Texas Technology 2003 Showcase
Plant Energy Optimization

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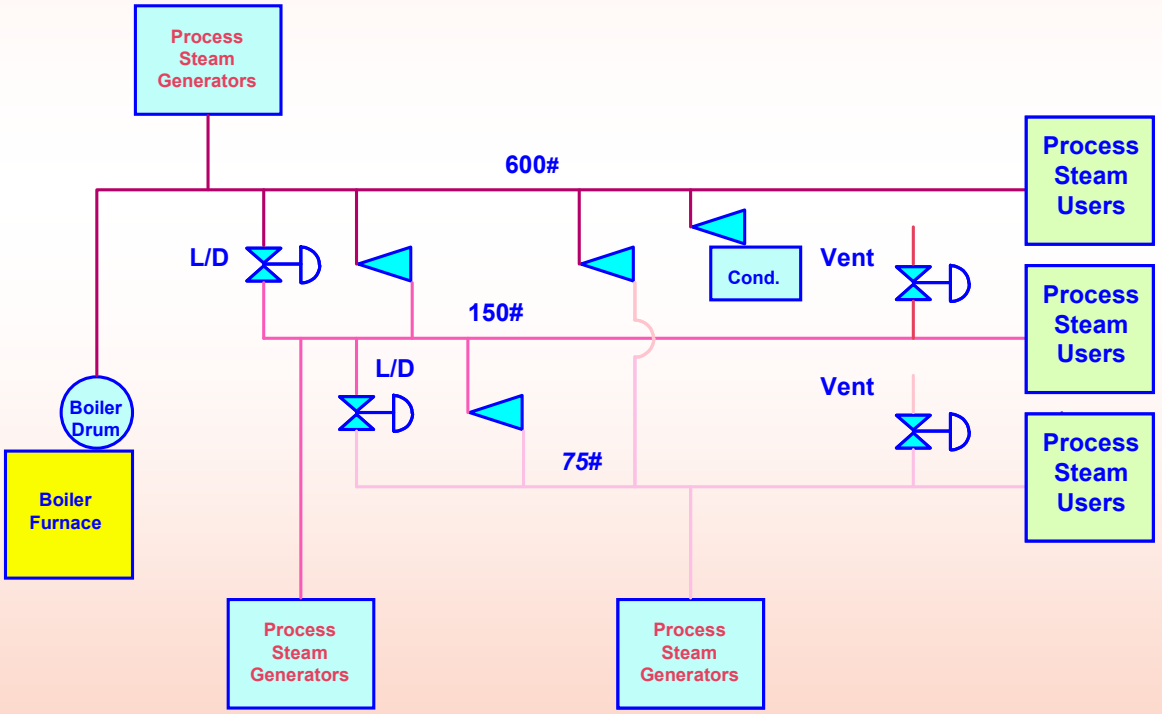
Deer Park Site

Simplified Plant Steam System

- *Three Main Header Systems*
  - *600 psig*
  - *150 psig*
  - *75 psig*
- *Other Local Pressures*



Plant Steam System Particulars

- 1,000,000 to 2,000,000 pounds per hour average steam generation
- Generation and consumption vary depending on unit rates
- Over 20 waste heat boilers
- Over 60,000hp of steam turbines
- One Gas Turbine with HRSG
- 2 Natural Gas Fired Boilers to maintain header pressure

Visual MESA Selected for Plant Implementation

- Continually Monitors the entire Steam, BFW and Condensate systems and flags problems
- Optimizes the entire steam & electrical system
- Evaluates "What If" cases
- Auditing and Accounting. Validates your data and helps you with trouble shooting, auditing and accounting.

Visual MESA Particulars for the Deer Park Plant

- Reads over 1000 tags every 3 minutes
- Optimizer runs hourly
- Resides on stand alone server
- Accessible from any desktop computer
- Plant data feeds from 9 separate Distributed Control Systems

Plant Energy Optimization Benefits

- Letting down and venting significantly reduced with 24/7 attention.
- Monitoring condensate return allows more to be returned. Diversions have to be manually switched back and this is sometimes forgotten.
- Turbine vs motor switching can be called correctly much sooner with better cost data.
- The “lost opportunity trend” tracked hourly will give increased attention by all to the overall energy system.

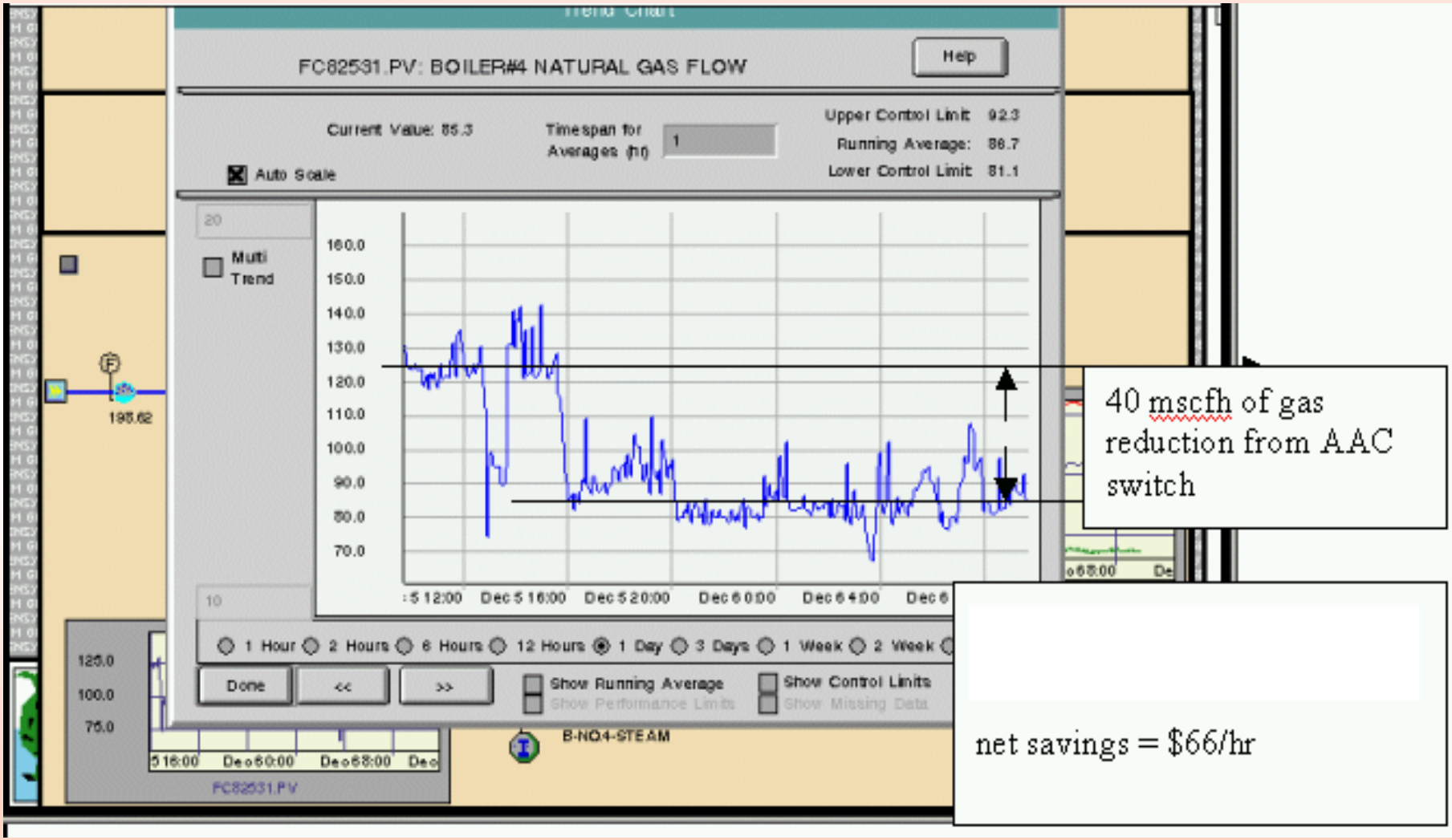
Plant Energy Optimization Benefits

- Corrective actions to the system that have been difficult to fund in the past have a much better basis for funding.
- The graphical representation of the steam system allows a much larger group of people to gain familiarity with the system.
- Meter inaccuracies can be identified and scheduled for corrective action.

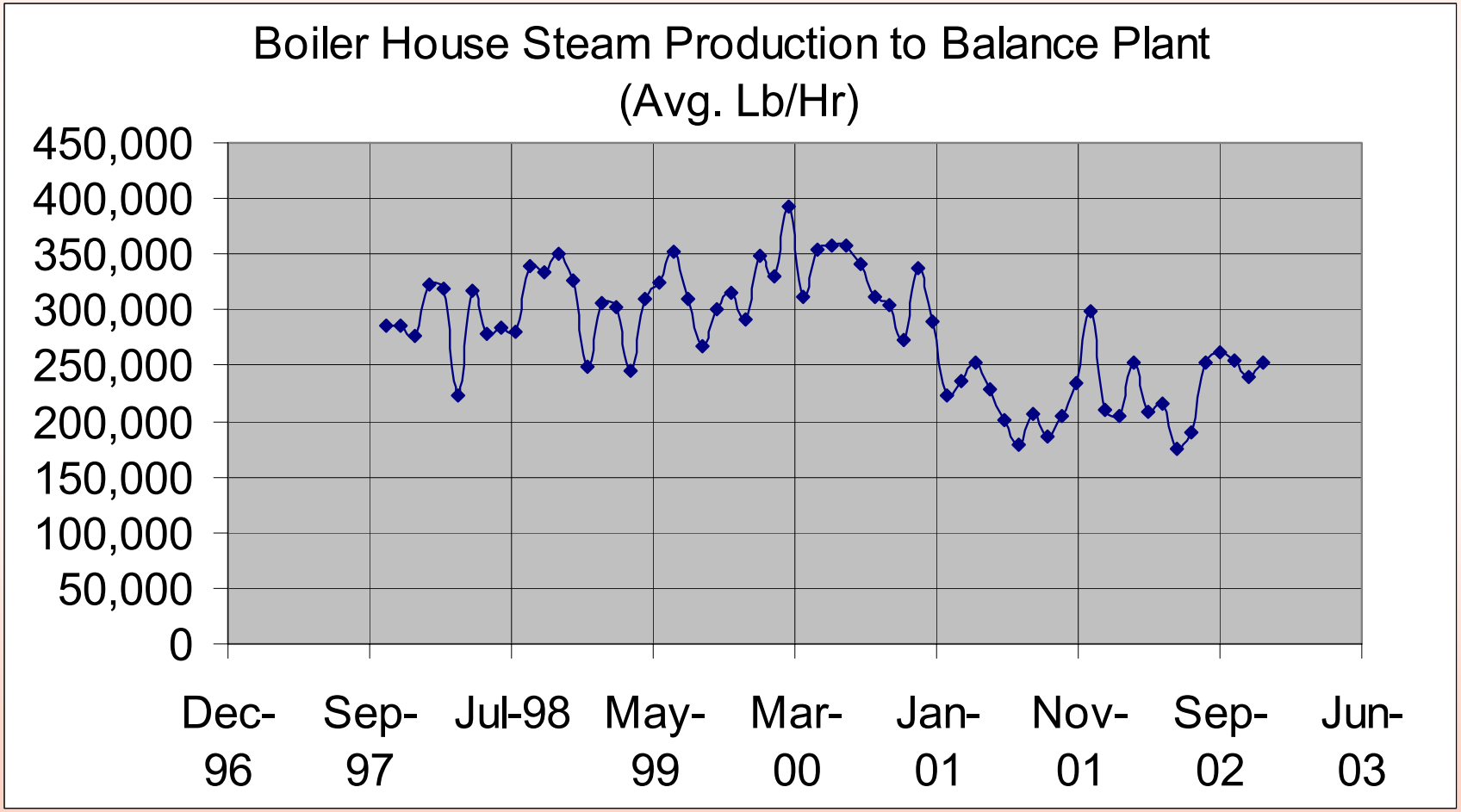
Plant Energy Optimization Benefits

- Detailed balances within each unit can be understood and corrected with potential energy improvement projects resulting.
- Shutdown and production planning can be evaluated from an energy perspective.
- The effect of rapidly changing natural gas and energy costs can easily be quantified.

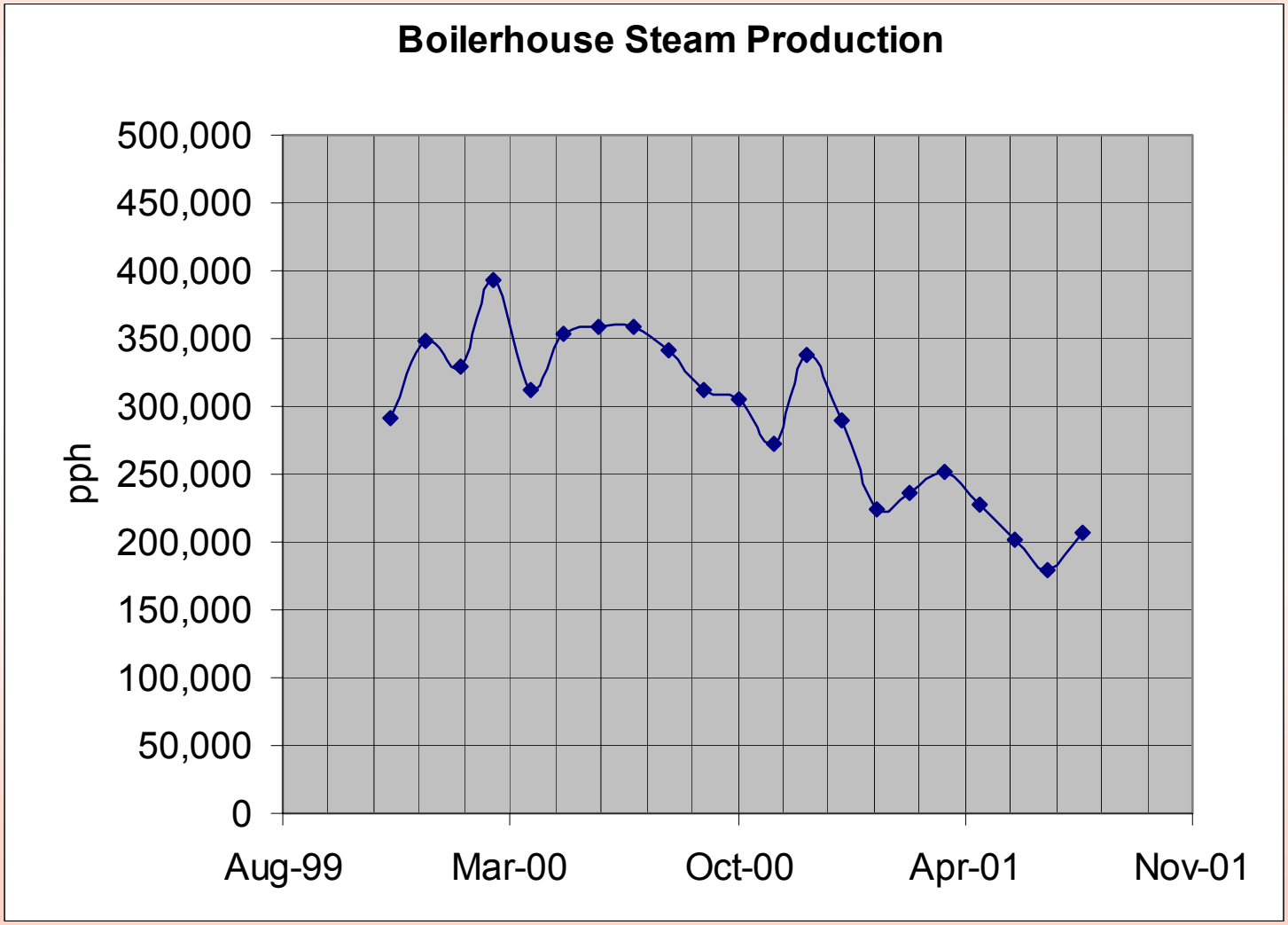
Example of Turbine/Motor Switch Showing Savings



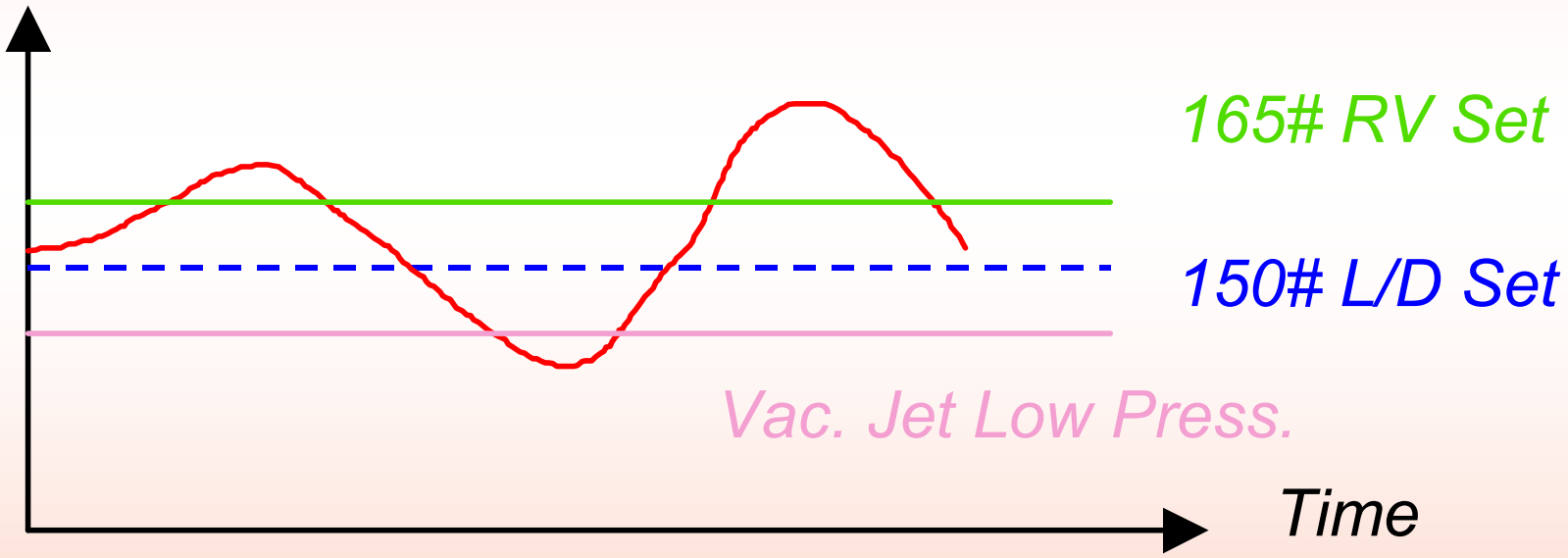
Plant Optimization System Operational in June 2000



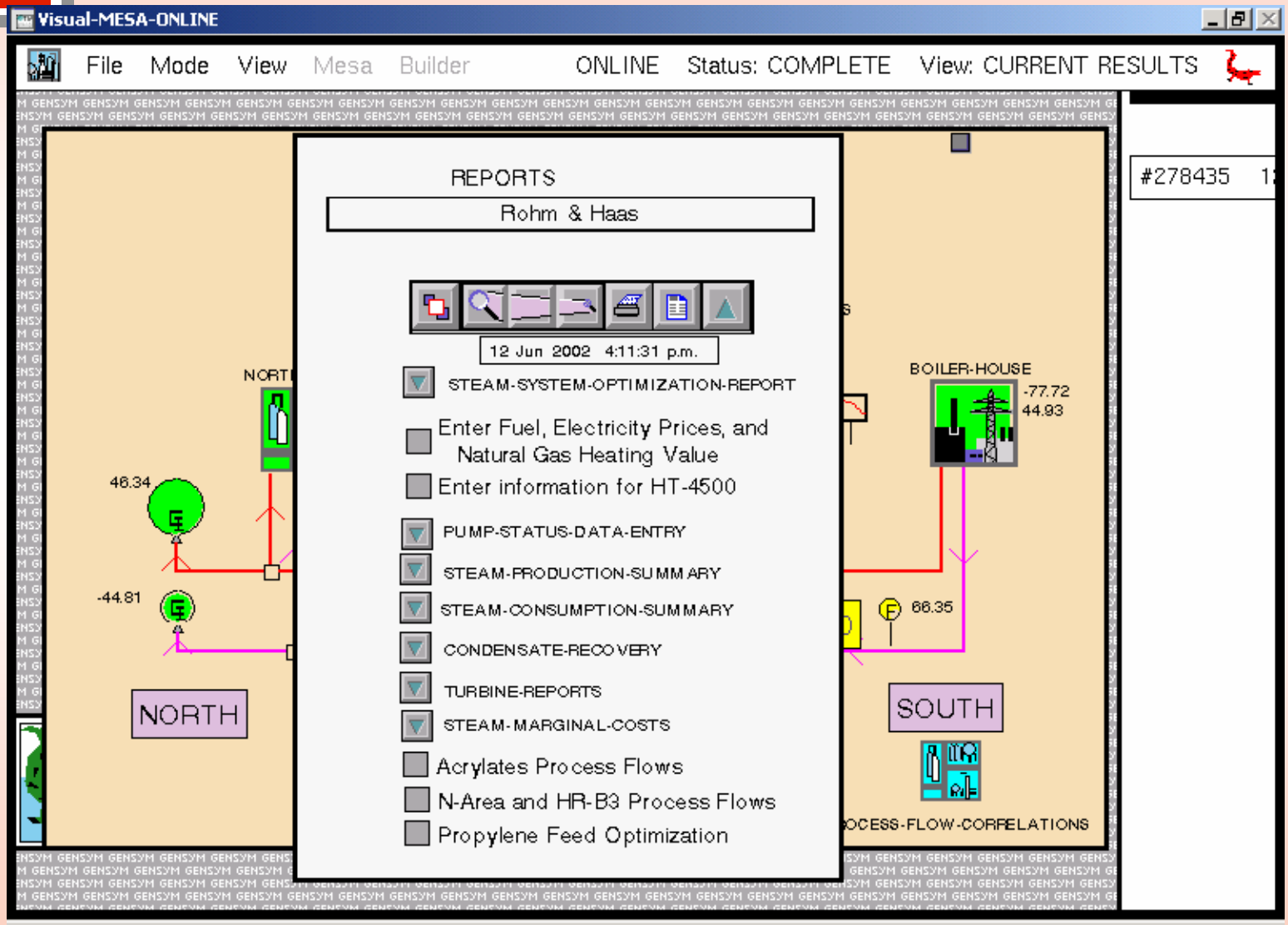
Fired Steam Production Drops After June 2002 Implementation



150# Header Narrow Band of Pressure Control



Customized Report Selection



Challenges

- Developing master flow diagrams of the steam system from the thousands of Process & Instrument Diagrams
- Keeping network connectivity reliable
- Determining how to respond to recommended changes
- Getting and keeping meters working – primary element and configurations/spans/tag id's/etc.

Obstacles & Lessons Learned

- It's more complicated than it appears.
- If you do not have the appropriate handwheels, you can't respond to every opportunity.
- Fixing one problem can create another problem due to equipment/process inter-relationships and constraints in the system.
- Makes an excellent learning tool for the steam system.
- Core group of people need to understand the software - They must take on communicating and training of others.

Obstacles & Lessons Learned

- The effort must be supported by management and have a champion
- Certain items will need to be “purchased” above and beyond the software – key flowmeters on letdowns, vents, and import/export to complex areas.
- Interface with IT department is mandatory

Future Plans

- Build Natural Gas model into Steam model
- Connect production planning to the model
- Add other Utilities like nitrogen and instrument air to the model
- Convert data server to Aspen IP-21
- Configure more detail into the model
- Provide graphical interface to DCS system to put information in front of operators