



Environment in Canada

Vahid Sohrabi, Ph.D., P.Geo.

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Agenda

- Environmental Perspectives
- Human Interaction with the Environment
- Has Canada Been So Considerate to Environment Before?
- Examples of Environmental Issues in Canada
- Canadian Environmental Regulations
- How does a Mining/Oil-Gas Project Start?
- Advantages of Environmental Regulations in Canada
- Questions?

Environmental Perspectives?



70% OF CHILDREN AGED 3-13 IN THE AMERICAS ARE CONCERNED ABOUT THE PROTECTION OF THE ENVIRONMENT (IN CANADA, 69%).



Rolling back Canadian environmental regulations during coronavirus is short-sighted

June 14, 2020 8:27am EDT

Environmental Perspectives?

1- stewardship

- Human beings as stewards of nature;
- Human beings to look after all living things;
- Sacred bond exists between themselves, nature and God;
- Often oppose science and technology;

Environmental Perspectives?

2- Imperialism

- Similarly comes from traditional thought process;
- The more dominant view of humans right to control nature;
- They feel nature and God are separate;
- Human being is respected by God by controlling Earth and nature.
- Francis Bacon (1561-1626) was very influential in British imperialism
- This view was very dominant during the 18th and 19th centuries and still remains prevalent in some Areas today.

Environmental Perspectives?

3- Romanticism

- Originated mainly at the end of the 18th century;
- Came from romantic view of artists, poets and writers;
- A reaction against the imperialistic view of nature and environment;
- The environment is valued for its worth to humans;
- This perspective praises the beauty of nature, honoring it with an almost God-like status;
- Nature is most beautiful when it is in its purest state, unaffected by humans.

Environmental Perspectives?

4- Utilitarianism

- The most important things in life are happiness and contentment
- Humans should be valued above everything else
- Animals have pleasure and pain with some value, but trees and plants have no feelings, have no value except their worth to humans.
- The environment performs fundamental roles, such as the provision of the food chain and the shaping of rich and diverse landscapes, to be used and enjoyed by any number of people.
- Utilitarians accept that it is often necessary to compromise short term pleasures, for the greater good over the long term.

Human Interaction with the Environment





**Has Canada Been
So Considerate to
Environment
Before?**

Environmental Impacts of Human Activities in Canada

- More than 23,000 contaminated sites listed by government
- Tax money is going to be used to remediate/restore these sites
- These sites are not the only contaminated sites across Canada

Environmental Impacts of Human Activities in Canada

1- Faro Zinc Mine

- Once largest open pit **lead-zinc** mine in the world
- Abandoned in 1998
- 70 Mt of tailings
- 320 Mt of waste rock
- Leaching heavy metals and acid
- Complex remediation project



Environmental Impacts of Human Activities in Canada

2- TCE Contamination

- Trichloroethylene (TCE)
- Used for many purposes such as solvent, degreasing, dry-cleaning, etc.
- Health effects: carcinogenic and potential reproductive effects
- Health standard level: 5.0 ppb
- Example of contaminated site: Shannon, Quebec, Canada



Environmental Impacts of Human Activities in Canada

3- Coal Mining in British Columbia

- Extensive open pit coal mining (25.7 Mt coal production in 2019)
- Overburden and waste rocks dumped into valleys
- Selenium was released and exceeded guideline
- Water quality for the protection of aquatic Life: $1.0 \mu\text{g/L}$
- Fish poisoning and water well
- Water treatment plant capacity: $10,000 \text{ m}^3/\text{Day}$ (increased to $20,000 \text{ m}^3/\text{Day}$)

U.S. demands explanation from province over river pollution from B.C. mines – by Bob Weber (CBC News British Columbia – May 11, 2020)

May 12, 2020 in Canada Mining, Canadian Media Resource Articles, Mining Environmental Accidents, Pollution, Tailing Dams and Abandoned Mines, United States Mining

<https://www.cbc.ca/news/canada/british-columbia/>

Contamination from Teck coal mines in waterways of Elk River watershed is a long-standing problem

CANADIAN PRESS: The U.S. government is increasingly concerned about pollution from British Columbian mines, following new research that shows contaminants in a river south of the border came from Canada.

In a letter obtained by The Canadian Press, the U.S. Environmental Protection Agency is demanding the provincial government hand over data explaining why Teck Resources coal mines in southern B.C. are being allowed to exceed guidelines for a toxic heavy metal.

"The EPA ... finds it unacceptable that the province has accepted [a treatment plan] that will allow seasonal exceedances of water quality objectives into the future," says the Feb. 4 letter to B.C. Environment Minister George Heyman.

Environmental Impacts of Human Activities in Canada

4- Mercury Poisoning, Grassy Narrows First Nations

- Roughly ~10 tons mercury dumped into river in 1960's-1970's
- Fish absorbed mercury
- First nations poisoned by fish consumption
- Minamata disease
- More than 80 km of river impacted



Environmental Impacts of Human Activities in Canada

5- Tailings Dam Failure, Mount Polly Copper Mine, BC

- Open pit and underground mine
- 20,000 tons copper and 50,000 oz of gold productions annually
- Tailings dam failure in 2014
- Estimated cost of clean-up: \$ 1.2 dollars



Environmental Impacts of Human Activities in Canada

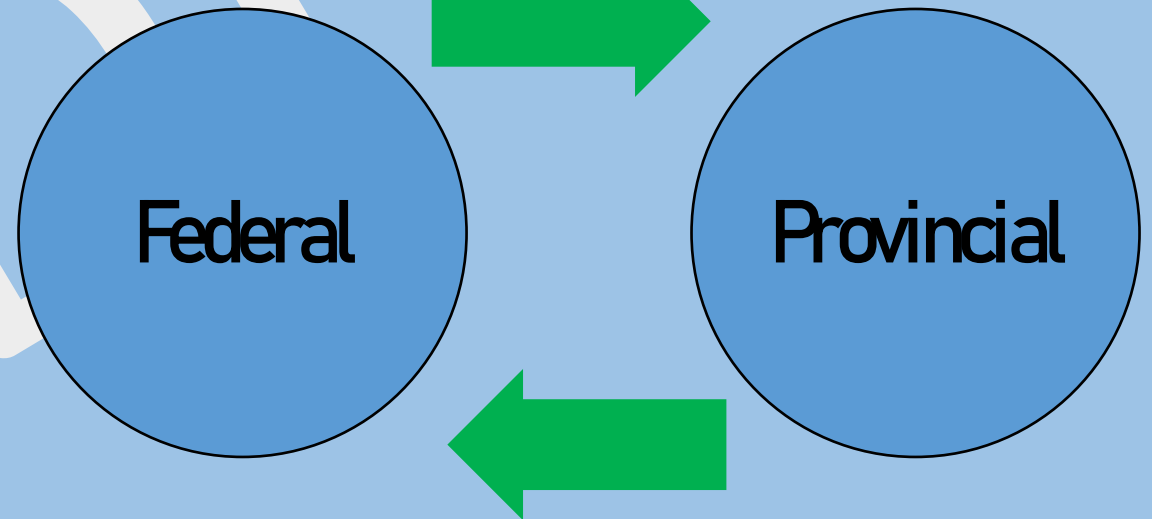
5- Tailings Dam Failure, Mount Polly Copper Mine, BC

Mount Polly tailing dam breach is called as the worst environmental disaster in BC.

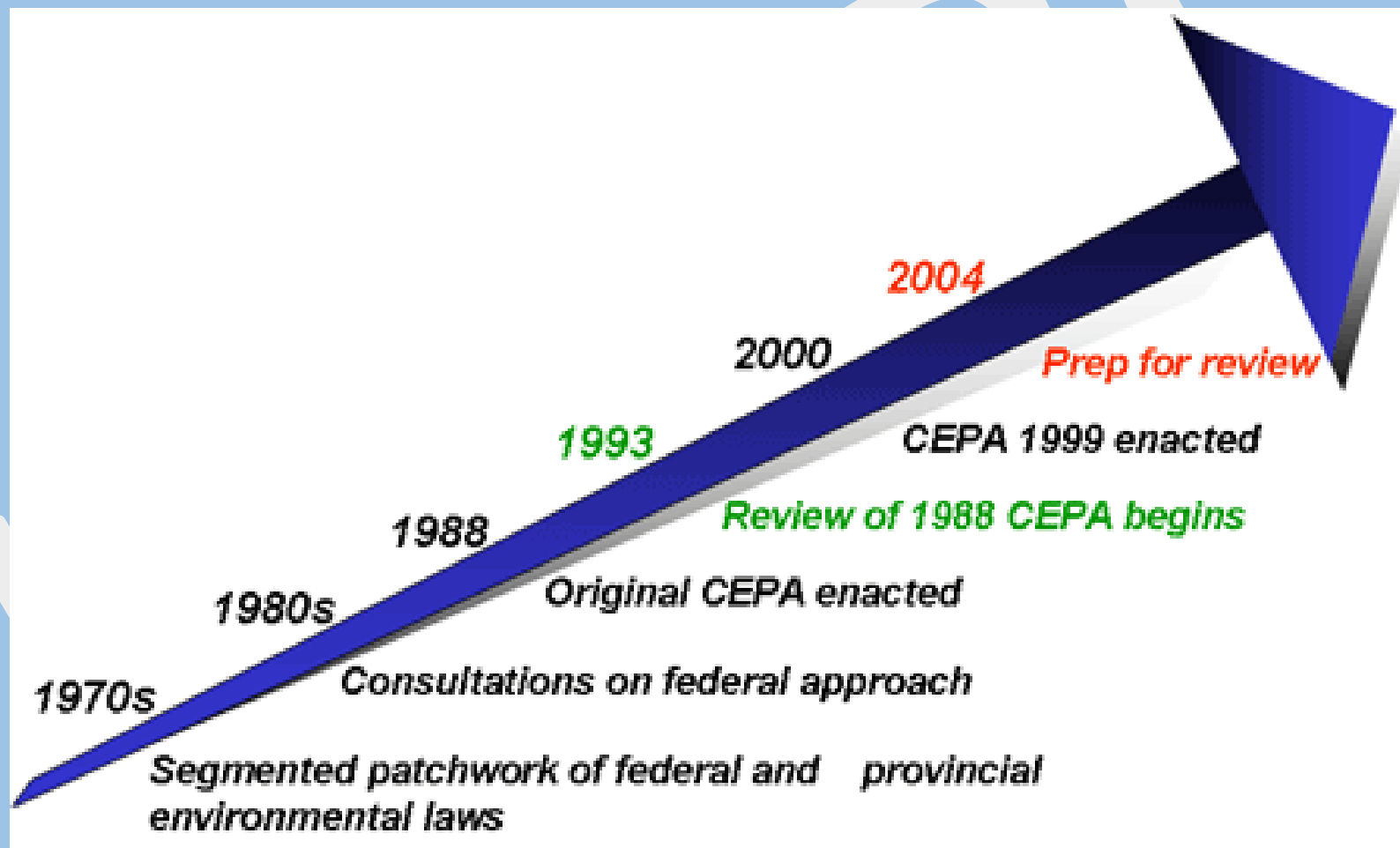
Is that right?



Canadian Environmental Regulations

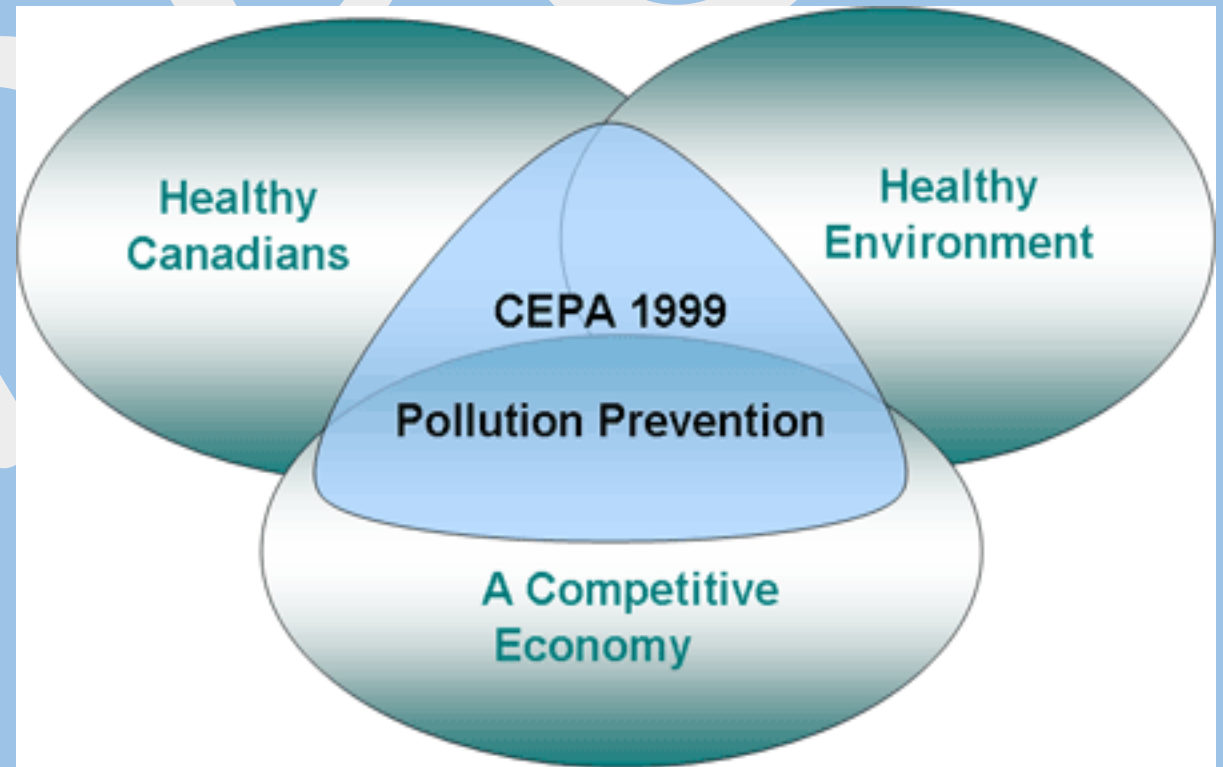


Canadian Environmental Regulations



Canadian Environmental Protection Act (1999)

- Core values of the CEPA Law:
 - sustainability; and
 - pollution prevention.



Canadian Environmental Regulations

Sustainable Development

- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

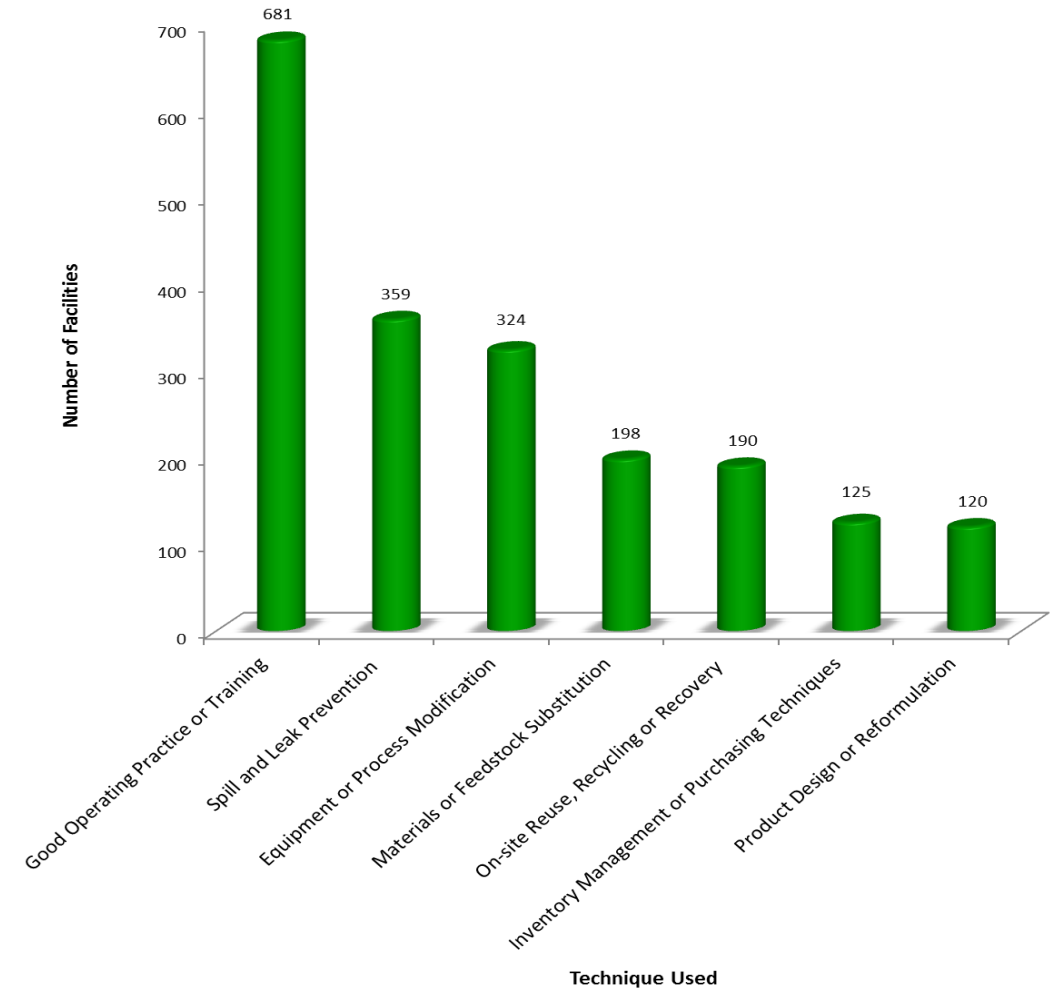


Canadian Environmental Regulations

Pollution Prevention

- The use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health.

The most practiced pollution prevention techniques in 2014



Canadian Environmental Regulations

Dangerous Goods and Safety Data Sheet (SDS)

- SDS should be available to all labours;
- Identification of the product and supplier;
- Hazard identification;
- Prevention; and
- Response.

SIGMA-ALDRICH sigma-aldrich.com

Material Safety Data Sheet
Version 4.1
Revision Date 10/23/2010
Print Date 02/08/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	Chromium(III) acetate hydroxide		
Product Number	315108		
Brand	Aldrich		
Product Use	For laboratory research purposes.		
Supplier	Sigma-Aldrich Canada, Ltd. 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufacturer	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	+19058299500		
Fax	+19058299292		
Emergency Phone # (For both supplier and manufacturer)	1-800-424-9300		
Preparation Information	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956		


2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification	Not WHMIS controlled.	Not WHMIS controlled.
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GHS Classification
Acute toxicity, Inhalation (Category 4)
Acute toxicity, Dermal (Category 4)
Acute toxicity, Oral (Category 4)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram	
Signal word	Warning
Hazard statement(s) H302 + H312 H315 H319 H332 H335	Harmful if swallowed or in contact with skin. Causes skin irritation. Causes serious eye irritation. Harmful if inhaled. May cause respiratory irritation.
Precautionary statement(s) P261 P264 P270 P271 P280 P301 + P312	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. Wash skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ eye protection/ face protection. IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.

Aldrich - 315108 Page 1 of 6

Canadian Environmental Regulations

Canadian Council of Ministers of the Environment

- Backbone of Canadian Standards/Guidelines and Environmental Procedures
- Guideline limitations for inorganic and organic compounds
- Checklists for environmental projects
- Procedures of sampling and analyses
- And much more ...



Canadian Council
of Ministers
of the Environment

Le Conseil canadien
des ministres
de l'environnement

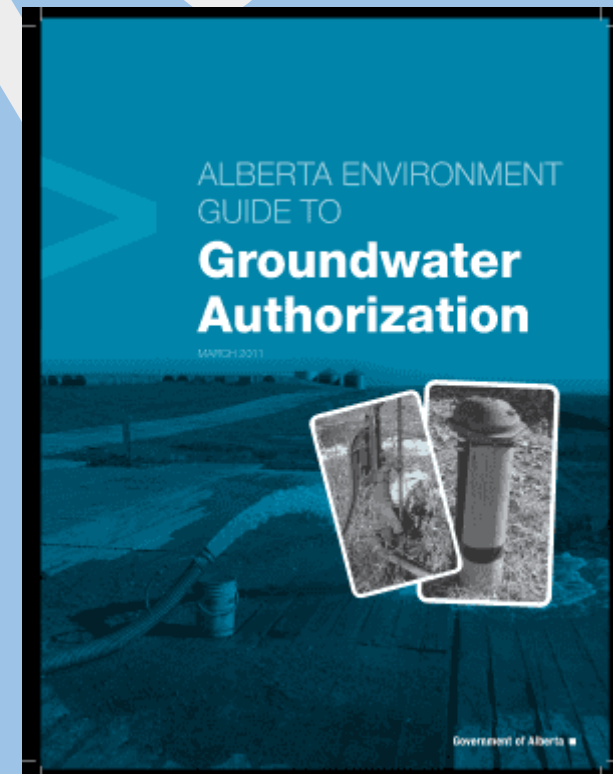
Canadian Environmental Regulations

Provincial Environmental Regulations

- Covers all matters of a local nature and property and civil rights within the province.
- Regulates over **agriculture, forestry, mining and hydroelectric development.**
- Pass most kinds of environmental laws. Provincial governments 'own' most natural resources.
- Exploitation of resources may include measures intended to protect the environment.
- All provinces have now passed legislation on water pollution and air pollution.

Example of Provincial Regulations-Alberta

- AEP adopted most of CCME guidelines
 - Analytical Methods for compliance with the Alberta Tier 1
 - Tier 2 soil and groundwater remediation guidelines
- Uses Tier 1 and Tier 2
 - Tier 1: offers generic guidelines for a range of sites within a given land use
 - Tier 2: explains how to modify Tier 1 guidelines for specific sites
- As an Example Alberta has more restricted groundwater authorization guideline compared to Ontario and BC



How does a Mining/Oil-Gas Project Start?

- 1- Baseline Assessment
- 2- Set-up Monitoring Network
- 3- Regular Seasonal Monitoring
- 4- Sample Analysis
- 5- Reporting and Submission of Report to Government
- 6- In Case of Contamination! Phase 1, Phase 2, Assessment
- 7- Additional sampling and complementary assessment and analysis
- 8- Evaluation of results
- 9- Remediation planning and conduct
- 10- Remediation monitoring
- 11- Remediation performance reporting

Is it possible to pursue
economic activities
considering
Environmental Regulations?



Is it possible to pursue economic activities considering Environmental Regulations?

Diavik Mine, Diamond Extraction

- 1000 m depth of open pit
- 200 m underground mining
- Located in the lake
- All employees are fly-in, fly-out
- Mine labour have relatively high salary
- Accommodation, food, flight and daily commuting is included
- Competitive product price in world market



Is it possible to pursue economic activities considering Environmental Regulations?

Suncor Energy, Oil Sands Mining

- Produces oil from oils and layer
- Oil is extracted by open pit mining and in situ extraction
- Highest level of environmental care
- 252nd largest public company in the world
- 8.9 million trees and plants until 2019



Advantages of Environmental Regulations in Canada

- Supports development of mining, and oil and gas industries
- Protects industries by provision of proper documents
- Respects and protects environment
- Respects the capacity of regional ecosystems to be sustained
- Ensures local people for the quality of their adjacent environment
- Optimizes economic benefits to the public owners
- Improves the quality of life for today and for future generations
- Creates sustainable jobs (environmental consulting, laboratory analysis, monitoring, planning, remediation and restoration, etc.)
- Addresses global climate change by achieving deep reductions in greenhouse gas emissions

