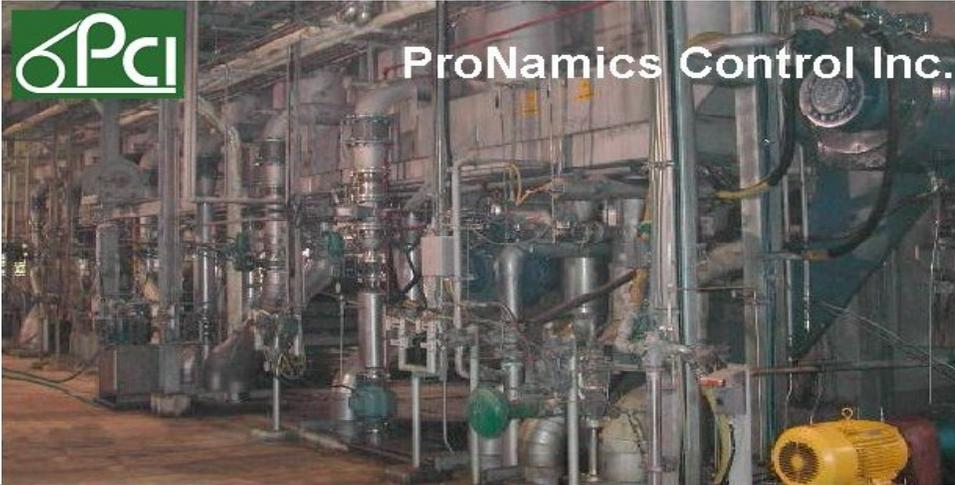




ProNamics Control Inc.



Process Control Optimization and Energy Conservation Course

Ways to reduce energy consumption

Topics covered include:

- Measuring and characterizing process variability
- Estimating the impact of variability on energy consumption.
- Identifying the sources of process variability
- Developing a roadmap for improved control loop performance
- Identifying Pump / Fan sizing energy saving opportunities
- Identifying Variable Frequency Drive opportunities
- Identifying opportunities for advanced control strategies
- Using process optimization tools to improve performance
- Using the process historian to identify opportunities
- Conducting process control optimization surveys to minimize energy consumption

High process variability reduces operating efficiency and forces the operator into conservative operating targets. These factors result in unnecessarily high energy consumption. The primary job of control loops is to minimize process variability.

Unfortunately the majority of control loops –under-perform and some act to increase process variability. Adopting best process control practices usually results in energy savings of between 5 and 15%. Some easy first steps are to ensure that the loop components are in good health and that the controller is properly tuned. Upgrading the control strategy or modifying the process equipment requires capital expenditure but usually offers an attractive return on investment. Better operator decision making can be achieved by improving the information available to the operator

Course Fees ...

CDN	\$1500.00
USD	\$1200.00

(Canadian Taxes Included.)
Fees include a full set of course notes.

Course is limited to 15 participants to provide individual attention and to address specific attendee issues.



Course Schedule

Day 1

- Lecture 1** **Process variability basics**
08:00 - 9:30 Measuring the variability,
Estimating the impact of variability on energy consumption
Identifying reduction opportunities
Symptoms of poor loop performance
- Lab 1** **Simulator Introduction**
09:30 - 10:30 Characterizing process variability
- Lecture 2** **Control Loop Basics**
10:30 - 12:00 Control Loop Overview / Components
Process dynamics / Targets
Control and energy performance VFD's versus Valve
Impact of Pump/Fan/Valve over-sizing on control performance

Lunch Break

- Lab 2** **Comparing VFD's and control valves**
13:00 - 14:00 Energy consumption and Control performance
- Lecture 3** **Control Loop Optimization**
14:00 - 16:30 Control Loop Performance targets / Current Industry Status
Identifying Loop Health Problems
Evaluating PID controller tuning
Achieving regulatory loop performance targets

Day 2

- Lab 3** **Identifying control loop performance problems**
8:00-9:00 Measuring Open loop dynamics / Loop health
Setpoint and Load response problems
- Lecture 4** **Identifying Opportunities for Advanced Control**
9:00 - 10:30 Cascade, Feedforward, Ratio Control
Split Ranging, Override control
- Lab 4** **Using cascade, ratio control to reduce energy usage**
10:30 - 12:00

Lunch Break

- Lecture 5** **Process Control Optimization Tools**
1:00 - 2:00 Data Collection Tools / applications
Time Series Analysis Software / Loop Tuning Software
- Lecture 6** **Process Control / Energy Conservation Auditing**
2:00 - 3:00 Objectives, Procedures, Benefits, Verification
- Lab 5** **Process Control / Energy Auditing**
3:00-5:00 Identifying opportunities and
recommendations

- Wrap-Up**
4:00-4:30

Course Location...

The course is being held at a conference facility. Attendees are responsible for arranging their own accommodations.

Accommodations ...

For convenience, we recommend that registrants stay at the hotel course site.

About the Course ...

The course begins with a review of process variability and its impact on energy consumption. The functioning of the control loop is reviewed, followed by an exploration of the impact of equipment over-sizing on variability and control performance. A roadmap for achieving 'good' control loop performance is presented. Identifying opportunities for VFD's and advanced control strategies are a focus. The final topic is process control and energy survey procedures. Approximately 30% of the course is devoted to a computer-based lab where the attendee practices the concepts presented during the lectures.

Who Should Attend...

The two-day course has been designed for process, production and energy conservation engineers who want to improve their understanding of the role of control optimization on energy consumption.

Instructors Include...

Doug Nelson, P.Eng. has over 30 years of industrial process control experience and extensive experience in process control training of operators, E/I techs, process control engineers and managers.

George Jablonsky, AScT is a recognized expert in optimizing and troubleshooting process control performance.

About ProNamics...

ProNamics Control Inc. is a Vancouver, BC company that conducts process and control optimization surveys, prepares process simulations to establish best practices and provides a range of training courses related to process control optimization. Visit our web sites at www.pronamicscontrol.com for more information about our services.