



# Process Development

The Saskatchewan Research Council's (SRC) Process Development Business Unit provides applied research, design, development, demonstration and scale up of value-added processing technologies for commercial application. This work helps clients in Saskatchewan and around the world achieve significant economic and positive environmental impacts.

Our services include niche areas such as sensor-based mineral processing, partial upgrading, biomass to biofuel and bioproduct processing.

## Key Capabilities

### Process Design and Development

Our team of experienced chemical engineers can design a process to produce a desired product, perform an economic assessment of a process, model an existing process in a chemical simulator or develop process improvements through energy audits and pinch analysis. Typical projects include:

#### Technology Development & Sensor-Based Sorting

- ▶ Process optimization, pilot plant construction and operation activities (incorporating client knowledge) for both commercial and non-commercial technologies
- ▶ Preliminary process design

#### Economic Assessments

- ▶ Preliminary plant cost estimates:
  - › Capital expenditures
  - › Operating expenditures
  - › Internal rate of return/net present value

#### Process Modelling

- ▶ Mass and energy balances
- ▶ Process simulation in ChemCAD

#### Energy Optimization

- ▶ Energy audits or optimum energy sources, including conventional, non-conventional and renewables; can include battery storage and hybrid generation solutions in partnership with other SRC business units
- ▶ Pinch analysis
- ▶ Water pinch

#### Waste to Biofuels

Biomass and other organic wastes can be converted to power, heat and value-added products (e.g., fuels) through numerous processes, including pyrolysis, gasification, hydro-liquefaction and catalytic conversion.

SRC's Process Development team offers the following services for biofuels:

#### Technology Search/Scan

- ▶ Access to SRC's Centre for the Demonstration of Emissions Reductions (CeDER) greenhouse gas emissions reduction database
- ▶ Broad or focused searches/scans for specific feed stocks or products, such as electrical power, synthetic natural gas and fuels
- ▶ General literature search or review of specific technology providers

## Technology Assessment and Validation – Desktop, Bench, Pilot or Field

- ▶ Assist in shortlisting available technologies
- ▶ Work with technology licensors to assess process performance with specified feedstocks, product specifications or other client requirements
- ▶ Estimate feedstock availability
- ▶ Characterize feedstock
- ▶ Model processes
- ▶ Estimate capital and operations

## CeDER

The Centre for the Demonstration of Emissions Reductions (CeDER) is a platform that provides real-world testing, demonstration and validation of emissions measurement, reduction, capture and conversion technologies.

CeDER is a low-cost, stage-gated, fee-for-service platform and offers independent, industry recognized third-party validation aimed at accelerating the commercialization and field deployment of viable greenhouse gas (GHG) reduction technologies. While the focus is on methane, CeDER can test, verify and demonstrate:

- ▶ Methane (CH<sub>4</sub>)
- ▶ Carbon dioxide (CO<sub>2</sub>)
- ▶ Hydrogen sulfide (H<sub>2</sub>S)
- ▶ Mono-nitrogen oxides (NO<sub>x</sub>)
- ▶ Sulfur oxides (SO<sub>x</sub>)

SRC's CeDER platform consists of a range of services and capabilities, including instrumented mobile facilities for independent third-party technology demonstration and performance validation, air quality monitoring and emissions testing.

## Key Experts



**Erin Powell, P.Eng., PhD,** manages the Process Development Business Unit in SRC's Mining and Energy Division. Erin has experience leading many projects across the energy, agricultural, and environmental sectors. She leads a team of engineers and chemists who provide expertise in greenhouse gas emissions reduction technologies, technology validation, surface operations for oil and gas, partial oil upgrading, renewable fuels, bioprocessing, and energy and water use optimization.

**Randy Fraser, P.Eng., M.Sc.,** is a Senior Research Engineer on SRC's Process Development team. He previously served as a Senior Design Engineer at Bantrel Co., and Senior Process Engineer at Saskferco Products Inc. In addition to process development, he has 10 years' experience in plant engineering. He has led multiple projects in optimizing, testing and validating novel technologies across several sectors.



**Erica Emery, P.Eng., M.Sc.,** is a Senior Research Engineer on SRC's Process Development team. She has experience in process design and simulation, bench top reactor operation (batch and continuous), technology assessment and validation, experimental design, and project management. She has expertise in optimizing and testing processes and technologies in the oil and gas and environmental sectors, including biofuels.

**Jane Danoczi, Pr.Sci.Nat., Engineering Licensee, M.Sc.,** is a Senior Process Engineer on SRC's Process Development team. She previously served as Manager, Process Design at Shore Gold Inc., CEO of Danoczi Solutions and Senior Research Officer at De Beers. In addition to corporate leadership, she has 28 years' experience in research and development of mining technologies and is best known for her work in sensor-based technologies.

