

MOU, OCAS, UOL & ACL

MOU
Memorandum of Understanding
between



**Oil & Natural Gas Commission, Centre of Advanced Studies (OCAS),
University of Lucknow (UOL)**
&



ACL Share Energy (ACL)

Company Reg.No. 917 723 958

Visiting address: Verksgata 1A (5th floor), 4013 Stavanger

Post address: PO-box 6509 Gausel, 4087 Stavanger

**A pioneering Indo-Norwegian collaboration (INORC) at Lucknow, Uttar Pradesh,
India**

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1. Introduction

The Hon. Vice Chancellor, University of Lucknow (UOL) Prof. S.P. Singh and Mr. Bjorn Thore Leidland, CEO, ACL have duly exchanged letters of intent between 28.01.17 and 28.02.17 to forge a joint academia-industry partnership, an Indo-Norwegian collaboration at ONGC Centre of Advanced Studies (OCAS), UOL. (ref. Appendix-I & II)

a. History & objectives of ONGC Centre of Advanced Studies

ONGC sets up Centre for Advance Studies at Lucknow University

Dated: 12 November 2016 06:40:10 PM

Oil and gas major ONGC has set up 'ONGC Centre for Advance Studies' at Lucknow University. The flagship centre was inaugurated and dedicated to public by H.E. Governor UP and Chancellor Shri Ram Naik in presence of Shri DD Misra, Director HR ONGC and Shri NK Verma, MD, ONGC Videsh Ltd.



ONGC sets up ONGC Centre for Advance Studies at Lucknow University; H.E. Governor UP Shri Ram Naik (extreme right) inaugurated and dedicated the centre to the public

Shri Ram Naik lauded the efforts of ONGC for its role in industry, its quest for excellence and as a role model in the field of CSR.

Shri Misra, Director HR said that ONGC is committed to the progress of society through its novel CSR initiatives. "ONGC being a responsible corporate is committed to social responsibilities through CSR activities and education is one of the key focus areas. ONGC will continue its association with academic institutions for quality higher education", he said. He lauded the inspirational guidance, leadership and directions of Shri Dharmendra Pradhan, MoS (I/C) MoPNG in the setting up of this ONGC Centre for Advance Studies.

Shri Verma spoke about the synergy that is needed between the academia and the industry to bridge the knowledge gap and said that the setting up of ONGC Center is a step in that direction.

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Now this MOU witnesseth as under

- b. ONGC Centre of Advanced Studies (OCAS), University of Lucknow (UOL),** with the address, University Road, Lucknow, Uttar Pradesh, 226 007, India and **ACL Share Energy ASA,** Company Reg.No. 917 723 958, Visiting address: Verksgata 1A (5th floor), 4013 Stavanger, Norway, Post address: PO-box 6509 Gausel, 4087 Stavanger, Norway, hereafter referred to as '**OCAS**', '**UOL**', and '**ACL**' respectively, have mutually agreed to enter into a **Memorandum of Understanding (MOU)** for the aims and objectives as mentioned hereafter.

The Hon. Vice Chancellor, UOL, **Prof. S.P. Singh** has entrusted **ACL, Norway** to become the '**Technical Partners**' at OCAS, UOL for

- **Ph.D. Research Programmes**
 - **Industrial Training Programme**
 - create a '**world-class industrial skills and competency hub of advanced education, applied industrial training and research**',
 - Programs in **Petroleum Geoscience & Technology** and **Applied Geology**
- c.** The Hon. Vice Chancellor, Prof. S.P. Singh further envisions that 'This agile business institute will run internationally recognised academic curriculums, training and research programs designed to impart the right theoretical knowledge and exposure to the state-of-the-art technology in the chosen fields. These training and research programs will empower the young and mature professionals alike by sharing the right tools to cater to industrial needs, solve challenges, quantify risks and uncertainties and enable them to progress and contribute towards the industrial, economic, environmental and societal progress of the nation and also become a part of the dynamic global industrial workforce. Domestic and international academia-industrial partnerships and collaborations will be the key to the sustained growth of OCAS, UOL.

2. ACL, as Technical Partner will be providing to the MOU

- a.** Input to strategic planning and implementation
- b.** Logistics: OCAS, , office space, day to day running and maintenance
- c.** Resources: University faculty for teaching and research collaborations
- d.** All responsibility for course syllabus, faculty and day to day running of the Masters of Petroleum Geoscience and Technology course is borne by the University of Lucknow (UOL) while seeking advice from OCAS management, other universities and global industry forums

3. ACL, as Technical Partner will be providing to the MOU:

- a.** OCAS will make the presentation with the MOPNG, ONGC, OVL, HPCL, BPCL, Input to strategic planning and implementation

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ACL will facilitate to develop and run Joint Industry Projects, and have a vision to make OCAS, a profitable organization. A joint industry project (JIP) is a work programme of mutual interest to a number of organizations each contributing to fund the work. Projects typically addressed in JIPs are either too complex or costly to solve by one party alone or it require specialized knowledge or equipment. The parties involved jointly agree on a scope of work, time schedule and contract conditions. JIP participants work together, share costs and benefits.

- b. The following proposed projects are an initial starting point to kick start the project and to start a constructive dialog to identify additional common industry problem statements both in India, Norway and international in the region. The projects will be operated as portfolio:

1. OMEGA Nova – a HR Development program
2. Replay Past Performance- a drill and verify well in simulator concept
3. Well Data analysis – Managing lost Time
4. Casing and Tubing Design and integrity verification
5. Industrial PhD program
6. Integrated Decision support – Improved decisions, risk, uncertainty Capex Opex NPV
7. Algae Oil and gas – Bio fuel pilot project
8. OCAS, , University of Lucknow, Drilling performance, Integrated Decision Support, IOR & EOR
9. iEC Zero CO2 discharge gas turbine and EOR
10. Rig optimisation: Early phase field development
11. NOON Mountain Development and Invest funding project

- c. It is currently under discussion ACL will be the technical partners to run the **Masters in Geoscience and Technology**, a two year course to be run at OCAS, UOL, beginning academic session in July, 2017. The course syllabus will comprise of a **major in Petroleum Geoscience** and **four electives** namely: '**Petroleum Geophysics**', '**Well construction and Geomechanics**', '**Petroleum Exploration & Production**' and '**Reservoir Engineering & Petrophysics**'.

Masters of Petroleum Geoscience & Technology, OCAS, UOL, India ' ...will be a course designed to **benefit Indian and international students from various branches of science**, providing them with an opportunity to be a part of a **collaboration between the international petroleum academic forums and the global oil and gas industry**, aimed at creating **competent industry professionals, with a major responsibility towards the development of a better society and environment**

while harnessing fossil fuels to meet the energy needs in India and the world...'

- i. This course will therefore enable the postgraduates to receive relevant training to become Reservoir Engineers, Geoscientists, Operational Geologist, Geophysicist, Petrophysicist, Production and Exploration Geologist and work efficiently and effectively in any oil and gas organization. OCAS has then created a 'skilled and competent workforce' for the industry.
- d. ACL will ambitiously pursue the needs of the industry and run **advance specialisation courses** at OCAS, bringing in the best-in-test. Following are the courses suggested
1. **Seismic imaging and interpretation advanced course** has been suggested by SPIC, ONGC
 2. At IOGPT a **MSc.in offshore technology course** has been suggested
 3. **Risk and uncertainty estimation in seismic interpretation** course has been suggested by SPIC, ONGC
 4. A **renewables/alternate energy/coal mining** course suggested by IOGPT
 5. Earthquake hazards around oil and gas installations
 6. Platform Engineering course
- e. ACL will run Industrial Ph.D. programs in association with various Norwegian universities, Norwegian and Indian oil and gas companies and applied industrial research organizations in Norway in co-operation with the University of Lucknow
- i. ONGC is keen to fund **Joint Industrial Projects (JIP)** for Ph.D. research programs comprising of an industrial and two academic supervisors, one each from UOL and a Norwegian university as suggested by ONGC personnel
 - ii.

who have aptitude for research to do their Ph.D. program at UOL on topics that are of industrial application e.g.

1. **Heavy oil exploration and exploitation: EOR,IOR**
2. **HP/HT challenges**
3. **Frequency estimation of producing reservoirs**

- f. ACL's **OMEGA NOVA HR development program** will include robust master's thesis planning and execution in alignment with industrial challenges including ACL's 11 applied industrial projects, exposure to relevant industry internships thereby providing a huge potential for appropriate job placements.
- g. Drill well in a simulator: Well replay project
- i. ACL will create a consortium of oil and gas companies to refurbish well data for a '**WELL REPLAY**' project: Drill and verify wells in an **advanced dynamic drilling simulator** utilized and **replay past performance** in order to introduce the Well Replay simulator technology to OCAS, UOL
 - ii. ACL will develop strong business relationships with clients in the Norwegian, Indian and international oil and gas market as a part of the Indo-Norwegian Collaboration (INORC), at OCAS, UOL
- h. **Technology transfer** is ACL's key objective in order to keep up with advancements and developments in the field of applied industrial research. The following technologies are being sought after by ONGC
1. Introduction and use of GPU technology to enhance seismic interpretation
 2. Nanotechnology
 3. Renewables
 4. Instrumentation
- i. ACL will be providing advisory services in the field of
1. Advanced Well Engineering
 2. Drilling Program Management
 3. Integrated Decision support
 4. Subsurface : exploration, appraisal and field development

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- j. ACL is able to provide specialist advisory services in the field of a) **Advanced Well Engineering** : Well Design, Casing Design, Completion Design, Technical Studies, Dynamics (hydraulics, well control, flow modeling), ROAM Advanced Torque/drag analysis, **Drilling Program Management** : Risk Identification, Procurement and Sourcing Strategies, Vendor Evaluation, Application of New Technologies, **Training and Facilitation** : HAZID/HAZOP, DWIS Drill Well In simulator, Casing Design and Tubing Design Course
- k. ACL also brings on board the following areas of specialisation including Well Trajectory Modelling, Time and Cost Estimation, Risk Based, Advanced Torque/drag analysis – ROAM, Casing and Tubing Design, Casing and Tubing Verification, Dynamic Hydraulics and Well Control, Geo-Mechanics (Partners), Early Phase -Field Development, E*Drilling Solutions - Cooperation Engineering, Advanced Well monitoring and RePlay previous drilled wells and real time operations
- l. ACL is in strategic partnership with E*Drilling Solutions : Advanced Well Monitoring and Re-play of old wells, Rox ltd (UK) – Tubular Design and Verification, , OMEGA NOVA VRI Project, Kingdom Drilling, Well Data Technologies – www.welldatatech.com, IPRES - www.ipres.com and IpRisk for WellsIP Risk for Fields. ACL is in communication with IRIS (International Research Institute in Stavanger), Tech Nova and SINTEF regarding potential partnerships with ACL at OCAS, , University of Lucknow in the foreseeable future. ACL also works in collaboration with CGE risk management solutions.
- m. Tools and methodologies used are as follows, **Landmark**: Compass, Well plan, StressCheck, WELLCAT, **Schlumberger**: TDAS (Tubular modeling), West temperature modeling, **eDrilling**: wellPlanner, wellSim Interact /hiDrill, wellAhead decision while drilling, wellAhead Replay, **Well Data Technologies**: RMX – Time/Cost/Risk estimation), Cost Tracking/Lessons, **ROAM - Torque & Drag prediction, MULTI - Multi-String Models**: Multi strings and for the annulus pressure build-up (APB), Baros. **KTOL - Formation kick tolerance, Optional: PSI – Sintef**: Geo Mechanics, Presse – Sintef, Pore pressure, **IPRES Integrated Decision support**: IPRISK – For Wells, IPRISK for Fields, IP Resource, IP Forecast
- n. ACL is willing conduct **doorstep and in-house training to oil company young and mature hires in India** and globally in the field of geology, geophysics and drilling
- o. ACL will familiarize Indian oil and gas companies with the Norwegian rules and regulations of operations in order to **foray into the oil and gas market on the Norwegian Continental Shelf (NCS)** in collaboration with efficient Norwegian

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stakeholders, who are extremely capable of making the Indian ventures/farm-in successful in Norway

- p. ACL will facilitate the **creation of an organization framework for OCAS, UOL**
- q. ACL is planning a potential **collaboration with PTC Industries Limited**, a Lucknow based company, a leading supplier of castings solutions, machined components and fabricated parts to the Norwegian oil and gas industry. This collaboration will be built further to enhance business development between the two countries.
- r. ACL will facilitate introduction to potential research/investment to **install solar panels** at OCAS and various other departments in the UOL campus.
- s. ACL in partnership with Innovation Norway will endeavor to **raise potential funding in order to facilitate technology transfer in areas of Advanced Computing, innovative renewable schemes and food processing methodologies**
- t. ACL will endeavor to attract the best national and international students to OCAS, UOL and make it a BRAND name internationally for quality education and applied industrial research. ACL energy will also offer its **branding services** to OCAS, UOL
- u. ACL will try to establish a consortium of Norwegian, Indian and international oil and gas companies to join in and work together for a common cause of **educating the youth** not only from India but also from overseas e.g. **Middle East, Mozambique, Venezuela and Nigeria while tying up with the Ministry of External Affairs, Govt. of India**
- v. ACL will provide a platform for **social entrepreneurship** and social effects as a part of the OMEGA NOVA program
- w. ACL will apply for **potential funding for OCAS in Norway, European Union and global industrial partners**

4. Scope of work and follow up

- a. The main scope of the MOU is to create a win-win situation for the parties, wherein OCAS, UOL benefits from increased exposure in the Norwegian and International petroleum academic market, whereas ACL builds up competence and services opportunities linking ACL expertise to the support tools and

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associated services from OCAS, UOL to the Indian, Norwegian and international market.

- b. ACL will provide strategic advice, innovation and digitalisation to create growth in the existing market and contribute competency development in strategy and business development, organisational, development and technology development and implementation by creating a
 - i. Common business development framework and processes including business models and business cases
 - ii. Strategies for program and portfolio management & Project Management Office ensuring prioritization, resource allocation and common tools for project management
 - iii. Organizational development including structure, process and culture
 - iv. Collaboration strategy and selection and development of collaborative tools
 - v. Innovation strategy, innovation management and common innovation processes
 - vi. Development of common change management process
 - vii. Digitalization & new technologies, management and agile processes
 - viii. Development and implementation of strategic market plan
- c. Progress of this agreement will be monitored by status reports and meetings every month.
- d. Subsequent to the signing of the MOU, ACL AS will submit an application for funds from Innovation Norway, IFU to the tune of 8-10 MNOK to as an Innovation Norway industrial research and development grant and Joint Industry Projects (JIP) at OCAS, half of the mentioned amount will be raised through Indian and international oil and gas business establishments
- e. ACL will apply for grant support from Norwegian Research Council to support 50% of the expenses incurred on industrial PhD research, Petromaks and Demo2000. Innovation Norway initiatives and EU funding.

5. Revision of the MOU

- a. OCAS & ACL is well within its rights to make such revisions as are necessary for the furtherance of the aims and objectives of this MOU and in such situations no other stakeholder shall not object to such revisions if the same are in accordance with the aims and objectives of the present MOU
- b. The effect of the MOU will commence April, 2017 and will be initially valid for a period 3 years with a possibility to extend it subsequently for another period of 3 years successively as per the present conditions of the MOU.

6. Exclusivity

The MOU is non-exclusive

7. ACL's commitments

- a. Build up OCAS, UOL competence to become a 'world class industrial training and research providing employment and business opportunities in Lucknow, Uttar Pradesh, India
- b. Promote OCAS, UOL as a competent service provider (advisory) for training and research in the oil and gas and other applied industry areas of business
- c. Provide ideas for further development and enhancement of the OCAS, UOL to become 'one of its kind' institution in the field of applied research in the energy and renewables sector
- d. Provide a platform to engage in business development in energy and allied sectors in Norway
- e. University Of Lucknow shall not be liable for any payments to ACL employees at OCAS, UOL.

8. Arbitration

In case of a dispute, between the parties herein in relation to the term and conditions as are mutually agreed hereinbefore or in relation to any other matter related to the present MOU, the same shall be referred to Arbitration in accordance with the Arbitration & Conciliation Act and the courts situated in Lucknow shall have exclusive jurisdiction.

This Agreement shall be construed and governed in all respects in accordance with the laws of Norway Stavanger Tingrett and India

- a. Neither party shall have any authority to, or shall attempt to, bind or commit the other party for any purpose.
- b. Any communication between the parties shall go through:

i. For OCAS, UNIVERSITY OF LUCKNOW:

Attention:

1. Financial Officer

ii. For ACL Share Energy:

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Attention:

- 1. Dr. Abhilasha Wal**
- 2. Mr. Bjorn Thore Leidland**

The terms of this MOU are agreed to and accepted effective -- April, 2017 on behalf of the undersigned respective organizations

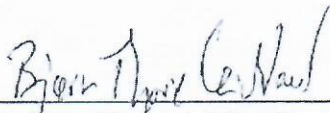
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Lucknow and Stavanger

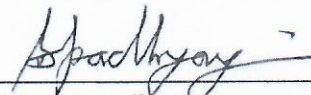
27th April 2017

For ACL Share Energy

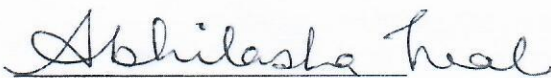
For OCAS – ONGC Centre of Advanced
Studies (OCAS), University of Lucknow
(UOL)



Mr. Bjørn Thore Leidland
President and CEO



Mr. S.C. Upadhyaya
CFO Finance Officer
Lucknow University, Lucknow



Dr. Abhilasha Wal
Vice President Business development
Dr. Abhilasha Wal