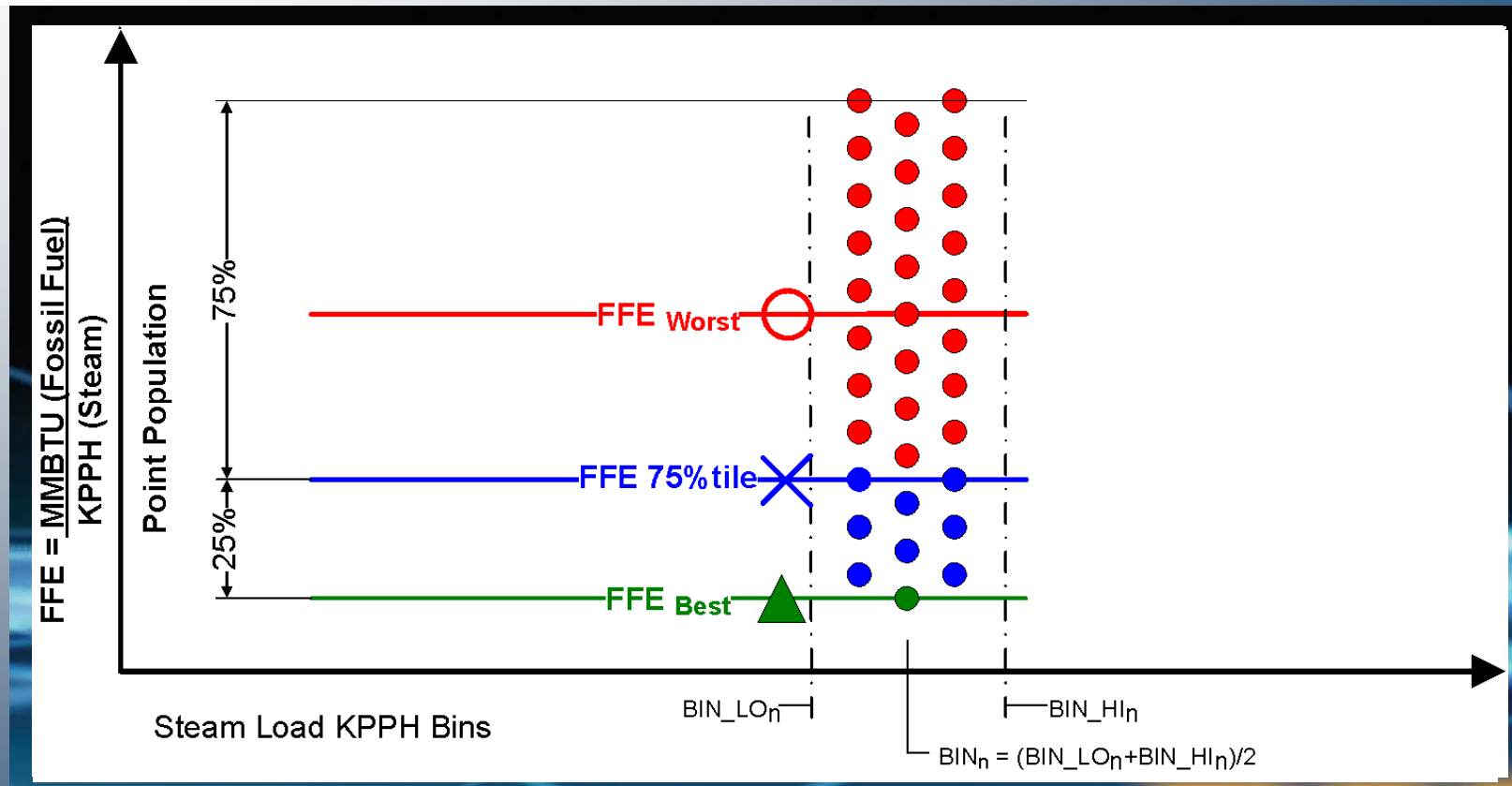
- Plot FFE against Steam Load in KPPH



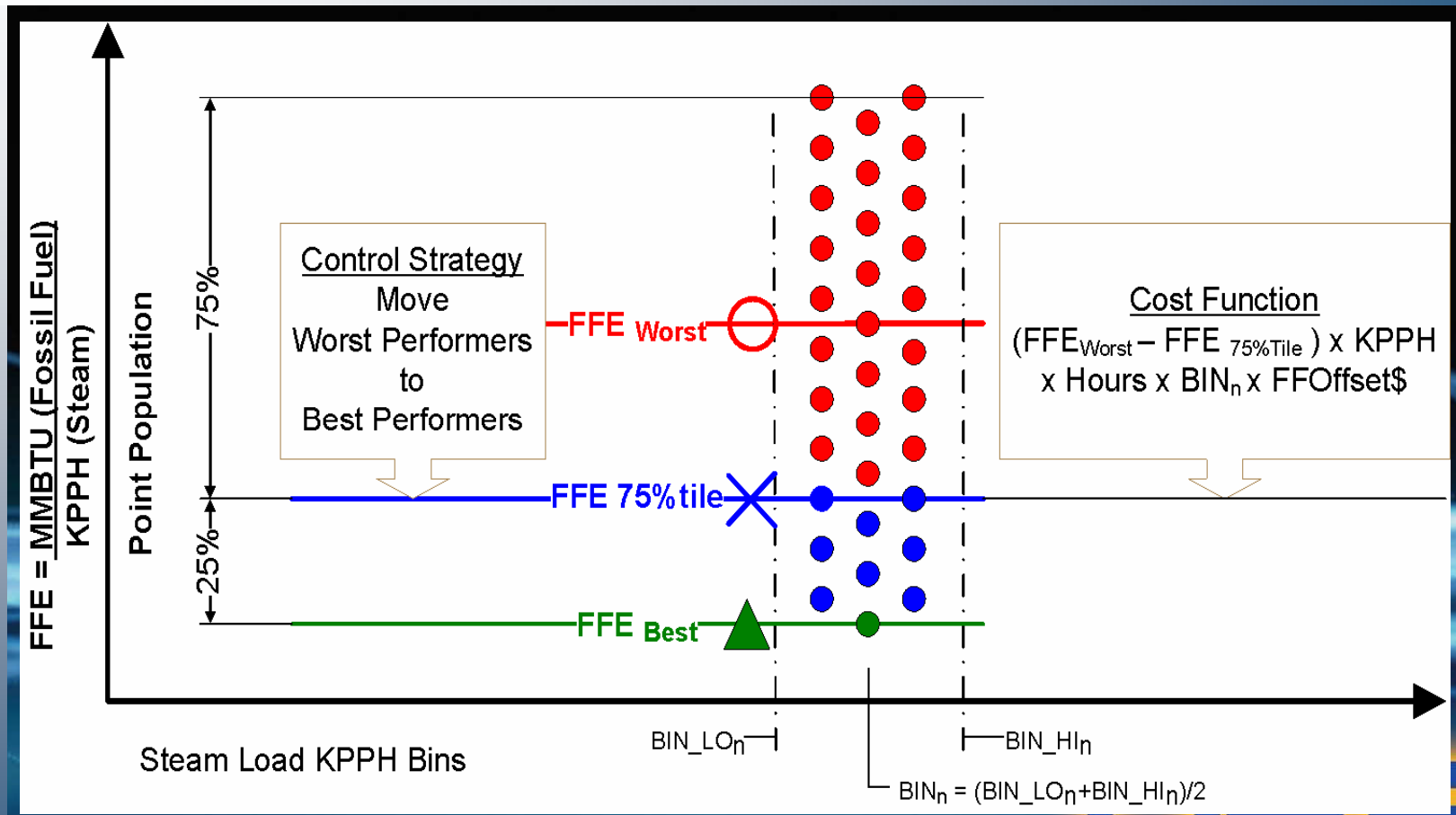
How are Improvements Measured?



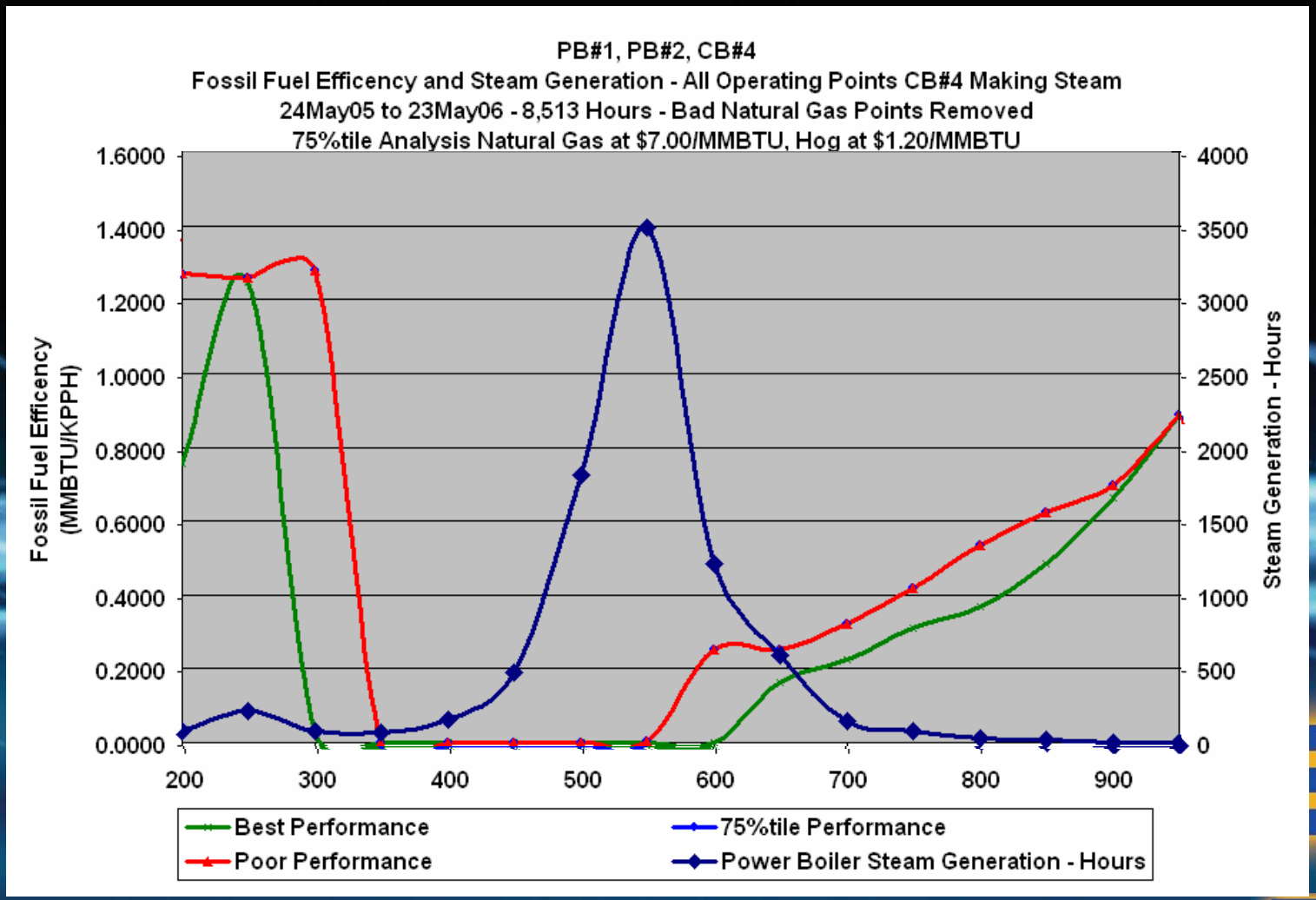
How are Improvements Measured?



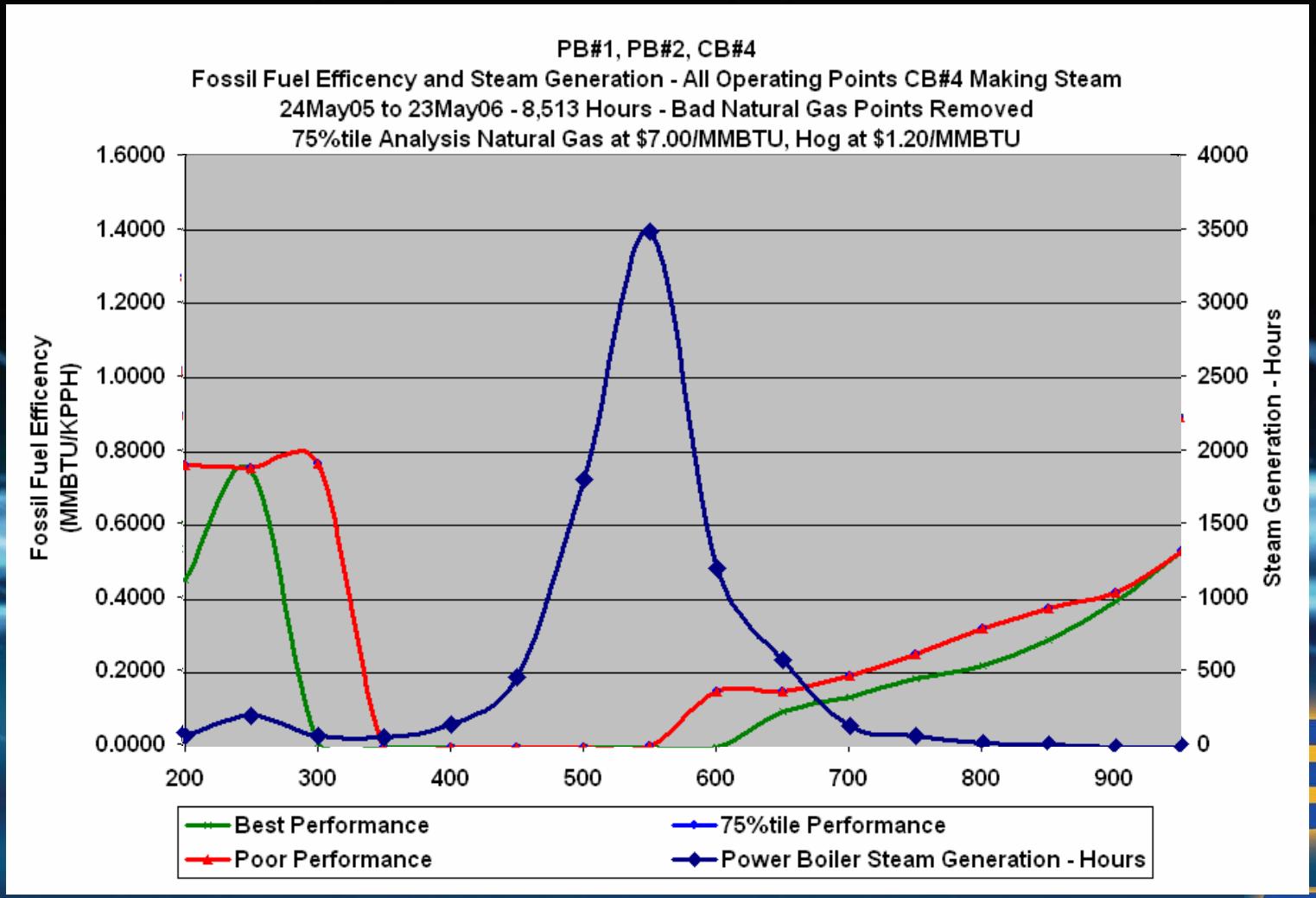
How are Improvements Obtained?



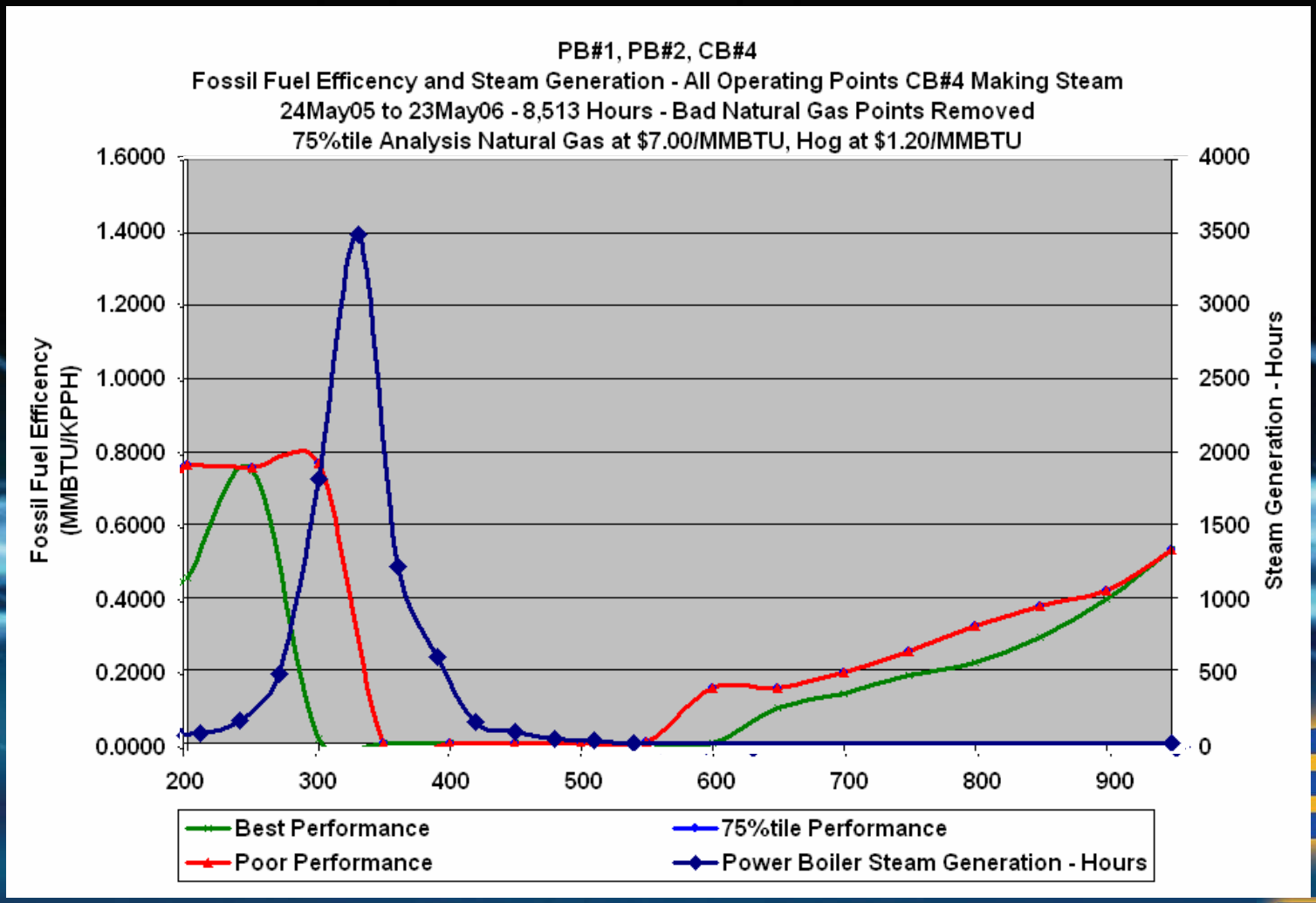
EMRS Variability Reduction



Improved Unit Efficiencies

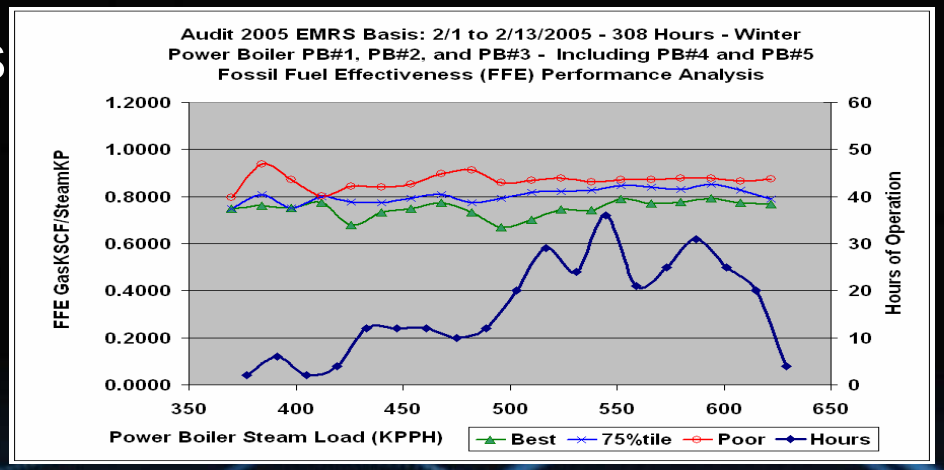


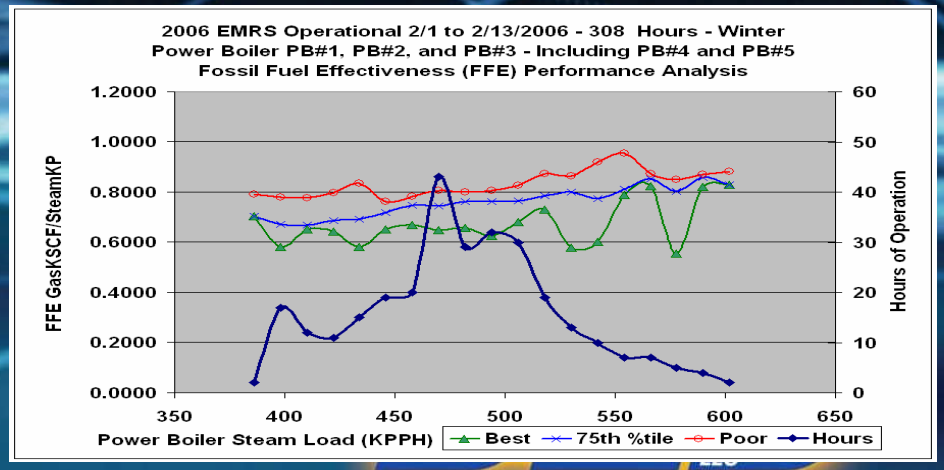
Waste Steam Reduction Projects



Results – Powerhouse 2006

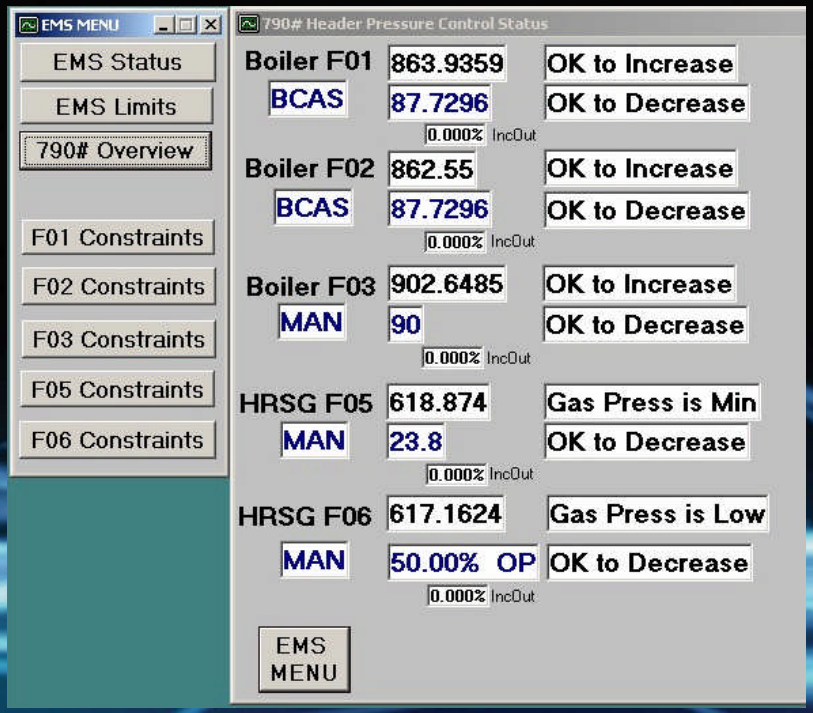
- Fossil Fuel Effectiveness (FFE) of a completed powerhouse project.
- Includes a Waste Steam Reduction initiative.
- Combustion work completed 2005
- EMRS work completed 2006
- Project Savings $1.5million/year





EMRS Control/Man Machine Interface

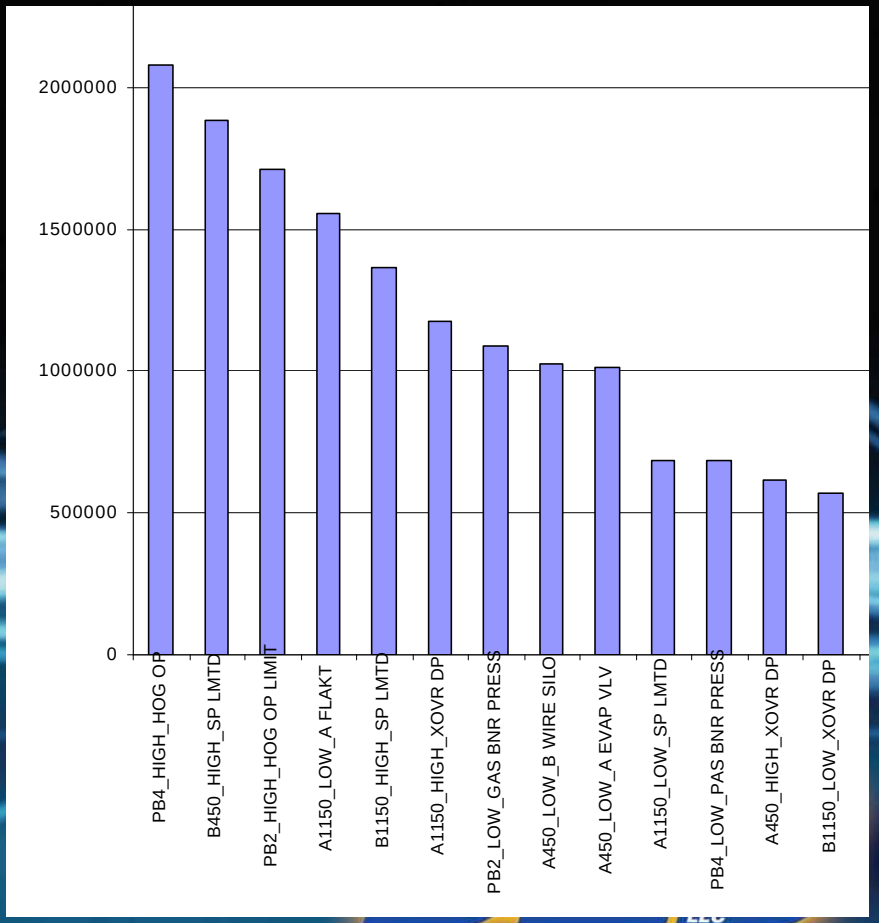
- Closed Loop Control
- Ergonometric Display Design
- Context-Sensitive Help Screens
- On-Line Constraint Reporting
- On-Line Economic Performance
- Automated Operations Advisor



EMRS Sustainable Performance

Constraint Reporting

- Identifies barriers to improved performance.
- Automatically generates a prioritized report of how to do better.



2006 Texas Technology Showcase

EMRS TransAlta Poplar Creek Station

EMRS Project Results - Energy

- TransAlta Poplar Creek Power Station
  - This complex uses 5 fuel types of varying BTU content in 8 boilers and 2 Gas Turbines
  - These results are reported from just the integration of the next generation of steam header pressure control applied on the ½ Mile 980# Steam Header
- Natural Gas Offset Using Waste Fuels
  - 2,600 to 4,200 MMBtu/Day
  - C$4.4 to $8.4 MM/Year
- Improved Steam Header Stability 50%
- Reduced Wear On Power Station From Coke Pulverizes to Steam Turbines and PRV's
- Maximized Destruction of Refinery Emissions

2006 Texas Technology Showcase

EMRS – Oil Sands Extraction Process

EMRS Process Unit

- Suncor Energy
  - Hot Process Water Energy Reduction C$11MM/Year
  - Production Increase C$240 MM/Year
    - C$44 MM/Year Credited to Controls
    - 9.5% -12.5% through Advanced Controls
    - Balance through Regulatory, SOP, and Miscellaneous Activities
  - Reduced Production Rate Variability 6% and Energy Usage 20%

Conclusion

The EMRS helps operate the process by:

- Making the correct operating decisions instantaneously
- Improving process agility and reliability.
- Communicating status and actions via language based messaging.
- Identifying ways to more effectively operate it.

Questions?

- Additional References and Information:

  http://www.des-ems.com