



ProNamics Control Inc.



# SAGD Process Optimization & Troubleshooting Techniques

## A way to Improve Productivity and Efficiency

### Topics covered include:

- Process Variability
- Process Dynamics
- Control Loop Performance
- Impact of Process Design
- Identifying Process Variability
- Attenuating Disturbances
- Troubleshooting Loop Problems
- Managing Process Variability

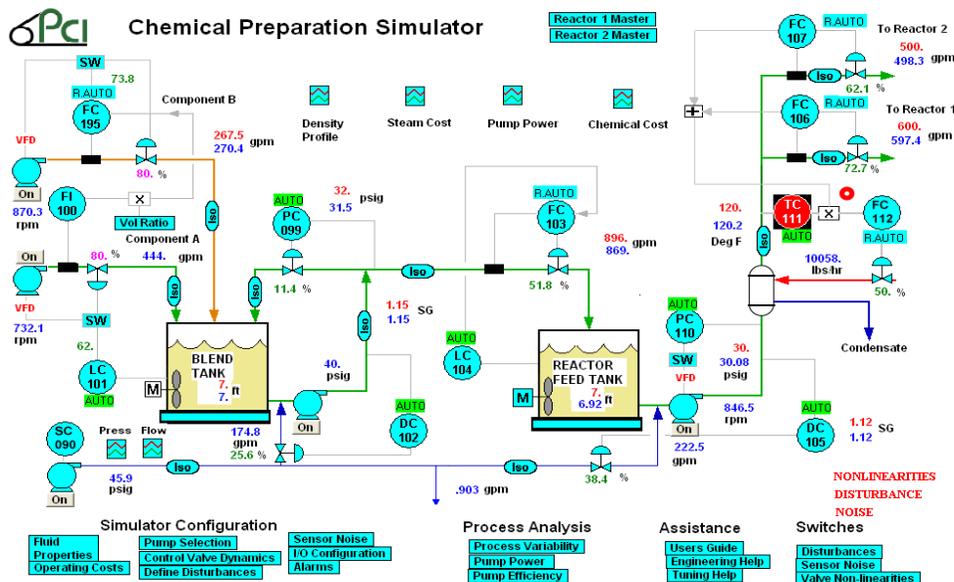
High process variability compromises the economic performance of SAGD processes through off-quality product and reduced process efficiency. Upgrading controller tuning, control valve response and control strategies are relatively easy pathways to reducing variability on key SAGD loops, thereby improving overall process performance. Improving the troubleshooting skills of process control personnel is another pathway to improved performance via quick and effective response to control loop problems.

### Course Fees...

CDN	\$2,500.00
USD	\$2,300.00

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

Course is limited to 20 participants to provide individual attention and allow our expert instructors to address specific mill issues.



## Course Schedule

### DAY 1

#### 08:00 Process Variability Overview

- Sources of variability
- Cost of variability
- Minimizing variability

#### 09:30 Process Control Basics

- Control terminology
- Loop Components
- Control loop block diagram

#### 11:00 Lab Introduction

- Process and Control simulation

#### 12:00 Lunch Break

#### 13:00 Process Dynamics

- Open Loop bump tests
- 1st Order response
- Integrating response
- Non-linearities

#### 15:00 Lab - First Order Dynamics

#### 16:30 Adjourn

### DAY 2

#### 08:00 Tuning the PID controller

- PID algorithm
- Lambda tuning procedures for first order, integrating loops
- Lambda selection
- Robustness
- Filtering

#### 12:00 Lunch Break

#### 13:00 Lab – Lambda tuning

- 1st Order Loops
- Integrating Loops

#### 16:30 Adjourn

### DAY 3

#### 08:00 Control Performance

- Setpoint and Load response
- Attenuation capabilities, Bode plots
- Impact of Non-linearities

#### 9:00 Lab – Control performance

#### 10:00 Advanced Strategies

- Cascade, Ratio, Feedforward
- Identifying Opportunities
- Developing tuning strategies

#### 12:00 Lunch Break

#### 13:00 Lab – Tuning strategies

#### 15:00 Optimization Tools

- Data collection fundamentals
- Descriptive statistics
- Time series analysis techniques

#### 16:30 Adjourn

### DAY 4

#### 08:00 Loop Troubleshooting

- Identifying the problem source
- Developing a solution

#### 09:30 Lab – Troubleshooting control loop problems

#### 12:00 Lunch Break

#### 13:00 Process Control Surveys

- Economic benefits
- Technical/organizational issues
- Survey procedures

#### 15:00 Lab – Control Survey

#### 16:30 Adjourn

## About the Course ...

This four day course is intended to strengthen the student's ability to optimize process performance. The first half of the course focuses on improving control loop performance. The measurement of process dynamics and Lambda tuning are the key topics. The second half of the course focuses on troubleshooting techniques, and management approaches to maintaining a low variability operation.

SAGD process and control systems are throughout the lectures to illustrate the course concepts. Approximately 30% of the course is devoted to a simulation lab where the course concepts are practised.

## Who Should Attend...

The course is primarily intended for process engineers, instrumentation engineers and operations management personnel who want to improve their ability to troubleshoot process control and variability problems. The course explores the implications of process equipment and therefore would be beneficial for maintenance and design engineers.

## Instructors...

**Doug Nelson, P.Eng.** has over 30 years of pulp and paper process control experience. He has authored papers on paper machine dryer control, control valve selection and the uses of process simulation in optimization surveys.

**George Jablonsky, ASCT** has over 25 years of industry experience in process control, instrumentation and optimization in the pulp and paper industry. He has held positions both in operations and maintenance management.

## 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 ProNamics ...

ProNamics Control Inc. is based in Vancouver, BC. The company 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 site at [www.pronamicscontrol.com](http://www.pronamicscontrol.com) for more information about our services.