

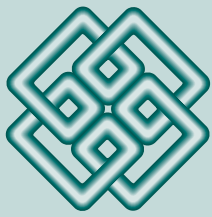


**PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA**

Facilitating Innovation, Technology Transfer,
and Collaborative Research and Development (R&D)
in the Upstream Oil and Gas Industry

PTAC

creating value through
innovation



2001

Value Creation
Technology Transfer
Achievements
Growth

Key Accomplishments

- Initiated Canadian Technology Transfer Agent Program (CTTA) and Technology Centre for Natural Gas (TCNG) with GTI Support**
- Facilitated the Launch of 36 R&D Projects**
- Sponsored World's Largest Coalbed Methane Conference with Canadian Coalbed Methane Forum**
- Participation Increased in PTAC Workshops and Forums**
- Facilitated the Launch of VAPEX Technology Pilots**
- Initiated the Launch of Producer Technology Transfer Pilot**

Message from the Board of Directors

2001 marked a year of significant expansion for PTAC, with the initiation of the Canadian Technology Transfer Agent (CTTA) program for natural gas. PTAC's financial resources increased substantially as a result of this program which is primarily funded by the Gas Technology Institute (GTI). Our staff increased to eight people and our capability to facilitate projects and events increased considerably, as evidenced by the record number of PTAC events and attendees for the year. Through the CTTA program, PTAC opened the Technology Centre for Natural Gas (TCNG) which provides information on natural gas technology and is open to the public. The CTTA also initiated a pilot project on technology transfer to assist producers to find new natural gas technologies that meet their needs.

PTAC facilitated the launch of an additional 36 projects valued at \$15M, bringing the total number of projects launched since inception in 1996 to 125 projects valued at \$57M.

VAPEX technology made another significant step towards commercialization in 2001 with the initiation of several pilot projects by our members. These VAPEX pilot projects were made possible by projects facilitated by PTAC between 1998 and 2000. This technology has the potential to create significant value from heavy oil and bitumen assets at reasonable costs, while emitting minimal greenhouse gas emissions. The commercialization of VAPEX technology would be a major technological advancement for the upstream petroleum industry. PTAC expects the applicability of this type of technology to broaden to other types of reservoirs. This technology will undoubtedly continue to evolve, with innovations further improving its results and its range of applications.

PTAC is the leading organization that facilitates the development of upstream oil and gas technology in Canada. We facilitated 26 Technology Information Sessions and 17 Workshops and Forums in 2001. PTAC, in conjunction with the Canadian Coalbed Methane Forum, also hosted the world's largest Coalbed Methane Conference, held in Calgary. We are frequently approached by members and industry to facilitate new initiatives and events. PTAC's contact database has continued to grow. Our web site has expanded with considerable new content. PTAC continues to seek feedback on the services we provide to create value through innovation for our members.

On behalf of the Board, we would like to express our appreciation to PTAC volunteers and staff for their outstanding contributions to our success. We would also like to thank GTI for their substantial financial contribution to our operations, providing us with the resources to broaden and expand our services to all our stakeholders.


Eric Lloyd
President of PTAC


Rich Kerr
Chairman of PTAC

Anadarko Canada Corporation
 BP Canada Energy Company
 Burlington Resources Canada Energy Ltd.
 Calpine Canada Resources Ltd.
 Chevron Canada Resources
 Conoco Canada Resources Limited
 Devon Energy Corporation
 Dominion Exploration Canada Ltd.
 EnCana Corporation
 Enerplus Group
 Husky Energy Inc.
 Imperial Oil Limited
 MGV Energy Inc.
 Murphy Oil Company Ltd.
 Nexen Inc.
 Passage Energy Inc.
 Penn West Petroleum Ltd.
 Petro-Canada Resources
 Petrovera Resources Limited
 Pointwest Energy Inc.
 PrimeWest Energy Inc.
 Shell Canada Resources Ltd.
 Suncor Inc. - Resources Group
 Talisman Energy Inc.

Adams Pearson Associates Inc.
 Advanced Geotechnology Inc.
 Alberta Collision Avoidance
 AMEC Earth & Environmental Ltd. C,ESU
 Air Liquide Canada Inc.
 Alfa Laval - Process Technology Oilfield Market Unit
 Alpine Environmental Ltd.
 Amtech Aeronautical Limited
 Aqueolic
 ARC Inc.
 Arkiril Enterprises
 BJ Services Company Canada
 Benhope Energy Inc.
 Boreal Laser Inc.
 Bowridge Resources Group Inc.
 Brine-Add Fluids Ltd.
 Cambian
 Can-K Artificial Lift Systems Inc.
 Canstar Environmental Projects Ltd.
 Canwell Enviro-Industries Ltd.
 Centre for Passive Sampling of Maxxam Analytics
 Clean-Flu Gas Filtration System (1987) Ltd.
 Clearstone Engineering Ltd.
 Computer Modelling Group Ltd.

Daily Oil Bulletin
 Digital Oilfield Inc.
 Earth Canada Corp.
 e-Scotia
 ElectroBusiness.com
 Emergent Technologies
 Envirodrive Inc.
 Envirosystems International Inc.
 ESG International Ltd.
 Extreme Telematics Corp.
 Fire Creek Resources Ltd.
 Gas Trak Ltd.
 G-Chem Environmental Ltd.
 gti e&p services Canada
 Gowling Lafleur Henderson LLP (Intellectual Property Development)
 Halliburton Energy Services
 HCl StanchemTravis Chemicals
 HotButton Solutions Inc.
 Hycal Energy Research Laboratories Ltd.
 Inno-centre Alberta
 Innovative Production Technologies Ltd.
 InSoil Canada Ltd.
 Intellimax Distribution Inc.
 John Zink Canada
 Katch Kan Limited

165
 As of April 19, 2002
 Members

Outlook

Outlook for 2002

PTAC expects 2002 to be the most active year since our inception in 1996. The number of Technology Information Sessions we host is expected to increase as more members take advantage of this effective and efficient service. We will be co-hosting, with Climate Change Central, a greenhouse gas technology conference for the Western Canadian energy and petrochemical industries in late May. We will be continuing with the Wireless, Telecommunication and e-Business Technology Forum Series, which started in March 2002.

PTAC will continue to facilitate the Canadian Association of Petroleum Producers (CAPP) Environmental Research Advisory Council (ERAC) process, as we have since 2000. We expect to host a number of information sessions, forums, workshops and technical meetings covering air, soil and groundwater, ecological and climate change issues. PTAC will continue to support the Alberta Energy Research Institute (AERI) and their Coordination of University Research for Synergy and Effectiveness (COURSE) program by hosting events on completed research as well as future research needs and proposals.

PTAC and the USA-based Petroleum Technology Transfer Council (PTTC) will also be co-hosting events in both Calgary and Houston in late 2002 or early 2003, likely on unconventional and marginal gas technology.

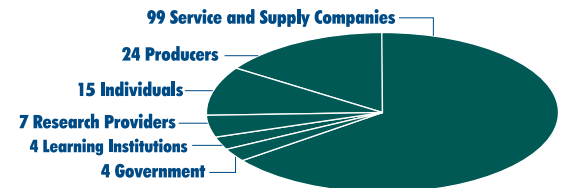
The Canadian Technology Transfer Agent (CTTA) program is now entering into the second year of a three-year contract with the Gas Technology Institute (GTI). The CTTA will continue to assist industry with the transfer of natural gas technologies throughout Western Canada. There are a number of events planned to improve communication and enhance technology transfer for all stakeholders. The pilot project on technology transfer with producers is expected to be completed this year, generating results which will help to determine whether to expand the pilot commercially.

The CTTA has started to facilitate a series of Gas Over Bitumen workshops to help overcome some of the inherent technical challenges. The CTTA also looks forward to the 4th Annual Coalbed Methane and Unconventional Gas Conference slated for October 23-25, 2002 at the Westin Hotel in Calgary. This conference is a joint effort between the CTTA and the Canadian Coalbed Methane Forum to communicate and facilitate technology development with the goal of commercialization.

PTAC will continue to advocate for an oil and gas technology development incentive mechanism, in particular for greenhouse gas and climate change related technology pilot projects.

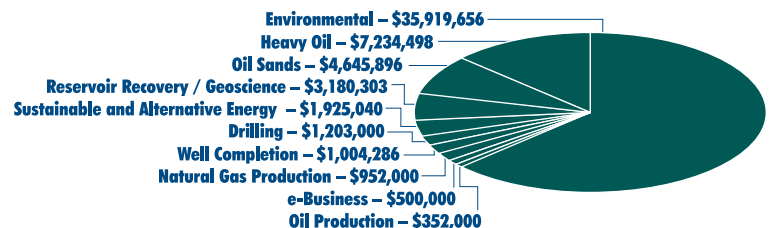
We have set a goal to facilitate the launch of 30 new projects with a value of \$10M in 2002. We will continue to strive for a significant financial surplus to build our cash reserves to 50% of our annual operating budget. PTAC will continue to operate in an open and collaborative fashion to provide focus on issues which are relevant and of value to our members and the upstream oil and gas industry.

Membership by Category



At year-end 2001 PTAC had 153 members, distributed as shown in the above graph. Our current members produce approximately 60% of Canadian conventional oil and gas. PTAC signed up our 165th member in April 2002. Visit www.ptac.org/members1.html for more information on these members.

Project Expenditure by Technical Area since Inception



PTAC has facilitated the launch of 125 projects valued at \$57M since inception in 1996. PTAC facilitated the launch of 36 projects valued at \$15M in 2001.

PTAC

14 Individuals

6 Research Providers

4 Learning Institutions

4 Government

KBL Land Use Consulting Ltd.
Komex International Ltd.
KPMG High Technology
Practice Group
Kudu Industries
Luscar Ltd. -
Specialty Products Division
M2M Matrix, Inc.
Macleod Dixon
(Technology Enterprise Group)
Macronic
Matrix Solutions Inc.
Mercury Electric Corporation
Meridian Environmental Inc.
Millennium EMS Solutions Ltd.
MJ Blair Corporation
mye-Energy Inc.
National Silicates -
Drilling Fluids Group
NeoCorr Engineering Ltd.
New Paradigm Engineering Ltd.
Newpark Environmental
Non-Elephant Encryption
Systems Inc.
Nordic Acres Engineering

Norwest Labs
Oil & Gas Network
OilspHERE.com
Omnicon Consultants Inc.
Opsc Energy Industries Ltd.
Pandell Technology Corporation
Pason Systems Inc.
Petro-Geotech
Petro-Studies Consultants Inc.
Prolift, a division of
CEF Technologies Ltd.
Promore Engineering Inc.
Prospectors Corporation
ProTechnics
Purdenial Steel Ltd.
Q/Max Solutions Inc.
Questor Technology Inc.
Rejuvenation Resources Ltd.
Roughneck.ca
Ruud Enterprises Ltd.
SAIC Canada
Schlumberger of Canada
Sealweld Corporation
Sibex International Inc.
Sierra Systems

Soltrus Inc.
The Moorhead Group LLC
The Petroleum Place, Inc.
The Proactive Group of Companies
Thomson Hydrogeologic Consulting
Total Combustion Inc.
Trican Well Service Ltd.
Unotec - Unique Oilfield
Technology Services
Upstream Info
URS
Variperem Canada Ltd.
VECO Canada Ltd. - Alliance Group
Vikor Energy Inc.
Weatherford Canada Partnership
Welllogix Inc.
Wellpoint Systems Inc.
Wellspring Production Services
Wood Group ESP (Canada) Ltd.
zed.i solutions
ZettaWorks

Carleton, Mike
Driedger, Dirk
Hooper, Dwayne
Logan, Al
Maier, Len
McCann, Tom
Porteous, Bob
Putt, Ken
Radke, Gerald
Schesnuik, Chester
Stephens, Mark
Todd, Murray
Towson, D.E.
Wong, Arnold

Alberta Research Council
Alberta Sulphur Research Ltd.
Natural Resources Canada
(CANMET)
Petroleum Technology
Research Centre (PTRC)
Saskatchewan Research
Council
TIPM Laboratory (Perm Inc.)

SAIT
University of Alberta
University of Calgary
University of Regina,
Faculty of Engineering

AERI Alberta Energy
Research Institute
Canada Customs and
Revenue Agency
Province of British Columbia
Saskatchewan Energy and
Mines

Founding Supporter:
Canadian Business Networks
Coalition (CBNC)

Board of Directors

As of April 19, 2002

Financials

Financial Report

PTAC experienced a very successful year financially, ending the year with a considerable surplus. The complete audited financial statements of PTAC for the year ended December 31, 2001 are available from PTAC offices upon request.

Technical Areas

Technical Areas

PTAC's technical committees help to: identify opportunities for research and technology development; raise awareness of existing R&D; find solutions including soliciting proposals and launching new projects; and inform appropriate industry people of new R&D proposals.

PTAC now has 14 Technical Areas and over 5800 contacts in:

- Drilling
- e-Business
- Environmental
- Fundamental Research
- Health and Safety
- Heavy Oil
- Inactive Well Management
- Instrumentation / Measurement
- Natural Gas Production
- Oil Production
- Oil Sands
- Reservoir Recovery / Geoscience
- Sustainable and Alternative Energy
- Well Completion

PTAC requires participation from senior technical people to identify important issues that require technology transfer or R&D. We encourage you to contact PTAC to obtain more information.

Collaboration

Association and Regulator Working Relationships

PTAC believes that working with industry associations and regulators to jointly plan and sponsor events and distribute information is an important component of the overall approach to collaborative R&D and technology transfer.

When our approach yields potential solutions to industry challenges that are not R&D-related, PTAC will transfer those items to interested associations, companies or regulators for their further development and implementation.

During 2001, we established new working relationships with the following associations:

- Canadian Coalbed Methane Forum (CMF)
- Completion Engineering Association (CEA)
- Petroleum Technology Transfer Council (PTTC)



PTAC facilitated the launch of 36 projects valued at \$15M during 2001.

Projects Launched

R&D Projects Launched in 2001

e-Business

- Crude Oil Document Exchange (CDOX) Pilot

Environmental

- Flare Research Project
- Well Test Flare Plume Monitoring 1
- Well Test Flare Plume Monitoring 2
- Monitored Natural Attenuation for Upstream Oil and Gas Industry
- Treatment of Hydrocarbon Contaminated Water using Constructed Wetlands – Phase III
- Foothills Model Forest Grizzly Bear Research Project
- Options for Thermal Heavy Oil Vent Gas Utilization and Mitigation
- Options for Conventional Oil and Gas Production Facilities
- Options for Conventional Gas Processing and Compression Facilities
- Fatigue Analysis and Damage Mitigating Control of Industrial Co-generation Systems*
- Real-Time Internet Based Surveillance of Oil/Gas Pipelines*
- Geomechanical – Reservoir Processes of Waste Injection (Disposal) into Unconsolidated Formations*
- Control of Methane Emissions from Heavy Oil Development*

Heavy Oil

- Geological Controls on the Isotope Geochemistry of Formation Gases in the Alberta Oilfields*
- Data Sufficiency for Petroleum Reservoir Decision Making*
- Foamy Oil Flow in Cold Production of Heavy Oil*
- Effect of Residual O₂ in CO₂ for a Combined Miscible Flood/CO₂ Sequestration Process*
- Seismic Monitoring for Enhanced Heavy Oil Recovery*

Natural Gas Production

- Experimental and Modelling Study of the Kinetics and Thermodynamics of Hydrate Decomposition*
- Identifying “Sweet Spots” in Basin Centered Gas Accumulations

Oil Sands

- Investigation of the Erosion-Corrosion Mechanisms in Slurry Flow*
- Intelligent Shovel Excavation in Varying Oil Sands Formation and Bitumen Content*
- Impact of Asphaltene-Solvent Interaction on VAPEX Process*
- Scale-up of Dispersion Coefficients in VAPEX Process*
- A Microstructural Approach to Modelling Sand Production*

Reservoir Recovery / Geoscience

- Screening of Alberta Pools for CO₂ Injection
- CO₂ WAG Flooding
- Gravity Stable Waterflooding
- Improved Formation Evaluation of Carbonate Reservoirs
- Water Abatement in Gas Wells
- Regain Permeability in Tight Gas Reservoirs
- Wireless Digital Sensors and Analysis Systems for Monitoring Petroleum Reservoirs*

Sustainable and Alternative Energy

- Fuel Cell for Conversion of Hydrogen Sulfide*
- Improving Solid-Oxide Fuel Cell Operation using Hydrocarbon Fuels*
- A New Technique for Mitigating Electrical Disturbances Caused by Energizing Generator Transformers*

* Launched in conjunction with Coordination of University Research for Synergy and Effectiveness (COURSE)

For further information, please refer to the 2001 newsletters or to the project index on PTAC's web site at www.ptac.org/projects1.html

creating value through innovation

PTAC's Value to the Upstream Oil and Gas Industry

PTAC offers a variety of services to its members and the upstream oil and gas industry.

PTAC continues to seek feedback on the services provided to create value through innovation for members.

Forums, Workshops and Conferences

A total of over 1400 participants attended forums and workshops hosted by PTAC in 2001, including the Third Annual Coalbed Methane Conference co-sponsored with the Canadian Coalbed Methane Forum.

PTAC forums focus on a specific need or technical area to communicate information on new technologies or case studies, or on the objectives and results of current research. Six forums were held in 2001: the annual environmental forum; flaring research; soil and ground-water; drilling waste management; e-Business; and shallow gas.

PTAC conducts workshops to provide opportunities for people to clearly define R&D issues, to identify potential solutions and to select the best approach to move forward. Potential suppliers of R&D have the opportunity to hear firsthand about such issues and to contribute their expertise and ideas for solutions. PTAC hosts the workshops and provides the necessary facilitation, administrative support and coordination to launch projects. When required, PTAC widely distributes Request

for Proposals (RFPs) with Expressions of Interest for each priority issue from workshops. Once we have identified those who will consider supporting the R&D, proposals are then solicited from potential suppliers. PTAC brings together the interested organizations in a structured way that leads to new R&D, while protecting proprietary interests. In 2001, PTAC sponsored 11 workshops in environment, health and safety, and heavy oil.

Technology Information Sessions

PTAC facilitates Technology Information Sessions for members to: solicit interest, feedback, participation or potential funding for new R&D projects; find industry partners to complete proposed R&D or technology development (such as field test or pilot sites) or to report on field test or pilot results; provide information on technology-related services; and market new technology to the Canadian oil and gas industry. PTAC facilitated 26 Technology Information Sessions attended by over 600 participants in 2001.

Canadian Technology Transfer Agent (CTTA) Program and Technology Centre for Natural Gas (TCNG)

The CTTA program is funded primarily by GTI to provide the required technology transfer capability and resources to enable technology providers to commercialize natural gas technologies needed within the Canadian natural gas industry. CTTA funds the TCNG which provides information on commercially available advanced natural gas exploration, production and processing technologies. TCNG patrons have access to selected databases to locate pertinent technical information. An information specialist is available to perform searches on subject-specific databases and to assist in obtaining information that is not in-house. PTAC members are invited to provide non-proprietary natural gas-related technology or technical information for inclusion in the TCNG.

List of Ongoing R&D Projects

R&D projects facilitated by PTAC are listed on PTAC's web site. This list contains the project title, name of organization performing the project, contact information and a link to the member's email and/or web site if available.

For more information, please visit PTAC's web site at www.ptac.org.



PTAC

**Facilitating Innovation, Technology Transfer,
and Collaborative Research and Development (R&D)
in the Upstream Oil and Gas Industry**

Contact Us

For further information, please contact PTAC

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