Stuart 9:13 am.

MACKENZIE COUNTY
SPECIAL COUNCIL MEETING

Monday, December 22, 2008
9:00 a.m.

Council Chambers
Fort Vermilion, Alberta

George Schmidt & Karen Holdich 11:00 a.m.

AGENDA

				Page
CALL TO ORDER:	1.	a)	Call to Order	
AGENDA:	2.	a)	Adoption of Agenda	
DELEGATIONS:	3.	a)	Frank Oberle, MLA – 11:00 a.m.	
		b)	Knelsen S+G – 9:00 a.m.	
BUSINESS:	4.	a)	Community Development Trust Fund send proposal to Minister's Office (SRD)	
		b)	Graders – Purchase/Lease	
		c)	Zama Grader Beat Tenders	3
lunch 12:00 - 12:35		d)		
IN-CAMERA:	5.	a)	Design Build Negotiations (P3)	Frank O. – 4. a)
		b)	CO_2 EOR Negotiations	– 5. b)
		c)	Inter-Municipal Negotiations i) High Level Fire/Tanker Unit	– Zama Access – Hwy 88
		d)	Zama City Access Base & Pavement	
		e)		
INFORMATION / CORRESPONDENCE:	6.	a)	Information/Correspondence Items	7
ADJOURNMENT:	7.	a)	Adjournment	

Energy – Mtg. – letter to Frank O by 3pm.

Agenda Item # 4. c)

MACKENZIE COUNTY

REQUEST FOR DECISION

Meeting:	**Special Council Meeting**
Meeting Date:	**December 22, 2008**
Presented By:	**William Kostiw, Chief Administrative Officer**
Title:	**Zama Grader Beat**

BACKGROUND / PROPOSAL:

During the current year the maintenance cost for the Zama Grader beat increased significantly compared to previous years. The maintenance cost for the beat consists mainly of contract grader costs, water truck and graveling costs. However, the increase is mainly attributable to the increase in the contract grader costs which, amounted to almost $426,000 for the current year.

OPTIONS & BENEFITS

Current grader contract cost:
44hrs per week @ $130 per hour = $297,440 for the year. However, the budgeted amount for the year is $270,000.

County grader cost:

	$
Capital cost in nominal terms	
- Purchase price	378,115
- Buy back	(226,210)
- Net real cost for 3 years	151,905
Cost per year	
- Capital cost per year	50,635
- Labour (44 hrs/wk @ $40/hr)	91,520
- Relief worker	10,000
- Fuel & oil (44 hrs/wk @ $30/hr)	68,640
- Maintenance & other	15,000
- Contingency	20,000
- Total cost	255,795

Author: Mark Schonken **Reviewed By:** _____ **CAO** _____

The anticipated cost per hour is $111.80 versus the budgeted cost of $130.00 per hour for GB Holdings.

Based on a 44 hour week the cost to the County from GB Holdings would have been $297,440. However, the cost for the current year significantly exceeded the budgeted hours and has reached a point where it is excessive.

The Equipment Committee reviewed grader options for Zama and it was concluded that the CAT160M AWD (all wheel drive) would be the most beneficial option.

Lease vs. purchase

Lease cost per year is $81,668; and

Purchase financial cost per year is $52,114 per year (average).

The purchase option is lower due to the difference in the interest rate of lease versus the County's borrowing rate of 4%. The lease rate offered by Finning is 8.6%.

COSTS & SOURCE OF FUNDING:

The cash cost of the County grader option for 2009 will be $583,275; this cost includes the total capital cost and the operational cost for the year. However, the real operational cost, as an expense, for 2009 will only be $246,199.

Funding will be received proportionally from the operational budget which includes $270,000 for GB Holdings, the remainder will have to be funded from the Capital budget.

RECOMMENDED ACTION:

Amend the capital budget to purchase a CAT 160M AWD grader for the Zama area to $378,115 and reduce the operational budget with $64,840 (representing the capital cost component and the saving).

Author: Mark Schonken **Reviewed By:** _____ **CAO** _____

ZAMA GRADER TENDER SUMMARY 2008

CONTRACTOR	Equipmant	MAKE	MODEL	YEAR	HOURLY RATE
Big "A" Services	Grader	Caterpillar	14H	2003	$130
Big "A" Services	Water Truck	Peterbuilt	378	2006	$102
GB Holdings	Grader	Volvo	730B	2008	$144
GB Holdings	Water Truck	International	7600	20007	$120
Big Red Bird	Grader	Caterpillar	14 h	1997	$160
Big Red Bird	Water Truck	Kenworth	W900	1984	$110
Dechant	Grader	Caterpillar	14m	2007	$181
Dechant	Water Truck	Kenworth	W900	2004	$140

Agenda Item # 6. a)

MACKENZIE COUNTY

REQUEST FOR DECISION

Meeting:	**Special Council Meeting**
Meeting Date:	**December 22, 2008**
Presented By:	**William Kostiw, Chief Administrative Officer**
Title:	**Information/Correspondence**

BACKGROUND / PROPOSAL:

The following items are attached for your information, review, and action, if required.

RECOMMENDED ACTION:

That the information/correspondence items be accepted for information purposes.

Author: C. Gabriel **Review by:** _____ **CAO** _____

Carol Gabriel

From: Joulia Whittleton
Sent: Thursday, December 11, 2008 10:54 AM
To: Council
Cc: Bill Kostiw
Subject: FW: News Release - Provincial Energy Strategy charts course for sustainable prosperity ~24926~

Joulia Whittleton
Director of Corporate Services

Mackenzie County
P.O. Box 640, Fort Vermilion, AB, T0H 1N0, Canada
Tel.: (780)-927-3718, Fax: (780)-927-4266
Toll Free: (877)-927-0677
Cell: (780)-841-8343 Email: jwhittleton@mackenziecounty.com

From: ACNMail@gov.ab.ca [mailto:ACNMail@gov.ab.ca]
Sent: Thursday, December 11, 2008 10:17 AM
To: Joulia Whittleton
Subject: News Release - Provincial Energy Strategy charts course for sustainable prosperity ~24926~

News Release

ALBERTA
Resourceful. Responsible.
December 11, 2008

Provincial Energy Strategy charts course for sustainable prosperity

Plan aims for clean energy production and wise energy use

Calgary... A long-term action plan for Alberta to achieve clean energy production, wise energy use and sustained economic prosperity was outlined by the Government of Alberta with the release of the Provincial Energy Strategy.

"Our strategic approach going forward recognizes that 21st-century energy challenges also represent great opportunities for Alberta," said Energy Minister Mel Knight. "The actions described in the Provincial Energy Strategy will help make Alberta a global energy leader that is recognized as world-class energy supplier, energy technology champion, and a responsible energy consumer and environmental citizen."

Specifically, the Provincial Energy Strategy includes actions to:

- address the environmental footprint of energy and encourage the development of renewable energy;
- explore ways in which value will be added to Alberta's energy industry, including supporting upgrading/refining/petrochemical clusters, and aggressively marketing Alberta's energy globally;
- change energy consumption behaviour by industry and consumers through conservation measures and a review of emissions targets and carbon charges for large industrial facilities;
- improve innovation through increased investment in research, development, demonstration and

deployment of energy technology; and
- enhance the capability of our electricity system by planning for a comprehensive upgrade to strengthen the transmission system by identifying requirements, technical solutions, timing, and updating of the approval process.

As part of clean energy production and encouraging renewable energy the strategy also recommends Alberta adopt a Renewable Fuels Standard (RFS). This new standard of five-per-cent ethanol in gasoline and two-per-cent renewable content in diesel by 2010 will help Alberta meet its climate change targets by reducing CO2 emissions by about one million tonnes annually, and will support Alberta's renewable fuels sector and the technology development of next generation biofuels.

Implementation of the Provincial Energy Strategy will include ongoing reassessment of objectives and strategies. The Government will report annually to Albertans on progress implementing the strategy.

For more information or a copy of the Provincial Energy Strategy visit http://www.energy.gov.ab.ca.

-30-

Backgrounder: Additional details on the Provincial Energy Strategy and the Renewable Fuels Standard

Media inquiries may be directed to:
Jason Chance
Alberta Energy
Communications
780-422-3667

To call toll free within Alberta dial 310-0000.

The following document has been posted to the Government of Alberta website to view this document online and/or additional information/backgrounder http://www.alberta.ca//acn/200812/24926232C684C-E7DE-976F-01D37383CE0F8F0C.html

A

TRANSPORTATION

NOTIFICATION OF HIGHWAY AND BRIDGE CONSTRUCTION OPERATIONS

Hwy 58:12
- Clearing and Timber Salvage and Other Work
- W. of Wenzel River to Wood Buffalo National Park Boundary

CONTRACT # 7736/08

TYPE OF CONSTRUCTION & DURATION

	Crushing
X	Clearing
	Grading
	Base Course
	Paving
	Bridge Construction
X	Other (Specify)

Type of delays expected (i.e. Traffic Accommodation Issues)

X	None
	Minor
	Major

Explain

Timber Salvage

Date of Commencement: November 12, 2008

Expected Completion date: Clearing – January 31, 2009
Salvage – February 28, 2009

PROJECT CONTACTS

Name of Firm and Personnel *(Print Below)*	Position	Office Phone	Cell Phone	Fax #
TRANS Project Administrator Adele Powell	Director	(780)624-6280	(780)618-9563	(780)624-2440
Engineering Consultant Glenn Newman	Manager	(780)377-3636	(780)915-0625	(780)435-8425
Contractor Respec Oilfield Services Ltd. Doug Rewega	President	(780)649-2370	(780)956-4326	(780)956-3306

INSTRUCTIONS
- Report to be completed by Consultant and submitted to Project Sponsor ELECTRONICALLY for distribution. Attach copy of Construction Location Plan.
- Report to be completed on all Contract projects
- Report to be resubmitted on carry-over projects
- Report to be submitted prior to work commencing (i.e. after pre-construction meeting)

SUGGESTED DISTRIBUTION LIST (via email)
- TRANS-ORG TCE PR
- MLA Constituency Office(s) need email
- Rural/Urban Municipalities need email
- District Supervisor, CVEB
- *Local EMS (ambulance, fire) (if applicable)*
- Maintenance Contractor
- Local R.C.M.P. need email
- Alberta Motor Association (AMA road.report@ama.ab.ca
- Transport Office, Sherriff's Branch julia.radu@gov.ab.ca
- Executive Director, TSS, Vehicle Safety roger.clarke@gov.ab.ca
- Chief Inspector, TSS, Dangerous Goods terry.wallace@gov.ab.ca
- Workplace Health & Safety Grande Prairie whs@gov.ab.ca
- Central Permitting (only for Bridge/lane closure) mizanur.rahman@gov.ab.c
- Communications heather.mclachlan@gov.ab.ca

REPORT PREPARED BY:

Consultant (Print Name): Glenn Newman - AMEC Earth & Environmental

Telephone Number: (780) 377-3636

Email Address: glenn.newman@amec.com

Date: November 14, 2008

Carol Gabriel

From: John Szumlas [john.szumlas@aagi.ca]
Sent: Saturday, December 20, 2008 3:10 PM
To: Bill Kostiw
Cc: George deRappard
Subject: Attached Letters -- Regarding Apache and Transportation Study

Attachments: Letter to Bill December 20, 2008.pdf; Transportation updates on timeframes Dec 20, 2008.pdf


Letter to Bill ecember 20, 20 Transportation pdates on time.

Hi Bill - Merry Christmas:
Not sure if you are working over the weekend, but as I promised to get you our views on the Apache issue we have attached a letter for your consideration and if you are happy circulation to Council As well we have prepared a note to file regarding the Transportation project I will be in the office Sunday AM till about 11 so if you wish to discuss please call On Monday prior to the Council meeting if you get voice mail press "0"
and Ester will find me
Take care
and thanks
john

--
John Szumlas
Activation Analysis Group Inc. (AAGI)
Suite 107, 4990 - 92 Ave
Edmonton, Alberta T6B 2V4
Telephone: (780) 415-5163
Fax: (780) 463-5280
www.aagi.ca

Activation Analysis Group Inc.
•Suite 107, 4990 – 92 Ave. Edmonton, AB T6B 2V4 ,
Phone 780.415,5163 • Fax 780.463.5280
Email: john.szumlas@aagi.ca

December 20, 2008

Our ref: 1218
Your ref: Apache - Zama

Bill Kostiw, CAO
Mackenzie County
P.O. Box 640
Fort Vermilion, Alberta T0H 1N0

Dear Bill:

Subject: Enhanced Oil Recovery (EOR) Project – Apache Zama

Further to your letter of December 16, 2008 and in preparation for the Special Council meeting scheduled for December 22, 2008, we wish to provide you with our preliminary comments of the review of the material that has been generated with respect to the issues we discussed.

1. We have been in conversation with Mr. French, Apache Canada's Regional Production Manager and with Mr. Bill Jackson, Apache Canada's Manager of Public and Government Affairs and they have shared with us additional material and comments.
2. We have reviewed material provided by yourself and Mr. French.
   This material includes:
   a) December 15, 2008 letter and attachments from Apache to the County.
   b) July 18, 2008 Apache proposal for Zama Basin Royalty Recommendation
   c) Various emails between Apache and Alberta Department of Energy
3. We have reviewed various government publications and announcements regarding Enhanced Oil Recovery and Carbon Capture Sequestration.
4. We have attempted to contact senior officials of Alberta Department of Energy (ADoE) and hope to discuss the matter with them prior to Christmas. Realistically however, we believe that will likely be early in the New Year before we can have these discussions. Once those conversations have taken place we will report.

To summarize the issue:

- The Zama Field is getting old and requires Enhanced Oil Recovery approaches to lengthen its productive life from 5 to 7 years to 25 years.
- Apache is Mackenzie County's single largest taxpayer and a loss of taxes from the Zama Field will have huge impact on the County.
- Apache has access to CO2 from its NE British Columbia field which is approximately 174 kms away from the Zama field that could piped for EOR use.
- To lengthen the productive life of the Zama Field, Apache is prepared to invest between $500 - $700 million to build the pipeline and necessary infrastructure to lengthen the productive life of the Zama field.
- To make the economics work, Apache is seeking EOR – CCS Royalty relief in similar fashion as projects in the Oil Sands. As well they are requesting permission to bundle their Zama field, so that they would submit one application as opposed to 27 separate applications.
- In 2004, Apache was granted $8.5 million ($5 mil Provincial and $3.5 mil Federal) to assist in a pilot EOR – CCS project at the Zama Keg River site. We are advised that the pilot was successful.
- On July 18, 2008, Apache submitted a proposal to ADoE for the project.
- On October 10, 2008 an email from ADoE arrived.

Based on our preliminary review, the issue in a "nut-shell" is likely best said by Beverley Murray, the Manager, Oil Royalty and EOR of Alberta Energy. To quote from her October 10, 2008 email to David French:

> *"I have tried to find out who will be looking at your proposal but so far have not been able to. As I indicated last week, we have gone through a re-structure that has taken the responsibility to review applications out or our unit and assigned them to the Economics and Markets branch. At this point there is no one in this new branch assigned to review the EOR applications.*
> *I spoke to Salim Merali, Director of Oil Operations, and he in turn has escalated the concern to our Branch head, Sandra Locke. Sandra told Salim that she will look into getting your application reviewed. Unfortunately, Sandra will be away next week, so we will not see any progress until she gets back."*

Given that Mr. French confirmed with us on December 18, 2008 that this is the last communications from ADoE and given the significant role of Apache to the County, we would recommend that Council consider the following approach.

- Confirm that the Town of High Level is fully in the loop with respect to this matter and support a joint presentation to the Province.
- Should a broader coalition be desired then conversations with Swan Hills and other municipalities should be considered later so as to not confuse the situation. We believe that it would be Mackenzie's best interest to not expand the group at this time, as more people will mean more items added to the agenda and likely delay further consideration of the request. Broadening the coalition to include other municipalities will likely be necessary, however we believe that Mackenzie County's interests should be job one. Mr. French did reference a meeting a few years ago that involved Swan Hills and Drayton Valley together with the local MLA's on this topic however the meeting resulted in limited results.
- In your discussions with Frank Oberle on December 22, 2008 request that he arrange a meeting as soon as possible between representatives from Council, the Town of High Level, Apache and either Minister Knight or Parliamentary Secretary Len Webber or the Deputy Minister of Energy Watson.
- Given that it appears that this file has slipped between the cracks, starting at the Minister may not be the best route, insofar as if he is not supportive we will have a major hurdle to over come.
- We would recommend that Mr. Oberle be apprised of the enormity of the situation from the point of view of the County and the Town and seek his assistance in arranging a meeting with Deputy Watson so that this file can be located and acted upon with dispatch. At the same time we are attempting to discuss the matter with Mr. Watson, so the two pursuits will meet at the same point.

Following your review we would welcome an opportunity discuss our findings. One last item, if you agree we would suggest that a copy of this letter be shared with Mr. French so that he is fully in the loop.

Sincerely,

John Szumlas

John Szumlas

Activation Analysis Group Inc.
•Suite 107, 4990 – 92 Ave. Edmonton, AB T6B 2V4 ,
Phone 780.415,5163 • Fax 780.463.5280
Email: john.szumlas@aagi.ca

December 20, 2008

Our ref: 1219
Your ref: Transportation Project

Bill Kostiw, CAO
Mackenzie County
P.O. Box 640
Fort Vermilion, Alberta T0H 1N0

Dear Bill,

Re: Transportation Study

We are writing to express our appreciation to Council and yourself, for approving the Transportation Study as per the AAAGI proposal dated November 5, 2008.

Because of the time of the approval, the project timelines will be adjusted accordingly as follows:

Project start date	January 5, 2009
Client update	February 15, 2009
Draft report submitted	March 30, 2009
Final Report Submitted	April 30, 2009

Initial meetings have been held by the project team and we will meet again for start up on January 5, 2009 following the Christmas break.

We have amended our work plan to incorporate a high level analysis of the Apache – Zama EOR – CCS royalty issue and undertake to complete this element prior to December 21, 2008.

We confirm that based on the minor revisions to the timelines and the addition of the Apache – Zama element our project budget for professional fees of will not exceed $50,000.00 plus GST and expenses.

We look forward to working with you and your Council colleagues on this important endeavour.

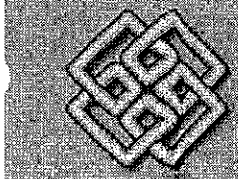
Sincerely,

John Szumlas

President

cc: George de Rappard

PETROLEUM TECHNOLOGY ALLIANCE CANADA



innovation

PTAC

Facilitating innovation, collaborative research and technology development, demonstration and deployment for a responsible Canadian hydrocarbon energy industry.

- FAQs
- Project Summary
- Profile Summary
- History
- Personnel
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- Membership Application
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PTAC – Creating Value for the Industry PDF

PTAC Governance Document PDF (137 KB)

- CO2 Enhanced Hydrocarbon Recovery
- Coalbed Methane / Unconventional Gas
- Drilling
- e-Business
- Emission Reduction / Eco-Efficiency
- Energy Efficiency
- Environment
- Fundamental Research
- Geomatics
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- Hydrogen / Hydrocarbon Upgrading
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- Innovation
- Instrumentation / Measurement
- Natural Gas Production
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- Oil Sands
- Pipelines
- R&D Funding
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- Forums/Conferences
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- Technology Information Sessions (TIS)
- Request for Proposals
- Projects

Technology for Emission Reduction and Eco-efficiency (TEREE)

Super-size your SME's potential to develop hydrocarbon energy technologies!
PTAC's NEW RESOURCE INITIATIVE **"Super-sized" Support for Canadian SMEs**

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- R&D Strategy
- R&D Legal
- R&D Tax
- COURSE
- AUPRF (formerly ERAC)
- AERI Survey Results doc

PTAC Compelling Business Case Presentation - 2 MB PDF

Coming soon

Upcoming events - forums, technology sessions, workshops, etc.

2009 06 9-11
Abstract Deadline extended to December 12, 2008
Global Petroleum Conference
Call for Presentation

ONLINE REGISTRATIONS AND REPORTS

New

Fire-Tube Immersion Heater Efficiency Improvement Design Guideline Project
Expression of Interest Form

2008
Ramping Up Recovery Business Case
Executive Summary Full Report

2008 PRESS RELEASE
PTAC Carbon Capture Storage (CCS) Project
PDF (61 KB)

PTAC REPORTS / ROADMAPS
PTAC RECENT REPORTS

2008 12 11 LF

This site has been optimized for Explorer 4.0 up and Netscape 4.0 up
Some downloads may require Acrobat Reader. To get Acrobat Reader select here.

Contact Us

Click here to view **PTAC Coordinators by Technical Area**

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President

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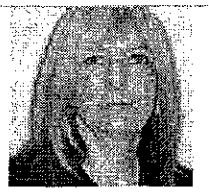

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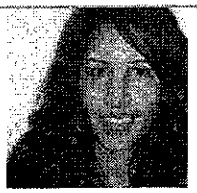

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to top

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2008 10 24 LF

PETROLEUM TECHNOLOGY ALLIANCE CANADA

PTAC

Approved November 2, 2006

Terms of Reference – PTAC CO_2 Enhanced Hydrocarbon Recovery (EHR) Steering Committee

PTAC Petroleum Technology Alliance Canada is an association that facilitates innovation, technology transfer and collaborative research, development, demonstration and deployment of technologies for the responsible development of Western Canada's upstream hydrocarbon energy industry. The purpose of PTAC is to bring industry stakeholders together to identify industry problems, define research projects to address these problems, and promote collaboration on the resulting research projects. Through this process PTAC will facilitate and encourage innovation, leverage intellectual and financial resources, promote technology transfer and enhance the effectiveness and environmental performance of the industry. Approximately 200 members and numerous government funders provide resources to enable PTAC to identify opportunities and provide co-ordination and pooling of resources for new technology and research of benefit to the Western Canadian upstream hydrocarbon energy industry.

The creation of a CO_2 Enhanced Hydrocarbon Recovery (EHR) Steering Committee was recommended to PTAC at the CO_2 from Industrial Sources to Commercial Enhanced Oil and Gas Recovery Forum and Workshop on October 1-2, 2003. The proceedings from this event can be obtained from the PTAC website at http://www.ptac.org/techresf.html or by contacting Brenda Belland of PTAC at (403) 218-7712.

Background

CO_2 injection for EOR is a process that has been used around the world for the past 3 decades. Injection of CO_2 for EOR increases oil production and reduces CO_2 emissions through storage of CO_2 in the oil reservoirs. The opportunity to link the supply of CO_2 from various sources with the demand for CO_2 from oil and gas producers will be the key driver for future success in this sector.

Mandate

The CO_2 EHR Steering Committee is to provide a forum on CO_2 EHR related innovation, research and technology, priorities, needs and challenges, as well as identification of barriers and opportunities.

Under the guidance of the Steering Committee, and as funding permits, PTAC will facilitate the search for new or improved technologies and will foster their development through pilot testing, if required. Furthermore, PTAC will organize demonstration projects, working groups, Requests for Technology (RFT's), technology or innovation case studies, workshops, forums, conferences, and technology information sessions as required to deliver the results of development work to industry.

Functions & Deliverables

Within the above mandate, the specific functions of the CO_2 EHR Steering Committee include:

1. Promote and facilitate knowledge transfer through appropriate mechanisms and channels to improve industry operations.
2. By 2007, identify the conditions required to commercialize successful CO2 EHR pilots in Alberta and Saskatchewan.
3. Identify, quantify and communicate priorities, barriers and gaps in the oil and gas industry.
4. Focus on technology vs. policy recommendations.

5. Facilitate initiatives and success stories to address identified challenges.

Principles and Decision Making

1. Committee follows an open and transparent process.
2. Consensus decision making with voting by majority if necessary.
3. Those that pay have the say on specific initiatives.
4. Membership will be reviewed at the 1st meeting of each year.

Membership

The CO_2 EHR Steering Committee will be co-chaired by one representative from industry, as well as representatives from government. Membership is limited to one representative per organization and is expected to include representatives from key stakeholders such as oil and gas companies, pipeline companies, service and supply companies, associations and others interested in improving CO_2 EHR.

CO_2 EHR Steering Committee Participation includes:

Name	Company
Kenny, Jim	Cimmaron Engineering
Podgurny, Dave	Air Liquide Canada Inc.
Locke, Sandra *(gov't co-chair)*	Alberta Department of Energy
Bachu, Stefan	Alberta Energy and Utilities Board
Hawkins, Blaine	Alberta Research Council
Courchesne, Rob	Anadarko Canada Corporation
Holowachuk, Russ	Canadian Fertilizers Limited
Spencer, Don	Devon Canada Corporation
Luhning, Richard	Enbridge Inc.
Wilson, Malcolm	EnergyINet
Weiss, Mike	EnCana Corporation
Maguire, Jim	Enermark Inc.
Zalzala, Adnan	Husky Energy Inc.
Delamaide, Eric	IFP Canada
Power, Janet *(gov't co-chair)*	Natural Resources Canada (NRCan)
Bunio, Gary	Paramount Resources Ltd.
Wichert, Gordon	Penn West Petroleum Ltd.
Gould, Scott	Praxair Canada Inc.
Sadorra, Ronnie	Shell Canada Limited
Coulter, Cal	Suncor Energy Inc.
Svrcek, Bill	University of Calgary
Preston, Carolyn K	NRCan
Finzel, Christeen	Alberta Environment
Filion, Isabelle	Air Liquide Canada
Farrow, Jackie	Enbridge
Heal, Kevin	ATCO Pipelines
Lawrence, Leah	EnCana Corporation
Shum, Philip	Alberta Department of Energy
Carr, Rick	Paramount Resources Ltd
Singh, Surindar	AERI
Durbin, Sean	Praxair Canada
Lalani, Sean	Ferus Gas
Edwards, Kelly	Kereco
Cole, Todd	ARC Resources

Gray, Bruce	TransCanada Pipelines
Jennifer Byrnes	Petro-Canada

AnalysisWorks
CO_2 Capture, Transport & Storage Economic Evaluation Model

Information for PTAC EHR Steering Committee
Calgary, February 8th, 2005

For additional information, contact: David Gladwin
AnalysisWorks
613-241-0388
dg@analysisworks.ca

Model Scope

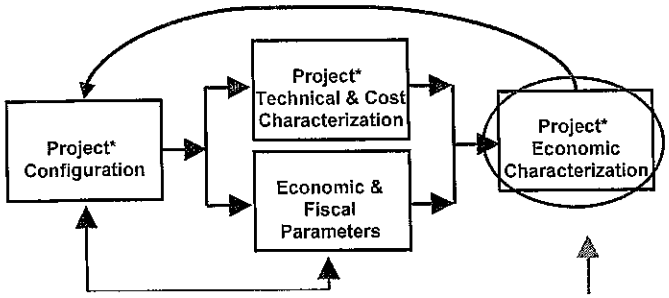
A quantitative analysis model to evaluate and demonstrate project finances and economics, including fiscal return, for:

- CO_2 capture and treatment
- CO_2 transportation
- CO_2 based enhanced oil recovery and enhanced coal-bed methane recovery
- acid gas injection / CO_2 sequestration

The Role of the Model in Project Evaluation

Builds on 'available'

- project definition, technical and cost parameters
- for CO_2 capture, transportation, and storage
  - individually or collectively



Developed by project proponents, input to the AW model

The AW model calculates / predicts

* A project includes CO_2 capture, transportation, and storage

AnalysisWorks

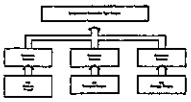
The model is designed to facilitate evaluation of projects and key input parameters

Model Structure

- Built in MS-Excel, suitable for use by a 'knowledgeable expert user'
- Modular / standardized design, in a series of linked modules
- All project inputs go into a single input parameter module
- Separate analysis modules for
  - CO_2 capture and processing
  - CO_2 transportation
  - CO_2 utilization or sequestration
- Model has mechanism to incorporate variable transfer pricing, risk & economic performance criteria between component projects
- Fiscal analysis for income tax, capital tax and royalty for
  - federal government
  - provinces of Alberta, Saskatchewan and British Columbia
- Monte Carlo simulation capability, to examine project variability
- Consolidation module – performance metrics, graphical output, analysis

AnalysisWorks

The model components



Input Module
- Project parameters
- Project technical and cost characteristics

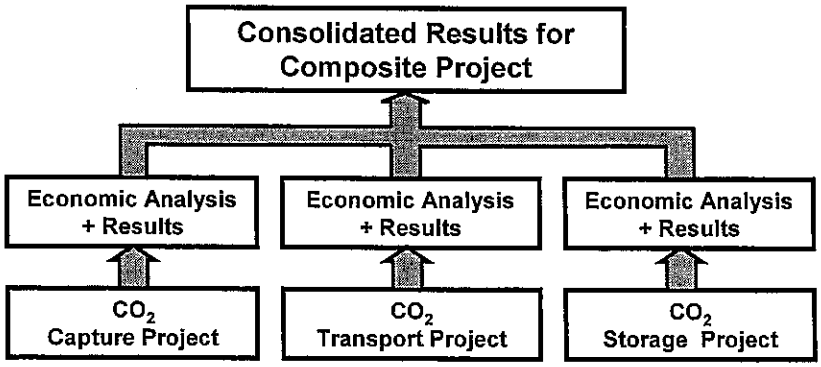
Analysis Modules
- For Capture, Transport & Storage
- Generate annual CapEx and OpEx, cashflow, taxes, royalty
- For Alberta, British Columbia, Saskatchewan

Results Module
- Technical – CO_2 sequestered, m^3OE produced
- Economic – \$/t CO_2, \$/m^3OE NPV at 0%, 5%, 10%, 15%, 20%, IRR
- Fiscal – Economic rent distribution between the companies, and federal and provincial governments

AnalysisWorks

5

The analytical model enables consolidated evaluation of composite projects



AnalysisWorks

6

CO_2 C&S Study for NRCan Was Based on 'Type Projects'

- Type projects were used as a platform for fiscal testing
- Representative conceptual projects, not actual projects
- Characterized the way project sponsors would characterize them
  - systematic and logical project design
    - used existing technology, do-able
    - directionally reasonable and believable
    - useful for planning and scoping purposes
- Configured from data from various sources, including in house
  - adjusted to generic base, largely removing direct correlation to known commercial projects/prospects (protecting the sources)
  - base input data for specific type projects may be protected

AnalysisWorks

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'Type Project' CO_2 CT&S Descriptions*

Number	Type Project	Project Description	Example	Project Complexity	Pipeline Required?	Possible Location
1	B ⟶ A'	Petrochemical Facility to EOR Type 1	Nova Joffre to a Small Size West-Central Alberta EOR	Single	Yes (short as possible)	AB
2a	A ⟶ B'	Coal-fired Power Plants to EOR Type 2	Sask. Power Plant or Husky Upgrader to Large EOR (Sask); Wabamun Power Plants to Large EOR (AB)	Single or multiple	Yes (longer)	SK or AB
2b	D ⟶ B'	Heavy Oil or Oil Sands Upgraders to EOR Type 2	Fort McMurray Plants to a Large Size North-Central Alberta EOR	Single or multiple	Yes (longer)	SK or AB
3	C ⟶ C'	Fertilizer Plant to EOR Type 3	Fort Sask. to a Medium Size Central Alberta EOR	Single	Yes (short as possible)	AB
4	Combination (A, B, C, D) ⟶ to (A', B',C',D')	Multiple Sources Linked to Multiple Utilization Opportunities	Wabamun Power Plants, Fort Sask., Fort McMurray and Red Deer to 4 Regional Alberta EOR HUBs	Integrated distribution system project	Extensive network pipeline/ common carrier	AB
5	A ⟶ D'	Coal-fired Power Plants to Sequestration Type 1	Wabamun Power Plants to an Abandoned Deep Gas Reservoir (CERI Sequestration Model)	Single	Yes (short as possible)	AB, SK or BC
6	E ⟶ E'	Large Upstream Gas Processing Facility to Sequestration Type 2	Ram River, McMahon, Kaybob South to Closest Sequestration	Single	No	AB or NEBC
7	A ⟶ F'	Enhanced Gas Recovery (EGR) Coal Bed Methane Project Example	Alberta Plains deep coal seam (e.g., Fenn-Big Valley area Manville coals) Alberta Research Council Model	Single	Yes (short as possible)	AB, SK or BC

***these are representative conceptual 'type projects' – not actual projects**

AnalysisWorks

8

Representative Output: TYPE PROJECT 3

PROJECT SUMMARY

Efficient Market Case

Alberta	***Units***	***Results***
CO2 Sequestered	*(million tonnes)*	3.1
Oil Equivalent Recovered	*(million m3)*	3.0
Capital Costs @ 0% discount	*($/tonne)*	47.1
Capital Costs @ 10% discount	*($/tonne)*	33.5
C-T-S Net Present Value @ 0% discount	*($ millions)*	153.1
C-T-S Net Present Value @ 10% discount	*($ millions)*	6.4
Internal Rate of Return, EOR only	*(percent)*	7.7%

AnalysisWorks

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TYPE PROJECT 3

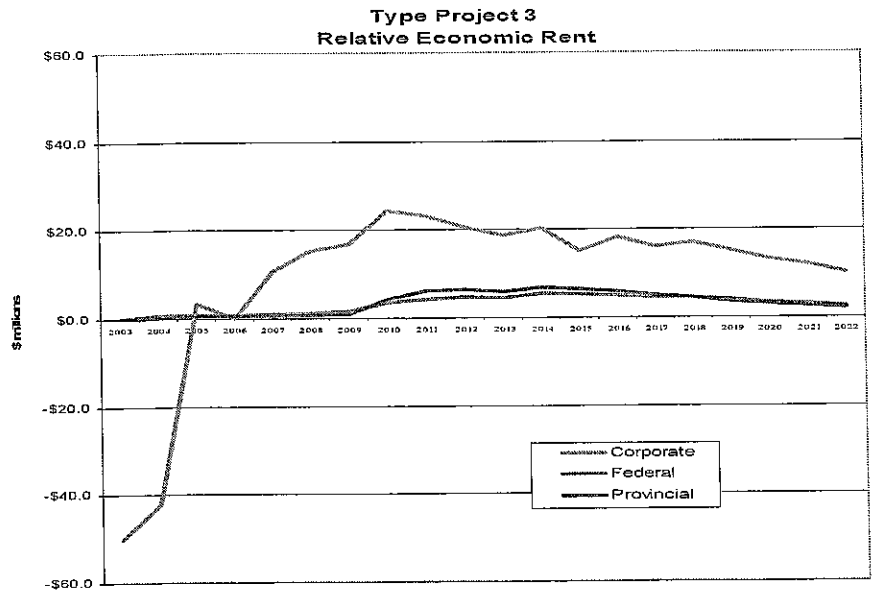
CASH FLOW BY PARTS

Efficient Market Case
Alberta

	Net Present Value ($ millions)	
	0% discount	***10% discount***
Total Revenue, Life of Project	999.7	366.3
- Capital Costs	166.1	122.5
- Operating Costs	545.2	196.1
- Federal Taxes	65.0	19.8
- Provincial Taxes and Royalty	70.3	21.5
Net Cash Flow to Company	153.1	6.4

AnalysisWorks

10



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CO_2 CT&S Analysis Model Offer

Sale of Licenses to use the AnalysisWorks CO_2 CT&S Analysis Model

- Offer to member companies of the PTAC CO_2 EHR Steering Committee
- Priced at $4,600/license-to-use, including PTAC 15% facilitation fee, with minimum take-up required of 5 companies *(plus sales tax and GST) (normal terms: $20,000/license)*
- Includes
  - Fully operational model for analysis of project economics
    - CO_2 capture and treatment
    - CO_2 transportation
    - CO_2 based enhanced oil recovery and enhanced coal-bed methane recovery
  - 1-day collective introductory / training session in Calgary
  - Maintenance and upgrades through 2005, including related fiscal changes
  - Future upgrades, post-2005, would be available through annual maintenance fee
  - Preferential consideration of requests for upgrades and changes to the model
- Priority access to fee-based consulting services of AnalysisWorks for project configuration, specialized analysis & interpretation, model/project customization
- Model is copyright, license is subject to 'no reverse engineering' condition, and non-transferable

AnalysisWorks

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CO2 Capture, Transport and Storage Economics

CASE NAME (input): **DemoProject 20050208**

Relevant Fiscal System Websites

Federal government	www.ccra-adrc.gc.ca	www.fin.gc.ca/access/budinfoe.html
Alberta government	www.revenue.gov.ab.ca	www.energy.gov.ab.ca
Saskatchewan government	www.gov.sk.ca/finance	www.em.gov.bc.ca/subwebs/resourcerev
British Columbia government	www.gov.bc.ca/fin	www.gov.sk.ca/enermine/energy

AnalysisWorks Contacts

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Model Organization

Workbooks	Worksheets	
Results	SummaryResults	
	Capture	
	Transport	
	EOR_ECBM	
	Storage	
Inputs	GuideNotes	
	Capture	
	Transport	
	EOR _ECBM	
	Storage	
	CO2PriceBalance	
	MacroInputs	
	TaxRates	
	RoyaltyFactors	
Capture, Transport, EOR/ECBM, Storage	SummaryResults	
	OperatingInputs	Capture/Transport/Storage
	CashFlow	
	Capex	
	Opex	EOR/ECBM only
	G&A	EOR/ECBM only
	Volumes	EOR/ECBM only
	GraphRevenue	EOR/ECBM only
	GraphRoyalty	EOR/ECBM only
	GraphData	EOR/ECBM only
	RoyaltyAlta	EOR/ECBM only
	RoyaltySask	EOR/ECBM only
	RoyaltyBC	EOR/ECBM only
	FedIncTaxAlta	
	FedIncTaxSask	
	FedIncTaxBC	
	IncTaxAlta	
	IncTaxSask	
	IncTaxBC	

Model Operation Notes

Cell notes	text cell	cell notes are made visible by holding the cursor over a noted cell these notes provide the user with data or analysis comments
Cell colouring	blue	basic data entry cells, user can modify
	jade green	advanced user entry, user can modify, but may have significant impact on project calculation
	black	cell is protected, not accessible for user modification
List selection boxes	blue ▼	selecting a list box cell will produce a down arrow, selecting the arrow will open a list box highlight and click to choose from amongst the selection options available
program controls		clicking on program cells initiates programmed calculation or model manipulation routines

Abbreviations

Natural gas	e3m3	thousand cubic metres	e3m3/d	thousand cubic metres per day
	mcf	thousand standard cubic feet	mcf/d	thousand standard cubic feet per day
	mmcf	million standard cubic feet		
Crude oil	m3	cubic metres	m3/d	cubic metres per day
	Mm3	million cubic metres		
	Bbl	barrels	Bbl/d	barrels per day
	mBbl	thousand barrels		
CO2	t	metric tonne	t/d	tonnes per day
	Mt	million tonnes	kt/y	thousand tonnes per year
	ton	imperial ton		
Power	Gwh	Gigawatt hour		
Heat content	Btu	British termal units		
Distance	km	kilometre		
	cm	centimetre		
Currency	$	Canadian dollars	$000	thousands of dollars
	$US	United States dollars		
Time	d	day		
	mo	month		
	y	year		

CO2 Capture, Transport and Storage Economics

DemoProject 20050208 Capture

Volume capacity (t/d)	802
Volume capacity (mcf/d)	15,228
Percent excess sold	0.0%

Type of Facility **Petrochemical Plant**
Type of income **M&P**
Location of Facility **Alberta**

Capital Costs (CapEx)

($000 2002)	CCA Class	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Preconditioning and SOx Removal	43	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2 capture	43	0	0	0	0	0	0	0	0	0	0	0	0	0
Compression at capture	43	27,300	0	0	0	0	0	0	0	0	0	0	0	0
Dehydration	43	1,471	0	0	0	0	0	0	0	0	0	0	0	0
Utilities & miscellaneous	43	0	0	0	0	0	0	0	0	0	0	0	0	0
Total CapEx		28,771	0	0	0	0	0	0	0	0	0	0	0	0

Baseline Operating Costs (OpEx) -- operating at design capacity

($000 2002)	Variable				Fixed				Total
	Power	*Process heat (gas)*	*Steam*	*Cooling water*	*Labour & Supervision*	*Maintenance*	*Overheads & Miscellaneous*	*Others*	
Preconditioning and SOx Removal	0	0	0	0	0	0	0	0	0
CO2 capture	0	0	0	0	0	0	0	0	0
Compression at capture	1,667	0	0	0	300	1,365	546	0	3,878
Dehydration	0	180	0	0	100	44	29	0	354
Utilities & miscellaneous	0	0	0	0	0	0	0	0	0
Total	1,667	180	0	0	400	1,409	575	0	4,231

($000 2002)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Variable													
Power	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667
Process heat (gas)	180	180	180	180	180	180	180	180	180	180	180	180	180
Steam	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling water	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Variable	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847	1,847
Fixed													
Labour & Supervision	400	400	400	400	400	400	400	400	400	400	400	400	400
Maintenance	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409	1,409
Overhead & miscellaneous	575	575	575	575	575	575	575	575	575	575	575	575	575
Other	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fixed	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385	2,385
Total OpEx	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231	4,231

CO2 Capture, Transport and Storage Economics

DemoProject 20050208 Capture

Type of facility	CCA Class	Income
Coal-fired Power Plant	43	M&P
Petrochemical Plant	43	M&P
Fertilizer Plant	43	M&P
Oil/Oil Sands Upgrader	41	Resource
Oil/Oil Sands Refinery	43	M&P
Gas Plant	41	Resource
Other Upstream Oil & Gas Facility	43	M&P

Location
Alberta
Saskatchewan
British Columbia

CO2 Price

($/t -- Nominal)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Default Price	38.00	38.68	39.38	40.09	40.81	41.55	42.29	43.05	43.83	44.62	45.42	46.24	47.07
User Direct Input	19.00	19.34	19.69	20.04	20.41	20.77	21.15	21.53	21.91	22.31	22.71	23.12	23.54
Built-up from component modules													
Capture													
Alberta													
Saskatchewan													
British Columbia													
Pipeline													
Alberta	12.05	12.27	12.49	12.71	12.94	13.18	13.41	13.65	13.90	14.15	14.40	14.66	14.93
Saskatchewan	12.89	13.12	13.36	13.60	13.84	14.09	14.35	14.61	14.87	15.14	15.41	15.69	15.97
British Columbia	12.53	12.76	12.99	13.22	13.46	13.70	13.95	14.20	14.46	14.72	14.98	15.25	15.53
EOR / ECBM													
Alberta	35.50	36.14	36.79	37.46	38.13	38.82	39.52	40.23	40.95	41.69	42.44	43.20	43.98
Saskatchewan	29.38	29.91	30.44	30.99	31.55	32.12	32.70	33.29	33.88	34.49	35.12	35.75	36.39
British Columbia	16.68	16.98	17.28	17.59	17.91	18.23	18.56	18.89	19.23	19.58	19.93	20.29	20.66
Storage													
Alberta	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Saskatchewan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
British Columbia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total for Capture													
Alberta	47.56	48.41	49.28	50.17	51.07	51.99	52.93	53.88	54.85	55.84	56.84	57.87	58.91
Saskatchewan	42.27	43.03	43.80	44.59	45.40	46.21	47.04	47.89	48.75	49.63	50.52	51.43	52.36
British Columbia	29.21	29.74	30.27	30.82	31.37	31.94	32.51	33.10	33.69	34.30	34.91	35.54	36.18
Balanced to target ROI													
Alberta	37.93	38.61	39.30	40.01	40.73	41.47	42.21	42.97	43.75	44.53	45.33	46.15	46.98
Saskatchewan	39.17	39.87	40.59	41.32	42.06	42.82	43.59	44.37	45.17	45.99	46.81	47.66	48.52
British Columbia	38.61	39.31	40.02	40.74	41.47	42.22	42.98	43.75	44.54	45.34	46.15	46.98	47.83
Link to Capture Module													
CO2 price profile :													
Balanced to target ROI													
Alberta	37.93	38.61	39.30	40.01	40.73	41.47	42.21	42.97	43.75	44.53	45.33	46.15	46.98
Saskatchewan	39.17	39.87	40.59	41.32	42.06	42.82	43.59	44.37	45.17	45.99	46.81	47.66	48.52
British Columbia	38.61	39.31	40.02	40.74	41.47	42.22	42.98	43.75	44.54	45.34	46.15	46.98	47.83

CO2 Capture, Transport and Storage Economics

DemoProject 20050208 — Transport

Volume capacity (t/d)	802
Volume capacity (mcf/d)	15,228
Length (km)	94
Diameter (cm)	15

Type of Facility — **Transportation Facility (1 only end user)**
Type of Income — General Business
Location of Facility — **Alberta**

Capital Costs (CapEx)

($000 2002)	CCA Class	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pipeline	17	14,100	0	0	0	0	0	0	0	0	0	0	0	0	0
Final booster	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pump stations	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Final pump station	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilities & miscellaneous	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total CapEx		14,100	0	0	0	0	0	0	0	0	0	0	0	0	0

Baseline Operating Costs (OpEx) -- operating at design capacity

($000 2002)	Variable with throughput				Fixed				Total
	Power	*Process heat (gas)*	*Steam*	*Cooling water*	*Labour and Supervision*	*Maintenance*	*Overheads and Miscellaneous*	*Others*	*Total*
Pipeline	0	0	0	0	0	0	0	282	282
Final booster	0	0	0	0	0	0	0	0	0
Pump stations	0	0	0	0	0	0	0	0	0
Final pump station	0	0	0	0	0	0	0	0	0
Utilities & miscellaneous	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	282	282

($000 2002)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Variable														
Power	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Process heat (gas)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steam	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling water	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Variable	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed														
Labour & Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overhead & miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	282	282	282	282	282	282	282	282	282	282	282	282	282	282
Total Fixed	282	282	282	282	282	282	282	282	282	282	282	282	282	282
Total OpEx	282	282	282	282	282	282	282	282	282	282	282	282	282	282

CO2 Price

($/t -- Nominal)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Default Price	9.00	9.16	9.33	9.49	9.67	9.84	10.02	10.20	10.38	10.57	10.76	10.95	11.15	11.35
User Direct Input	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO2 Capture, Transport and Storage Economics

DemoProject 20050208 **EOR/ECBM**

Type of Project	**Enhanced Oil Recovery (EOR)**
Location of Facility	**Alberta**
Percent EOR	100%

($000 2002)	units	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Production Volumes															
Oil	m3/d	0	20	278	391	461	508	547	588	569	545	503	481	449	402
Oil	Bbl/d	0	128	1,747	2,461	2,902	3,197	3,442	3,703	3,579	3,427	3,166	3,025	2,826	2,530
Sales Gas	e3m3/d	0	1	16	23	23	31	35	38	36	34	33	32	31	29
Sales Gas	mcf/d	0	33	579	826	806	1,115	1,237	1,351	1,285	1,222	1,157	1,136	1,111	1,015
Recycled CO2	t/d	0	0	154	476	540	607	615	684	726	718	689	682	615	568
Recycled CO2	mcf/d	0	0	2,925	9,034	10,245	11,512	11,672	12,972	13,787	13,619	13,069	12,940	11,680	10,774
Purchased CO2	t/d	0	384	797	792	801	802	796	725	647	604	564	409	339	270
Purchased CO2	mcf/d	0	7,295	15,126	15,028	15,195	15,228	15,111	13,765	12,280	11,461	10,703	7,767	6,436	5,121
Capital Costs (CapEx) ($000 2002)															
Property Acquisition		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exploration		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development		0	14,117	2,423	5,793	3,822	3,277	2,901	961	566	1,014	775	175	2,170	306
Fixed Assets		6,433	28,702	4,887	10,616	6,399	5,660	6,810	1,596	565	844	915	161	1,965	273
Total CapEx		6,433	42,819	7,310	16,409	10,221	8,936	9,711	2,558	1,131	1,857	1,690	336	4,135	579
OpEx ($000 2002)															
excluding CO2															
Variable															
Oil Production		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas Production		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Variable		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed															
Field Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Well Costs		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other		0	1,126	3,801	5,483	6,357	7,224	7,895	8,486	8,856	9,130	9,187	9,093	9,153	9,135
Total Fixed		0	1,126	3,801	5,483	6,357	7,224	7,895	8,486	8,856	9,130	9,187	9,093	9,153	9,135
Abandonments		0	0	0	0	0	0	0	0	21	228	298	335	555	628
Total OpEx (excl. CO2)		0	1,126	3,801	5,483	6,357	7,224	7,895	8,486	8,878	9,358	9,484	9,428	9,708	9,763
General & Admin ($000 2002)		0	0	0	0	0	0	0	0	0	0	0	0	0	0

CO2 Capture, Transport and Storage Economics

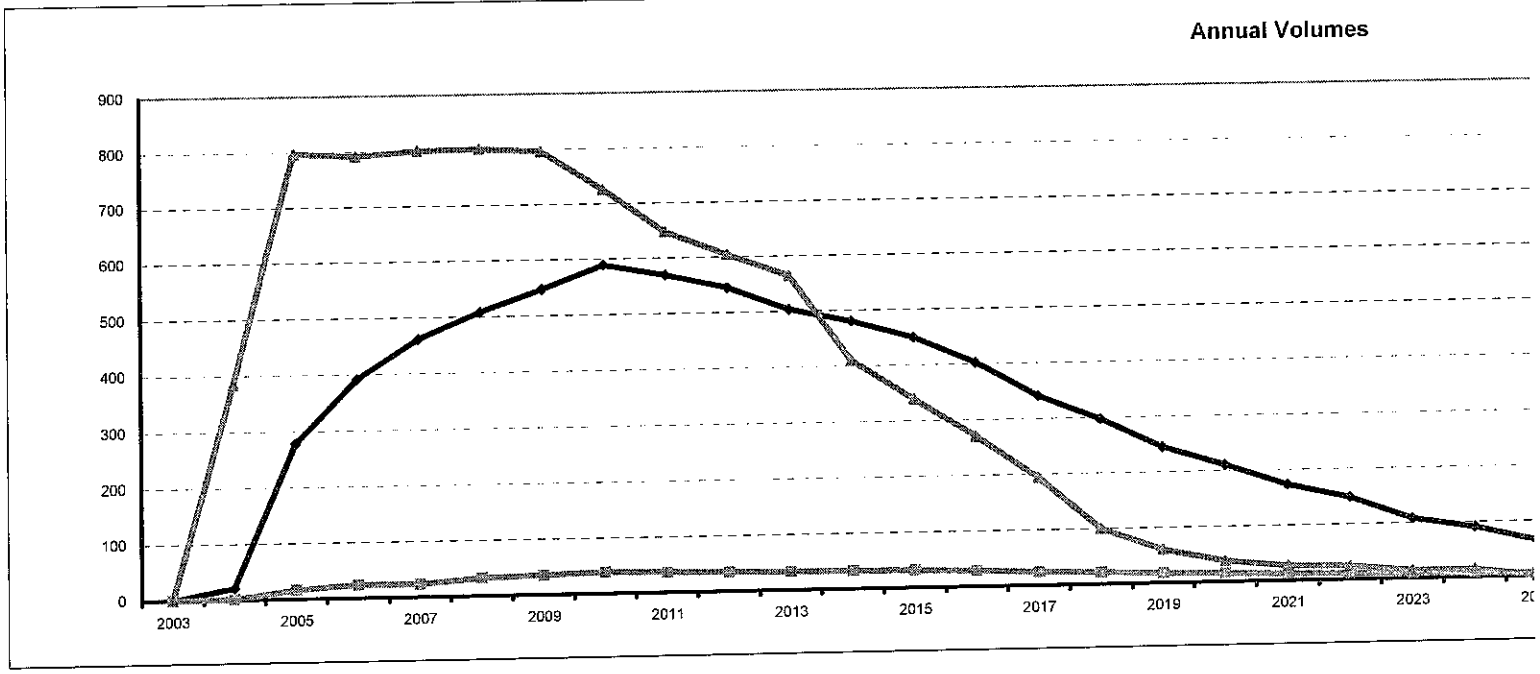
DemoProject 20050208 EOR/ECBM

Number of Wells															
Injector wells used	#	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Producer wells used	#	0	10	39	47	52	56	60	61	62	62	61	60	61	60

				Existing at start of CO2 EOR project
Number of Wells				
Injector wells utilized over project life	#	43	38.1%	11
Producer wells utilized over project life	#	70	61.9%	18
Total Wells		113	100.0%	28

Byproducts Composition															
LPG (m3 / 000 m3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sulphur (tonnes/ 000 m3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CO2 Price	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
($/t -- Nominal)														
Default Price	47.00	47.85	48.71	49.58	50.48	51.39	52.31	53.25	54.21	55.19	56.18	57.19	58.22	59.27
User Direct Input	19.00	19.34	19.69	20.04	20.41	20.77	21.15	21.53	21.91	22.31	22.71	23.12	23.54	23.96



CO2 Capture, Transport and Storage Economics

DemoProject 20050208 **Storage**

Total gas injection capacity (t/d)	0
Total gas injection capacity (mcf/d)	0
Actual CO2 storage (t/d)	0
Actual CO2 storage (mcf/d)	0

Storage commences, yr	0
Storage terminates, yr	0

Type of Facility Direct storage
Type of Income General Business
Location of Facility Alberta

Capital Costs (CapEx)

($000 2002)	CCA Class	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Injection lines	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Injection facilities	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Injection wells	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total CapEx		0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: development costs for development wells is CDE if the wells contribute directly to oil & gas production
development costs for development wells for direct Storage is not deductible under any category
CCA only applies to tangible assets in the wells.

Baseline Operating Costs (OpEx) -- operating at design capacity

($000 2002)	Variable with throughput				Fixed				
	Power	*Process heat (gas)*	*Steam*	*Cooling water*	*Labour and Supervision*	*Maintenance*	*Overheads and Miscellaneous*	*Others*	*Total*
Injection lines	0	0	0	0	0	0	0	0	0
Injection facilities	0	0	0	0	0	0	0	0	0
Injection wells	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

($000 2002)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Variable														
Power	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Process heat (gas)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steam	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling water	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Variable	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed														
Labour & Supervision	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overhead & miscellaneous	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fixed	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total OpEx	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	units	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Storage Volumes															
CO2 sequestered	t/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2 sequestered	mcf/d	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CO2 Price

($/t -- Nominal)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Default Price	9.00	9.16	9.33	9.49	9.67	9.84	10.02	10.20	10.38	10.57	10.76	10.95	11.15	11.35
User Direct Input	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO2 Capture, Transport and Storage Economics

DemoProject 20050208

CO2 Market Efficiency Adjusment

% of excess CO2 captured at source sold to other users	0%

CO2 Transfer Price Balancing

Transfer Price of CO2 C&S to provide preset Rates of Return

	Target Return After Tax and Royalty	NPV at Target Discount Rate	*Price of CO2* (2003 dollars) $/t	$/Mcf	*Transfer Price Basis*
Alberta					
CO2 Capture	**10%**	$0.0	$37.93	$2.00	**Balanced to target ROI**
CO2 Transport	**10%**	$0.0	$12.05	$0.64	**Balanced to target ROI**
Storage	**0%**	$0.0	$0.00	$0.00	**Balanced to target ROI**
EOR/ECBM	**10%**	$0.0	$35.50	$1.87	**Balanced to target ROI**
Transfer Price Gap (+ve = gap / -ve = surplus)			$14.47		
Saskatchewan					
CO2 Capture	10%	$0.0	$39.17	$2.06	Balanced to target ROI
CO2 Transport	10%	$0.0	$12.89	$0.68	Balanced to target ROI
Storage	0%	$0.0	$0.00	$0.00	Balanced to target ROI
EOR/ECBM	10%	$0.0	$29.38	$1.55	Balanced to target ROI
Transfer Price Gap (+ve = gap / -ve = surplus)			$22.68		
British Columbia					
CO2 Capture	10%	$0.0	$38.61	$2.03	Balanced to target ROI
CO2 Transport	10%	$0.0	$12.53	$0.66	Balanced to target ROI
Storage	0%	$0.0	$0.00	$0.00	Balanced to target ROI
EOR/ECBM	10%	$0.0	$16.68	$0.88	Balanced to target ROI
Transfer Price Gap (+ve = gap / -ve = surplus)			$34.47		

CO2 Transfer Price Basis
Default Price
User Direct Input
Built-up from component modules
Balanced to target ROI

Target IRR rates
0%
5%
10%
15%
20%

CO2 Market Efficiency
0%
50%
100%

CO2 Capture, Transport and Storage Economics

DemoProject 20050208

Macro Inputs

	Units	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Crude Oil Prices															
Real / Constant $2003															
WTI	$US/Bbl	$22.99	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58	$21.58
Differential	$/Bbl	$1.15	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43	$1.43
Edmonton Par	$/Bbl	$34.38	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92	$31.92
Differential to Wellhead	$/Bbl	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10	$1.10
Wellhead price	$/Bbl	$33.28	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82	$30.82
Wellhead price	$/m3	$209.45	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97	$193.97
Nominal / $OTD															
WTI	$US/Bbl	$22.99	$21.97	$22.36	$22.77	$23.18	$23.59	$24.02	$24.45	$24.89	$25.34	$25.79	$26.26	$26.73	$27.21
Differential	$/Bbl	$1.15	$1.46	$1.48	$1.51	$1.54	$1.56	$1.59	$1.62	$1.65	$1.68	$1.71	$1.74	$1.77	$1.80
Edmonton Par	$/Bbl	$34.38	$32.50	$33.08	$33.68	$34.29	$34.90	$35.53	$36.17	$36.82	$37.48	$38.16	$38.85	$39.54	$40.26
Differential to Wellhead	$/Bbl	$1.10	$1.12	$1.14	$1.16	$1.18	$1.20	$1.22	$1.25	$1.27	$1.29	$1.31	$1.34	$1.36	$1.39
Wellhead price	$/Bbl	$33.28	$31.38	$31.94	$32.52	$33.10	$33.70	$34.31	$34.92	$35.55	$36.19	$36.84	$37.51	$38.18	$38.87
Wellhead price	$/m3	$209.45	$197.46	$201.02	$204.64	$208.32	$212.07	$215.89	$219.77	$223.73	$227.75	$231.85	$236.03	$240.28	$244.60
Natural Gas															
Real / Constant $2003															
Henry Hub	$US/mmbtu	$3.43	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49	$3.49
Differential	$/mcf	$0.76	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90	$0.90
Alberta Spot @ Plant Gate	$/mcf	$4.54	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49	$4.49
Differential to Wellhead	$/mcf	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50
Wellhead price	$/mcf	$4.04	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99	$3.99
Wellhead price	$/e3m3	$143.39	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77	$141.77
Nominal / $OTD															
Henry Hub	$US/mmbtu	$3.43	$3.55	$3.62	$3.68	$3.75	$3.82	$3.88	$3.95	$4.03	$4.10	$4.17	$4.25	$4.32	$4.40
Differential	$/mcf	$0.76	$0.92	$0.93	$0.95	$0.97	$0.98	$1.00	$1.02	$1.04	$1.06	$1.08	$1.10	$1.11	$1.13
Alberta Spot @ Plant Gate	$/mcf	$4.54	$4.58	$4.66	$4.74	$4.83	$4.91	$5.00	$5.09	$5.18	$5.28	$5.37	$5.47	$5.57	$5.67
Differential to Wellhead	$/mcf	$0.50	$0.51	$0.52	$0.53	$0.54	$0.55	$0.56	$0.57	$0.58	$0.59	$0.60	$0.61	$0.62	$0.63
Wellhead price	$/mcf	$4.04	$4.07	$4.14	$4.21	$4.29	$4.37	$4.45	$4.53	$4.61	$4.69	$4.77	$4.86	$4.95	$5.04
Wellhead price	$/e3m3	$143.39	$144.32	$146.92	$149.56	$152.25	$154.99	$157.78	$160.62	$163.51	$166.46	$169.45	$172.50	$175.61	$178.77
Byproducts Pricing															
Real / Constant $2003															
Ethane	$/m3	$87.35	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85	$86.85
Propane	$/m3	$133.35	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72	$126.72
Butane	$/m3	$141.97	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59	$133.59
Pentanes	$/m3	$219.24	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30	$204.30
Sulphur	$/t	$4.13	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52	$7.52
Nominal / $OTD															
Ethane	$/m3	$87.35	$88.41	$90.00	$91.62	$93.27	$94.95	$96.66	$98.40	$100.17	$101.98	$103.81	$105.68	$107.58	$109.52
Propane	$/m3	$133.35	$129.00	$131.32	$133.69	$136.09	$138.54	$141.04	$143.58	$146.16	$148.79	$151.47	$154.20	$156.97	$159.80
Butane	$/m3	$141.97	$135.99	$138.44	$140.93	$143.47	$146.05	$148.68	$151.36	$154.08	$156.86	$159.68	$162.55	$165.48	$168.46
Pentanes	$/m3	$219.24	$207.98	$211.72	$215.53	$219.41	$223.36	$227.38	$231.47	$235.64	$239.88	$244.20	$248.60	$253.07	$257.63
Sulphur	$/t	$4.13	$7.66	$7.79	$7.93	$8.06	$8.22	$8.37	$8.52	$8.67	$8.83	$8.99	$9.15	$9.32	$9.48

CO2 Capture, Transport and Storage Economics

DemoProject 20050208

Macro Inputs

	Units	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CO2															
Real / Constant $2003															
At source	$/t	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00	$38.00
Transportation	$/t	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00	$9.00
Delivered for plant gate sales	$/t	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00	$47.00
Recycled	$/t	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70	$5.70
Nominal / $OTD															
At source	$/t	$38.00	$38.68	$39.38	$40.09	$40.81	$41.55	$42.29	$43.05	$43.83	$44.62	$45.42	$46.24	$47.07	$47.92
Transportation	$/t	$9.00	$9.16	$9.33	$9.49	$9.67	$9.84	$10.02	$10.20	$10.38	$10.57	$10.76	$10.95	$11.15	$11.35
Delivered for plant gate sales	$/t	$47.00	$47.85	$48.71	$49.58	$50.48	$51.39	$52.31	$53.25	$54.21	$55.19	$56.18	$57.19	$58.22	$59.27
Recycled	$/t	$5.70	$5.80	$5.91	$6.01	$6.12	$6.23	$6.34	$6.46	$6.57	$6.69	$6.81	$6.94	$7.06	$7.19
Exchange Rate	$US/$	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647	$0.647
Escalation															
Annual Rates (incremental)	Percent														
General inflation / GDP	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Operating cost inflation	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Capital goods inflation	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Crude Oil	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Natural gas	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
CO2	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Electrical Power	%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
Cumulative Factors, for escalation from $2003															
General inflation / GDP	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
Operating cost inflation	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
Capital goods inflation	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
Crude Oil	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
Natural gas	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
CO2	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
Electrical Power	unit	1.0000	1.0180	1.0363	1.0550	1.0740	1.0933	1.1130	1.1330	1.1534	1.1742	1.1953	1.2168	1.2387	1.2610
CapEx & OpEx base data entry year	2002	(end of year accounting)													

Conversion Factors	
Bbls/m3 (Crude oil and pentanes+)	6.29287
mcf/e3m3 (Natural gas)	35.49373
mmbtu/GJ	0.948213
t/Ton	0.9071847
CO2 mcf/t	18.977
$/mcf to $/GJ	1.055
Btu/cf	1000
GJ/ million m3	37,432.2

Oil equivalencies (Gas/Oil)	mcf/Bbl	6
	e3m3 gas /m3 oil	1.01

Discount Rates	0%	5%	10%	15%	20%

CO2 Capture, Transport and Storage Economics

DemoProject 20050208 — *ALBERTA FISCAL REGIME EVALUATION*

Technical Results

		Capture	Transport	Storage in EOR/ECBM	Direct Storage	Total
Incremental oil equivalent recovered	Million m3	0.0	0.0	3.0	0.0	3.0
CO2 stored	Million tonnes	3.1	3.1	3.1	0.0	3.1

Economic Results

Discount → Rate		*0%*	*5%*	*10%*	*15%*	*20%*	*IRR*
NPV before royalties, taxes ($millions)	*Jan 1, 2003*						
Capture		$17.7	$12.1	$5.5	$0.1	-$3.9	15.11%
Transport		$20.1	$10.9	$5.1	$1.3	-$1.2	17.28%
Storage in EOR/ECBM		$164.1	$77.4	$31.0	$5.7	-$8.2	16.72%
Direct Storage		$0.0	$0.0	$0.0	$0.0	$0.0	n/a
Total		$201.8	$100.4	$41.5	$7.1	-$13.3	
NPV after royalties, taxes ($millions)							
Capture		$5.9	$4.1	$0.0	-$3.8	-$6.8	10.00%
Transport		$10.3	$4.0	$0.0	-$2.6	-$4.2	10.00%
Storage in EOR/ECBM		$68.4	$24.6	$0.0	-$13.3	-$20.3	10.00%
Direct Storage		$0.0	$0.0	$0.0	$0.0	$0.0	n/a
Total		$84.6	$32.7	$0.0	-$19.7	-$31.3	
Discounted Profit Index AT ($)	*Jan 1, 2003*						
Capture		$0.2	$0.1	$0.0	-$0.1	-$0.3	
Transport		$0.7	$0.3	$0.0	-$0.2	-$0.4	
Storage in EOR/ECBM		$0.5	$0.2	$0.0	-$0.2	-$0.3	
Direct Storage		n/a	n/a	n/a	n/a	n/a	

EOR Cost Structure

Unit Opex, PV	$/t CO2					
Capture		$27.6	$16.5	$10.6	$7.6	$5.7
Transport		$2.4	$1.4	$0.8	$0.6	$0.4
Storage in EOR/ECBM		$127.8	$71.8	$45.2	$30.8	$22.3
Direct Storage		n/a	n/a	n/a	n/a	n/a
Total		$157.8	$89.6	$56.8	$39.0	$28.4
Unit Capex, PV	$/t CO2					
Capture		$9.6	$9.1	$8.7	$8.3	$8.0
Transport		$4.7	$4.5	$4.3	$4.1	$3.9
Storage in EOR/ECBM		$40.7	$33.0	$27.5	$23.5	$20.3
Direct Storage		n/a	n/a	n/a	n/a	n/a
Total		$54.9	$46.5	$40.4	$35.8	$32.2
Unit CO2 Transfer Price ($2003)	$/t CO2					
Capture		$37.9				
Transport		$12.1				
Storage in EOR/ECBM		$35.5				
Direct Storage		$0.0				
Transfer Price Gap (+ve gap / -ve surplus)		$14.5				

Distribution of Cash Flow

		Capture	Transport	Storage in EOR/ECBM	Direct Storage	Total	%
Nominal	$million						
Total Revenue		$131.6	$41.8	$680.7	$0.0	$854.1	100%
Capital Costs		$29.3	$14.4	$124.7	$0.0	$168.3	20%
Operating Costs		$84.7	$7.4	$391.9	$0.0	$483.9	57%
Federal Taxes		$7.8	$6.4	$35.7	$0.0	$49.9	6%
Provincial Taxes and Royalty		$4.0	$3.3	$59.9	$0.0	$67.3	8%
Net Cash Flow to Company		$5.9	$10.3	$68.4	$0.0	$84.6	10%
Discounted CashFlow	$million	NPV 10	*Discount Rate:*	*10%*			
Total Revenue		$65.2	$20.7	$253.8	$0.0	$339.6	40%
Capital Costs		$26.6	$13.0	$84.3	$0.0	$124.0	15%
Operating Costs		$33.0	$2.6	$138.5	$0.0	$174.1	20%
Federal Taxes		$3.6	$3.3	$11.5	$0.0	$18.5	2%
Provincial Taxes and Royalty		$1.9	$1.7	$19.4	$0.0	$23.0	3%
Net Cash Flow to Company		$0.0	$0.0	$0.0	$0.0	$0.0	0%

Fiscal Markers

Tax / Royalty as Percentage Impact on IRR	Capture	Transport	Storage in EOR/ECBM	Direct Storage
Life of Project, Net:				
Effective Tax Rate	34%	42%	15%	n/a
Effective Royalty Rate	0%	0%	21%	n/a
Effective Tax + Royalty Rate	34%	42%	40%	n/a

AnalysisWorks
Consulting Services Division of Two Ducks Resources Inc.

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February 8, 2005/updated February 24, 2005

The following is a draft agreement for purchase of a license for AnalysisWorks' CO2CTS modeling template for Excel by special arrangement through the PTAC CO2 Enhanced Hydrocarbon Recovery (EHR) Steering Committee. The agreement represents the terms to acquire a license to use the template on an as-is, where-is basis.

AnalysisWorks is also available to assist purchasers in implementation and customization of analytical models and the template, as addressed in section 9 of the terms. Assistance will be provided by David Gladwin with back-up from David Birnie if needed.

If you have any questions, please contact David Gladwin, at AnalysisWorks, as above.

Draft

Agreement between Company X ("Purchaser") and AnalysisWorks respecting the sale of a license to use software and the provision of consulting services

These the terms of agreement relate to the licensing of **AnalysisWorks**' CO2CTS modeling template software (the "Software") to **Purchaser** through a special arrangement with the **PTAC EHR Steering Committee**, and the retention of **AnalysisWorks** by **Purchaser** for consulting services related to the installation and use of the Software.

1 LICENSE

1.1 **AnalysisWorks** grants Purchaser a perpetual non-exclusive, non-transferable license to use a copy of the Software and accompanying documentation (if any) according to the following terms.

1.2 **Purchaser** may, subject to clause 8.1 herein, install the Software on any number of **Purchaser**'s computers at any one time.

1.3 **Purchaser** may not:

a. translate, reverse engineer, decompile, disassemble, create derivative works based on, copy (except for backup copies) the Software or the accompanying documentation;

b. rent, transfer or grant any rights in the Software or accompanying documentation in any form to any person;

c. remove any proprietary notices, labels, or marks from the Software or the documentation; or

d. use any computer hardware or software designed to defeat any hardware copy-protection device, should the Software be equipped with such protection.

1.4 This is not a sale; title and copyrights to the Software, accompanying documentation, and any copy made by **Purchaser** remain with **AnalysisWorks**. Unauthorized copying of the Software or the accompanying documentation, or failure to comply with the above restrictions, will result in automatic termination of this license.

1.5 The Software shall be given to **Purchaser** by **AnalysisWorks** in the form of certain code contained in a CD-ROM.

1.6 **AnalysisWorks** will provide a collective, one-day, introductory training session for one representative of the **Purchaser** together with other **Purchaser**s under this special arrangement through PTAC, in Calgary at a time and place to be arranged through PTAC, numbers of participants per session will be limited to six.

a. Additional personnel of the **Purchaser** may be participate in this training at the rate of $1000 each, or alternately through a specially arranged session at the **Purchaser's** site, terms to be negotiated;

2 **LICENSE FEE** – The license fee (the "License Fee") for the Software shall be the sum of FOUR THOUSAND SIX HUNDRED ($4,600.00) DOLLARS, including a 15% PTAC facilitation fee. **Purchaser** shall pay to **PTAC** any and all sales taxes, including GST if applicable, payable in respect of the License Fee.

3 **TERMS OF PAYMENT** – **Purchaser** shall pay the License Fee to **PTAC** within five (5) business days of the acceptance by **Purchaser** of the Software. **Purchaser** hereby acknowledges that **Purchaser** accepts the Software as of the date of execution of this Agreement.

4 **REPRESENTATIONS AND WARRANTIES** – **AnalysisWorks** represents and warrants to **Purchaser** that **AnalysisWorks** is the legal and beneficial owner of the Software and has the right to license the Software.

5 **NO WARRANTY AND DISCLAIMER**

5.1 **AnalysisWorks** makes and you receive no warranties, express, implied, statutory or in any communication with you, and **AnalysisWorks** specifically disclaims any implied warranty of merchant ability or fitness for a particular purpose. **AnalysisWorks** does not warrant that the operation of the software will be uninterrupted or error free.

5.2 Computer-aided software such as the software are intended to assist with corporate planning purposes. They are not substitutes for professional judgment or independent analyses. The enclosed software has not been tested in all situations under which it may be potentially used. **AnalysisWorks** shall not be liable in any manner for the results obtained through the use of the software.

6 **LIMITATION OF LIABILITY** – In no event will **AnalysisWorks** be liable for any damages, including loss of data, lost profits, cost of cover or other special, incidental, consequential or indirect damages arising from the use of the software or accompanying documentation, however caused and on any theory of liability. This limitation will apply even if **AnalysisWorks** has been advised of the possibility of such damage. **Purchaser** acknowledges that the license fee reflects this allocation of risk.

7 NO OBLIGATION RE UPDATES; ABANDONMENT

7.1 **Purchaser** expressly acknowledges and agrees that **AnalysisWorks** is under no obligation to provide updates for the software or any support or documentation related to the software at any time. If and when **AnalysisWorks** prepares updates for the software, **AnalysisWorks** and **Purchaser** may negotiate a commercial arrangement respecting such updates. It is noted that **AnalysisWorks** currently intends to make annual updates of the software, incorporating changes to legislation as may affect the fiscal analysis, and enhanced functionality.

7.2 In this clause, the term "abandon" shall mean that **AnalysisWorks**, in its sole discretion, decides that the Software has no commercial significance to **AnalysisWorks**. If **AnalysisWorks** abandons the Software, **AnalysisWorks** shall advise **Purchaser** in writing whereupon if **Purchaser** is interested in acquiring ownership of the Software, then **Purchaser** and **AnalysisWorks** shall attempt to negotiate in good faith a commercial arrangement to transfer ownership of the Software from **AnalysisWorks** to **Purchaser**.

8 RESTRICTION ON PURCHASER USE: CONFIDENTIALITY

8.1 The sole purpose (hereinafter the "Purpose") for which **Purchaser** can use the Software is for **Purchaser** corporate planning purposes for projects to capture, transport and/or storage of CO2 to enhance hydrocarbon recovery or store CO2.

8.2 Except as specified in clause 8.1 herein, **Purchaser** shall not make any other use of the Software or its associated documentation (if any).

8.3 **Purchaser** covenants with **AnalysisWorks** as follows:

a. except as provided for this Agreement, **Purchaser** shall not disclose the Software to any person (which term shall be interpreted broadly in this Agreement to include, without limitation, any company, partnership, government or individual);

b. **Purchaser** shall only disclose the Software to those of **Purchaser** employees or agents who are directly involved in and have a strict need to know the Software for the Purpose; and

c. **Purchaser** shall, on a best efforts basis, take all steps available to ensure that each of such employees or agents shall keep the Software in strict confidence and shall not disclose the Software to any person.

9 CONSULTING SERVICES

9.1 Consulting Services - Subject to the terms and conditions hereof, **Purchaser** may engage **AnalysisWorks** to perform consulting services on an as needed basis at the hourly rate of $200.00. **AnalysisWorks** hereby agrees to perform such consulting services. It is acknowledged and agreed that **Purchaser** specify the results to be accomplished by **AnalysisWorks**, but **Purchaser** shall not direct the details and means by which such results are to be accomplished by **AnalysisWorks**.

9.2 No Deductions - Payments to **Purchaser** for such consulting services shall consist of the gross amounts set forth in this Agreement. **Purchaser** shall not, unless advised by its legal advisors, withhold any amounts for income taxes or make any deductions in respect of Canada Pension, unemployment insurance, workers compensation, health care, professional dues or levies or other expense whatsoever from such fees payable to **AnalysisWorks**. Arrangements for Goods and Services Tax, if applicable, shall be addressed by **Purchaser** and **AnalysisWorks**.

9.3 **AnalysisWorks** not an Employee - In the performance of such consulting services, **AnalysisWorks** shall be an independent contractor. **AnalysisWorks** shall not be an employee of **Purchaser** and shall not be entitled to receive from **Purchaser** any benefits whatsoever. **AnalysisWorks** and **Purchaser** acknowledges and agree that **AnalysisWorks** reserves full control of its activities as to the manner and selection of methods with respect to performing such consulting services.

9.4 **AnalysisWorks** cannot contract on behalf of Company - Nothing in this Agreement shall be construed to constitute **AnalysisWorks** as an agent or representative of **Purchaser**. **AnalysisWorks** shall not enter into any contract or commitment in the name of or on behalf of **Purchaser** or bind **Purchaser** in any respect whatsoever.

AGREED to this ____ day of _____, 2005

AnalysisWorks	**Purchaser**
_____	_____
Per: David Gladwin	Per: