

National Energy
Board



Office national
de l'énergie

North American Pipelines

- Advantages, Disadvantages, Risk Reduction

**United Nations Economic Commission for Europe
Workshop on the Prevention of Water Pollution
due to Pipeline Accidents
8 – 9 June 2005**

Christine van Egmond
National Energy Board, Canada

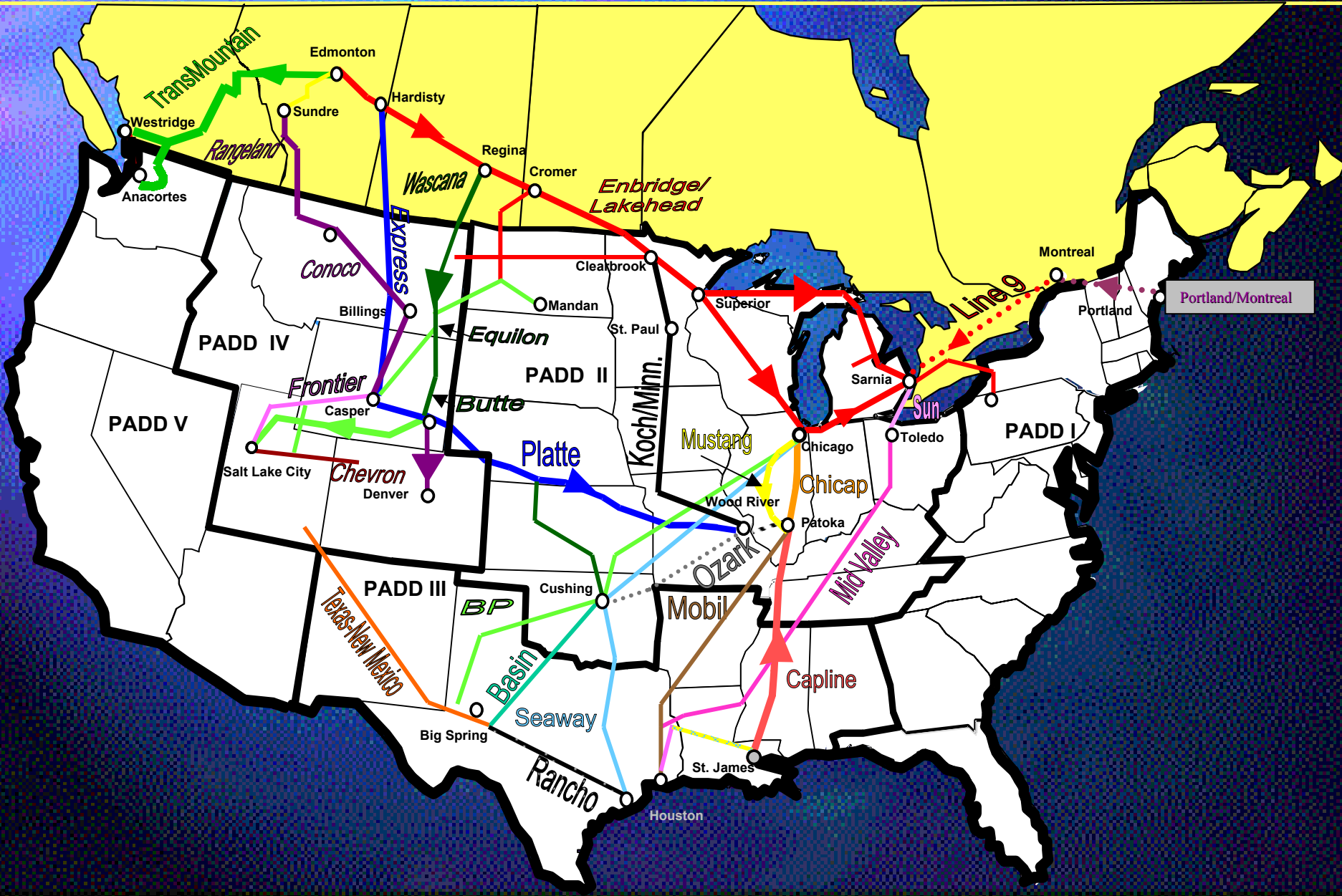
Canada



Introduction

- **Overview of North American pipeline infrastructure**
- **National Energy Board (context)**
- **Benefits & disadvantages of pipelines**
- **Reducing the risk of pipeline accidents**

Major North American Oil Pipelines





National Energy Board of Canada

- **Regulates about 45 000 km of transmission pipelines that cross inter-provincial or international borders (between Canada and U.S.A)**
- **40% of these lines carry crude oil or refined products (gasoline, aviation fuel)**
- **National Energy Board's role is to promote safety, environmental protection and economic efficiency in the regulation of pipelines, energy development and trade**



Major Oil Pipelines in Canada





Oil Pipelines Crossing International Waterbodies





Benefits and Disadvantages of Pipelines

➤ Benefits

➤ Economic

- 8.0 €/m³ toll from Edmonton to Chicago

➤ Safety

- 87 times fewer deaths than truck transport
- 35 times fewer fires/explosions than truck transport

➤ Security

- Largely invisible to the general public

➤ Environment



Benefits and Disadvantages of Pipelines

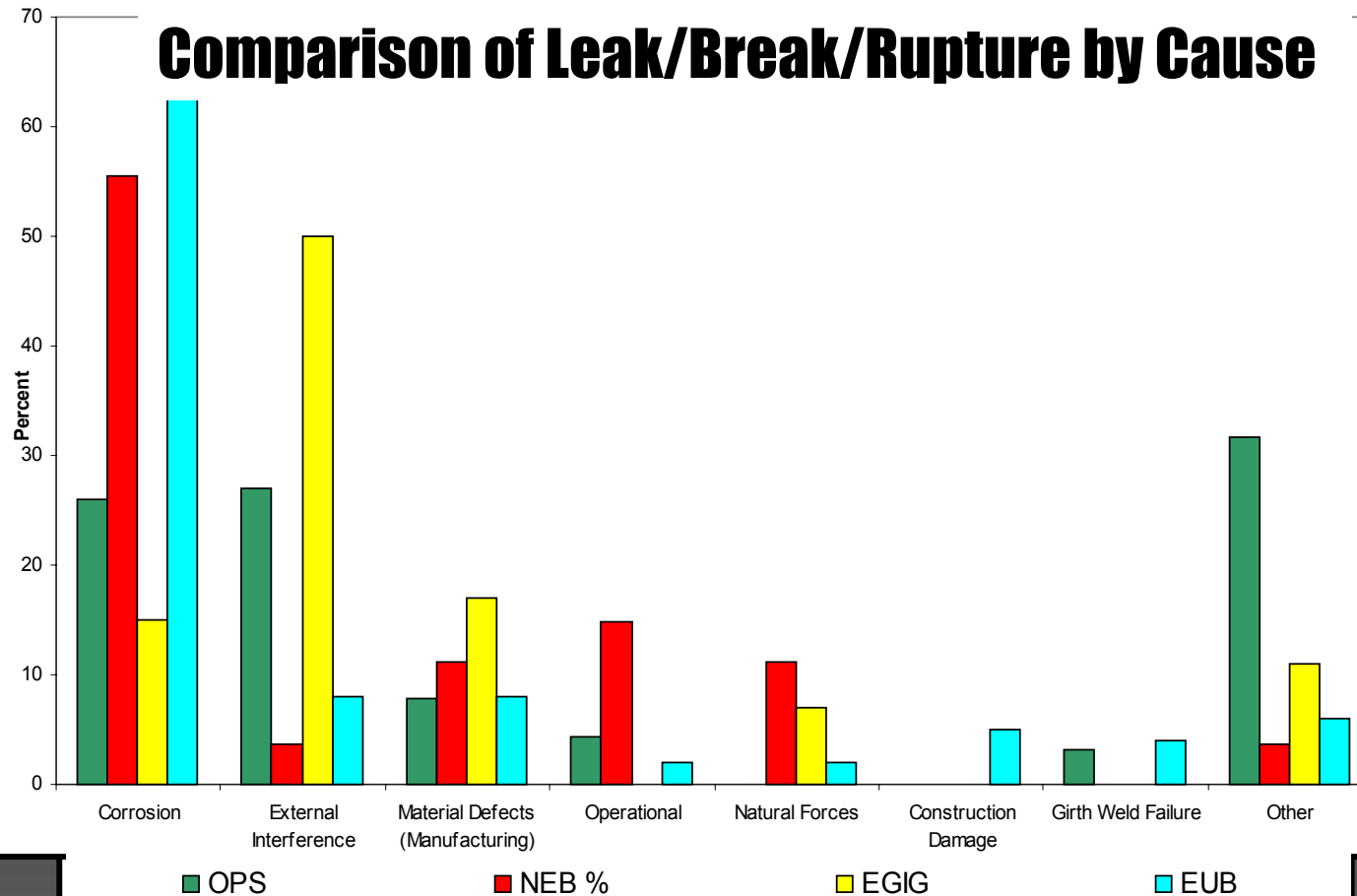
- **Disadvantages**
 - **Capital cost**
 - ~500,000 €/km or 650 – 800 €/km•mm diameter
 - **Environmental impacts of construction**
 - Topsoil stripping
 - Deforestation (right of way clearing)
 - **Environmental impacts of operation**
 - Effects of pipeline releases
 - **Infringement on land rights (expropriation)**

Reducing the Risk of Pipeline Accidents

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Reducing the Risk of Pipeline Accidents

Risk = Probability x Consequences

- **Canadian regulatory approach:**
 - **Reduce probability**
 - **Integrity Management Programs**
 - **Damage Prevention Programs**
 - **Mitigate consequences**
 - **Emergency Planning and Response Programs**
 - **Verify compliance**
 - **Management System Audits**



Reducing the Risk of Pipeline Accidents

- **Integrity Management Program**
 - Reduce the probability of corrosion-related releases
 - Includes:
 - Management System
 - Working Records System
 - Condition Monitoring Program
 - Mitigation Program

- **Damage Prevention Program**
 - Reduce the probability of third-party damage
 - Permission to excavate on RoW; notify within 30 metres
 - Awareness obligations



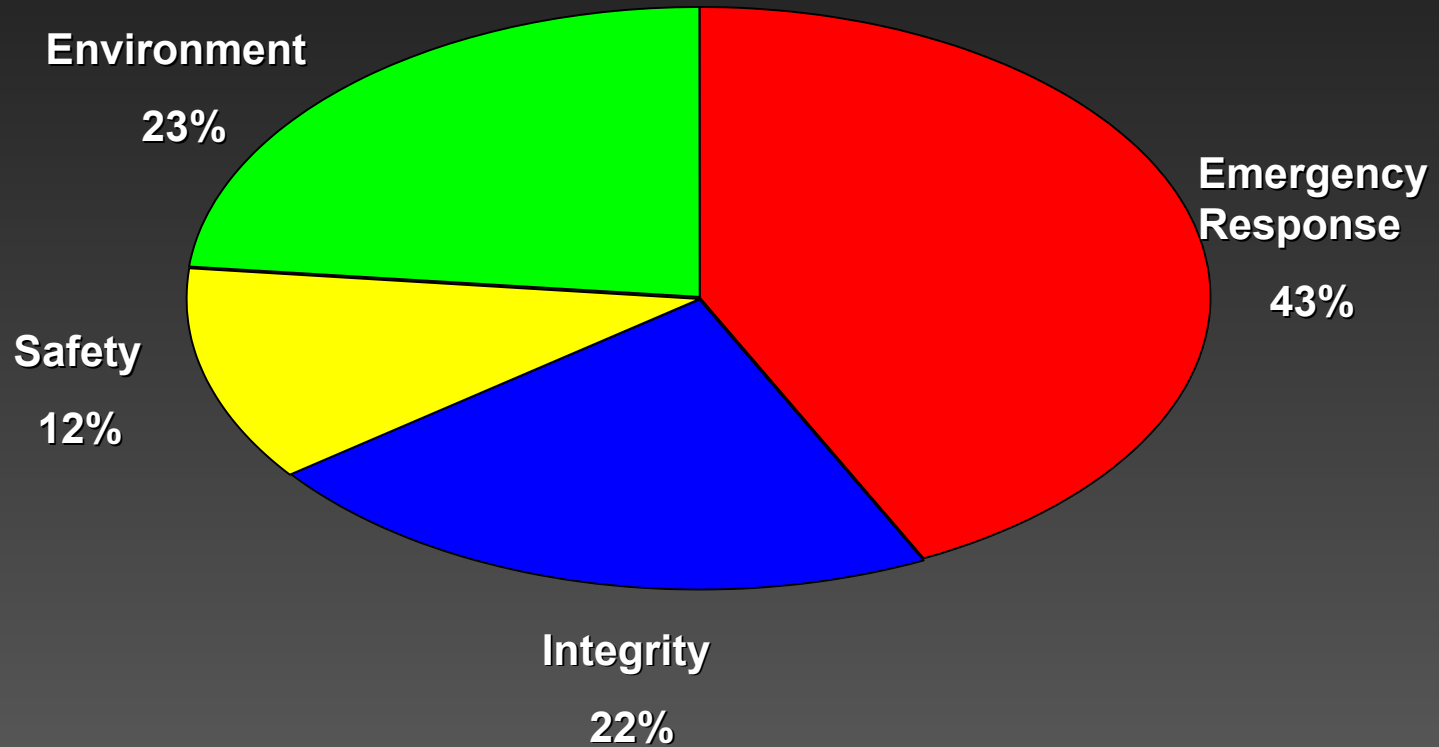
Reducing the Risk of Pipeline Accidents

- **Emergency Planning & Response Program**
 - **Mitigate consequences of an uncontrolled release to land or water**
 - **Management system approach**
 - **Liaison program for first responders**
 - **Continuing education program for public**

- **Compliance verification**
 - **NEB management system audits**



Audit Findings



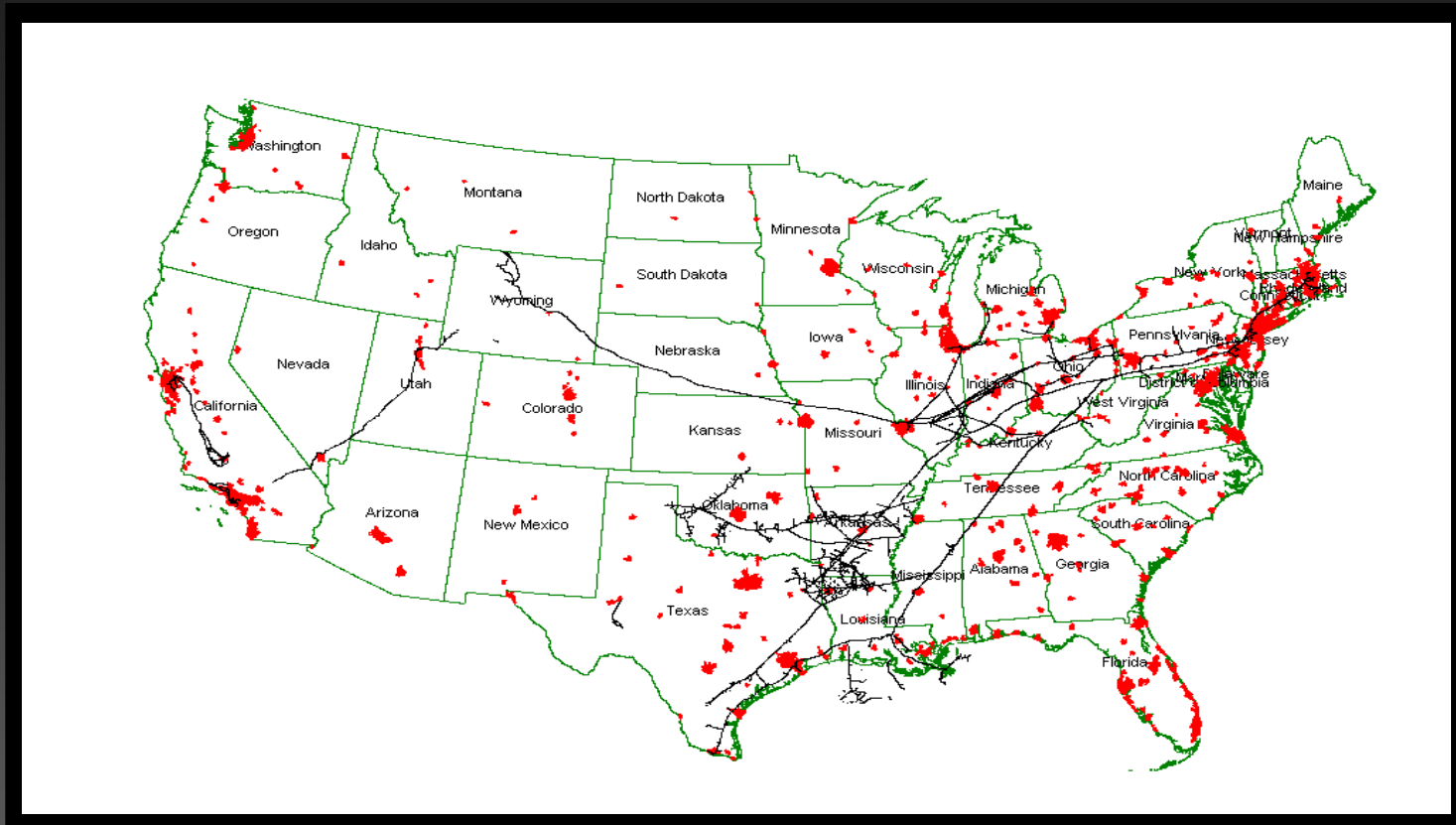


Reducing the Risk of Pipeline Accidents

- **U.S.A. regulatory approach**
 - **Hazardous Liquids Rule (2002)**
 - **Identification of High Consequence Areas**
 - **Baseline assessments**
 - **Continuous evaluation and assessment**
 - **Risk assessment**
 - **Repair criteria**
 - **Program effectiveness measures**
 - **Emergency response**



USA Pipelines & High Consequence Areas





Working with Other Regulators

- Pipeline Technical Regulatory Authorities Committee of Canada (PTRACC)
- Memorandum of Understanding with U.S. Pipeline Hazardous Materials Safety Association
- Development of joint GIS-based pipeline mapping system

NEB Pipeline Mapping System

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Welcome to the GIS Initiative - Microsoft Internet Explorer

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Address http://web.neb-one.gc.ca/OurBusiness/CorporateProjects/GIS/

National Energy Board Office national de l'énergie

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Our Business

Decide in the Public Interest

Assure Compliance

Provide Energy Advice

Engage Stakeholders

Raison D'Être

Activities

Board Agenda

Hearing Schedule

Outgoing Correspondence

Pipeline Company Info (& more)

Regulatory Documents

Related Links

NEB's Geographic Information System Initiative

Welcome to the home page of the NEB's Geographic Information System Initiative!

NEW As of February 7, 2005, NEB staff can access **iMap v0.1** - a tool that provides staff with a simple map of Canada containing pipelines and related facilities in Western Canada and the East Coast in relation to major transportation and hydrographic networks, Indian reserves and various protected areas. Some of the things you can do with **iMap v0.1** are:

- View pipeline systems and related facilities
- Investigate the nature of a pipeline segment
- Find a pipeline or facility
- Find approximate locations of NEB regulated pipelines
- Create simple maps for inclusion in reports or Board Items.
- Look at your neighborhood in a satellite image of Calgary

Message to first time users...

Before you can access **iMap v0.1**, you must first [install ArcReader](#) from the Service Desk's [software distribution page](#).

About iMap

The NEB initiative geographic map-like pipelines to other lakes, or view of U forward to the next extent by the business...

A GIS system also allows one conduct analysis on the features it contains. For example:

- How far is that pipeline from that community?
- How many incidents have occurred in this region?
- How will the environment be affected in the event of a spill or rupture?

Canada[1] - ArcReader

File Edit View Tools Window Help

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CANADA - GENERAL MAPS

- FRONTIER WELLS
 - Drilling Stats 2004-2005
 - Wells 1900 - 1999
 - Wells 2000 - 2005
- POPULATION
- APPROX and NOT COMPLETE NEB REG PIPES
 - Proposed Mackenzie Valley Pipeline
 - Oil and Gas - work in progress - errors possible
 - Group 1 - work in progress - errors possible
 - Group 2 - work in progress - errors possible
- ALL PIPELINES BY DIAMETER SCALE DEPENDANT
- PIPELINES & FACILITIES
 - BC AB SK Facilities (All)
 - BC AB SK MB EC Pipelines (All)
 - BC AB SK MB EC Pipelines (All) by Substace
 - BC AB SK MB EC Pipelines (All) by Status
- PROTECTED AREAS POINTS
 - CA National Parks 1 to 7.5M - Points
- NTS MAP INDEXES
 - Index 1 to 50K NTS
 - Index 1 to 250K NTS
- ADMIN BOUNDARIES
- TRANSPORTATION
- HYDROGRAPHY
- ABORIGINAL
 - First Nations
 - Land Claims
- PROTECTED AREAS
 - AB Protected Areas
 - AB Crown Reservations
 - BC Protected Areas
 - CA National Parks 1 to 7.5M - Areas
 - SPOT Satellite Image - CALGARY
 - ADMIN BOUNDARIES AREAS

Canada[1] - ArcReader

File Edit View Tools Window Help

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Identify Features on the Map

Identify from: <Top-most layer>

BC AB SK Facilities (All)

Location: [1,312,605.22 / 440,578.05 Meters]

Field	Value
DIAMETER	43095
OPERATOR	
LIC	08895
LINE	098
LOCATION	05,34,025,02u/5
FACILITY	Meter/regulator station
BATTERY	
STATUS	Operating
NAME	
POWER	0
CAPACITY	0



Summary

- **What have we learned?**
 - **Regulatory intervention can positively influence safety and environmental protection**
 - **Understanding release causes is a critical first step in developing a program to reduce the risk**

- **Future regulatory directions**
 - **Increased movement toward goal-oriented regulation**
 - **Introduction of Health, Safety and Environment Case**