



ऑयल इंडिया लिमिटेड

(भारत सरकार का उद्यम)

Oil India Limited

(A Government of India Enterprise)

Conquering Newer Horizons

अईन निडूज

ऑयल न्यूज़

OILnews

HOUSE JOURNAL OF OIL INDIA LIMITED



Volume 39 No. 7, March - April 2012

H a r n e s s i n g WIND ENERGY

**OIL's maiden Wind Energy Project
at Ludharava in Jasailmer district
of Rajasthan**

**Generating
13.6 MW**



- Capacity of Wind Farm - 13.6 MW
- Location 'Ludharava'- 15 Km from Jasailmer City Centre
- Total number of WTGs -- 16 (Sixteen)
- Capacity of each WTG - 850 KW
- Tower Height - 65 Meter, Blade Dia- 58 Meter
- Feed in Tariff (Rs. / kWh) - 4.46



Volume 39 No. 7
March - April 2012

COVER :

**OIL's Wind Energy
Project at Jaisalmer**

PREVIEW

Cover Story	4
Spotlight	5
Focus	6
News	7
CSR	8
Events	9-11
Technology	12-15
Sphere News	15
Sports	16
Training & Development	17
Awards & Accolades	18
Assamese Section	19-26
Hindi Section	27-31



Page - 4



Page - 16



STOP PRESS

Shri S.K. Srivastava takes over as CMD, OIL

Shri S.K. Srivastava has taken over as Chairman and Managing Director (CMD) of Oil India Limited (OIL) on 01.05.2012. Mr. Srivastava is upstream petroleum professional with an excellent blend of experience and expertise in Exploration, Drilling and Production in oil and gas sector. Mr. Srivastava joined Oil India Ltd. In 1977 at OIL's field head quarter at Duliajan and has about 35 years of excellent track record. During this period, he steered various oil and gas projects of OIL besides heading international assignments. His experience in OIL include 1½ decade of service in Assam and Arunachal Pradesh, where he occupied several leadership positions in various capacities. He was Head of Exploration in Duliajan, Assam leading a team of geoscientist, was involved in multi-disciplinary workstation based geo-scientific interpretation for identification of drillable prospects and development locations using 2D, 3D seismic and other oil/gas field data in Assam and Arunachal Pradesh. He had also held the position of Director (Operations), OIL.

Mr. Srivastava is responsible for several oil and gas discoveries and credited with setting up Oil India's state-of-the-art G&G Interpretation Centre in Duliajan, Assam. He conceptualized studies of "Revitalization of Old Oil Fields - Nahorkatia & Moran" to look for bypassed and un-drained oil with ultimate objective of maximizing recovery and enhancing oil production. Now as CMD, OIL, he has plans to revitalize old Oil Fields to improve declining production.

Further during this period, he was directly associated in development strategies of new discoveries, which enabled OIL to sustain crude oil production of over 3 MMTPA in the last decade despite major oil fields being in advanced state of depletion. Mr. Srivastava played major role in formulating OIL's short and long term Exploration, Development, Drilling and Production plans.

Apart from these achievements, particularly for Assam, he has actively guided OIL in the National and International bidding in several countries including Africa, Middle East, South East Asia and North American Continents. He was the Chief Adviser (Exploration & Development) and Country Manager of OIL's Libya operations.

Before joining CMD, OIL, Sri S. K. Srivastava was holding the position of Director General, Directorate General of Hydrocarbon, Ministry of Petroleum & Natural Gas, Government of India, had played very important role by heading oil and gas and CBM exploration, Development and Production related functions on behalf of Ministry of Petroleum and Natural Gas. As Director General, he was leading a team of dedicated Geoscientists and Engineers for evaluation of Oil & Gas Field Development Plans and suggesting strategies for making it more techno-economically feasible, Monitoring of field operations of the approved development plans, Monitoring of major oil producing fields including Mumbai High, Neelam, Heera, D-6 and Rajasthan etc. Under his guidance, DGH was monitoring the profit petroleum arising out of production sharing contract to the tune of more than 4000 crores and Royalty of about 4900 crores annually to central Govt. Mr. Srivastava is member of many high power committees formed for policy making in oil & gas sector. He has signed various MOUs, on behalf of Government of India, with international agencies from USA, UK, Germany etc. in the field of Gas Hydrate Research and Shale Gas Development.

Apart from the professional excellence, Mr. Sunil Kumar Srivastava is very well read, a music lover and a keen golfer. He is multilingual and has excellent command over many Indian and foreign languages.

OIL News wishes Shri Srivastava success in all fronts.

EDITORIAL

Dear Reader,

The last few months have been dominated by Board exams throughout the country. There has been a frenzy of activities, tensed students and even more concerned parents as they await the results. For a business entity, the end of a fiscal year is almost same as end of an exam and one just have to look at the report card to see how the organization has performed. Well as an Oilindian, we have ample reasons to feel elated at having broken all time records of production as well as recorded the highest ever profits besides many other laudable achievements. However, the foray of OIL into the renewable energy sector by successfully commissioning the maiden Wind Energy Project at Lodurva in Jaisalmer district of Rajasthan and a Solar PV Power plant at the Company's Jeypore Oil Collecting and Gas Gathering station in Dibrugarh district of Assam will definitely be rated as major milestones in OIL's corporate journey. OIL News compliments all the members of the multidisciplinary teams of OIL who ensured that the long awaited goal of every Oilindian to see OIL become an energy company become a vibrant reality.

These indeed are legitimate reasons for every member of OIL's extended family to celebrate and reconfirm our commitment to achieve even greater milestones in the years ahead!

Regards,

- Tridiv Hazarika

Address for communication

PR Department
Oil India Limited, Duliajan
Dist. Dibrugarh (Assam) Pin - 786 602
Tel : (0374) 2808495, Fax : (0374) 2800427
email : tridivhazarika@oilindia.in

The views expressed by the authors in the articles are their own and the Company does not subscribe or take responsibility for any part or whole of the views.

— Editor, OIL News

Editorial Family

Advisor : **Pranjit Deka**
Editor : **Tridiv Hazarika**
Associate Editors : **Dr. Raman Ji Jha (Hindi)**
Beena Purkayastha (Assamese)

Assistant Editor : **Jayant Bormudoi**

OIL News is the bimonthly trilingual house journal of Oil India Limited brought out by Public Relations & Corporate Communication Department. Company related news / features may be reproduced only with the permission of the Editor.

Design & Produced by Saikia Printers, Duliajan



From Resident Chief Executive

Dear Oilindian,

At the outset, let me take the opportunity to accord a warm welcome to Shri S K Srivastava, our new leader and also bid farewell to Shri N M Borah, who led OIL with great finesse, enabling the Company to excel on diverse fronts.

"Skills can be learned while experience must be earned."

- Joy Gumz

As an Oilindian, we are indeed very fortunate to have in the helm of the Company's affairs a person like Mr Srivastava with his vast experience and exposure having served as the leader of the prestigious regulatory body, the Directorate General of Hydrocarbons (DGH) as Director General.

Having known Shri Srivastava for many years as a colleague, I am more than convinced that he would leave no stone unturned to steer OIL to achieve greater heights of all round excellence and fulfill his vision of elevating OIL to a Maharatna Company.

Now that our CMD has set his sight on such a great milestone, the onus lies on each of us to contribute our share in realizing this collective vision of all Oilindians. With annual targets becoming even more challenging, it will require even greater commitment and perseverance from every Oilindian to obtain excellent ratings from the Government.

In this regard, I believe that alongside hard work, we must be able to master the art of innovative and smart work. All of us work hard in life - there is no doubt about it. We work hard in our jobs so we can excel at work. We work hard so we can achieve the best results in our life. After working hard for an extended period of time, there comes a point when we realize that there's only so much we can do by working hard. While hard work is definitely the brick of success, one has to start working smart too to get the maximum value for one's time and effort. Working hard gives results and working hard and smart at the same time gives the top results. Smart work is about making the right strategy, about following a disciplined work culture. Hard work translates your vision and ideas into results.

Everything has an objective. It's just a matter whether one knows it or not. The people who don't know the objective of what they are doing are the ones who end up wasting the most time. If the objective is known well, then the person can be more focused and accomplish the task.

Another area where, we need to focus more is efficient project management. Irrespective of the task at hand, we must be able to treat it like a project with a set timeline and deliverables. A disciplined project management process is important to any project. Project managers are expected to deliver results, on time and within approved budget. Solid project planning reduces the risks associated with any project you take on.

Many a time, crisis can hit a project for several reasons like agitation programmes, natural calamities, recession, etc. In such a situation, it is essential for project managers to display maturity and profound administrative and managerial skills to handle the situation. The power inherent in the abilities of an accomplished project manager makes a huge difference in the outcome of the project.

I am sure with such an attitude towards our work and a systematic and structured approach, we will certainly be able to achieve our targets.

Let us all make a firm commitment to live up to the expectations that our stakeholders have on us and break into the long awaited zone of a 4 million tonne Company within this year itself and provide the best possible support to our new CMD as he leads OIL into new frontiers of excellence.

Warm regards

(N K Agarwal)

Resident Chief Executive



OIL ENTERS INTO RENEWABLE ENERGY SECTOR

OIL has established its footprint in Renewable Energy Sector with the successful commissioning of its maiden Wind Energy Project at Lodurva in Jaisalmer district of Rajasthan and the Solar PV Power Plant at Jeypore in Dibrugarh District, Assam.

The Wind Farm was formally inaugurated by Shri N M Borah, CMD, OIL on 31st March 2012 at Lodurva in Jaisalmer. Shri N K Bharali, Director (HR&BD), Shri S Rath, Director (Operations), Shri N K Agarwal, RCE, and other senior officials of OIL were also present during the inauguration along with the Chairman and Managing Director of Gamesa Wind Turbines Pvt. Ltd, Shri Ramesh Kymal.

OIL's wind farm was successfully connected to the Power Grid of Rajasthan Rajya Power Vidyut Prasaran Nigam Ltd (RRVPL) at Amar Sagar on 31st March 2012 i.e. within the challenging time line set for project completion.

Located at Lodurva, 15 Km from Jaisalmer City Centre, the capacity of the Wind Farm is 13.6 MW. A total of 16 Wind Turbine Generators - G 58, each capacity of producing 850 KW are installed. Oil India Ltd awarded Gamesa Wind Turbines Pvt. Ltd, the Indian subsidiary of Gamesa-world leader in the design, manufacture, installation and maintenance of wind turbines- orders for commissioning sixteen G-58 (850 KW) machines equalling 13.6 MW. The height of the tower is 65 metre and the diameter of the blade is 58 metre. It is worthwhile mentioning that the said project was commissioned within 58 days from the date of issue of LOI on 3rd February, at an approximate Investment of ₹ 100 Cr.

The 100 KWp grid interactive solar PV power plant with 220V, 3000 AH battery back up at Jeypore, about 15 Km away from OIL's Fields Headquarters at Duliagan in the state of Assam, is the maiden project on Solar PV power plant taken up by Oil India Limited.

The Jeypore OCS / GCS complex is primarily fed power from the 11 KV APDCL grids. The complex also has DG sets of 45 KVA installed capacity as back up. The total annual energy bill for the complex is more than 10 lakh. The Solar plant was connected to the Grid in the month of April, 2012 and the plant has generated more than 13000 units till date. During this period, the power consumption from Grid as well as DG sets has drastically come down to 22 units from Grid and zero from DG sets.

This is the first Grid interactive project in the State of Assam. This is a milestone project for OIL in its endeavour towards green energy initiative. This project was completed in-house by a team of OIL's engineers.



Wind Energy Project in Jaisalmer



Solar Energy Project at Jeypore

Oil India Limited has also taken up a project to provide solar energy to the upcoming Sasoni Merbeel Eco Tourism Project under its CSR initiatives located in Dibrugarh District.

These Projects have become OIL's first green energy project marking the company's aggressive expansion in Renewable Energy Sector. OIL is aware of the environmental responsibilities and is taking steps to adopt eco-friendly energy production technologies. With the current level of technology, the potential for utilization of wind and solar energy for electricity generation is of the highest order. The unexploited resource availability has the potential to sustain the growth of wind and solar energy sector in India in the years to come.

Additional Secretary, MOP & NG, lauds OIL during visit to Duliajan



Shri Sudhir Bhargava, Additional Secretary, MOP & NG, Government of India visited OIL's Field Headquarter at Duliajan on 5th April, 2012. He was accompanied by his wife Smt. Priya J Bhargava and daughter.

He was taken to the IT Centre where he attended presentations delivered by OIL Officials. Thereafter, the first Electronic data Interchange mode (EDI) transaction between OIL & NRL was triggered and inaugurated by Honourable Additional Secretary, MOP&NG, Shri S Bhargava, in presence of Shri N M Borah, CMD, OIL, Sri N Bhakta, D(F)-NRL, Shri T K Ananth Kumar, D(F), Shri N K Bharali, D(HR&BD), Shri S Rath, D(O) and other senior officials of OIL.



Shri Bhargava then visited Virtual Reality Centre (VRC) where multi-disciplinary teams can visualize the subsurface data in a realistic 3D work frame and analyze the hydrocarbon prospects in a particular area. While being briefed about the functions and the role of the VRC, he had a look at the system which is used for analysing hydrocarbon prospects. He evinced keen interest in its operations and asked wide ranging questions.

Expressing his admiration for OIL's efforts, Shri Bhargava said that he is delighted to be at Duliajan and is well aware of the role which OIL is playing in ensuring that India's Oil and Gas demands are met. He applauded the management and wished OIL a great future.



B2B Transaction between NRL & OIL Established

Oil India has started transacting with Numaligarh Refinery Limited (NRL) a downstream company using Electronic data Interchange mode (EDI) through a Microsoft Middleware known as Biztalk. The first EDI transaction between OIL & NRL was triggered & inaugurated by Honourable Addl. Secretary, MOP&NG, Shri S Bhargava, in presence of Shri N M Borah, CMD, Shri N Bhakta, D(F), NRL, Shri T K Ananth Kumar, D(F), Shri N K Bharali, D(HR&BD), Shri S Rath, D(O) & other senior officials of OIL.



Shri S. Bhargava, Addl. Secretary, MOP&NG in presence of Shri N. M. Borah, CMD, OIL inaugurating the B2B Server.

This is first ever implementation of B2B between an upstream and a downstream Oil Company for automating crude oil transaction process using EDI mode through internet based technology, which will ensure accuracy and instantaneous business data exchange between OIL & NRL.



Shri N Bhakta, D(F), NRL & Shri T K Ananth Kumar, D(F), OIL after signing the EDI transaction

BizTalk Server is Microsoft's Integration and connectivity server solution. BizTalk Server 2010 provides a solution that allows organizations to more easily connect disparate systems. Including over 25 multi-platform adapters and a robust messaging infrastructure, BizTalk Server provides connectivity between core systems both inside and outside organization. In addition to integration functionality, BizTalk also provides strong durable messaging, a rules engine, EDI connectivity, Business Activity Monitoring (BAM), RFID capabilities and IBM Host/Mainframe connectivity.

Mounded LPG Storage Bullets commissioned successfully

Mounded LPG Storage Bullets including LPG Pump House and associated facilities at OIL Duliajan was successfully commissioned. Shri N K Agarwal, RCE, OIL along with other senior officials of OIL formally inaugurated the facilities on March 22, 2012 with switching on the LPG Despatch Pump. From EIL, Shri P K Mukherjee, AGM (Proj.) along with Shri P Baruah and Shri N J Baruah from BCPL were also present in the Inauguration Ceremony.

Storage area of any hydrocarbon plant is considered to be the most hazardous and vulnerable area. The aboveground LPG storage vessel, viz., bullets and Horton spheres have now been replaced by the Mounded Bullets which would provide a much safer mean of storage of LPG. After commissioning of Mounded LPG Bullets and decommissioning of Horton Spheres, potential hazard of the LPG plant has been reduced to a great extent.

M/s Engineers India Limited (EIL) was appointed as a Project Management Consultant (PMC) for implementation of this project. M/s Fabtech Projects & Engineers Ltd., Pune was awarded the contract for detail engineering, procurement and construction (EPC).

The old above ground LPG Storage bullets, old pump house with associated piping, structures, etc were dismantled and removed. The new mounded bullets were constructed at the same location. The main facilities are 3 nos of Mounded Storage Vessels, LPG Pump House with four numbers of barrel type pump associated piping, CP System, Fire Fighting System, Electrical & Instrumentation works.



OIL WINS GOLDEN PEACOCK CSR AWARD, 2012

Oil India Limited, has been awarded with the coveted Golden Peacock Award, for Corporate Social Responsibility 2012. OIL has won this prestigious award in the National Category in recognition of its ongoing CSR activities.

Shri K K Nath, Executive Director (Exploration and Development) and Chairman, CSR Committee, OIL accompanied by Shri M P Chaliha, Manager, Public Relations and Corporate Communication Department, OIL received this prestigious award at the "Dubai Global Convention- 2012 and 7th International Conference on Social Responsibility" held at Dubai from 24th to 26th April, 2012.

The award was presented in a gala award ceremony by H.E. Dr. Abdulrahman A. Al-Awar, Director-General, Federal Authority for Government Human Resources (FAHR), Justice M N Venkatachaliah, Chairman, IOD India and former Chief Justice of India and H.E. Mr Juma Al Majid, Chairman of Dubai Economic Council & Founder Chairman of Juma Al Majid Group at the International Conference.



Shri K K Nath, ED, E&D & Chairman, CSR Committee accompanied by Shri MP Chaliha, Manager, PR receiving the Golden Peacock Award in Dubai

The Golden Peacock Award is in recognition of OIL's ongoing endeavor towards the all-round development of the people residing in and around the Company's operational areas. Under its CSR initiatives, the Company has embarked upon massive programmes of education, health and infrastructure development in order to create a better and sustainable future.

2ND ANNUAL GREENTECH HR AWARD 2012

Oil India Limited has been awarded the 2nd Annual Greentech HR Award 2012 for Training Excellence (Gold Category). During the 2nd Annual Greentech HR Conference from 15th to 16th March 2012 at Sher-i-Kashmir International Conference Centre (SKICC), Srinagar (India), Oil India Limited was presented the trophy and certificate of Award in the award ceremony where prominent personalities from government, industry, trade associations etc. were present. The award was given away to Shri N K Bharali, Director (HR&BD) by Shri Bhaskar Chatterjee, Secretary, DPE, Government of India. The award was given in recognition of Company's HR practices and constant innovation in the area of Training.



"CFO 100 ROLL OF HONOUR 2012"

Shri. T. K. Ananth Kumar, Director (Finance), Oil India Limited has been honoured with "CFO 100 Roll of Honour 2012" under "Winning Edge" in "Risk Management" at a recent event held in Mumbai. He has been awarded for the second time in succession i.e. for both the years 2011-12.

The "CFO 100 Roll of Honour 2012" award was presented in the glittering ceremony of CFO India's Second Annual Award function held on 20.03.2012 at Taj President Hotel, Mumbai organized by Nine Dot Nine Mediaworxs. Shri. O. P. Bhatt, former Chairman, SBI was the Chief Guest. The Function was attended by top CFOs of Industry, to name few were Shri Afzal Modak, CFO, GE India and Shri Sunil Kakkar, Group CFO, IDFC et-al. The evaluation for the award was done by an esteemed jury panel which consisted of Shri S.V. Narasimhan, Former Director Finance, Indian Oil Corporation, Shri K. Vaidyanath, Former ED & CFO, ITC et-al.



OIL SIGNED MoU WITH TISS & DIBRUGARH UNIVERSITY

One of the significant landmarks that had marked the Company's growing responsibility towards implementing its Social initiatives was achieved on 3rd February 2012 by signing an MoU with Tata Institute of Social Sciences (TISS), Mumbai, the pioneer institute for imparting education in Social Sciences in the Country and thus, became a part of the National CSR Hub. The broad objective of the MoU is to identify, evaluate and advice on key projects to be undertaken as flagship programmes in certain thrust areas for furthering socio-economic development within the broad framework of National CSR guidelines issued by Department of Public Enterprise, Govt. of India and also to develop a robust CSR policy for Oil India Limited.

Another landmark was achieved on 26th March 2012 when OIL had signed an MoU with Dibrugarh University to conduct a Need Assessment Study and Social Audit in and around its operational areas. In this context, Dibrugarh University had formed a cross functional team comprising of sociologists, economists, anthropologists, etc. who would carry out the required study and audit.

Need assessment study is conducted to assess the socio-economic needs of the people and communities of OIL operational areas in order to initiate need-based projects and programmes. Moreover, it is important to conduct an audit of the ongoing CSR initiatives and activities of the Company in the OIL operational areas.

The study and the audit would be conducted in a phased manner to cover the OIL's operational areas in Assam and Arunachal Pradesh covering 5 districts of Assam (Dibrugarh, Tinsukia, Sivasagar, Lakhimpur & Dhemaji) and 2 districts of Arunachal Pradesh (Lohit and Changlang). The study would help OIL to formulate the Company's future CSR road map as well as the highlight the significance of developing a trust/foundation for implementing the Company's visible CSR projects keeping in cognizance OIL's CSR policy and the new CSR guidelines by Department of Public Enterprises (DPE).



Officials of OIL & TISS signing MoU in presence of Shri A. Jaini, DGM (PR), OIL Corporate Office



Shri R. K. Saikia, GM(HR), OIL congratulating Shri K. K. Deka, VC, Dibrugarh University after signing the MoU

Shri N M Borah, CMD, OIL, inaugurates the Multi-Disciplinary Center

Shri N M Borah, CMD, OIL, inaugurated the Multi-Disciplinary Center-(MDC) at Assam Engineering College, Guwahati on 9th of April 2012. OIL had extended a financial support of ₹ 1.5 crore towards construction of the Multi Disciplinary Centre (MDC) at the engineering college.

After the inauguration, in his speech, Shri Borah, urged the students to think about careers in the petroleum sector as it would be significant for at least the next six or seven decades, even as alternative and non-conventional energy sources are being explored.

Addressing students and faculty, Shri Borah mentioned that the petroleum sector has been offering great opportunities and challenges to young engineering professionals. He spoke about the upstream petroleum industry its future and challenges, urging students to prepare themselves to respond to new prospects in an appropriate manner.

Shri Borah appreciated the success of Assam Engineering College alumni in various spheres, especially their achievements in the energy sector. He mentioned that many of them have earned recognition as engineers at OIL and other petrochemical industries.

Speaking on the occasion, AEC Principal Shri N Patowary thanked OIL for its generous funding and said that the Multi Disciplinary Centre would help students in a number of ways.

At present the MDC houses the Entrepreneurship Development Cell, Training and Placement Cell and a new language laboratory under a single roof.



The Multi Disciplinary Centre at AEC



OIL OBSERVES FIRE SERVICE WEEK-2012

The ardent necessity for prevailing awareness about fire safety precautions was the major cause for concern as the Fire Services Department of OIL observed Fire Services Day. Observance of Fire Services Week continued till April 14 to drive home the message of prevention and also quick response to disaster.

Together with the rest of the country, Oil India Limited's Fire Service Team also observed the Fire Service Week from 8th April to 14th April 2012. The theme for this year was "Smoke Management Saves Lives". The underlying message was that many lives are smothered by the thick smoke, in addition to those that tongues of flames claim. But, the major concern is about what causes fire and the resultant loss of lives.



Under the aegis of Directorate General of Civil Defence, Fire Section, Minister of Home Affairs, Govt. of India, Oil India Limited observed Fire Service Week in a befitting manner to make general people aware of necessity for minimizing loss of life and property due to fire, which have been mounting during the past few years and

thereby causing set back to the National Progress.

On 14th of April, Shri N K Agarwal, RCE, OIL paid homage to firemen who lost their lives while discharging their duty and addressed the gathering apprising their duties towards fire safety precautions and responsiveness towards disaster. The OIL Fire Service Team is committed to generate public awareness about Fire Prevention & Control by conducting special campaigns in Installations, Schools etc. and organizing awareness programme during the week.

This year Fire Service Week was observed in Oil India Limited by organizing various competitions, exhibitions,



demonstrations & film show etc. The programmes were scheduled to create Fire Safety Awareness amongst the installations & Society at large in & around Duliajan, Moran & Manabhum.

The Fire Service Week is organized every year in remembrance of the lives lost in the devastating fire that erupted and the explosions that followed on 14th April, 1944 at the Victoria Dock in the Bombay Port, now Mumbai Dock and also to prevent the fire in all industries. 14th April, is also to be observed as "MARTYRS" Day to pay homage to those brave fire fighters who lost their lives in performance of their duties.



North Eastern Oil and Coal Mines Safety Week, 2011-12

Directorate General of Mines Safety (DGMS) gave Oil India Ltd. the honour to host the final day function at its Field Head Quarter, Duliajan on 22nd April, 2012. The company's functional directors along with the senior executives and the employees participated in the function to drive the message of safety to the grass root level. OIL hosted the final day function of 'North Eastern Oil and Coal Mines Safety Week, 2011-12' in collaboration with ONGCL, Coal India Limited, Geo-Enpro Petroleum Limited, Arunachal Pradesh Mineral Development and Trading Corporation Limited at Duliajan Club.

The concluding function was organised by Oil India Limited after a gap of four years. The event was attended by Shri Satish Puri, Director General of Mines Safety, as the Chief Guest, Shri Utpal Saha, Dy Director General Mines Safety, Eastern Zone, Sitarampur, Guest of Honour and Shri D K Sahu, Director Mines Safety (i/c), Guwahati Region and Convenor, Safety Week Celebration Committee 2011-12.



A large number of participants from North Eastern Oil and Coal Mine fraternity like Shri S Rath, Director (Operations) OIL, Shri B K Baruah, Executive Director ONGCL, Sivasagar, Shri S K Jain, Basin Manager Assam and Arakan Basin, Jorhat and Shri A K Bora, Chief General Manager NEC Margherita, representatives from CIL, ONGCL (Agartala, Jorhat, Silchar, Sivasagar), Geo-Enpro Kharsang, APMDTCL, Namchik along with 500 guests invitees participated in the concluding function.

The event flagged off with the hoisting of Safety Flag by Chief Guest, Shri Satish Puri. The flags of the participating organisations were also unfurled by the visiting dignitaries, followed by slogan and poster, song, drama competitions creatively reflecting the significance of safety held among the participating companies. An exhibition displaying working models related to industrial safety was also organised to showcase the technological innovation in the dominion of safety.



In the second fold of the function, Shri N K Agarwal, RCE, OIL and President Organising Committee presided over the function and conducted the proceedings. Shri Chitrabhanu Bose, Secretary Organising Committee delivered the salutary address to the august gathering. All the dignitaries on the stage enlightened the gathering with their valuable insights emphasising the safety matters in various domains. To commemorate the occasion, a souvenir, 'Sarvabhayaprada' was released by Shri Satish Puri, Director General of Mines Safety.

In the last phase of the function, awards were distributed to those who stood apart in their initiatives to make the asset, people and environment around them safe.

The Safety Week Concluding Function was lined up with the basic objective of propagating the message that "*the right way of doing things is only the safe way*". Observance of the safety week has immensely helped in increasing the safety awareness amongst the workers of the industries, particularly in OIL India thus reducing its rate of accidents over the years.



WATER AWARENESS WEEK

As many areas of the globe face increasing freshwater constraints due to increased consumption and the likely impacts of climatic change, Oil India Limited, over the last couple of years has joined United Nations global campaign on this noble cause as a responsible corporate and has been sponsoring drives aimed at increasing awareness related to this precious resource.

"Water Awareness Week" campaigns held in and around OIL's operational areas in the last couple of years have made it possible to reach out to a large section of the society and create much needed awareness, both for the conservation, as well as judicious use of this precious resource. These initiatives, besides being acknowledged and appreciated by the local and also national media, have also contributed towards OIL receiving recognitions and awards at various national and international forums, on issues related to safety, environment and sustainable development. Very significant of the recent recognitions being acknowledgment and inclusion of OIL's initiatives by the UN at its global mapping of noticeable efforts on this aspect and receipt of the "Aqua Excellence Awards 2011" under the Corporate Social Responsibility (Water) category awarded to OIL by Aqua Foundation, an organization working in the field of water, bringing governments, policy makers, researchers, academicians, technology providers, consultants, industry players and NGO's on a common platform.

As in the past, to carry on the good work done so far, this year also, OIL has successfully completed the observance of Water Awareness Week from 22nd March to 28th March, 2012 with programme planned at Field Headquarter, Duliajan as well as OIL's operational areas in Moran & Digboi. The inclusion of Street Play (in Duliajan, Moran & Digboi) was appreciated by all and considered to be an effective medium to create awareness amongst considerable section of people about conservation of water.



Cycle Rally flagged off by Shri N. K. Agrawal, RCE, OIL

The observance of Water Awareness Week, 2012 was commenced with the flag hoisting of Water Awareness Week's flag by Sri N K Agarwal, Resident Chief Executive on 22nd March, 2012 at Duliajan Club Premises, followed by administering the water awareness week's pledge. Street Plays were organized in various places in Duliajan, Moran and Digboi, during the week. The street play highlighted the condition of water crisis and the need of judicious use of water.

As a part of observance of WAW'2012, on 24th March, 2012, a one day seminar, on "Management and conservation of Water" was organized at Duliajan club. Two eminent speakers, Dr. Arup Sarma from IIT, Guwahati and Dr. J N Sarma from Dibrugarh University were present. Sri K K Nath, Executive Director (E&D) of OIL presided over the seminar. In Moran and Digboi also technical seminars were conducted amongst the OIL officials, employees and students. Apart from in-house faculties from OIL, Sri Dipak Basumatari of NEIST, Jorhat was also present in Moran as guest speaker.

Drawing competitions were held amongst the school students of Duliajan, where more than 2000 students participated. The students from "Mrinaljyoti Rehabilitation Centre", also actively participated in the event. Photography competition also organized amongst employees and their family members.

On the occasion of observance of WAW'2012, a souvenir 'SOUVENEER' was published to commemorate the event ceremoniously released by Executive Director (E&D), Sri K K Nath, in front of august gathering of Technical seminar on 24th March, 2012.

Various other awareness campaign, to create water awareness like mass displaying of water conservation slogans and awareness week posters were carried out in Duliajan, Digboi and Moran.



Shri K. K. Nath, ED(E&D), OIL along with other officials releasing the souvenir

High Performance Computing in Geosciences PROMISES & CHALLENGES



B J Reddy
Head, Geophysics



D S Manral
Chief Geophysicist



Mukesh Kumar
Sr. Geophysicist

Summary

Geoscientist's in the oil & gas industry are tirelessly focusing their knowledge and experience to unravel the mother earth for locating & extracting hydrocarbons from increasingly obscure and challenging geologic locales in the subsurface through integrated mapping, imaging, interpretation and reservoir grade analysis of geoscientific and engineering datasets. The challenges posed by the invincible mother earth in quest of hydrocarbon resources have necessitated invention, innovation & application of cutting edge technologies, techniques, work processes & knowledge in various facets of the E&P value chain. These advances in varied facets could be successfully translated into practice only through enabling computational technology which has indeed shown an unprecedented growth and complemented the Geo-scientific initiatives head on more often than not.

Moreover, if we look back, today computing has evolved to a stage where High performance computing has become affordable, efficient and space convenient and holds a promising future, though challenges will always be part and parcel of it given the appetite of geoscientist to keep on innovating and asking for more.

As a corollary, in the last few decades, the upstream industry has made a journey from seismic trace operations to elastic wave modelling to understand the Earth at higher and higher resolution and on a larger and larger scale. In recent times compute intensive imaging applications such as reverse time migration, iterative and interactive velocity model building and full waveform inversion amongst others have significantly increased the role of High performance computing and made it more vital than ever in the oil & gas industry.

Introduction

The developments in Geosciences and Geophysics in particular have undoubtedly lead to a paradigm shift in all facets of the E&P Value chain right from data acquisition to imaging, interpretation and reservoir management etc.

Several geophysical techniques have evolved over the years covering all domains of the E&P value chain for exploration,

exploitation and reservoir characterization viz. 3D seismic, 4D seismic, Multi-component seismic, wave equation based migration, inversion, reservoir simulation methods etc. These techniques are primarily aimed at unraveling the formidable subsurface challenges for identification & delineation of hydrocarbon resources.

Moreover, advanced methods for investigating the Mother Earth involve in use of complex theoretical models requiring extremely compute intensive applications/ algorithms to handle such complexity and the huge data sets generated in the process. These advances have enabled oil & gas industry to take several initiatives for carrying out target oriented exploration & development activities in terms of large scale 3D, 4D & multi-component surveys comprising of high channel counts, finer shot & receiver spacing & fine sampling rate amongst others. This has resulted in an explosion of data volume from several gigabytes to few terabytes. These developments have dramatically increased the volume of data and data imaging requirements, a schematic diagram illustrating computing advances vis advances in geoscientific applications is shown in Figure 1.

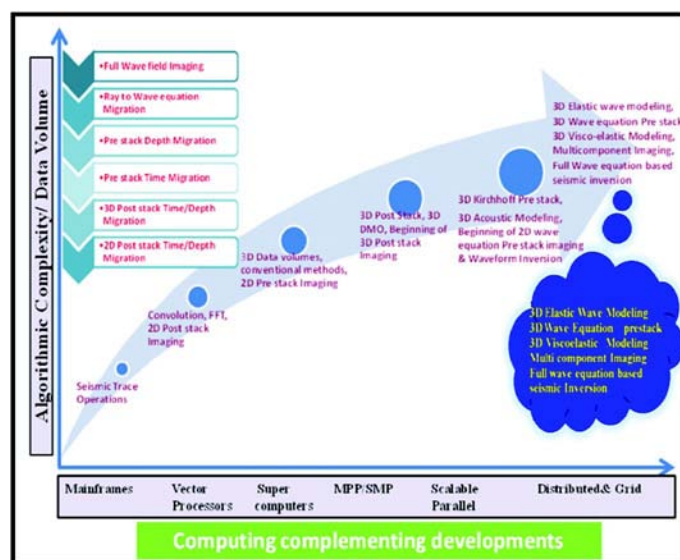


Figure 1: Computing complementing developments

Key Drivers of HPC in Geosciences

The oil and gas industry has always been at the forefront of adopting and implementing technologies from various disciplines be it physical, biological, material, or computational sciences amongst others in quest of hydrocarbon resources. Therefore, it was not surprising when it used the unique capabilities provided by supercomputing for over decades, wherein it took buildings to house the hardware and months to completely iterate

through a project's dataset. Infact the past generation of geoscientist were often so far ahead of the curve that they had to wait patiently for computing technology to evolve to their expectations for testing/implementing innovative algorithms for solving complex 3D problems thereby indicating the presence of a symbiotic relationship between Geoscientist and compute technology.

Geoscientist's in the oil & gas industry still retain the same appetite and keenness as their past generation to innovate in their own domain and continually place demand on the computational technologies, while being in a ready state to tap the compute power of leading high-performance computing technologies available as on date. Moreover, the multidisciplinary activities of Geoscientists engaged them in adoption and application of leading edge technology and spurred the development of new computer technology and enhanced the discovery of energy resources.

The developments in geoscience over the last few decades and the ever increasing challenges to explore and develop hydrocarbon resources have led to the usage of several cutting edge techniques and technology. The increased data volume thereof, usage of compute and data intensive imaging algorithms in pre stack time & depth domain for unraveling geologically complex multifarious subsurface, reservoir modelling, simulation studies, high resolution visualization & real time data rendering have necessitated the usage of high performance computing, scalable storage, high performance interconnect fabrics, high bandwidth, visualization facilities and efficient data management solutions amongst others. The Recent advances in seismic interferometry and accurate depth migration algorithms have enabled geoscientists to image complex geology with a higher degree of confidence. In fact the rapidly evolving field of exploration seismology is marked by continual algorithmic advancements and the processing and analysis of large datasets that are indeed pushing the limits of HPC.

However, it is pertinent to note that traditional approaches cannot possibly manage the explosion of dataset and their compute intensive nature for making informed & confident decisions that are relevant to data in huge volumes (3D/4D/3C) seismic, derived seismic attributes, empirical relationship mapping, rock physics, wells, interpretation objects, time-variant geologic processes etc. Moreover, the continual focus on adoption and implementation of emerging technologies, burgeoning data volumes generated thereof and advanced analytical/model based approaches/processes have placed exceptional demands on computing landscape & decision makers in the E&P industry worldwide to execute their oil & gas workflows/processes efficiently. A typical oil & gas work flow/process employing cutting edge technology is illustrated with the help of a schematic diagram in Figure 2.

In view of above backdrop it emerges that all aspects of computing, including data management, processor

arithmetic-unit speed, memory bandwidth and latency, interconnect performance, IO bandwidth, Visualization, and power consumption play a crucial role in exploration & development activities right from data acquisition to reservoir simulation and monitoring. Hence for imaging & integrated interpretive geoscientific applications one requires fit for purpose hardware architectures/landscape to optimally utilize the various applications throughout the E&P value chain.

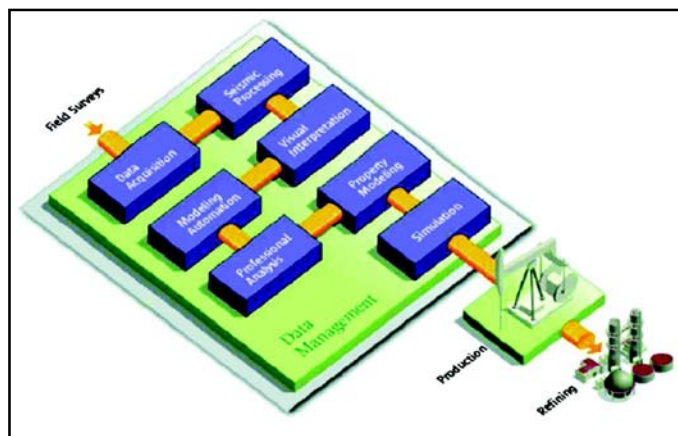


Figure 2: Typical Oil & Gas work flow

In corollary, HPC landscape is continually evolving to meet the pressing demands and hence has emerged as a mainstream technical tool in the oil and gas industry worldwide. Fuelled by new and more economic server-based cluster computing technologies, and by modeling/simulation software developed specifically for exploration and production, supercomputing has today reached to desktop. Today HPC has become a potent and critical tool spanning diverse aspects including everything from timely modeling and simulation of large-scale physical systems, to processing, analysis and interpretation and visualization of huge seismic data volumes. Few applications, such as waveform inversion and true wave equation MVA which were previously thought to be computationally impossible or impractical are now making inroads into routine commercial application.

High Performance Computing: Industry's Choice

In recent years, tremendous advancement in computer capabilities in terms of ease of programming (object oriented), flexible storage, computational speeds volumetric visualization have led to a paradigm shift in the way large volume of datasets and compute-intensive applications are applied in varied facets of the E&P value chain. The computing systems and their efficiency have changed with time and will continue to evolve. The advances and fundamental premises of the cluster based high performance computing systems have made them the choice of industry instead of mainframe computers, stand alone supercomputers and massive parallel processors.

High performance computing (HPC) has been revolutionized by a fairly new scalable clustering technology approach which is based on open architecture and open standards. HPC is basically cluster-based computing technologies that harness the networked power of multiple smaller and more affordable commodity hardware pieces. Today the HPC clusters are capable of providing the computational power equal to that of supercomputers thereby making them an appropriate candidate to address the varied challenges of oil and gas exploration.

The growth of cluster computing has been fueled by a number of key technology developments in recent years. First is the rapid advancement of CPU technology, in accordance with Moore's Law. Second is the commoditization of high performance networking technology, which provides the interconnection network, required for cluster computers to communicate with one another. Last is the maturation of the software infrastructure required to orchestrate the activities of hundreds or thousands of cluster computers, making the task of effectively harnessing these hardware advancements accessible to a larger group of programmers. The key factors which made high performance computing systems more demanding in E&P sector are following:

- I Improved seismic data processing efficiency
- I Able to perform data intensive computations and tackle complex algorithmic challenges.
- I Lowered the risk and project cycle time.
- I Eliminated single point of failure.
- I Eliminated the performance bottleneck
- I Better visualization solutions
- I Flexible storage infrastructure
- I Vale addition at reasonable cost
- I Open architecture and open standards
- I Energy & Space efficiency

Over the past few decades, geoscientists have developed new technologies and techniques for unraveling the Earth employing complex theoretical models for gaining more subtle insight of the subsurface while making it applicable to huge data sets. Many of the advances in geoscience have changed the way we perceived, imaged and characterized the subsurface. Notable advances among them include 3D anisotropic prestack depth migration, Beam Migration, Reverse Time Migration for imaging the Earth's reflectivity, 3D wavefield tomography for deriving complex velocity models, 3D visualization techniques for effective interpretation & prospect identification, more accurate time lapse and simulation studies, sophisticated fluid-flow simulators for understanding oil and gas production, and digital rock simulators for understanding the subtle relationships between the measured fields and the underlying geology.

The continual evolution/development of high performance computing system have today enabled geoscientist's to

acquire, store, manage, process, visualise and interpret very large-scale data volumes quickly and with confidence. Infact High performance computing has become exciting not because it is fascinating rather, it is now a tool that addresses the technical issues and limitations involved in analyzing and displaying large amounts of data. Moreover, HPC has exploded because of the convergence of inexpensive cluster computing, parallel applications that harness clusters, and high performance storage. HPC has therefore become pervasive part our economy and will continue to drive the competitive edge in businesses, as well as to improve the quality of life by solving varied problems spanning several disciplines that are relevant to today's world.

Challenges & Way Forward:

The real HPC challenges today are to integrate all the compute units to transfer large data volumes to and from the processing units (efficient data access), and to process data in small chunks distributed over many processing units (efficient algorithms). The most limiting factor in the optimization or configuration of the clusters is internal memory bus; data throughput and computer interconnect fabric. The growing number of computing components within the hardware architecture means large efforts must be made for the parallelisation of application programs. It is a fact that parallelisation tools are far behind the possibilities offered by HPC hardware.

As a user one need to make a number of choices before assembling a cluster system. This may include a number of key perimeters to be considered in view of the expected performance viz. What hardware will the nodes run on? Which processors will you use? Which operating system? Which interconnect? Which programming environment? What application software will run on the cluster for optimal and efficient usage? Each decision will affect the others, and some will probably be dictated by the intended use of the cluster. Therefore computational tools are often not easy to use and require considerable judgment and expertise

The payoff for developing/implementing the high performance computational tools and the computer comes when the production user employs the computational tools to solve real problems. A large, massively parallel computation may produce terabytes of data. Extracting information from such datasets is a massive challenge. Thus, while computational science and engineering has great potential, there are significant challenges to realize that promise.

On the other side substantial amount of energy consumption & cooling requirements need immediate attention. It is a well-known fact that the energy consumption of HPC data centers will double in the next four to five years, if the current trend continues. The development of HPC systems that reduce the energy consumption is absolutely necessary.

A serious competitor catching up the multi-core CPU is

represented by graphical processing units (GPUs), which are graphic cards used for scientific computing. They are fast and will get a lot faster. GPU's are cheap & use less power than CPUs when compared on a performance-per-watt basis. But the limitations of the GPUs are only good for tasks that perform some type of number crunching. The GPU's were designed specifically to process graphics, and that means processing streams of data. The fastest graphics chips are already in the Teraflops range whereas normal Multi-Core chips are slowly touching this border.

The real problem with GPUs is that they may not be programmed as it is for normal common CPUs. That's the reason that GPUs offer the support of the CUDA (compute unified device architecture) library that provides a set of user-level subroutines and allows the GPU to be programmed with standard C or Fortran without the need to use a graphics specific API. For the nearest future scenario of HPC systems the hardware architecture will be a combination of specialized CPU and GPU type cores.

Furthermore, since exploration data analysis makes use of a broad mix of applications. Some algorithms are CPU-intensive, others are memory-intensive, others still are I/O-intensive, and some are all three. This again places varying

IOPS and throughput demands on a storage system. What's needed is a storage solution that has the flexibility to handle the application mix found in most energy exploration organizations.

Moreover, given the enormous amounts of data in geosciences that need to be manipulated, analyzed, integrated, moved, and visualized, the key to success is to have highly honed & improved computational workflows in place to handle the work. Additionally, exploration organizations worldwide need to continuously try accelerating their workflows. This can be achieved through optimization of increasingly sophisticated analysis algorithms to take advantage of a hardware-assisted speedup by running them on GPUs and FPGAs. Use of these technologies can significantly change the IOPS and throughput demands on a storage system.

Also in order to perform seismic analysis on the scale required today, geoscientists must be more than experts in signal processing & geological formations. There is a need to give more impetus to computational geophysics so that industry professionals learn low-level software programming to quickly analyze large datasets on high-performance computing (HPC) resources.

Sphere News

CALCUTTA NEWS

BUSINESS DEVELOPMENT MEETING OF OIL

ON 6th and 7th March, 2012, OIL Calcutta office organised the Business Development Meeting of OIL. Shri TK Ananth Kumar, D(F), Shri B N Talukdar, D(E&D), Shri N K Bharali, D(HR&BD), Shri S Rath, D(O), Shri P K Sharma, Independent Director, Prof. Sushil Khanna, Independent Director and other senior officials of OIL attended the Meeting.



Documentation workshop on implementation of ISO 9001::2008

OIL Calcutta Office organised three (3) Days 'Documentation Workshop' on Implementation of ISO 9001:2008 on 27th February, 2012 and on 2nd and 3rd March, 2012. The Workshop was conducted by National Productivity Council and selected participants from all section of Calcutta Office attended the Workshop.



7TH OIL INDIA CHALLENGE GOLD CUP

Assam State Electricity Board won the 7th Oil India Challenge Gold Cup by beating hosts Oil India Limited 2-0 in the final at Nehru Maidan, Duliajan. Assam State Electricity Board (ASEB) scored both the goals after the break in a keenly contested encounter. Hemanta Kumar Barhma scored the opener in the 63rd minute while three minutes from time Chayaram Basumatary sealed the victory.

The 7th Oil India Challenge Gold Cup was organised by Oil India Limited from March 21 to April 1 2012 at Nehru Maidan in Duliajan. In total, 14 teams took part in the Tournament with the champions received ₹ 150,000 (1.5 lakhs), while the runners-up got ₹ 100,000 (1 lakhs).

The OIL Challenge Gold Cup is a very significant sport event that has in its own gone a long way in harnessing the tremendous potential of the naturally gifted football players of the region. Oil India Limited organises this tournament every year to promote football in this region and to enable talent to be spotted.

This year, a total of 14 teams took part in the championship. The participating teams included - Punjab Police (Jalandhar), Kenkre FC (Mumbai), Camelia George Telegraph (Kolkata), Southern Samity (Kolkata), JCB Bhilai Brothers (Chattisgarh), Techno Aryan Club (Kolkata), Green Valley FC (Guwahati), Nagaland Police, Assam Police Blues (Guwahati), ASEB (Guwahati), Morning Star FC (Diphu), Trugpu FC (Manipur), Oil India FC, Duliajan Football Academy.

In the colourful closing ceremony organised on 1st of April, a souvenir was released by Shri N K Agarwal, RCE, OIL to commemorate the spectacular event. The function was attended by Shri Binanda Deka, Group General Manager (Production), Oil India Limited, Shri Jamshed Khan, Secretary, Dibrugarh District Sports Association and Shri Arun Das, Resident Chief Editor, Dainik Janambhumi as Guest of Honour and other officials of OIL.



Shri N K Agarwal, RCE, OIL releasing the Souvenir



Players in action during the Gold Cup



Winner Team - ASEB



Runners Up Team - OIL

TRAINING Snapshots



A Training on HSE for Executives from 22nd to 23rd March 2012 at PHQ, Duliajan



Seminar on "Women Empowerment Reality or Myth" held on 11th April, 2012 at MTDC, Duliajan



Training on Cummins Smart Engines held from 13th to 19th February 2012 by M/s. Cummins, India at Duliajan

The Ph.D thesis of **Dr. M K Sarmah of R&D Department** titled 'Compositional analysis of heavy residual fraction of North-east Indian crude oils having different Geological origins' has been published in the form of a book by the Lambert Academic Publishing GmbH & Co., Germany. Dr. Sarmah is presently working as Research Scientist in R&D Department of OIL.



Mr. Bhaskar Jyoti Dutta, son of Mr. Hem Chandra Dutta of Transport Department (Moran), a student of Vellore Institute of Technology has successfully completed his graduation in Mechanical Engineering as well as Information Technology in the same year.



Rituraj Borgohain, son of Ajit Kumar Borgohain of Geology & Reservoir Dept, a student of class-VIII of St. Xavier's Higher Secondary School, Duliajan has won laurels in various Chess tournaments. Rituraj was awarded first position in the GTC Round Robin Rapid Chess Championship 2012, held at Guwahati Town Club from 1st to 6th May, 2012. In 2011, Rituraj also participated in the All Assam School Chess 2011 and was placed champion in the final ranking. Earlier in the same year, Rituraj participated in ONGC Asian Schools Chess Championship held at Indira Gandhi Stadium, New Delhi and was ranked 52 with 4 points.



Miss Anoushka Das, a student of Class VI of Delhi Pubic School, Duliajan, was awarded 1st Position and secured 17th State Rank & 297 Olympiad Rank in the International Olympiad of English Language 2012 organized by Educational Society of English Language, New Delhi. She was also awarded Third Prize in the Mathematics Competition Cat-I organized by Assam Academy of Mathematics in the year 2011. She is daughter of Mr. JPP Das, Chief Engineer(Prodn OIL) and Mrs. Arati Das, Senior Manager – Employee Relations



Shri Rupanta Rwiteej Dutta, son of Smt Lipika Dutta and Shri D.K. Dutta of Oil India Limited, PHQ, Narengi, Guwahati, former student of DPS Duliajan, is currently pursuing his Bachelor of Engg. Degree in Computer Science Engg. at Manipal Institute of Technology, Manipal, Karnataka. He is selected for an internship by the National committee of International Association for the Exchange of Students for Technical Experience (IAESTE) of the Czech Republic at VENDAVO CZ (a Pricing management Software Development company), Ostrava, Czech Republic from 01.06.2012 to 15.07.2012.



Pathar's Children Brings Laurel To Assam

PATHAR, a renowned drama group of Duliajan, Assam was invited to stage the inaugural play at the North East Children's Theatre Festival organised at Ravindra Natya Mandir, Mumbai held from 6th to 11th April, 2012.

The Festival was organised by National School of Drama in collaboration with PL Deshpande Maharashtra Kala Academy. Famous filmmaker and noted theatre personality, Ms. Sai Paranjape inaugurated the Festival.

Pathar's play "Sumadhur Sammangal" staged during the inaugural day of the Festival depicted childhood of Mahapurush Sri Sri Sankardev. The play beautifully depicted the transition of young Sankar to Saint Sankardeva. The play was highly appreciated by the august

gathering present during the festival.

Keeping in perspective, the unique achievement by Pathar, OIL had sponsored the team uniform while the organisers funded their air travel to Mumbai, fooding and lodging and other necessary expenses. Shri Pabitra Chetia, an employee of LPG Department and Director, Pathar led the 25 member team which comprised of Children most of whom are from nearby villages from various ethnic communities in and around Duliajan.



Pabitra Chetia



`ÜAK÷ǎõ`Ŧý0B%+_+×%ò»XTQ %WlùC Y»\$X a†û_Eõ

0 AK: aEo 0 01 a] ,2012 T«F» Y»ç %+_ +%0ç
 ×_x] a000 %Wj lÜC Y»ç X a tÜc Eo Vç +K» GBS Eo» a* äY0ç lç
 =ä/lçG» éaäTö 35 [K» Wj» L_0Tö 0 0 004 %aXBS, FXX %ç0
 =dYç/X» VI tÜç %ç0 %» pütç» Yç 1977 \$Xtö %+_ +%0ç
 \$Eo» Tö aÇG »lVç 0 0 004 äEçYXç] äTö - aGK: YËo» Eo äXtEç
 »lVç _GaTö [ç] çX %00ç» YËo» äç m» Wj» K: * äTäFäTö ä00
 V Eo Wj» %a] %ç0 %» Gç0 YÄ Tö %+_ » Eç] - EçL Eo äXtEç
 »K: %ç0 Vç lçL çTö %aXBS Eç i] j6 [[Y ç] çY] »] çY Eo %ç0
 »] çY Eo \EçYX L »Y» açç Tö FXX =YäçGY %ç0 =~lX] Eo
 ä _aEçX» aqÜç Eoç \Eç pÜçX Eo V _Aç Eo äXtEç »K: *

[illegible]

A+a]É:ÊËTöV%çç%»cSç» [ÿæ»C

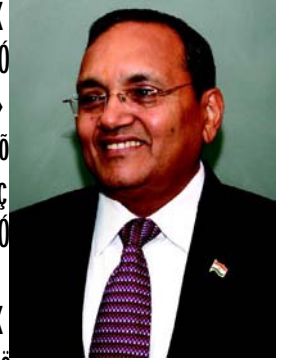
LcTdr %>0 %dWdW Y»a»T» à^àX
%>ZÉ;]VY(Yò, V-1 G - Y(fA-0% %>0
=w» %a]»É;]c«l/ T»-X[y/c VcF_»
àlyT» àT«àT» %+_ +%> x_×] àD«Eò
aV« àXTE«V %>«% %+_ ×_×] y/c
Y«k«òàT«T»]Éi =Yà/r«(%àXBS %>0
=-rX) %>0 E«>à]àXL« %>0 *

%+_+<0> %Vf|ü%0Y»\$ X
a†ü_Eõ» YVTö ä^cG <V^c> %cGäTö

0 0Y0W4äY0_ rç] %00Y0E0E0äGK:-JÜWŠ»» %ÜBT0Q0+>k000
älÄk> _%¼ c+VE0jY0 (DGH)» atü E0 Y0X »äY E0-i[X:=
E0» %0K:- * A+ YV[ät0 äTfätoäY0_ rç] JÜWŠ»ê c+VE0jY0»
%äKS, =-rX %00=dY0X a0WEdr Ec]-EcLTö Y000 %»cSç
vK:- %00äT0T0 E0iEc_ äT0DGH A äE0W \$0E0» »d_ä0bè_
[K» 4900.00 äE000E0» »d_c:=%00 4000.00 äE000E0» _c0
v[r_e alü écK:- *

āV' » āTō - YēEō āGK:F% [yāYXtō-XVpS Eōctō [S
=Jō IūTōa]Y- Eō}» aVai ū ūYō* āTōFātō āGK:cēāVdō
» \$kU%>Ōā` _ āGK:āŌ\o_Yā}ŌaYEdr āEqYfAk\$Aptō%ca)»Eō,
+= āEq Lq)KY %v āV' » %dū>gr ālū ēāātō\ōTōSōEō» ec:
ŌŪ) EōāK*

~ 0 0 0 0 0 0 ALX [S Y0r0q0Y ~ [yNp x^Lx %d » a] rT0
Y 0 Gx E-X %>0 aGc Z0 af_ _ Q_Y0* \00c> CY>T0VF_ UE0
~ 0 0 0 0 0 0 aEd y0C \00T0%>0\w\ Y \00c Ed[y Ya>



aX14

%+_+×%ç××]ä0ö ãç0x YÉĖĖ[ŷ 2012 %LŮ

4V » %G` 0Y» eT0 Y00X %+_ +%0c x» ä00a]d» E0 iC %00 =~IX» cE0
 %G[V0+ %c0» %cS0 E00S 2012 [0» %T0X00V äG00X YIE00 [00 c0E0» ä0*

\$ē_Tō [jō] 24 A×Ų_» Y×ç 26 A×Ų_ Tō»Fē_ ŌŲ_+Tō%XōTō "ŌŲ_+ {ŷ Ŷa}dVwK,
2012 %Ų_0 aŠ] %Ų_LŲ_Tō ac]cLēō VŲ_ŶŲ_Ų_ a×X_X (Dubai Global Convention,
2012 & 7th International Seminar on Social Responsibility)"Tō%+_ +%Ų_Ų_ é=
EŲ_iŶŲ_ā tūc_Eō (%āKBS %Ų_0=ŶX) `Ų_EŲ_Ų_VŲ_EŲ_ XŲ_ %Ų_0 LXaŲ_VŲ_Ŷ{ŶŲ_G` YŲ_Ų_Eō
`Ų_Ų_Ŷi YāŲ_ \$ē_cŲ_ =NŲ_Ų_ GBS Eō* āZŲ_Ų_ _%U»×Zō GŲ_Sā]³Ų_Ų_ā=X »āŲ_Ų_(FAH
%₃Ų, \Ų_Tō YŲ_NP]Ŷi {ŶŲ_Y×Tō%Ų_0+³a×Ų_Ų_Ų_Ų_¼ Ų_ā×kōŲ_Ų_+%Ų_Ų_ %Ų_Ų_lù LŲ_Ų_Ų_ AX
%Ų_Ų_lù Tūc_LŲ_Ų_ Ē]cLV GŲ_» YŲ_TŲ_YEō%Ų_lù LŲ_Ų_%_]cLā/ =YāNŲ_%XŲ_Tō[Ų_a]

*XL» Eō[tiū Tō[p[ra Eōc »ç+L» %dji - aç]aL Eō=ŕX» Eō»S %+_ +»ç[ç _x]aōōō GōS Eōc [jēd a]d Eō_īç YVāi ū»
 ōōēā tōōō ūY =Nb %dji ōā Eō [ōā» āEō[çXāōç aX[çX tōēç āç*



a6lç YTOÇPS Eö»ä:a6lçatic Eç YU
 AX:a6Y%+ » %ççato Ei xYlç
 AX æ0%ççç %0%çççiaE0 *ç

*[rô][N]pEō YU' BYY»V' K Eō»ā:

A+[«» ac]»S %X0X0a6Liç aLcGT0 Y00» %0Y00» JFi [rT0 "the right way of doing things is only the safe way" (a6Xü0Y^ü0écK:Eç] E00» £^üY^ü0)eaal0aeG-T0»F %dL X E0c c£*

0% X 3 V X



%[C] + 30pA_ %'x00-J\A G» E0[0]Y` 0%XY E0[C] [p0[C] E0[C] VC_VrC_C AE0V` -[V]ic`- V`] æ 0V` KeyY E0[C] a00T0 [p0[C] 16]E0_ KX Y0E0(m%C0) A %_YaT0%aC_LX E0C Multi Talent Hunt Y0aC0T0 aT0T0` fC0T0T0` 00X %0E0 E0aC* Z000` 0b`x0 KXa_]Se a[V000aV0C]aT0 +a00a a00T0 GY0Live Y»aY X E0aC*

अक्षर - १

(=daGc - %+_ +%drc =Jdō]dHx]Eōx[Vic_r, VC_Vrcl_cXē_)

- V_Y Eō]c [yc aTEdōc x[VdG

Y»Jdōācē/c Y»c

ā]c xfc]]clTō

āTō]c x[Vc]cX YcXē\$

A»c-A» ācē/c %cl [SvāX+ c÷!

a]r» JdEōXrctō

ā]x »ā_c xQdō A»VX LßX eXTō

Tō] Vrc acāa+ ā^ [Vdōē_*

āai TōcX» Eōc ā^X,

+xTōā ācē/c Xc+ A»Tōc;

āTō]c āacSc_Y [pīō

[Ya» %ōTō

»ō/c Y Jdē ā āTō]c Eōbē_

Hē» %cēāKē] ^Vc*

āTō]c ādōc&`Tō

VXc+ aō Yc+ =PāK÷

ā]c ē` ¼ ā]c ēEō c»-

a]ā^ FcTō Eōc cēTō]+

āTō]c āVc» āEōPā[y»

%c Zō ēEō Jdē āKē

»x» SēEōcā_C xEdLX[V A»Tōc

x_Fc %āK÷ā]c Xc] !

āTō]c [Vdō HcX QōcTō

āFcl [Vc+ JdēāKē

TōcXāTōA» %cē [YX»

ā_SEō Gd_c x[VdēāKē !

A»Tōc cēāTō [YōdōJdē YdVc

ā]c cēTō AEōā[Vēō ā»Fc

VdX Y»[YVrc Xc+,

āTōcJdēā^ ā]cā+ %Xc Vc+*

āTōX+ %VcX %cā_c ā^]+,

āTōTōc [Vc Xcā_c A»Tōc [VdāKē-

EōSTōVc %PōEō,

cēTōā[Vtō āEō[yacē

\$ Jdē» a»rc» Zō āVFc

āa+ā[y] [Ytō ā^ %cK÷ %c]c LßX Gd»*

%c]c EōVcTō] āV-FK÷c

āVFc Xcā_c %c]

āTō]c Vdē» āEōSTōxL_x-Eō=Pō %`Eōc*

%c]cēō %cā_cEōTōEōc YDcāTō

āTō]c āVcTōdōVcX āYc»S =Pō*

%c] Vrc Vc, Y» Y» ^cG

Tō] XVtō Vrc-

""+ %cāKē xEō» Vtō, =Pō'

āTō]c Ydē»Tōa[y cēTōFc]dō

A»VX Vrc c[ē_x-Eō_c

=LdōFcā_C āFcY āX»c

Arēā^ %c]c LßX» aVdōVrc Vrc*

ā]c •ō

ā]c ē` ¼ Eō» %c]X

ēEō c» _G»Y

%`ōaVrc x[Vdē ā[y]c Y Jdē

ā]c LßX» Hōd» YdēāKē I dē ac÷cyY*



%ǻVχǻ_£ō %³/a» LŸ/X]Wß %ç»Óaf]ř ċCfõ..



0 A' \$ô/G4w0, Y»»[ýX x[y\öG



0A_ \$0aa2Xc3/c_ Y»[cX x[)dG



×Y %0C÷V, Y×»[ýX ×[ý0G



VA ^d/c/4 Y»»[ýX x|yG


$$[A] \cdot [P] = dY/dX \cdot (aT_0) \times [A] \cdot [G]$$

$$\frac{dQ}{dt} = \frac{dY}{dt} X \left(\frac{dT}{dt} \right) \times \frac{dG}{dt}$$


WA]. \$ô T c] Ç Y, x Qk e x Qk AK ÷ x \ c G



Uy A YUX, xQx e xO AK: xYAG



У. Л. »', ЕВ аеа FX x\G



· 0KÝ_E0Ü0MÝç; ál ü/ %×λδçÜEō ×ΓλG



U>[y⁸V⁸DVca, \H⁸e⁸4C eTö_c`r x\wG



WA_AK:SOEG, A_ xY xL xYNÖG



0Y0Y Xx=10'c, aC]GD x[y0G



UÖX aEÖc, X»çYwç x[ÿG


$$Y = Z \left(\frac{dY}{dX} \right) \times \frac{1}{Y}$$

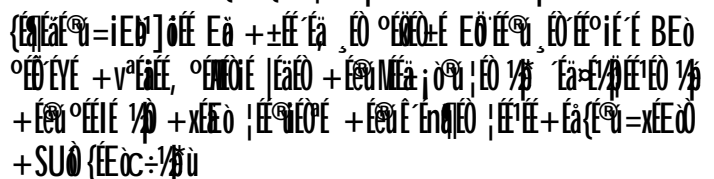
[illegible]
$$\|e^{\alpha} + e^{\beta}\| \leq \|e^{\alpha}\| + \|e^{\beta}\|,$$
[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]
$$\begin{aligned} \forall t \in \mathbb{R} \quad \text{E}(\mathbf{X}_t) &= \mathbf{E}(\mathbf{X}_0) = \mathbf{E}(\mathbf{X}_0 + \mathbf{B}_t) = \mathbf{E}(\mathbf{X}_0) + \mathbf{E}(\mathbf{B}_t) = \mathbf{E}(\mathbf{X}_0) + \mathbf{0} = \mathbf{E}(\mathbf{X}_0) \\ \text{E}(\mathbf{X}_t) &= \mathbf{E}(\mathbf{X}_0) = \mathbf{E}(\mathbf{X}_0 + \mathbf{B}_t) = \mathbf{E}(\mathbf{X}_0) + \mathbf{E}(\mathbf{B}_t) = \mathbf{E}(\mathbf{X}_0) + \mathbf{0} = \mathbf{E}(\mathbf{X}_0) \end{aligned}$$

Ο ΕΟΧΕΜ*

Handwritten signature

$$(B\mathbb{X} \ E\mathbb{a} + \mathbb{O} \ E\mathbb{a})$$

$$+ \mathbb{E} \ E\mathbb{a} \ E\mathbb{a} \ E\mathbb{a} \ E\mathbb{a} \ E\mathbb{a}$$

[illegible][illegible]

+ 011 202 338 2100 Fax: 011 202 338 2101

[illegible][illegible][illegible][illegible][illegible]

© 2012 BS&E® E&E E&E E&E E&E

[illegible][illegible][illegible]

+É+É <É=É É+É ÉJÉ÷Eò {É/ÉO {ÉÉÉ >ðÉÇ{É ðÉÉÉÉ VÉÉ+É Éä+Éä+Éä
°Éä{ÉOÉO {ÉÉÉÉ+ÉÉÉÉgÉVÉ+É Éä VÉÉÉÉä

[illegible][illegible][illegible][illegible][illegible][illegible]

0°E/°E0 °uE °E45 Eä EB IE IEIE Eö b0/E0 °Eä0/E0 1/° Eä (+E°
 Eö °EIE0>0VEEJ(EIE Eä E+E 10 +EJE °uE/Eä°EäVäEä 1/°E
 1/°EIE °Eä °E(+EäEä+ |Eä 2012 °EäE÷°EäVEEä N°E +Eä
 + |E IE0 {+EäEä13,000 °EäEä °EäVäEä >0VEEä={Eä Eö
 1/° <°E + EäEä EäNäE, b0/E0 °EäEä °EIE-°EIE Eöb÷°Eä>0VEE
 Eö JEIE °EäEä °EäEä +EäEä +Eä IE0 Eöb÷°EäEäEä 22 °EäEäEä
 +Eä b0/E0 °Eä °EäVEäEä °EäEäEäEä>0VEEäEä JEIE 1/°E/°

[illegible][illegible]

[illegible][illegible][illegible][illegible]

VE' EOE Eo > x/ (u = f/ a (f/ o m/ a B + f/ (v/ o/ v) ; f/ m/ o/ m/ = f/ o/ v/ p/ e, {f/ < f/ m/ , o/ m/ s/ f/ x/ + f/ a/ f/ p/ e (f/ o/ m/ a {f/ e p/ e u/ v' f/ o/ i/ e Eo = o/ f/ a/ p/ o/ f/ i/ n/ a/ f/ e m/ a/ f/ e v/ s/ = x/ p/ o/ i/ f/ e/ a/ f/ o/ u/ x/ < f/ f/ = f/ o/ v/ o/ f/ e d/ f/ x/ f/ o/ f/ e f/ o/ f/ e m/ a/ f/ e v/ s/ < o/ f/ e o/ f/ e a/ o/ f/ e f/ e m/ a/ f/ e o/ x/ f/ f/ = f/ o/ v/ o/ f/ e m/ a/ f/ e f/ a/ f/ e, B + f/ (v/ o/ v) {f/ f/ v/ = o/ f/ f/ a/ f/ m/ a/ f/ e < f/ o/ m/ o/ f/ p/ e s/ f/ e u/ f/ e f/ e, o/ f/ o/ f/ o/ f/ o/ v/ e, + i/ m/ e/ f/ e f/ e j/ e f/ e + f/ o/ f/ e f/ e t/ o/ f/ e B f/ a/ f/ e f/ o/ m/ e + f/ e u/ v/ s/

{É<ŒÉ<Œ ¨ÛªÉ+É Eđā®Ū/É;É;É ¶Èb÷°Ė°É...ĚĚĖĖ

[illegible]

$\{E<[E\langle E \text{ " } \ddot{O}^a E+E E\ddot{a}+nE^{(R)}]E E^{(W)}E+E E^{(b)}\div^o E^o E^{...}\ddot{E}xG\}$

[illegible]

S O L A R E N E R G Y

The 100 KWp grid interactive solar PV power plant at Jeypore, in the state of Assam, is the maiden project on Solar PV power plant taken up by Oil India Limited.

