



ON COURSE

Coordination of University Research for Synergy and Effectiveness

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WHAT IS COURSE?

COURSE is a new (1999) initiative between the energy resources industry, Alberta universities and Alberta government to increase and focus the amount of fundamental research being conducted at Universities in Alberta related to the energy resources industry.

- **Increases and better aligns fundamental and breakthrough university research with energy resources industry needs,**
- **Provides results that exceed what may be achieved by one university or department alone,**
- **Improves probability of research application, and**
- **Ensures maximum value for Government involvement.**

Funding is provided by the Ministry of Alberta Innovation and Science through the Alberta Oil Sands Technology and Research Authority (AOSTRA). An undertaking has been provided to the COURSE Leadership Board that there will be a substantial phased increase in the availability of funding support for university research projects which have direct Industry involvement and interest. The funding of the research projects at the universities will be selected and administered by COURSE.

COLLABORATION AND COORDINATION

Stimulated by COURSE, a joint venture has been formed between the University of Alberta and the University of Calgary, with AOSTRA funding for startup, called PITI – Petroleum Industry Technology Institute. PITI manages the COURSE initiative. PITI will also promote increased collaboration between the two universities to provide combined teams of researchers to service energy resources industry research needs. Offices have been established at both universities for COURSE and PITI. Richard Luhning is the Director of PITI and the Chair of the COURSE Leadership Board.

FAST STARTUP FOR COURSE

COURSE began operations in March 1999 with rapid start-up as follows:

- **March** – Issued call for applications for the first COURSE funding competition.
- **April** – Addressed the strategic priorities for fundamental energy resources research with a simultaneous video workshop between Calgary and Edmonton with assistance of CONRAD and PTAC. See PTAC web-site at www.ptac.org.
- **June** – Applications (59) for first competition received, evaluated and applicants informed of results in July.
- **August** – Second COURSE competition set for January 7, 2000 to streamline the process for improved coordination with industry, graduate students selection and other funding agencies.
- **September** – Industry information meetings held in Edmonton and Calgary to present 70 potential project applications seeking industry support for January 7, 2000 competition. See PTAC web site at www.ptac.org.
- **October** – Established COURSE Administrative Assistant network among all technical departments at University of Alberta and University of Calgary for improved communication and collaboration.

COURSE MEMBERSHIP

- There is no fee for membership.
- All participants in COURSE projects, including those planning to receive final reports at no cost, will automatically become eligible for membership and recognition in the “ON COURSE” newsletter.

If you are interested in becoming a COURSE member or in receiving this newsletter, please fill out the “Membership/Newsletter Fax Back” form on the back of this newsletter and fax it to Richard Luhning at 403 289-1988.

HOW INDUSTRY CAN PARTICIPATE

COURSE does not have preset rules for industry participation in COURSE funded projects. The general guidelines for industry participation are as follows:

- A cash contribution is not required.
- Industry may choose how it wishes to participate from the following: being a technology “receptor” (receiving the final report at no cost), assisting in formulating the project plan, providing a letter of support for the application to COURSE, being a project advisor, doing work-in-kind for the project or cash financial support to the project as arranged between the university researcher and the company to fit the project.
- Industry support of a COURSE project may be linked to a site-specific project supported by the company. COURSE must be informed of such linkages and the financial value but not the specific technical results.

NEW PRO.J

NEW PROJECTS FUNDED FROM COURSE JUNE 1999 COMPETITION

COURSE STARTS \$2.6 MILLION OF RESEARCH PROJECTS

**15 new projects started, and
launching up to about 20-30 more January 2000**

COURSE received 59 applications for funding at the first competition in June 1999. Fifteen projects with a total value of \$2.6 million were selected to begin in September 1999 at Alberta universities. COURSE provided \$1.5 million in funding, industry provided \$657,000, with the remaining \$443,000 from NSERC, work-in-kind and other sources. This represents the largest number of cooperative oil and gas university research projects started in many years.

The 15 new projects are described to the right. If the reader wants more information on a specific project – fax Richard Luhning at COURSE (403) 289-1988, with your name, phone and fax numbers, or contact the researcher directly.

PROJECTS SEEKING INDUSTRY SUPPORT FOR JANUARY 2000 COURSE FUNDING COMPETITION

On September 9 and 10, 1999, in Edmonton and Calgary, COURSE held industry information meetings to present potential project applications which researchers were considering for the January 7, 2000 funding competition. The researchers are seeking industry/individual company input, advice and support for the projects to assist in preparing a successful application.

The applications for the January 7, 2000 competition are not limited to the approximately 70 projects described. Additional applications are encouraged. Applicants are not limited in the number of applications or awards that may be provided.

The projects presented were in the following areas:

Type	No. of Projects
Environmental	17
Plant Operations	17
Conventional Oil/Gas & EOR	8
Heavy Oil	4
In Situ Oil Sands	1
Service Industry	0
Drilling/Completions	0
Upgrading	3
Oil/Gas Pipelines	8
Slurry Pipelines	3
Oil Sands Mining	4
Extraction	1
Tailings Ponds	1
Others	5

The projects are summarized on the PTAC web site at www.ptac.org. The detailed descriptions and contacts for the researchers are available through the COURSE offices at University of Alberta and University of Calgary.

Contact **Richard Luhning**,
Phone: (403) 282-1211,
Fax: (403) 289-1988

ENVIRONMENTAL

Gas Plant Remediation

Remediation strategies will be developed and tested for in situ degradation of amine and glycol contamination at a former sour-gas plant site. Furthermore, non-invasive geophysical techniques will be evaluated for monitoring remediation progress.

Contact: **Dr. Carl Mendoza**,
University of Alberta,
Phone: (780) 492-2664,
Fax: (780) 492-2030,
carl.mendoza@ualberta.ca

A Technique to Identify and Quantify NMHC and Aerosol Emissions from Individual Oil and Gas Reservoirs

A new technique is available to measure aerosol content in oil and gas, which may provide a method to identify the source of fugitive emissions for more rapid and definite identification.

Contact: **Dr. A.L. Norman**,
University of Calgary,
Phone: (403) 220-5405,
Fax: (403) 220-7773

SEISMIC/ EXPLORATION

Seismic Velocity Imaging of the Steen River Crater: Technique Development for Exploring Crater Reservoirs

The project will investigate the properties of the Steen River Crater, largest in Alberta and currently producing oil and gas, to assist in the search for other craters.

Contact: **Assoc. Prof. Alan Hildebrand**,
University of Calgary,
Phone: (403) 220-2291,
Fax: (403) 284-0074

UPGRADING

Bio-upgrading for Heavy Crude Quality Improvement

Biological upgrading of heavy oil will be investigated with selected fungi and bacteria collected from field operations and grown in the laboratory.

Contact: **Dr. Murray R. Gray**,
University of Alberta,
Phone: (780) 492-7965,
Fax: (780) 492-2881,
murray.gray@ualberta.ca

CONVENTIONAL OIL/ GAS & EOR

Increasing Gas/Oil Recovery from Naturally Fractured Reservoirs with Water Coning Problems: Process Understanding and Field Applications

Water coning causes excessive water production in oil and gas wells, which accelerate in naturally fractured reservoirs. The project will investigate the basic physical mechanisms of the water coning.

Contact: **Dr. Mehran Pooladi-Darvish**,
University of Calgary,
Phone: (403) 220-8779,
Fax: (403) 284-4852,
pooladi@ucalgary.ca

PLANT OPERATIONS

Mitigation of Harmonic Distortions in Oilfield Electrical Distribution Systems

The use of variable frequency drive motors (typically pump jacks) cause the generation of harmonic currents which can damage electronic controls and exceed national standards for harmonics in power systems. The project will measure the effect in the field and develop a predictive model to control the problem.

Contact: **Dr. Wilsun Xu**,
University of Alberta,
Phone: (780) 492-5965,
Fax: (780) 492-1811,
wxu@ee.ualberta.ca

Development of a Novel Hardfacing Material System for the Oil Sands Industry: Pseudoelastic Composites with Nanostructured Reinforcing Particles

Wear is a major factor in the oil sands industry. The project will investigate the development of a new hardfacing material system using pseudoplastic titanium/nickel alloy combined with ceramic particles.

Contact: **Dr. Dongyang Li**,
University of Alberta,
Phone: (780) 492-6750,
Fax: (780) 492-2881,
dongqing.li@ualberta.ca

NEW PROJECTS

IN SITU OIL SANDS

Investigation of Interfacial Mass-Transfer Mechanisms in the VAPEX Process for Heavy Oil Recovery

VAPEX is a non-thermal method, which uses dissolved solvents to reduce bitumen viscosity for production. The rate of dissolving of the solvents and the mass transfer mechanisms are a major factor in the process operation.

Contact: **Dr. Brij B. Maini**,
University of Calgary,
Phone: (403) 220-5752,
Fax: (403) 284-4852

SLURRY PIPELINES

Online Slurry Air-content Determination and Analysis (OSADA) Technology for Oil Sands Development

Air entrainment in oil sands slurry (hydrotransport) lines impacts the performance of the system. The project will investigate the modelling, design and analysis method for on-line air-content measurement.

Contact: **Dr. J. Szymanski** and
Dr. S. Frimpong,
University of Alberta,
Phone: (780) 492-9770,
Fax: (780) 492-0249,
sam.frimpong@ualberta.ca

Solids Distribution in Hydrotransport Process

The project will investigate the relationships between the solids level used in hydrotransport of mined oil sands and the bitumen/water froth separation process.

Contact: **K. Nandakumar**,
University of Alberta,
Phone: (780) 492-5810,
Fax: (780) 492-2881,
kumar.nandakumar@ualberta.ca

EXTRACTION

Destabilization of Emulsified Water and Fine Solids Through Asphaltenes Precipitation

The use of paraffinic diluent causes mined oil sands bitumen/water froth to separate rapidly. The project will investigate the kinetics and optimization of the method.

Contact: **Dr. Jacob Masliyah**,
University of Alberta,
Phone: (780) 492-4673,
Fax: (780) 492-2881,
jacob.masliyah@ualberta.ca

OIL SANDS MINING

Oil Sand Lump Size Estimation (LSE) by 3-D Sensing

The size of oil sands "lumps" feeding into the mining hydro-transport system impact the performance. The project will investigate a means of measuring the lump size on-line to allow optimum performance.

Contact: **Dr. Hong Zhang**,
University of Alberta,
Phone: (780) 492-7188,
Fax: (780) 492-1071,
zhang@cs.ualberta.ca

Particle Flow Modelling of Oil Sands Excavation

Conventional shovel and truck mining equipment has difficulties with "sticky" oil sands and other properties, which the project will investigate to improve efficiency.

Contact: **Dr. Dwayne D. Tannant**,
University of Alberta,
Phone: (780) 492-3379,
Fax: (780) 492-0249

TAILINGS PONDS

Metallurgical Studies for the Production of Rutile Concentrate from Oil Sands Tailings

Oil sands mining tailings contain valuable minerals; the project will investigate the separation of titanium minerals (rutile).

Contact: **Dr. Qi Liu**,
University of Alberta,
Phone: (780) 492-8628,
Fax: (780) 492-2881,
qi.liu@ualberta.ca

Role of Microbial Process on Sulfate-enriched Tailings Deposits

Methane is generated by micro-organisms in oil sands tailings, which may accelerate activity, by methods proposed to consolidate the tailings with gypsum. The project will investigate the potential change in methane generation.

Contact: **Dr. Phillip M. Fedorak**,
University of Alberta,
Phone: (780) 492-3670,
Fax: (780) 492-9234,
phil.fedorak@ualberta.ca

CALL FOR APPLICATIONS

CALL FOR COURSE

\$2 MILLION FUNDING APPLICATIONS

January 7, 2000 Deadline

COURSE is calling for research proposal applications for the Year 2000 funding competition. Up to a maximum of \$2,000,000 will be awarded as a portion of the costs of up to about 20-30 projects with the funding duration lasting up to a maximum of three years. Applicants will be informed of results by mid-March 2000.

The COURSE award may vary from a minor share up to 100% of individual project costs. There is no limitation on the size of the project or number of participants in the projects. Applications must be from a Principal Researcher at an Alberta University. Applicants are not limited to a single application. An applicant may be provided with more than one award as a result of the competition. The prior awarding or having a current COURSE project award will not be considered as a factor in the evaluations.

Application forms (based on NSERC 100 and 101) are available at the COURSE offices at University of Alberta and University of Calgary, through the COURSE Administrative Network representative in each department and will be mounted on the PTAC web site at www.ptac.org. See COURSE contacts on back for more information.

APPLICATION SELECTION CRITERIA

FACTORS

POINTS*

A. Importance to Alberta Energy Resources

_____/20

1. Significant Impact
2. Strategic Importance to Alberta Energy Resources
3. Environmental/Sustainable Performance
4. Basis for New Industry Potential
5. Quality of Life Improvement

B. Importance to Industry

_____/20

1. Commercial Viability
2. Fundamental Support to Commercialize Important Technology
3. Significant Potential Economic Benefit
4. Improvement Over Alternatives
5. Potential for Success

C. Alignment with COURSE Principles

_____/20

1. Collaborative Approach (between universities and departments)
2. Industry Support/Interest
3. Significant Technology Advancement
4. Technology Transfer Plan
5. Training and Skills Development
6. Leverage of Research Funding

D. Quality of Application

_____/40

1. Technical Quality of Application
2. Fundamental Science and Information Generation
3. Experience and Capability of Researchers
4. Achievable Plan and Budget
5. New Researcher Beginning

E. Total Points (sum of A, B, C & D)

_____/100

* Rating of 100 points is perfect, ranging down to 0 for totally unacceptable.

SCOPE OF RESEARCH PROPOSALS

- COURSE is more interested in supporting fundamental and breakthrough projects than incremental aspects of mature technology or ongoing programs.
- The research proposals may relate broadly to the Industry activities in Alberta's energy resources including conventional oil and gas, heavy oil, oil sands and directly related activity.
- Each project is strongly encouraged to have an industry company involved in the project. It is not necessary to have pre-arranged industry support prior to making the application to COURSE, although it is a consideration in awarding funds.
- The training and development of skilled personnel through the research project activity is important to COURSE.
- Collaborative projects among universities to assemble the best research team are encouraged and is a consideration in awarding funds, but is not required.

EVALUATION PANEL

- The COURSE evaluation panel for the January 7, 2000 competition will have 12 voting members: University of Alberta - 3 members, University of Calgary - 3 members, and six industry representatives.
- The names of the panel members will not be announced until after the formal announcement of the competition results.

INTELLECTUAL PROPERTY

A new concept for intellectual property is being put in place for projects with COURSE funding. The universities/researchers will have ownership of the technology with the right to license the technology to third parties and receive license fees. Any license issued for use in Alberta will be license fee free.

ADMINISTRATIVE NETWORK AMONG UNIVERSITIES AND MEMBERS

A network has been formed among about 45 administrative assistants at university departments, member companies and COURSE to facilitate communication, information flow and contact generation. Each person in the network is provided with a COURSE operations information manual which will be periodically updated to provide on-site information for researchers and members.

Contact the COURSE office for more information to join the network.

Membership/Newsletter Fax Back

Fax back this page to 403 289-1988 to receive your membership information package, project information, and/or future newsletters. New members will be featured in the next newsletter.

Name

Company

Address

Fax

Phone

Email Address

- Please send me membership information and newsletters.
- Please send me information on projects proposed for January 2000 funding competition.
- Please send me newsletters only at this time.

ON COURSE

ON COURSE Newsletter is published by COURSE – Coordination of University Research for Synergy and Effectiveness – to increase communication between industry, government and university research providers for energy resources.

For further information please contact:

Richard Lunning,
Director, COURSE/PITI,
Tel. (403) 282-1211,
Fax. (403) 289-1988

Brenda Brindza,
Administrative Assistant,
COURSE/U of Alberta,
Tel. (780) 492-5232,
Fax. (780) 492-2581,
bbrindza@ualberta.ca

Beth Hill,
Administrative Assistant,
COURSE/U of Calgary,
Tel. (403) 282-1211,
Fax. (403) 289-1988

Coordination of University Research for Synergy and Effectiveness



CALGARY

University of Calgary Research Park
Energy Resources Research Building
100, 3512 - 33 Street N.W.
Calgary AB Canada T2L 2A6

EDMONTON

Room 638
Chemical and Materials Building
University of Alberta
Edmonton AB Canada T6G 2J9