

A photograph of an industrial facility, likely a refinery or chemical plant, at night. The scene is illuminated by warm, golden lights, possibly from the sun setting or rising, creating a dramatic silhouette effect against a dark blue sky. Several tall, cylindrical distillation columns and various pipes are visible, some with red safety railings. The overall atmosphere is industrial and somewhat mysterious due to the low light.

CO2 Extraction Turning Emissions to Profit

ConocoPhillips Canada

James Chan

NRCAN's Canada's Energy Efficiency Awards 2005

Time Magazine
Canadian Edition
March 21, 2005

WINNER:
CONOCOPHILLIPS CANADA, CALGARY, ALBERTA
PROJECT: Empress CO₂ Extraction Plant

Getting the most from gas

As ConocoPhillips Canada processes natural gas in Empress, Alberta, it produces a stream of waste gas containing carbon dioxide and sulphur. Instead of incinerating the gases, a team of employees found a way to extract the CO₂ and sell it to industrial users. In the process, they reduced energy consumption



at the plant by about 75,000 gigajoules, enough power to light 750,000 100-watt light bulbs continuously for 12 days. They also eliminated about 62,000 tonnes of greenhouse gas emissions a year

**SUSTAINABLE DEVELOPMENT
IN ACTION:** By extracting CO₂,
ConocoPhillips reduces energy
consumption and saves more
than \$300,000 a year.

and about 50 tonnes of sulphur emissions.

"We save between \$300,000 and \$500,000 a year in fuel," says Victor Standish, the plant's Asset Manager, "and we sell the waste gas. The Empress CO₂ extraction plant is a good example of sustainable development in action – addressing social, environmental and economic interests."

Canada

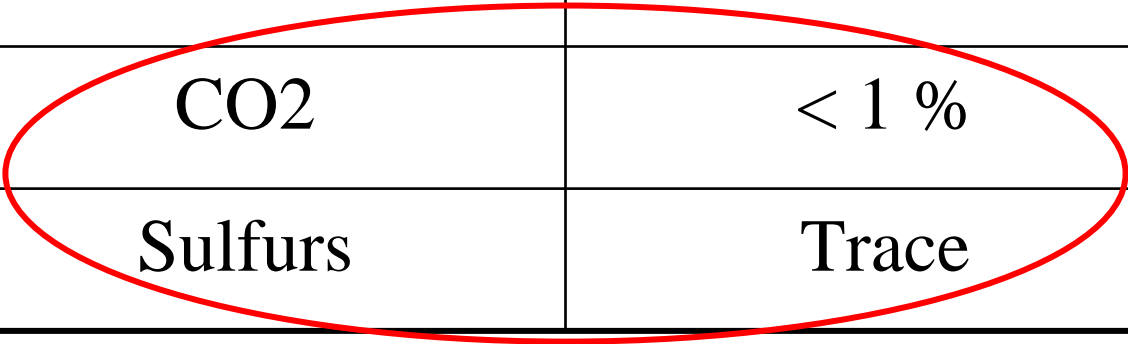
Empress Straddle Plant



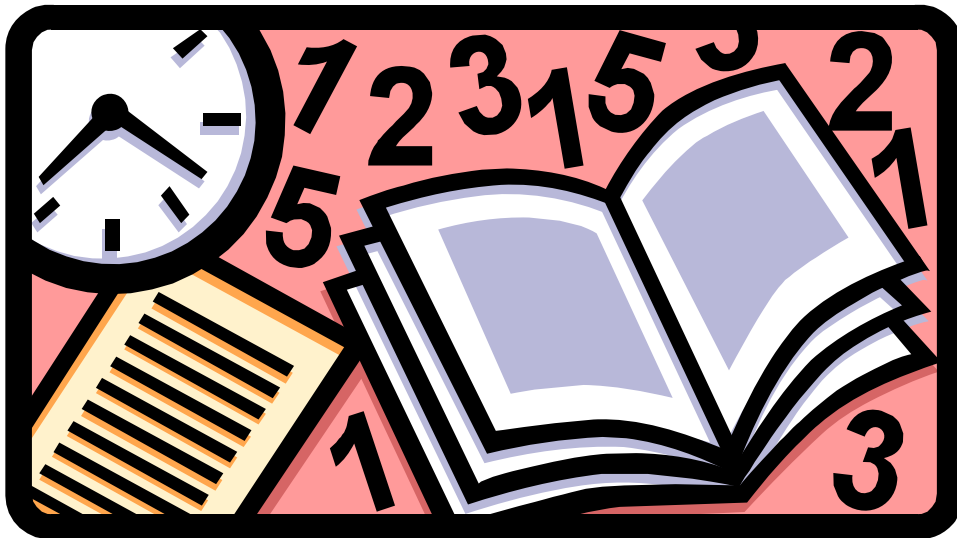
- 2.4 bcf / day
 - Ethane
 - Propane
 - Butanes
 - Natural Gasoline

Inlet gas stream composition

Methane	92 %
Ethane	3.5 %
Propane	~1 %
Butanes +	< 1 %
CO ₂	< 1 %
Sulfurs	Trace



CO2 and sulfur gas removal



- Approval to Operate
- Contract specifications

Sour gas treatment



- Composition
- Volume
- Fuel usage
- Operational issues
- Maintenance issues

Question ...



Is there a way to separate the CO₂ from the sulfur stream so we don't have to try and "burn" the CO₂ along with the sulfur gases?

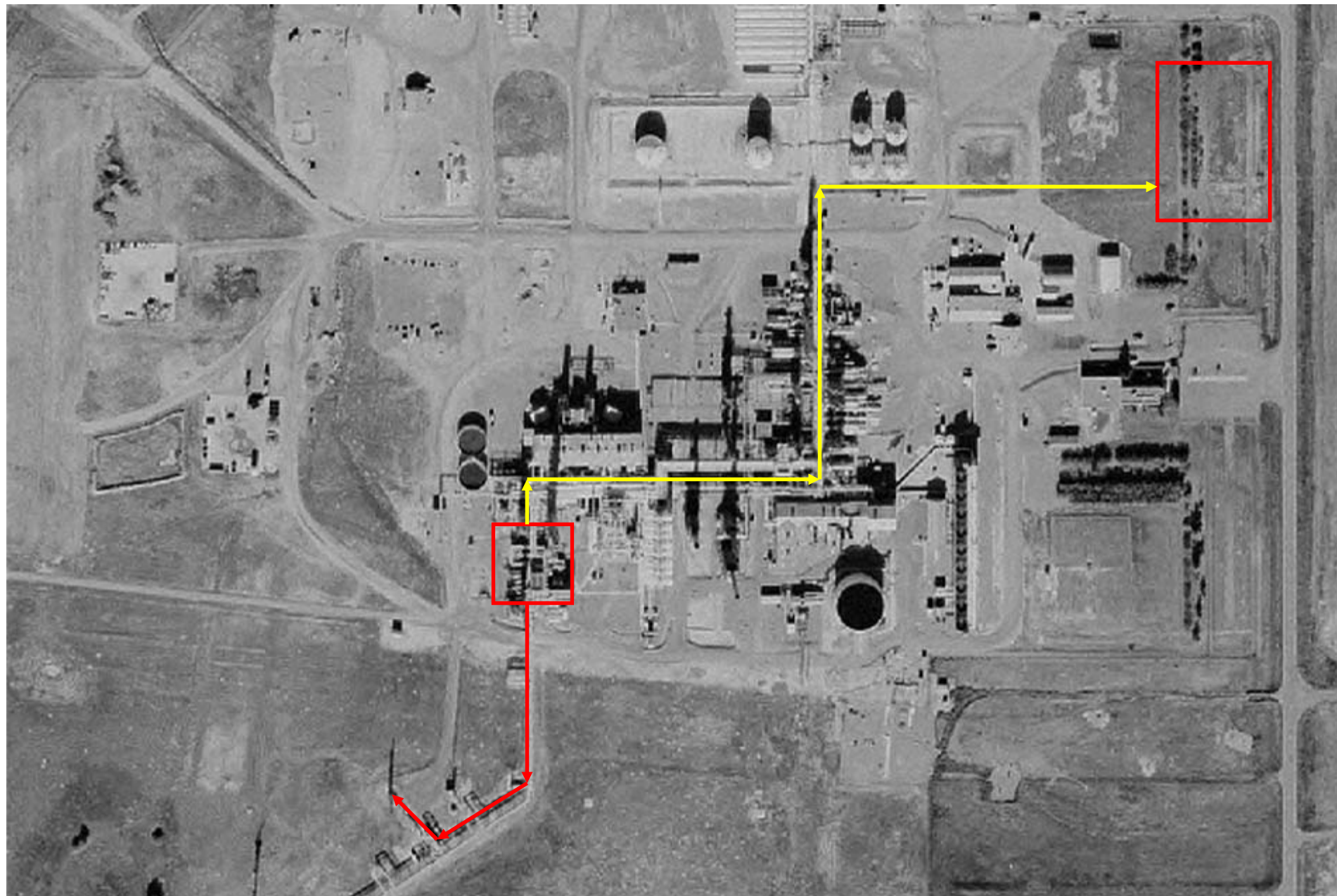


9th Canadian Pollution Prevention
Roundtable - 2005

The Players...

- Operations
 - Engineering
 - Business Development
 - Legal
 - Environmental
 - Regulatory
- Ferus Gas Industries

A new partnership, a new plant, ...



CO2 Extraction Plant 1



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CO2 Extraction Plant 2



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CO2 Extraction Plant Processes

- Sulfur gas treating, separation, storage, and disposal
- CO2 compression, refrigeration, storage, transportation

The Result

	Before	Today
Fuel	75,000 GJ/Year used for SGI	Fuel saved
CO2	62,000 tonnes emitted	CO2 captured and sold for reuse
Sulfur (as SO2)	165 tonnes emitted per year	110 tonnes emitted per year

Win-Win-Win

- Open to change
- Persistence
- Connecting
- Collaboration

