



PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA

PTAC

Conventional Heavy Oil

Drilling

e-Business

Environmental

Fundamental Research

Health and Safety

Inactive Well Management

Natural Gas Production

Oil Production

Oil Sands

Reservoir Recovery / Geoscience

Well Completion

Facilitating Innovation, Technology Transfer and
Research & Development
in the Upstream Oil & Gas Industry

R&D



PTAC

2000

**Growth and technology transfer
Achievements funding**

Key Accomplishments

Record Number and Value of R&D Projects Launched

Natural Gas Technology Transfer Program Funding Obtained

R&D Project Results Realized

Membership Increased

Successful Workshops, Forums and Technology Information Sessions Hosted

Message from the Board of Directors

PTAC continued to grow in 2000 and realized several significant milestones. We added 60 new members, hosted 30 Technology Information Sessions, sponsored 9 workshops and forums and facilitated the launch of a record 38 R&D projects valued at \$30.8 million. PTAC has facilitated the launch of 89 R&D projects valued at \$42 million since inception in 1996. The results for many of these projects have been provided to funders and whenever possible, been made available to the public via our website.

In December 2000, PTAC and Gas Technology Inc. (GTI) signed a three-year contract for PTAC to provide a Canadian Regional Technology Transfer Agent (RTTA) Program for natural gas. This has resulted in a significant expansion for PTAC with the establishment of a Natural Gas Technology Centre and the hire of three additional staff. We recently moved to new office space to accommodate the expansion and to co-locate with GTI.

PTAC hosted our first safety event, a forum on "Ways and Means to Reduce Wildlife/Vehicle Strikes on an Industry-Wide Basis." The response to this and subsequent driving safety events has been very positive.

Two Environmental research groups, the Soil Long Term Planning Committee and the Salinity Working Group, were formed in 2000 to provide direction on research needed in these technical areas.

Our collaborative approach to challenges faced by the industry has proven to be very effective in facilitating innovation and change with a diverse group of stakeholders.

On behalf of the Board, we would like to express our appreciation to PanCanadian Petroleum for the provision of office space and services support to PTAC since December 1998. This support has been instrumental to our success over the past two years. We would also like to thank PTAC staff and volunteers for their contribution to the planning and holding of events and the initiation of new R&D needed by the Canadian upstream oil and gas industry.

Eric Lloyd
Eric Lloyd
President of PTAC

Alan Archibald
Alan Archibald
Chairman of PTAC

R&D Project Results Realized

Completed

A total of 29 PTAC facilitated projects have been completed to date and the results reported to funders and whenever possible, to other interested parties. Most project results have been made available through PTAC, however some project results are proprietary and only available to funders. The following 11 projects were completed in 2000.

Environmental

- Options for Conventional Heavy Oil Vent Gas Utilization and Mitigation
- Flaring Technology Field Test Facility: Phase 1a – Flaring Mitigation Centre Market Assessment
- Flare Speciation – Part I
- Flare Performance – Part I
- Flaring – Improved Liquid Separation
- Flaring – Alternate Technologies – Part I
- Fugitive Emissions

Conventional Heavy Oil

- Thermal Solvent Process – Field Scale Engineering and Economics
- In Situ and Refinery Upgrading of Vapex Heavy Oil Production for Increased Value and Reduced Emissions (VAPEX Phase 2)
- Vapex Refinery Upgrading Project
- Heavy Oil Vent Gas Utilization

Projects

R&D Projects Launched in 2000

Launched

PTAC facilitated the launch of 38 projects valued at \$30.8 million during 2000. For further information, please refer to our 2000 newsletters or to the project index on our website (www.ptac.org/projects1.html).

Conventional Heavy Oil

- Progressive Cavity Pump Run-Life Improvement
- Vapex Engineering and Economics – Phase 3
- Foamy Oil Behaviour: Beyond the Cold Production Process
- Cyclic Solvent-Based Process for Heavy Oil Reservoirs
- SAGD Application in Reservoirs with Depleted Gas Caps
- Characterization of Conventional Oil and Gas, Heavy Oil and Bitumen Formations using Low Field NMR Spectroscopy*
- Asphaltene Deposition*
- Intermetallic-Based Alloy-Coatings on Steel Structures Used in Oxidation, Sulphidization and Carburization Environments*
- Enhanced Oil Recovery by Unrease-Catalyzed, Microbial Calcium Carbonate Blocking*
- In-Line Multiphase Flow Meter Development*
- Performance Evaluation of Shale for Ensuring Hydraulic Isolation around Thermal Wellbores*

Drilling

- Evaluation of Coiled Tubing Serviceability for Sour Service Applications
- Borehole Stability and Sand Production Risk Assessment Software – Phase 2
- A New Measurement while Drilling Surveying Technique Employing the Technology of Fiber Optic Gyroscope in a Strap Down Inertial Navigation System*

Environmental

- Assessment of Phytoremediation as an In Situ Technique for Cleaning Oil Contaminated Sites – Phase 3
- Development of Soil and Water Quality Guidelines for Sulfolane and DIPA: Environmental and Human Health
- Natural Gas Losses
- Monitored Natural Attenuation
- Evaluation of Hydrocarbon Degradation and Uptake by Plants
- Options for Conventional Heavy Oil Vent Gas Utilization and Mitigation
- Weyburn CO₂ Monitoring Project
- Improving the Performance of High Temperature Fuel Cells*
- Degradation of Petroleum Hydrocarbons at the Soil/Root Interface in Contaminated Soils*
- Natural Attenuation of Petroleum Hydrocarbons at Upstream Oil and Gas Facilities*
- Combustion Enhancement and Emission Reduction from Flare Stacks Using Passive Jet-Flow Control*

Natural Gas Production

- Optimization of Steam Generator Performance*

Oil Sands

- Geotechnical Behaviour of Oil Sands Paste Tailings/ Geotechnical Physics of Producing Thickened Tailings (Paste)*

- Fundamental Study of Bitumen Digestion Process*
- Development of a New Technology to Improve the Equipment Utilization Rate in Mining Operations*
- Research into Cold (25°C) Conditioning of Oil Sands with Regard to Solids Reduction in Froth through Solvent/Demulsifier Nascent Froth and Naphtha/Paraffinic Diluent Post-Production Froth Treatment Schemes*
- At Face Slurrying: Advancing Innovative Technology for Oil Sands Production*
- Impact of Residual Bitumen Removal Methods on the Separation of Heavy Minerals in the Oil Sands Tailings*

Reservoir Recovery / Geoscience

- Enhanced Waterflooding using Toe-to-Heel Displacement
- Improved Water Production Prediction in Carbonates
- Seismic Velocity Anisotropy and Depth Imaging*
- Evaluation of Miscible and Submiscible Flue Gas Injection for Improved Recovery of Light Oils and Sequestering of Green House Gases*

Well Completion

- Gel-Foam Applications
- Water Abatement in Gas Reservoirs

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

** Results completed and reported to funders in 2000

28
Producers

Alberta Energy Company Ltd.
Anadarko Canada Corporation
Anderson Exploration Ltd.
BP Canada Energy Company
Burlington Resources Canada Energy Ltd.
Canadian Hunter Exploration Ltd.
Chevron Canada Resources
Crestar Energy
Encal Energy Ltd.
Enerplus Group
Gascan Resources Ltd.
Gulf Canada Resources Limited
Husky Energy Inc.
Imperial Oil Limited
Maxx Petroleum Ltd.
Murphy Oil Company Ltd.
Nexen Inc.
Northstar Energy Corporation
Numac Energy Inc.
PanCanadian Petroleum Limited

Passage Energy Inc.
Penn West Petroleum Ltd.
Petro-Canada Resources
Pointwest Energy Inc.
PrimeWest Energy Inc.
Shell Canada Resources Ltd.
Suncor Inc. - Resources Group
Talisman Energy Inc.

100
Service & Supply Companies

Adams Pearson Associates Inc.
Advanced Geotechnology Inc.
AGRA Earth & Environmental Ltd. C,ESU
Air Liquide Canada Inc.
Alpine Environmental Ltd.
Amtech Aeronautical Limited
Aqueolic
Arkril Enterprises
Barlon Engineering Group Inc.
Benhope Energy Inc.
BJ Services Company Canada
Boreal Laser Inc.
Bowridge Resources Group Inc.
Brine-Add Fluids Ltd.
Canwell Enviro-Industries Ltd.
CE Franklin eBusiness
Centre for Passive Sampling Technology
CHEM-PET Process Technology Ltd.
Clean-flo Gas Filtration Systems (1987) Ltd.
Clearstone Engineering Ltd.
Colt Engineering - Core Projects Group

Computalog Ltd.
Computer Modelling Group Ltd.
D.E. Towson and Associates Inc.
Digital Oilfield Inc.
Duke Engineering Services
e-Energy Inc.
ElectroBusiness.com
Engineering Seismology Group Canada
ESG International Ltd.
Fire Creek Resources Ltd.
G-Chem Environmental Ltd.
Global Industrial Solutions Network Inc.
Governors Technologies Corporation
GTI E&P Services Canada Inc.
Gowling Lefleur Henderson
(Intellectual Property Department)
Halliburton Energy Services
HCl Canada
Hycal Energy Research Laboratories Ltd.
IVRnet
John Zink Canada
KBL Land Use Consulting Ltd.

160 Members

As of March 26, 2001

Outlook for 2001

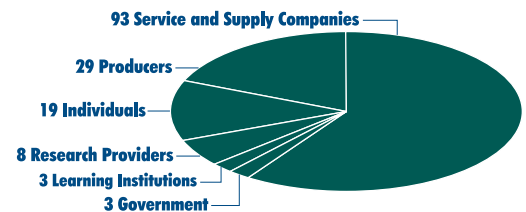
PTAC expects the RTTA Program for natural gas to generate considerable demand for technology transfer events and information that will assist in the challenge of expanding an economical and environmentally friendly supply of natural gas for North American energy markets. The additional capability provided by the program to PTAC members and industry is expected to expand our role as a facilitator and increase the value that stakeholders realize from our services.

PTAC recently initiated a widespread survey on Canadian upstream oil and gas technology and research needs and expertise across all technical areas. The survey results will be utilized by PTAC to determine priorities for events and initiatives, and be incorporated into an overall R&D Strategy document. We plan to release the requirements for utilization by government, academia and industry in an effort to facilitate the required R&D related investment, initiatives and resulting application of new technology.

We expect to see new technical groups or initiatives in the areas of: flaring; greenhouse gas (GHG) and fugitive emissions; human, ecological and animal health; heavy oil enhanced recovery; driving safety; and fundamental research.

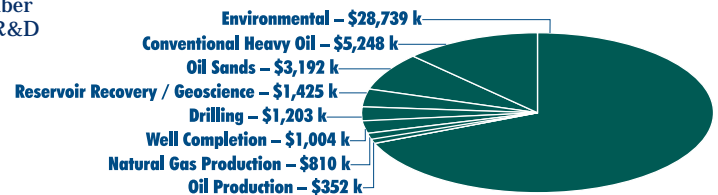
We have set a goal of launching a minimum of 30 projects with a value of \$10 million in 2001. We are predicting a significant increase in our annual budget to \$1 million based on the RTTA Program funding and our growing membership and event revenue. PTAC will continue to encourage member participation in workshop and forum planning to ensure collaborative R&D is focused on relevant issues.

Membership by Category



The number of PTAC members increased to 155 by year-end 2000. PTAC signed up our 160th member in March 2001, continuing our pattern of steady membership growth. Our current members produce approximately 60% of Canadian Conventional Oil and Gas.

Project Expenditure by Technical Area



PTAC has facilitated the launch of 89 projects valued at \$42M since inception in 1996.

Komex International Ltd.
KPMG Consulting - Oil & Gas Practice
Kudu Industries
Lionhead Engineering & Consulting Ltd.
Lloyd Energy Inc.
Lockheed Martin Ness - Mitchel Field
MacLeod Dixon
(Technology Enterprise Group)
Macronic Ltd.
Matrix Solutions Inc.
Mercury Electric Corporation
Millenium EMS Solutions Ltd.
NJ Blair Corporation
NetworkOil Canada Inc.
New Paradigm Engineering Ltd.
NEWALTA Corporation
Naetic Engineering Inc.
Nordic Acres Engineering
Norwest Labs
OilPro Industries Inc.

Oilsphere.com
Omnicon Consultants Inc.
OnX.com
Opsoo Energy Industries Ltd.
Pason Systems Inc.
PCP International Inc.
PetroCosm
Petro-Studies Consultants Inc.
Pinnacle Technologies, Inc.
Proalta Machine & Manufacturing Ltd.
Prolift, a division of CEF Technologies Ltd.
Prudential Steel Ltd.
Q/Max Solutions Inc.
Quality Certification Bureau Inc.
Questor Technology Inc.
Radian Canada
Real Time Measurements Inc.
Rejuvenation Resources Ltd.
Ryan Energy Technologies Inc.

SAIC Canada
Sanjel Corporation - Eng. and Tech. Services
Schlumberger of Canada
Sibex International Inc.
Sierra Systems
TankSafe Inc.
The Petroleum Place, Inc.
Thomson Hydrogeologic Consulting
Total Combustion Inc.
Trican Well Service Ltd.
Universal Separations Systems Inc.
Unotec - Unique Oilfield Technology Services
Variper Canada Ltd.
VECO Canada Ltd.
VentureBC
Welogix
Winterhawk Marketing Services Inc.
Wireless Matrix Corporation
Ziff Energy Group

Ayasse, Conrad
Burnside, Wayne
Carleton, Mike
Century, Jack
Driedger, Dirk
Elias, Craig
Logan, Al
Maier, Len
Mathew, Roy
McCann, Tom
Neulander, John
Penhale, Bob
Putt, Ken
Stephens, Mark
Todd, Murray
Tzanco, Elena
Willson, Diana
Wilson, Kenneth

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

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

Alberta Energy Research Institute (AERI)
Province of British Columbia
Saskatchewan Energy and Mines

Founding Supporter:
Canadian Business Networks Coalition (CBNC)

Board of Directors

Board of Directors
As of March 26, 2001

- Alan Archibald**, *Chairman, PTAC*
President, Pointwest Energy Inc.
- Larry Bell**, *Past Chairman, PTAC*
Vice President Operations Services,
Gulf Canada Resources Limited
- Eric Lloyd**, *President, PTAC*
Petroleum Technology Alliance Canada
- Denis Gaudet**, *Director, Technology Transfer, PTAC*
Petroleum Technology Alliance Canada
- Bob Hill**
Vice President, Technology and Operations,
Canadian Energy Pipeline Association (CEPA)
- Eddy Isaacs**
Managing Director, AERI
Alberta Energy Research Institute
- Rich Kerr**
Chief Engineer, Nexen Inc.
- Neil McCrank**
Chairman, Alberta Energy and Utilities Board
- Frank McIntyre**
Reservoir Engineering Manger,
Rainbow Lake,
Husky Oil Operations Ltd.
- Pat McLellan**
President, Advanced Geotechnology Inc.
- Brian Moreland**
VP Engineering & Production,
Burlington Resources Canada Energy Ltd.
- Bruce Peachey**
President, New Paradigm Engineering Ltd.
- Ken Putt**
President, K.W. Putt Consulting Inc.
- Laurie Schramm**
Vice-President, Energy Technologies
Alberta Research Council
- Bruce Stewart**
Director, Western Research Centre,
Natural Resources Canada (CANMET)
- Bill Svraek**
Professor, Department of Chemical and Petroleum Engineering, University of Calgary
- Paul Swinton**
Reservoir Engineering and Technology Manager,
BP Canada Energy Company
- Murray Todd**
President, Todd Resources
- Don Towson**
Industrial Technology Advisor,
National Research Council's Industrial Research Assistance Program (IRAP) -
Hosted at Petroleum Services Association of Canada (PSAC)

Auditor's Report Financials

We have audited the financial statements of PTAC Petroleum Technology Alliance Canada for the year ended December 31, 2000 and have reported thereon without reservation under date of January 19, 2001. The accompanying summarized balance sheet and summarized statements of revenues, expenses and surplus have been prepared from the audited financial statements.

In our opinion, the accompanying summarized balance sheet and statements of revenues, expenses and surplus fairly summarize the information as to the financial position of PTAC Petroleum Technology Alliance Canada and the results of its operations contained in the audited financial statements.

HAMILTON ROSENTHAL
Chartered Accountants
Calgary, Alberta
January 19, 2001

Summarized Balance Sheet

As at December 31, 2000, with comparative figures for 1999

Assets	2000	1999
Cash	\$ 27,672	\$ 20,843
Marketable securities	46,639	43,896
Accounts receivable	52,686	46,049
Prepaid expenses	612	-
	127,609	110,788
Capital assets	39,900	28,661
	\$167,509	\$139,449
Liabilities and Surplus		
Accounts payable, accrued liabilities	\$ 11,093	\$ 341
GST payable	5,133	-
Deferred revenue	148,227	121,035
Payable to members	3,493	16,050
	167,946	137,426
Net Assets		
Invested in capital assets	39,900	28,661
Unrestricted	(40,337)	(26,638)
	(437)	2,023
	\$167,509	\$139,449

Summarized Statement of Revenue and Expenses

Expenses and Surplus for the year ended December 31, 2000, with comparative figures for 1999.

Revenues	2000	1999
Membership	\$337,582	\$336,992
CAPP	35,000	-
Events	21,135	-
In-kind revenue	12,000	11,500
Interest income	4,021	3,086
Other	-	14,586
	\$409,738	\$351,578
Expenses		
Operating	\$412,198	\$368,985
Excess (short) of rev./exp.	(2,460)	(17,407)
Surplus, beginning of period	2,023	19,430
Surplus, end of period	\$ (437)	\$ 2,023

The complete audited financial statements of PTAC for the year ended December 31, 2000 are available from PTAC offices upon request.

Sessions

Technology Information Sessions

PTAC hosted 30 Technology Information Sessions attended by a total of over 800 participants in 2000. These sessions provided our members with the opportunity to obtain funding and technical input for proposed R&D, learn about new R&D initiatives and emerging technology, report on project and field test results, and transfer and market new technology in the conventional oil and gas industry.

If you have a particular technical focus area that needs to be addressed, please contact PTAC with your ideas.

Workshops and Forums

PTAC sponsors workshops to provide opportunities for people to clearly define R&D issues and identify potential solutions and the best approach to move forward. Potential suppliers of R&D have the opportunity to hear first hand 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 2000, PTAC sponsored four workshops in Drilling, Environmental (Flaring and Soil Remediation) and Reservoir Recovery.

Forums that are focused on a specific need or technical area are conducted to communicate information on new technologies or case studies, or on the objectives and results of current research.

Five forums were held in 2000: the Annual Environmental Forum, Flare Gas Incineration, Health and Safety, Conventional Heavy Oil and e-Business.

Over 700 people participated in these nine workshops and forums held in 2000.

The continued involvement of industry personnel is needed by PTAC in 2001 to plan workshops or forums in areas such as Environmental, Drilling, Heavy Oil, Natural Gas, Well Completion, and Reservoir Recovery. We encourage you to contact PTAC if you have ideas for such workshops, forums or working groups.

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 or regulators for their further development and implementation.

Technical Areas

PTAC now has 12 Technical Areas of interest and over 3600 contacts in:

- **Conventional Heavy Oil**
- **Drilling**
- **e-Business**
- **Environmental**
- **Fundamental Research**
- **Health and Safety**
- **Inactive Well Management**
- **Natural Gas Production**
- **Oil Production**
- **Oil Sands**
- **Reservoir Recovery / Geoscience**
- **Well Completion**

PTAC requires participation from senior technical people to identify important issues that require technology transfer or R&D. If you are interested in participating, or seeing particular issues addressed, we encourage you to contact PTAC to provide input or to obtain additional information.

PTAC

**An Association that Facilitates Innovation,
Technology Transfer, and Research & Development
in the Upstream Oil & Gas Industry**

For further information please contact:

PTAC

Petroleum Technology Alliance Canada
Suite 750, Hanover Place
101 - 6th Avenue S.W.
Calgary, Alberta T2P 3P4
website: www.ptac.org
fax: (403) 263-3041
e-mail: info@ptac.org

Eric Lloyd, President
phone: (403) 218-7701
e-mail: elloyd@ptac.org

Denis Gaudet
Director, Technology Transfer
phone: (403) 218-7710
e-mail: dgaudet@ptac.org

Arlene Merling
Executive Coordinator
phone: (403) 218-7702
e-mail: amerling@ptac.org

Jane Arnall
Event Coordinator
phone: (403) 218-7704
e-mail: jarnall@ptac.org

Brenda Belland
Information Specialist
Natural Gas Technology Centre
phone: (403) 218-7712
e-mail: bbelland@ptac.org

Lorie Frei
Administrative Assistant
phone: (403) 218-7700
e-mail: lfrei@ptac.org

Kerri Markle
Technology Transfer Coordinator
phone: (403) 218-7711
e-mail: kmarkle@ptac.org

Tannis Such
Environmental Coordinator
phone: (403) 218-7703
e-mail: tsuch@ptac.org