From the desk of ED

It's my privilege to greet all readers of this Bulletin as I assume the responsibility of heading the Centre for High Technology. With the continued support of the Ministry of Petroleum & Natural Gas and all our other stakeholders, we re dedicate ourselves to your service.

To attain continuous improvement in the performance of Indian refineries, CHT, on behalf of the Ministry of Petroleum and Natural Gas (MoP&NG) and the PSU/ JV refineries, has engaged M/s Solomon Associates to benchmark refineries for the calendar year 2014. The study will compare various KPAs (Key Performance Areas) of the Indian Refineries related to process, energy, environment & maintenance performance, operating expenses, financial performance and human resource management with refineries worldwide. Like the previous two cycles in 2010 and 2012, this process will help in gap identification for achieving greater efficiencies, enhanced reliability and improved margins by realizing the full technical and financial potential of the refineries. The exercise was kicked off by the Data Coordinators’ Seminar held at IDIB Bhawan during 30 – 31st July, 2015. More than 90 participants from 15 PSU refineries attended the 2 day event and obtained clarifications on various issues with regard to the data to be submitted to the consultant. The benchmarking exercise, along with presentations to the refinery management and to the Ministry, is to be completed by 31st March 2016.
As you know, CHT took a lead role in benchmarking energy consumption in Indian refineries by developing the Specific Energy Consumption metric in association with EIL. Starting from last year, we began compiling data and computing carbon dioxide emissions from refineries. Responding to the widespread concern over global warming and climate change, the Ministry of Petroleum & Natural Gas has approved our proposal to confer an award on the refinery with the lowest CO2 emission. This will be in addition to the awards given for annual Specific Energy consumption and those based on audit of steam leaks during GOGCF 2015. Earlier CHT had invited applications for awarding best innovations of the year under 3 categories, i.e., Best Indigenously Developed Technology, Best Innovation in Refinery (refinery / group / individual) and Best Innovation in R&D institute (institute / group / individual). The nominations received are being scrutinized by the Select Committee of SAC.

The Government of India enacted the Energy Conservation Act in 2001. The Act aims to make the industrial sector more energy efficient, by notifying Designated Consumers (DCs) among the energy intensive industries and mandates on progressive energy reduction. For this purpose, The Bureau of Energy Efficiency (BEE) launched the PAT (Perform, Achieve and Trade) scheme. PAT is a market based mechanism in which sectors are assigned efficiency improvement targets. Consumers who surpass their targets get incentives in the form of Energy Saving Certificates (ESCs), while those that do not have to pay a penalty and/or purchase ESCs. These certificates will be traded on Energy exchanges from November 2015. In the PAT cycle-1, eight energy intensive sectors were covered. From PAT cycle-2, 3 more sectors including Refinery sector will be covered. CHT is assisting BEE in operationalizing the target setting exercise for Petroleum Refinery sector.

With a view to generate awareness and promote the use of Hindi in official work, CHT celebrated Hindi Fortnight during 8th to 22nd September 2015. As a part of celebrations, various competitions were arranged among the employees, such as Noting-drafting, Handwriting, Translation, Recitation, etc.

The Refining sector in India is currently passing through a challenging phase, amidst fluctuating prices of crude oil & products, shrinking refining margin, need for huge investment for upgrading fuel quality in line with international trend, stringent environmental stipulations and increasing concern for energy security, residue upgradation, etc. Going forward, refining operations will also be guided by reduction in carbon footprint and water consumption. In order to meet these challenges, there is an urgent need to explore and adopt innovative solutions to create and add value from the existing assets, improve the process and energy efficiency, yield optimization, process integration & intensification, flow control, reliability management, minimizing environmental impact, hydrogen addition and upgrading bottom of the barrel coupled with quality upgradeation, etc. For meeting Hon’ble Prime Minister’s vision of reducing energy imports by 10% by 2022, and 50% by 2030, Refineries will also see integration with gasification and biomass-refining for feed diversification. Hydrogen is the fuel of the future and a corner of energy of future refineries are in best position to meet requirement as applications are developed and demand increases progressively.

Keeping these challenges in view, the theme of the 20th Refineries Technology Meet (RTM), the biggest event on CHT’s calendar, will be “Value Creation through Innovative Solutions”. RTM is scheduled during 18th-20th February, 2016 at Sheraton Grand, Mumbai in association with Indian Oil Corporation Limited. The technical papers that will be presented during the RTM, will primarily focus on this theme and address various innovative approaches that should be adopted by the Indian Refining industry to achieve pacesetter performance. RTM provides perfect platform to the top professionals and decision makers from the oil and gas refining companies to discuss the latest industry issues, network, share their experiences in operations, maintenance, project implementation and also share their ground breaking ideas, discuss and learn the latest in refining technology to stay ahead of competitors. The RTM welcomes refinery professionals from across the refining and related industries to demonstrate their product/services to the operators / end-users. I am looking forward for your active support to make the mega event successful.

Brijesh Kumar
Executive Director

18th Meeting of Executive Committee (EC) of CHT

The 18th Meeting of Executive Committee of CHT was held on July 6, 2016 under the chairmanship of Shri Sandeep Pandurik, IAS, Joint Secretary (Refineries), MoP&NG, Government of India and participated by Directors (Refineries) of IOCL, BPCL, HPCL, Director (T)-EIL and Director-IP & apart from Directors and senior officials from NPCI, MPRL, NREL and OILB. The EC approved the proposal to engage M/s Solomon Associates to benchmark the Indian PSU refineries and BDOR for the calendar year 2014. The EC also reconstituted the Committee for commercialisation of Indigenous Technology. Apart from these major decisions, EC had a detailed review on the progress and major activities of CHT including HCF projects, Technical Services Program and proposal for Performance Gap Reduction & Margin Improvement Programme.

PAT Scheme implementation in Refineries

Perform, Achieve & Trade (PAT) is a regulatory instrument to reduce specific energy consumption (SEC) in energy intensive industries, with an associated market based mechanism to enhance cost effectiveness through Energy Saving Certificates (ESCserts), which can be traded. PAT is an initiative under MNRE (National Mission for Enhanced Energy Efficiency), which itself is one of the eight missions under NAPOC (National Action Plan on Climate Change). Under this initiative, 15 energy intensive sectors have been identified. In PAT cycle-1 (2012-13 to 2014-15), Eight sectors were covered. In PAT cycle-2, three more sectors including Petroleum Refineries will be covered, PAT cycle-2 will commence from 1st April, 2016 and will end on 31st March, 2019.

BEE (Bureau of Energy Efficiency) under MOP (Ministry of Power) has been entrusted with the mandate of implementation of PAT scheme. BEE will notify Refineries above a threshold limit of energy consumption as Designated Consumers (DCs). Under the PAT scheme, each target for energy saving is given to each DC. If the achievement is better than the Target, Energy saving certificates (ESCerts) are issued (1 MTOE = 1 ESCert). If the achievement of a DC falls short of Target, then ESCerts have to be purchased and/or Penalty has to be paid.

CHT is closely associated with BEE in implementation of PAT scheme in Refineries. The MSB methodology for computation of Specific Energy Consumption (SEC) developed by CHT has been accepted to be the performance metric for the PAT scheme by the Technical Committee headed by ED (CHT). CHT is also helping BEE in developing the format for collection of required data from the Refineries and the calculation of Specific Energy consumption. A Technical sub-committee has also been formed to look into external factors which would affect the SEC and to suggest methodology of normalisation.

The plan for submission of Refinery-wise Targets by BEE is 31st December 2015 and for the notification of Targets by MOP is 31st March 2016.

Under the PAT scheme, each DC has to:

- Have a certified Energy Manager
- Submit annual energy return
- Get energy audit conducted by an accredited energy auditor
- Implement techno-economic viable recommendations
- Comply with energy consumption norms and standards

“Live as if you were to die tomorrow. Learn as if you were to live forever.”

-Mahatma Gandhi
necessary that the objective of the Seminar – of a clear understanding of the methodology and data input – was achieved.

Mr Kevin Henke, Senior Consultant, SA, expressed great expectation from the deliberations. He explained the importance of this Seminar & requirement of Performance Benchmarking and briefed about the agenda/ schedule of the two day event. Following the inauguration, the seminar went into the details regarding data input, spreadsheets, role of data check to ensure quality, definition of refinery facilities & standard units, non-process facilities, allocation of shared facilities and key process unit data. Mr Henke also discussed different Key Performance Areas and best practices of process maintenance / energy balance / material balance in operation of refineries.

The Seminar was highly interactive and delegates from the refineries made effective use of the opportunity to clarify their doubts. Participants ranged from Technical Services, Operations, Finance, Maintenance and Human Resources, whose areas of responsibility covered the entire gamut of data sought by Solomon Associates for the benchmarking exercise.

The only thing that I have done is not mitigated by luck, diminished by good fortune, is that I persisted, and other people gave up."

—Harrison Ford

"Energy-water nexus"

Brijesh Kumar
Executive Director, Centre for High Technology

Vast amount of water is used in the energy sector as water is the most effective medium for carrying away waste heat. Even the renewable power sources such as photovoltaic solar and wind power, which require little water to produce energy, require water in processing the raw materials, to build the turbines and solar panels.

As energy requires water, water supply and sewage disposal also needs energy. In the areas where fresh water is scarce, the energy footprint for the drinking water may be extremely high, as it must be brought in from a long distance.

Both water and energy price rising demands and constraints in many regions as a consequence of economic and population growth. Excessive consumption of both can lead to resource depletion, pollution, and increase in their prices. In addition, climate change will amplify their vulnerability to one another.

Nearly 70% of the earth is covered by water, yet the world’s water systems face formidable threats. Only 2.5% of it is fresh. The rest is salt and in ocean. Even then, just 1% of our freshwater is easily accessible, with much of it trapped in glaciers. In essence, only 0.007% of the planet’s water is available to quench 6.8 billion people.

More than a billion people currently live in water-scarce regions, and as many as 3.5 billion could experience water scarcity by 2025. Increasing pollution degrades freshwater and coastal aquatic ecosystems and climate change is poised to shift precipitation patterns and speed up glacial melt, altering water supplies and intensifying floods and drought.

Another paradox is that water availability is lowest in equatorial countries, where populations are rising. India, China & most parts of Africa are predicted to face water shortages in the near future. Even countries in Central & Eastern Europe will face water shortage, if immediate steps are not taken to conserve and minimize water usage. Most of the countries predicted to face water shortage are agricultural intensive which means they will start importing food once the water issue gets difficult to manage.

Water-energy-food nexus is on top of the global policy agenda these days. The understanding of this nexus allows us to invite engagement & investments in future to target efficiency in water use and reductions in energy intensities in the energy sector.

By conserving water and reducing runoff, the negative impacts of the water-energy nexus can be mitigated. Through a Water footprint, one can learn how much water is consumed and what action can be taken to reduce water consumption from the activities with the highest impact. Water constraints can occur naturally, as in the case of droughts and heat waves, or be human-induced, as a result of growing competition among users or regulations that limit access to water.

For the energy sector, constraints on water can challenge the reliability of existing operations as well as the physical, economic and environmental viability of future projects. What does this mean for future energy supply? Integrate water constraints into the energy sector. Water power generation will have to deploy more and more technologies that can be used to manage water-light conditions. The development of unconventional oil and gas resources, which raise water and quality risks, will be challenging and this will be the price of multi-billion dollar welfare.

Likewise there are many synergies and trade-offs between water & energy use and food production. Recognizing these synergies and balancing these trade-offs is central to jointly ensuring water-energy-food security. India is the world’s largest ground water user. Agriculture, ground water, and electricity sectors in much of India are now bound in such a situation where the growth of agriculture is being supported by unsustainable trends in ground water and electricity, so much so that even growth in agriculture is now threatened.

In some areas, the imbalance is staggering. For instance, the Upper Ganges in eastern India, where underground reservoir would essentially need 54 times as much rain as it currently gets to replenish the water that’s being used by farmers and the local population.

The energy-water challenge is too large for any organization to tackle alone. The global community is well aware of this nexus, but has so far addressed them in isolation, within sectoral boundaries. A nexus approach to sectoral management, is needed to ensure that co-benefits and trade-offs are evaluated and considered.
Awards for best performance in CO₂ emission

It has become imperative to measure and control emissions from the hydrocarbon industry which contributes to 3-5% of total Indian Green House Gas (GHG) emissions in view of vital issues of international concern, both in industrialized and developing countries, such as global warming and climate change.

As an initial step to address the issue, estimation of CO₂ emission will be done as per the API compendium for GHG 2009. Refinery emissions are categorized in three parts such as 1) Direct emission 2) Indirect emissions related to energy and 3) Other indirect emissions during loading and transport of crude and products. It has been decided to follow Carbon Weighted Tonne (CWT) method for estimating CO₂ emissions, as it is being widely used for comparing CO₂ emission in refineries in EU.

It was proposed earlier to institute awards for refineries with the lowest carbon footprint, on lines similar to that for the awards for Specific Energy Consumption (SEC). In continuation of this, to recognize refineries with best performance in Carbon Dioxide emission, Mop&NG has approved to the constitution of the Award Selection Committee and accorded its approval for conferring 2 nos. of awards to best performing refineries in 2 categories for the year 2014-15.

New Initiative : Innovation Awards

The Governing Council of CHT has accorded approval for institution of R&D/Innovation award for ‘Best Indigenously Developed Technology/Process’. The objective is to promote innovative scientific endeavor in the country by encouraging and rewarding excellence in original invention/innovation and channelizing national and international knowledge and expertise with the mission of giving impetus to innovation activity in the country. Also, it is aimed at recognizing the hidden creative talent in individuals or group out of recognized R&D system that could be harnessed for the benefit of the nation. The award is primarily for Hydrocarbon sector and will be given every year. The awards will be conferred for the following categories:

- Best indigenously developed technology
- Best innovation in Refinery (refinery/group/individual)
- Best Innovation in R&D institute (refinery/group/individual)

In this regard, nominations have been invited from PSU oil companies & their R&D wings, private & JV oil companies and CSIR-IIP.

ISO – 9001:2008 Audit for CHT

Centre for High Technology obtained ISO 9001:2008 in June 2013 and as per the system requirement, 2nd Periodic Audit (PA2) was carried out by M/s DNV GL on 17th July 2015. On satisfactory completion of the audit, M/s DNV GL has certified for continuation of ISO 9001:2008 to CHT office.

This certification is as per the international standard related to quality management system. This certification ratifies an organization on customer focus, approach sustained customer satisfaction by producing & delivering services and providing support functions that meet customers’ needs and expectations.

Prior to the audit, 1-day ISO awareness training programme was organised on 10th July 2015 at CHT office as per the ISO requirements.

Visit of Assistant Secretaries, Mop&NG to CHT office

Assistant Secretaries in Ministry of Petroleum & Natural Gas, Government of India, Shri Arun Thamburaj and Ms Vandana visited CHT office to get a feel of the refining industry and to understand functioning of this nodal agency working under Mop&NG. They were warmly welcomed by ED-CHT, Shri Brijesh Kumar and briefed about the activities undertaken by CHT for the overall growth of hydrocarbon sector in India. CHT Directors, Shri Rajan Kapoor, Shri I. H. Shivaraay, Shri A. S. Pathak and Advisor (T) Shri A.K. Agrawal participated in the meeting and briefed the officials regarding different aspects of CHT functions.

“We, the present generation, have the responsibility to act as a trustee of the rich natural wealth for the future generations. The issue is not merely about climate change; it is about climate justice.”

-Narendra Modi
उत्तर प्रोयोगिकी केन्द्र में हिंदी पत्रकारी का आयोजन

शासकीय कार्यालयों के रूप में इस बिन्दु का आयोजन किया गया है। उत्तर प्रोयोगिकी केन्द्र में हिंदी पत्रकारी के आयोजन के लिए, नवम्बर के आयोजन के लिए विविध विषयों पर विशेष ध्यान दिया गया है।

<table>
<thead>
<tr>
<th>तिथि</th>
<th>कार्यक्रम/प्रक्रिया</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.09.2014</td>
<td>हिंदी पत्रकार, माननीय राज्य मंत्री, (स्वतंत्र प्रमाण), पेट्रोलियम और प्रौद्योगिकी श्रेणी मंत्री, जतन जाटी, द्वारा श्रेष्ठ पत्रकार का पुरस्कार दिया गया।</td>
</tr>
<tr>
<td>14.09.2014</td>
<td>हिंदी पत्रकार, माननीय राज्य मंत्री, (स्वतंत्र प्रमाण), पेट्रोलियम और प्रौद्योगिकी श्रेणी मंत्री, जतन जाटी, द्वारा श्रेष्ठ पत्रकार का पुरस्कार दिया गया।</td>
</tr>
<tr>
<td>23.09.2014</td>
<td>डॉ. (डॉ. शौकत) प्रेरणासाधन कार्यक्रम हिंदी पत्रकार, माननीय राज्य मंत्री, (स्वतंत्र प्रमाण), पेट्रोलियम और प्रौद्योगिकी श्रेणी मंत्री, जतन जाटी, द्वारा श्रेष्ठ पत्रकार का पुरस्कार दिया गया।</td>
</tr>
</tbody>
</table>

हिंदी पत्रकारी को सामाजिक, राजनीतिक और सांस्कृतिक क्षेत्रों में समर्पित किया गया है।
20th Refinery Technology Meet

As a part of dissemination of information on latest developments and emerging trends in the field of downstream hydrocarbon sector, Centre for High Technology (CHT) has been periodically organizing Refinery Technology Meet (RTM) on various themes of immediate relevance to the oil industry. Such meets provide a platform to the participants from oil companies and other organisations to interact, discuss and obtain comprehensive inputs on technological advancements from developing suitable strategies to meet future challenges.

The RTM also aims at bringing together participants from public & private sector refineries, policy makers, consultancies, catalyst manufacturers and technology providers from India and abroad and provide a platform for sharing, interacting and exchange of technical ideas among refinery operators, technology providers, researchers, etc.

During the last RTM at Chennai, which was organised during 2014, more than 600 delegates from India and abroad participated in the three days program apart from the Chief Executive, Directors and Senior Executives from the oil industry. A total of 83 Technical Papers, including 36 papers from Global leaders in Refining Technology such as Shell, Exxon Mobil, Chevron, UOP, Axens, Lummus, Dupont, Solomon, KBR, etc., were presented during the Technical Sessions. The three poster sessions were organised during three days of Meet covering 80 poster papers. Also, 12 exhibition stalls for displaying new refinery technologies and catalysts during the meet were booked.

CHT will be organizing 20th edition of Refinery Technology Meet (RTM) during 16th to 18th February, 2016 in Hyderabad jointly with Indian Oil Corporation. The theme of 20th RTM will be Value Creation through Innovative Solutions.