Canadian Carbonization Research Association

CCRA

Objectives:

1. To conduct Research and Development of importance to the coal and carbonization industries in Canada.
2. To co-ordinate and support Canadian carbonization Research in and related to steel, foundry, smelting and coal industries.
3. To affiliate with national and international organizations or associations having similar objectives, “for the benefit of Canada”.

CCRA

- Since 1965, the CCRA has provided a framework for technical cooperation between government and industry.
- Supports technical initiatives that meet the needs of
  - Coal industry and its members,
  - Steel industry and its members and
  - Federal Government which represents Canadians

CCRA

- Enhance the sustainability of Canada's coal and metallurgical industries through cost shared metallurgical fuels research to improve fuel utilization efficiency, productivity, the environment and economic viability of these industries.
- The Association has corporate members from Canada's major steel and coal mining companies and federal government representation.
- Want to meet both short term, medium term and longer term needs of all our members.

CCRA

Canadian Carbonization Research Association (CCRA)

- ArcelorMittal Dofasco
- SunCoke Energy
- CanmetENERGY
- Anglo American/ Peace River Coal
- USS Canada
- Walter Energy/ Western Coal
- Grande Cache Coal
- Teck Corp

Industrial Innovation Group
Industrial Energy Systems
Energy for High Temperature Processes

Personnel
Dr. T. MacPhee

- 2 PhD Scientists
- 2 Research Engineers
- 8 Technicians

Equipment

Coal

- Chemistry
- Petrography
- Rheology
- Physical
- Movable Wall Oven
- Sole Heated Oven

Coke

- Chemistry
- Size
- Strength
- Density
- Porosity
- Coke Carbon Forms

CCRA Members

CanmetENERGY
Leadership in ecoInnovation

SunCoke Energy

WALTER ENERGY
WESTERN COAL

ArcelorMittal
DOFASCO | HAMILTON

U. S. Steel Canada
A Subsidiary of United States Steel

Teck

PEACE RIVER COAL

Grande Cache Coal Corporation

CanmetENERGY Personnel and Budget

CanmetENERGY-Ottawa

- Total Staff (218)
- Scientific and Professional (136)
- Program and Administration (40)
- Technical (40)
- Executive (2)

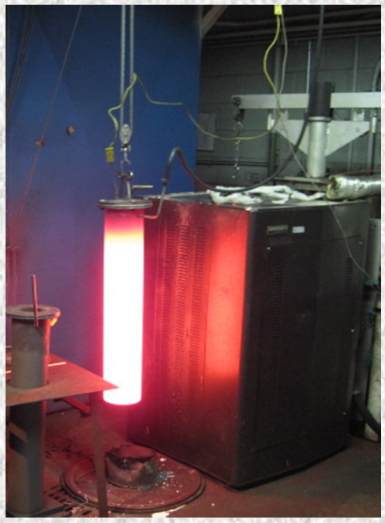
Over 300 scientists, engineers, and technicians in three laboratories across Canada (Ottawa, Devon, Varennes)

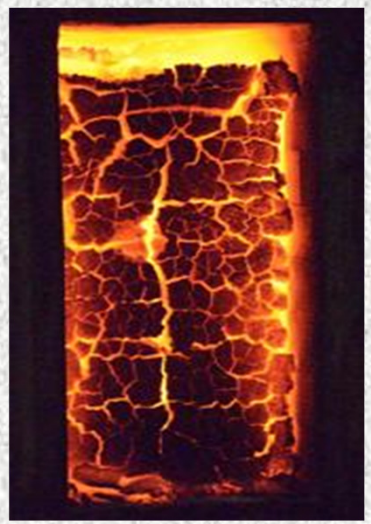
125 policy, admin, and support staff

Overall budget of $75M for all three labs

Ottawa Lab ~$36M budget (2010-11); ~$8.5M to Industry Group; ~$1M to IES-EHTP Section (Coal & Coke R&D)

Canmet ENERGY





Canadian Carbonization Research Association

www.cancarb.ca

CCRA
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CCRA Research Focus

The CCRA was formed in 1965 to conduct research on behalf of Canada's steel and metallurgical coal producers for the competitive advantage of the industry. Their research is focused in four main areas:

1. Energy and CO2 reduction in the coal and steel industry
2. Energy and environment
3. Fundamental aspects of coal and coke utilization
4. Database, Standards and Procedures

CanmetENERGY & CCRA

CanmetENERGY was a founding member of the CCRA over 40 years ago. Since then, CanmetENERGY has carried out numerous research programs in conjunction with the CCRA on behalf of Canada's steel and metallurgical coal producers in the areas of:

- Energy efficiency and GHG reduction
- Renewable Energy
- Sustainability of metallurgical coal supply
- Iron making
- Mining, processing and transportation

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CCRA

- CCRA comprises of a
  - Board of Directors which meets two times a year. These meetings coincide with the Technical Committee Meetings.
  - Technical Committee which meets quarterly.
  - Technical discussions center around the
    - Energy and CO2 Reduction in the Steel Industry
    - Energy and the Environment
    - Fundamental Aspects of Coal and Coke Utilization
    - Database, Standards and Procedures

CCRA

1. Energy and CO2 reduction in the Steel Industry:
   To develop the technical understanding to improve energy efficiency and coke quality for higher productivity and lower coke rate blast furnace operation.
   - Coke Fissuration (To understand how coke fissuration affects coke quality)
   - High Temperature Properties of Coke (Coke properties after primary slag attack)
   - GHG Mitigation
     - Bio coke and bio-injection development
     - Charcoal additions to coal blends
     - N2 free blast furnace
2. Energy and the Environment:
   To determine the options for new cokemaking technology in Canada
   To determine how to decrease the energy required in the production of coke and minimize environmental impacts.
   - Non-Recovery Cokemaking
   - Dry Coke Quenching
3. Fundamental Study of Carbonization:
   To understand the fundamental science of coal and coke utilization to improve energy efficiency.
   - Mine Circuit Optimization
   - Mineral Matter and Coke Reactivity
   - Optimization of Carbonization Conditions for Canadian coals
   - Utilization of Briquetting Technology
   - Factors Affecting Coke Bed Permeability
   - Characteristics of Gething Coking Coals
4. Database, standards and procedures:
   To generate industrial intelligence from historical data.
   To develop standards or procedures to enhance the knowledge and utilization of Canadian coal and coke.
   To perform co-operative research with International Research Leaders in the field.
   - Database (Coke strength prediction using PLS modeling of coal properties)
   - Standards (Development of ISO and ASTM standards for Canada)
   - Technical merits of WCC
   - International collaboration – University of New South Wales, UBC, CPM
   - 18 inch – SHO comparisons

CCRA

- Technical support has also been provided to the coal industry which has proved to be reliable, accurate and unbiased.
- This has allowed Canadian Coal companies to compete on the International market and develop global markets.
- Canadian coal presence has been significantly increased over the many years globally based on quality, security of supply and long reserve capacity.

CCRA

- The CCRA/CanmetENERGY joint research program is there to meet industrial partner's needs.
- Historically, this arrangement has had great benefit to all members.
- Projects can include both the CCRA Technical Committee Program and or Confidential Research.
- Both TC and Private Research are confidential in nature.
- New members must sign a confidentiality agreement. Any guest members will not be allowed to take any of the handouts from a meeting. Non-members will not receive meeting minutes even if they attend.

CCRA

- Membership
  - Full Active members (30-35K per year)
  - Connected members (10-15K per year)
  - Associate (CanmetENERGY)
  - Guest members
  - Budget is about $450-500K for research
  - Fees and costs associated with attending meetings are tax deductible