At a Glance

1. From the Desk of Executive Director

2. 14th Meeting of the Governing Council (GCo) of CHT

3. 19th Meeting of Executive Committee of Centre for High Technology

4. 79th Meeting of Scientific Advisory Committee (SAC) on Hydrocarbons

5. Working Group Meeting in review Refinery performance

6. Implementation of PMI (Purification, Achieve and Tracking) scheme in Refinery sector

7. Performance benchmarking

8. Oil & Gas Conservation Fortnight 2016

9. Workshop on sharing of indigenously developed technologies

10. Hydrogen as a Clean & Sustainable Energy Carrier

11. ISO - ASI.25009 Re-Certification Audit of CHT

12. Activity Correlation Nova

13. ‘Fundamental Catalytic Cracking’

14. ‘Fast & Loss and Energy utilization’

15. ‘Power & Utilities’

16. ‘Environmental Management’

17. ‘Catalytic Upgrading and Debenewal’

18. ‘Hydroprocessing & Hydrogen Generation’

19. ‘Delayed Coker & Vistoracker’

From the Desk of Executive Director

Like every year, the New Year - 2016 started off with the Oil & Gas Conservation Fortnight (OGGF) celebrations throughout the country, from January 16-31, with the purpose of creating awareness amongst various target groups for promoting oil conservation and emission reduction. As in previous years, Centre for High Technology (CHT) associated in this noble cause, organized surveys in the areas of ‘Furnace/Boiler Efficiency’ and ‘Furnace Insulation Effectiveness’ in Indian refineries including private refineries (RIL and Essar Oil and JV refineries (IPMEL and BORL). The committee constituted by the Ministry of Petroleum & Natural Gas (MoP&NG) will evaluate the performance results obtained during this survey. I would like to convey my gratitude to the management of all the refineries for extending their cooperation and support in conducting of the surveys during OGGF.

With the cooperation of various host refineries, CHT regularly organizes Activity Committee Meetings (ACMs) on critical and important areas of refinery and pipelines operations. ACMs provide common knowledge sharing platform to the industry for exchanging their experience and best practices. CHT organized 8 new ACMs between October 2016 to June 2016 and topics covered were Fuel & Loss and Energy Optimization, Fluidized Catalytic Cracking, Environment Management, Power & Utilities, CCR & ISOM, Pipelines Operations, Hydro-processing & Hydrogen Generation and Delayed Coker & Vistoracker.

CHT played a key role in helping the Bureau of Energy Efficiency (BEE) in arriving at refinery-wise targets for specific energy consumption which was notified by BEE on March 31, 2016. For this purpose, CHT revamped its specific energy consumption metric, commonly referred to as MBN, with revised energy factors for a number of processing units. The New MBN methodology has been implemented at all refineries along with accounting procedure to bring them at common platform for inter-refinery
comparisons. The methodology would also be used for awarding refineries for performance in specific energy consumption from the year 2015-16. I would like to thank all refineries, including Private and JV refineries in extending fullest cooperation in implementation of new MBN.

CHT engaged Ms. Solomon Associates, USA to benchmark the performance of the Indian PSU refineries based on the operating data for the year 2014. The results of the 2014 benchmarking cycle were made available in January 2016. The significant findings indicated that all refineries have made improvements to their performance from the previous benchmarking cycle of 2012. As against a world reduction of specific energy consumption of 1 EII/unit per year, Indian PSU refineries have averaged a reduction of 3.5 EII units per year. However, the energy costs of Indian refineries continue to be high - as much as 82% of the total operating cost. Indian refineries need to reduce their energy consumption for which CHT continues to assist Indian refineries in achieving these goals. Utility suppliers like NTPC and PTC are already assisting refineries to identify sources of electric energy to replace the internal generation by the refineries. A second exercise is to engage consultants to assist refineries in identifying specific energy reduction initiatives that can be undertaken by them. With the efforts of the refineries, aided by the inputs from CHT’s initiatives, the results of the next benchmarking cycle should show further improvement in performance and assist Indian refineries to achieve world scales performance.

My best wishes to all for meeting the future challenges.

(Brijesh Kumar)
Executive Director

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**34th Meeting of the Governing Council (GC) of CHT**

The 34th Meeting of the Governing Council (GC) of Centre for High Technology (CHT) was held on December 10, 2015 under the chairmanship of Shri K.D. Tripathi, Secretary, MoP&NG. The GC had a detailed review on the progress and status of major activities of CHT including:
- Integrated Refinery Business Improvement Program (IRBIP) under Phase II
- Energy Efficiency Improvement Study at Numaligarh Refinery and HPCL Visakh
- Institution of Awards for Innovation for Refineries and R&D
- Finalisation of Methodology for GHG (CO2 equivalent) Inventory Performance of Refineries
- Technical Services Agreement (TSA)
- Performance Benchmarking of PSU refineries
- Performance Improvement of PSU refineries through Gap Identification, Analysis and Recommendations
- Modification of Methodology and Energy factors for Evaluation of Specific Energy Consumption;
- Performance Audit of PSU Refineries
- Activity Committee Meetings organised by CHT during the year
- Organising 20th Refinery Technology Meet (RTM)
- The status of the R&D projects approved by Scientific Advisory Committee (SAC)

GC approved CHT’s proposal for performance gap bridging for Specific Energy Consumption with additional scope of covering Performance Audit by including experienced operating experts along with the consultant.

GC also accorded approval for implementation of New Energy Factors for Specific Energy Consumption i.e., New MBN (MBN) from the year 2015-16 and use of the same for target setting for PMT (Perform Achieve and Trade) Scheme of BEE.

**19th Meeting of Executive Committee of Centre for High Technology**

The 19th Meeting of Executive Committee of Centre for High Technology was organized on May 24, 2016 at SCOPE Complex, New Delhi under the chairmanship of Shri Sandeep Poundsrik, IAS, Joint Secretary (Refineries), MoP&NG. The Meeting was attended by Directors (Refineries) of IOCL, HPCL, BPCL, Director (T-EL) apart from senior officials from CRCL, NREL, MRPI, and CIOB. EC took a detailed review of the progress and major activities of CHT including Performance Benchmarking study carried out for 15 PSU refineries through Solomon Associates for the calendar year 2014 and the subsequent plan for the cycle of 2016, initiation of the modalities for carrying out Performance Gap Reduction and Margin Improvement programme for the refineries and floating of global tender for Performance Improvement of PSU refineries. Besides this, deliberations also took place with regards to implementation status for the ongoing Refinery Performance Improvement Programme (RPIP), review of the status of commercialization of indigenously developed technologies & identification of gaps to improve the commercialization success rate and new R&D Proposals.

**20th Refinery Technology Meet (RTM)**

20th RTM organised by CHT in association with Indian Oil Corporation Ltd, will be held from September 7-9, 2016 at Mahatma Mandir Convention cum Exhibition Centre, Gandhinagar, Gujarat
The meetings of Working Group to review Refinery Performance were organized twice during the first half of 2016 under the chairmanship of Shri Sandeep Poudrik, ISAS, Joint Secretary (Refineries), MoPNG. The first meeting was held on February 16, 2016 at Vadodara Refinery of IOCL and the second meeting on May 24, 2016 at SCOOPE Complex, New Delhi. The deliberations of the Working Group covered the following important issues affecting operational efficiency of the refineries and their profitability:

a) Upgradation of Kerosene: During the meeting held at Vadodara, it was decided that a task force consisting of refinery and marketing wings of major PSU oil companies and CHT shall submit a concept paper on desulphurization of kerosene consisting of demand projection, present level of sulphur in kerosene and projected in future, technological options and investment required. In the subsequent meeting, a concept paper was presented by CHT in consultation with the industry. The paper will be finalized by CHT.

b) Grid Power: Variations in the cost of power from captive generation in respect of various refineries was deliberated. It was decided to review Fixed and Variable cost of power from CPP as well as Grid Power under various options like Open Access and Group Captive mode and strategies for utilization of Grid Power. A Taskforce comprising members from Industry partners, EL and CHT has been working out a common methodology for calculating the cost of own power for realistically assessing the economics of use of Grid Power. Refineries shared their plans and status of various options for taking grid power.

c) Auto fuel policy 2025: Implementation of BS-IV and BS-VI fuels: Industry was advised to complete all projects related to BS-IV and BS-VI by December 2016 and September 2019 for country-wide smooth roll-out by 1st April 2017 & 1st April 2020 respectively. The schedule and the preparedness for the same was reviewed refiner-wise. Concerns from refineries were discussed for achieving the targeted project completion schedule.

d) Performance Parameters: The methodology for calculation of performance parameters was reviewed and it was decided that performance parameters such as crude throughput, new MN, distillate yield (incl. LOS & Wax) to be adopted for performance monitoring on monthly basis. It was also decided that while presenting QRM, data on complexity, crude and costs to be included besides inventory losses on crude, finished products and intermediate stocks. CHT also presented the Refinery performance for the completed year 2015-16 and April 2016.

e) Strategic development of refineries: MoPNG suggested that Approach Paper be prepared for development of refining sector during next 25 years to meet the growing needs of petroleum products with the help of industry working group or any other suitable consultant. CHT presented interplay issues which are important for arriving at futuristic crude processing capacity by 2040 and requested that a Working Group be constituted for finalization of paper.

f) Review of refinery projects: The status of projects costing ₹ 100 crore and above at refineries were deliberated. Majority of the projects were going as per the project schedule. The reasons for delay and the problems faced were reviewed.
Implementation of PAT (Perform, Achieve and Trade) scheme in Refinery sector

Bureau of Energy Efficiency (BEE) under Ministry of Power is entrusted with the implementation of the PAT scheme for achieving Energy saving in Energy Intensive Industries. It is one of the initiatives undertaken under NMEEE (National Mission for Enhanced Energy Efficiency), in the first PAT cycle, eight industrial sectors were covered. In PAT cycle-II, three more sectors are getting covered including Refinery sector. PAT cycle-II has commenced on 1st April 2016 and would end on 31st March 2019, with 18 Refineries, each with Energy consumption of more than 90,000 TOE getting covered under PAT cycle. A Technical committee has been formed with representation from all the Oil companies, BEE and PCRA. New MBN methodology of CHT has been taken as the metric for calculation of Specific Energy Consumption in Refinery Sector. CHT organized a series of meetings with Refineries and BEE to clear all the doubts regarding calculation of New MBN, Targets, Implementation and regulatory aspects of PAT. Data was also sought from Refineries to know the ENCON schemes/projects in hand, those envisaged till 2018-19 and the Biely reduction in Energy during PAT cycle. Based on the New MBN calculations for the Baseline year, targets were calculated by BEE and were notified through Gazette on 31st March 2016. The Target reduction in Energy for the Refinery sector is 5.97%. Further, CHT along with BEE and PCRA has verified the data and documents submitted by Refineries for the Baseline year. CHT is also in the process of lining up consultant to undertake comprehensive study for Energy reduction in PSU Refineries which should help to take care of any gap over the energy reduction achievable with envisaged schemes as on date. The Refineries have to appoint certified Energy Manager in each Refinery who will file Annual energy return. Each Refinery has to undergo mandatory Energy audit by an accredited Energy auditor in the beginning of the PAT cycle. The Target MBN figures will have to be achieved in the assessment year namely 2018-19. The Refineries who achieve better than the target will be provided with ‘Escorts’ which can be traded through power exchange. If the achievement falls short of the target, then the concerned Refinery has to buy ‘Escorts’ from the market or pay to the Government, the cost of shortfall in TOE saving, apart from Penalty up to 10 lakh.

Performance Benchmarking

Over the past two decades, refining capacity in India has grown beyond its own petroleum product requirements. Indian refineries are now regularly exporting products. In order to assess their competitiveness, benchmarking is an extremely useful exercise that helps refiners in comparing their performance with global peers and identification of gaps and potential areas of improvements. Centre for High Technology (CHT), engaged M/s Solomon Associates USA to benchmark the performance of the Indian PSU refineries in respect of the operating data for the calendar year 2014. Bharat Oman Refineries Ltd. (BORL) was included in the consolidated exercise. The results of the 2014 benchmarking cycle were made available by Solomon Associates in January 2016. CHT drew up a presentation schedule, in consultation with the participating refiners, in the first and second week of February 2016. On the request of some refineries for corrections in the data submission, Solomon Associates recomputed the final results, which were released in March 2016.

Oil & Gas Conservation Fortnight 2016

During January 18-22, 2016, CHT organized surveys to assess “Furnace/Boiler Efficiency” and “Furnace Insulation Effectiveness” in all Indian PSU, Private & JV Refineries in India, as a part of the Oil & Gas Fortnight (OGSF) 2016. Because of its planned shutdown, the survey for IOCL Guwahati refinery was carried out in the first week of January 2016. For each refinery, an audit team was constituted which comprised of a Coordinator-cum-Team Leader and 3 external members. A total of 79 nos. engineers from CHT and other refineries were involved in the exercise to carry out the survey during the 5 day period.

As a follow up of decision during meeting on Commercialisation of Indigenous Technologies chaired by Director (R), IOCL, a two day work shop was conducted on June 2021, 2016 for sharing of information regarding indigenous developed technologies. The senior officials from Refineries and R&D institutions of IOCL, BPCL, HPCL, EL, and CSR-IRI participated in the workshop. The objective of the workshop was to highlight the technologies available with respective Oil Industry & R&D institutes.

The participating organisations interacted with each other to adapt the indigenous developed technologies in their respective fields.

Some of the indigenous technologies deliberated are IOCL’s “IndiDieset” HDH Hydrotreatment for Euro-IV & V diesel, “IndiHex” Food Grade Hexane Hydro treatment of hexane for benzene removal, “IndiJet” ATG Hydro treating technology.

Workshop on sharing of indigenously developed technologies

Life is like riding a bicycle. To keep your balance, you must keep moving.

- Albert Einstein

The greatest threat to our planet is the belief that someone else will save it.

- Robert Swan
Hydrogen as a Clean & Sustainable Energy Carrier

Brijesh Kumar
Executive Director, Centre for High Technology

Areas of research
- Fuel cells for transportation (stationary and portable applications)
- Hydrogen production and delivery
- Hydrogen storage
- Manufacturing
- Market transformation
- Safety codes and standards
- Systems analysis
- Technology validation

Hydrogen production from renewable sources
- Biological Water Splitting
- Fermentation
- Conversion of Biomass and Wastes
- Photo-electro-chemical Water Splitting
- Solar Thermal Water Splitting
- Renewable Electrolysis

Biological Water Splitting

In the photo-biological water splitting process, hydrogen is produced from water using sunlight and specialized microorganisms, such as green algae and cyanobacteria. Certain photosynthetic microbes use light energy to produce hydrogen from water as part of their metabolic processes. Because oxygen is produced along with the hydrogen, this photo-biological hydrogen production technology must overcome the inherent oxygen sensitivity of hydrogen-evolving enzymes. There is a need to address this issue by screening for naturally occurring organisms that are tolerant of oxygen and by creating new genetic forms of the organisms that can sustain hydrogen production in the presence of oxygen. Researchers are also developing a new system that uses a metabolic switch, which can operate without oxygen. The objective is to ensure that the photosynthetic growth phase and the hydrogen production phase are not self-canceling.

Fermentation

In the fermentation process, hydrogen is produced from the fermentation of renewable biomass materials. Scientists are developing pretreatment technologies to convert lignocellulosic biomass into sugar-rich feedstock that can be directly fermented to produce hydrogen, ethanol, and high-value chemicals. Researchers are also working to identify a consortium of Clostridium that can directly ferment hemichitin to produce hydrogen. Other research areas include bio-prospecting efficient cellulolytic microbes that can convert crystalline cellulose directly to hydrogen to lower feedstock costs. Once a model cellulolytic bacterium is identified, its potential for genetic manipulations, including sensitivity to antibiotics and ease of genetic transformation, will be determined. Future fermentation projects will focus on developing strategies to generate mutants that are blocked selectively from producing waste acids and solvents in order to yield higher yields.

Conversion of Biomass and Wastes

Hydrogen can be produced via pyrolysis or gasification of biomass resources such as agricultural residues like peanut shells, consumer wastes including plastics and waste grease or biomass specifically grown for energy uses. Biomass pyrolysis produces a liquid product (bio-oil) that contains a wide spectrum of components that can be separated into valuable chemicals and fuels. Indirect technologies for hydrogen production by catalytic reforming of biomass pyrolysis products. Specific research areas include reforming of pyrolysis streams and development & testing of fluidizable catalysts.

Photo-electro-chemical (PEC) Water Splitting

The cleanest way to produce hydrogen is by using sunlight to directly convert water into hydrogen and oxygen. In the PEC water splitting process, hydrogen is produced from water using sunlight and specialized semiconductors. Multi-junction cell technology developed by the photovoltaic industry is being used for PEC light harvesting systems that generate sufficient voltage to split water and is stable in a water/electrolyte environment. The NREL-developed PEC system produces hydrogen from sunlight without the expense and complication of electrolyzers, at a solar-to-hydrogen conversion efficiency of 12.4% lower than what has been captured. Research is underway to identify more efficient, low cost materials and systems that are durable and stable against corrosion in an aqueous environment.

Solar Thermal Water Splitting

The High-Flux Solar Furnace concentrates solar energy generating ultra-high temperatures that enables hydrogen production via a thermochemical reaction cycles. Researchers use the High-Flux Solar Furnace reactor to concentrate solar energy and generate temperatures between 1,000 and 3,000 °C. Ultra-high temperatures are required for thermochemical reaction cycles to produce hydrogen. Such high-temperature, high-flux, solar-driven thermochemical processes offer a novel approach for the environmentally benign production of hydrogen. Very high reaction rates at these elevated temperatures give rise to very fast reaction rates, which significantly enhance production rates and more than compensate for the intermetallic nature of the solar resource.

Hydrogen Storage

Whether for stationary or portable transportation applications, cost-effective, high-density energy storage is necessary for enabling the technologies that can change our energy future and reduce greenhouse gas emissions. Hydrogen can play an important role in transforming our energy future if hydrogen storage technologies are improved.

Market Transformation

Market transformation activities address technical and non-technical barriers to the commercialization of hydrogen and fuel cell technologies to ensure that laboratory advances can be realized in the marketplace. Projects focus on deploying hydrogen and fuel cells in key early markets—specify vehicles, backup and remote power, power and primary power for critical applications such as hospitals or data centers and renewable hydrogen production technologies.

Early Market Deployments

Strategic early market deployments can accelerate the market penetration of hydrogen and fuel cells. A modest number of new orders can significantly reduce costs through economies of scale.

Early market sales stimulate further market activity by:
- Supporting the growth of a domestic industry
- Overcoming logistical and other non-technical challenges associated with the adoption of a new technology
- Establishing key infrastructure elements essential for future market growth
- Providing real-world operation and performance data and lessons learned that can be used to validate the benefits of the technology.

Petroleum Refineries could also introduce hydrogen in their product slate, taking advantage of surplus hydrogen generation capacity, to promote and accelerate development of these applications till sustainable production technologies are fully developed.

Safety, Codes and Standards

Hydrogen safety, codes and standards focus on ensuring safe operation, handling and use of hydrogen and hydrogen systems through safety sensors and codes and standards for buildings and equipment.

Safety Sensors

To facilitate hydrogen safety, NREL, USA is testing hydrogen sensors that detect leaks and monitor gas purity at the Safety Sensor Testing Laboratory. Because hydrogen is colorless and odorless, sensors are important for safe hydrogen fueling stations, equipment and facilities.
ISO – 9001:2008 Re-Certification Audit of CHT

Centre for High Technology obtained ISO 9001:2008 Certification in June 2013 and as per the system requirement. Re-Certification Audit was carried out by M/s DNV GL on June 28, 2016. On the satisfactory completion of the audit, CHT has been recertified with ISO 9001:2008 by M/s DNV GL.

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

Prior to the audit, one-day ISO awareness training program was organized on June 23, 2016 at CHT Office as per the system requirement.

Activity Committee Meets

‘Fluidised Catalytic Cracking’

The 43rd FCC Activity Committee Meeting was held in HPCL-Mittal Energy Limited (HMEL), Bhatinda on 5th & 6th October, 2015. The two day event was attended by about 60 delegates from various Indian Refineries. Shri Ruchir Kacker, AGM-TS, HPCL-Mittal Refinery, welcomed all the participants. Shri Rajan Kapoor, Director, CHT delivered the keynote address. He reiterated that FCC being the highest profit generating unit in a refinery, this meeting is one of the most important Activity Committee Meet. He emphasized the need to maximize the FCCU utilization and improve the Energy Intensity Index (EII) and Volumetric Expansion Index (VEI) of FCCUs of Indian refineries.

Convener of the Activity Committee Meeting, Shri S. Ramanathan, Chief Manager (Petchem), BPCL Kochi Refinery, spoke at length about various aspects of FCC such as its position in Refinery configuration, economy and challenges. He presented a detailed comparison of Catalytic Cracking vs Hydrocracking with respect to value

43rd Activity Committee Meet on “Fluidized Catalytic Cracking” Seated (L-R): Shri S. Haider, Additional Director, CHT; Shri Rajan Kapoor, Director, CHT; Shri A.S. Basu, Head, HMEL Baroda Refinery; Shri S. Ramanathan, Chief Manager (Petchem), BPCL Kochi Refinery and Shri K. Sunil Kumar, Joint Director, CHT.

In addition, he emphasized the need for building higher conversion FCCUs in view of the proposed Euro VI equivalent specifications for MS, expected to be implemented by April 2020. Shri A.S. Basu, Head of HMEL Refinery also shared his thoughts on the occasion. He dwelled upon the technology evolution that FCC operation has undergone over the years starting from distillate mode to the recent petrochemical mode. He opined that conversion and selectivity of catalyst are two areas which need further improvement.

Presentations were made by the representatives from the refineries highlighting the performance of the respective FCC units during the period April 2014 to June 2015. Shri S. Haider, Additional Director, CHT, presented the comparison of the EII and VEI data of all FCCUs, drawn from the 2012 benchmarking study.

42nd Activity Committee meet on ‘Fuel & Loss and Energy optimization’ was organised by CHT with EOL as hosts at Vadinar during 26-27 November 2015. The meeting was inaugurated by Shri C. Manoharan, Director (Refineries) in the presence of Shri L.H. Shivaraya, Director, CHT. The meeting was attended by 45 participants from Refineries, EIL (R&D), CSR-IIP and vendors viz., Forbes Marshall, GTC and Emerson. Each Refinery made a presentation on the Energy & Loss data, schemes implemented in the previous year & planned in current year; Energy saving achieved/ projected to be achieved and a case study by each refinery on energy conservation.

Participants of the Activity Committee Meet on “Fuel & Loss and Energy Optimization”
‘Power & Utilities’

The 29th Activity Committee Meet was organised jointly by CHT & BPCL Mumbai Refinery on October 29-30, 2015 at Mumbai. The meeting was attended by 50 delegates from 17 Refineries, EL and reputed vendors (M/s PTC India Ltd & M/s GE Power). During the Meet, a total of 22 presentations were made. Refineries made 16 presentations on action taken for arranging Grid Power at high voltage for refinery operation, CPP performance during the previous year, major interruptions/failures and its Root Cause Analysis.

Shri Brijesh Kumar, ED-CHT, in his keynote address, briefed about various activities pursued by CHT for improvement of refinery performance and emphasised the need for cheaper and reliable Grid Power for refinery operation since cheaper crude prices prevailing presently are not sustainable. In his inaugural address, Shri S.S. Sundarajan, ED, BPCL, Mumbai Refinery, talked about challenges faced by P&M department of the refineries for providing reliable & cheaper power to refinery. Earlier, Shri C.J. Iyer, GM (Ops), BPCL, Mumbai Refinery, welcomed the delegates.

At the outset, Shri Vjay Mohan, Advisor (Tech), CHT made a presentation on Refinery Power requirement vs Grid Power based on various factors like availability, reliability and cost comparison. ELi presented on Steam & Power Power optimisation in Cogen Plants. M/s PTC discussed various options presently available for cheaper & reliable Grid Power for refinery operation. M/s GE Power made presentation on Fuel flexibility in Gas Turbine for cheaper power. Plant operation optimisation and Software solutions to various problems faced in operation and maintenance of GTs. This was followed with question & answer session where delegates discussed major operation & maintenance issues faced in their refineries.

‘Environmental Management’

The 28th Activity Committee Meet on ‘Environmental Management’ was held at Mumbai on October 8-9, 2015. The meet was jointly organized by Centre for High Technology (CHT) and Hindustan Petroleum Corporation Limited, Mumbai Refinery. The meeting was attended by 52 participants from 17 Refineries across the country, R&D centres and Representative from EL and reputed vendors.

Shri A.R. Tamhankar, GM, HPCL, Mumbai Refinery welcomed delegates to the 28th ACM on Environmental Management.

Shri Brijesh Kumar, ED, CHT, in his keynote address, emphasised the importance of the ACM. He upheld the importance of such meetings as they provide a platform for sharing rich experience on the critical issues and best practices. In his address, he talked on the carbon footprint and water footprint of the refineries. In this context, he announced that Ministry has approved the award for lowest CO2 emission amongst Indian Refineries.

In his inaugural address, Shri N.S.J. Rao, ED, HPCL, Mumbai Refinery, expressed his concern for rapid technological growth which is compounded with increased environmental awareness. He emphasised that as statutory bodies are more vigilant at present, one cannot relax on the Environmental issues. He concluded his address with “Environment First, Production next” and gave good wishes to the meeting.

Lighting of ceremonial lamp by Shri S. Bharathan DGM (Technical), HPCL, Mumbai Refinery and Convener of the Meet.

Shri S. Bharathan, DGM (Technical), HPCL, Mumbai Refinery, chaired the meeting as Convener.

The meeting was formally inaugurated by lighting of the ceremonial lamp. All the participating refineries presented their best practices, innovative ideas and last one year performance on Environment. At the end of each presentation, queries sought by the participants were clarified. HPCL (R&D), IOCL (R&D) and EL also presented the development activities carried out in the field of environment.

There were a total of 22 presentations with good interaction between the participants and presenters. All the pertinent questions were discussed after each individual presentation in an interactive manner.

M/s JVM Marketing displayed their various products along with schemes for collecting floating oil. M/s Carbon Clean Solutions presented their development activities on CO2 capturing & efficient re-use.

At the end of the two-days’ meeting, a separate Q&A session was also held to discuss the problems faced by the refineries for effective solutions. All refineries showed their concern about the storage time of hazardous waste, i.e., max. 90 days from the date of generation of Hazardous waste.

In his valedictory address, Shri C. Abhram, GM (HSE), IOC-RHQ, summarized all the relevant issues which were discussed during 2 days’ meeting.
‘Catalytic Reforming and Isomerisation’

The 38th Activity Committee Meet on “Catalytic Reforming and Isomerisation” was held on October 13-14, 2015 at Visakhapatnam in association with Visakh Refinery of Hindustan Petroleum Corporation Ltd. The Meet was attended by 60 participants. The meet got excellent response with participation from all the refineries, R&D centres of EIL, HPCL and IP. Additionally, representatives from process licensors, M/s Axens and M/s UOP attended the two-day meet. Refinery personnel shared their operational highlights, best practices, troubleshooting carried out and benefits achieved.

The Meet was inaugurated by Shri G. S. Prasad Sarma, GM, Operations, HPCL. Visakh refinery. Shri G S Prasad Sarma detailed the evolution of the CCH technology by quoting various references. Earlier

mitigate the occurrence of accidents. He informed that the need of the hour is not only to evaluate our practices based on lessons learnt from various incidents but to upgrade our systems with latest technological advancements, innovative solutions and mutually acceptable solutions and recommended practices in order to function effectively retaining focus on safety and integrity of pipelines.

During the two day programme, a total of 18 presentations were made on various topics related to Pipeline Design & Construction, Operation & Maintenance, Integrity

‘Pipelines Operations’

Centre for High Technology in association with Indian Oil Corporation Limited-Pipelines Division, organised the 34th Activity Committee Meeting (ACM) on “Cross-Country Oil & Gas Pipelines” at OIDs Bhawan, Noida on December, 22-23, 2015. A total of 60 Pipeline engineers from ONGC, IOCL, BPCL, HPCL, GAIL, Oil, EIL & OISL participated.

At the outset, Shri Brijesh Kumar, ED, CHT welcomed the participants and various dignitaries present. He briefed them about various activities of CHT along with the need for organising such Activity Committee Meetings which help in building up the industry interface and information sharing of the best practices. During his welcome address, ED, CHT emphasized about the significant role of Pipelines as carriers of crude oil, petroleum products and natural gas which provides environment friendly and low cost transportation thereby aiding in the overall economic growth of the country. He also stressed on the need to maintain safe and un-interrupted Pipeline operations.

The meet was inaugurated by Shri R.K. Santamani, Executive Director, IOCL, Northern Region Pipelines, Panipat. During his keynote address, he opined that in the emerging global Oil & Gas scenario, such platforms for knowledge sharing are of great importance as pipe liners are faced with common challenges of pillerages, ROU acquisition, corrosion, safety of the pipelines stretching through densely populated areas and carrying highly inflammable products, etc. He stressed the need for compliance to design codes and prescribed safety standards in order to

Shri G.S. Prasad Sarma, GM, Operations, HPCL, Visakh refinery, welcomed the participants. Shri H.R. Shivaraya, Director, CHT, also addressed the participants.

Apart from the presentations by the individual/refineries, HPCL, R&D presented on the Metall Catalytic Coking while EIL, R&D Centre presented on Catalytic Refiner Simulation & Optimization software developed by EIL & IP. CSIR-IP presented on the recent trends in Catalyst Development. The process licensors M/s Axens presented the advancements in catalytic reforming technology and development of new catalyst for ISOM having longer life and better conversion ability. M/s UOP presented on challenges and opportunities for refineries while producing BS-IV & V Grade Gasoline.

Shri V.S. Sahgal, DGM (Ops), BPCL, & Convener for the ACM lighting the ceremonial lamp. Standing (L-R): Shri A.S. Pathak, Director, CHT; Shri R.K. Santami, Executive Director, IOCL; Northern Region Pipelines, Panipat and Shri Brijesh Kumar, Executive Director, CHT

Q&A session of the 34th Activity Committee Meet on “Cross Country Oil & Gas Pipelines”. Seated (L-R): Shri V.S. Sahgal, DGM (Ops), BPCL, Mumbai & Convener for ACM; Shri S.R. Jadawal, GGM & Head Pipelines, ONGC, Mumbai; Shri R.P. Pandey, GM (CM), ONGC, New Delhi; Shri B.D. Yadav, EICDPAP; IOCL Pipelines Division, Noida; Shri S.N. Wahi, GM (Main.), BPCL, Mumbai; Shri Rakesh Vireh, GM(Maj.), EDL, New Delhi and Shri Vinay Mittal, GM (Pipeline Engineering Depts.), EDL, New Delhi.

Participants of 34th CHT Activity Committee Meet on “Cross country Oil & Gas Pipelines”.

Management and case studies which were followed by brief interaction between the presenters & the delegates. Q&A session was held at the end of two day programme wherein the delegates put forth various issues dealt in areas of Pipeline design, operation, maintenance and safety. An Expert panel chaired by Dr. B.D. Yadav, Executive Director (Operation & Project), IOCL, Pipelines Head Office, Noida and General Managers from ONGC, BPCL and EDL shared their expertise in pipeline operations while addressing the queries of the participants thereby providing effective solutions.
Hydroprocessing & Hydrogen Generation

11th Activity Committee Meeting on Hydro-processing & Hydrogen Generation was organised at Hyderabad during February 16-18, 2016 by CHT with sponsorship of Chennai Petroleum Corporation Ltd (CPCL). The meeting was attended by 101 participants from 17 Refineries, R&D Centres of IOC, HPCL & BPCL, EIL, IIP, experts from process licensing companies, viz., Axens & UOP and Catalyst Vendors, viz., Haldor Topsoe and Süd-Chemie. The meeting was inaugurated by Shri LH. Shivaraya, Director, CHT in the presence of Shri Madhusudan Sau, DGM, IDCL-R&D and Shri S. Satagopan, Chief Manager (TS) CPCL. In total, 45 presentations were made followed by intensive interaction by the participants with presenters during the three-day Meet. Shri Madhusudan Sau, DGM-R&D, IDCL was the convener for the meet covering Hydroprocessing Units and Shri Bimalesh Gupta, Chief Manager (TS), NRL was the convenor for the meet covering Hydrogen Units.

Delayed Coker & Visbreaker

The 7th CHT Activity Committee Meet on "Delayed Coker and Visbreaker" was held at HICC, Hyderabad on March 21-22, 2016. The meet was organised by Centre for High Technology (CHT), Noida, which was sponsored by Bina Oman Refineries Ltd (BORL), Bina. Delegates from various refineries across the country from Private & Public Sector Organisations, R&D Centres and representatives from EIL attended the meet and deliberated on the various aspects of delayed cooking and visbreaking technologies.

The programme started on 21st March 2016 with Inaugural Session. The welcome address to all the participants was delivered by Shri U. Deza, Additional Director, CHT, in which he requested all the participants to make the maximum use of the opportunity of the meet to interact and share their valuable experience for the benefit of all.

In his address, the Convener of the meet, Shri D. Chakraborty, GM (TS&HSE), IDCL, Gujarat Refinery opined that although Visbreaker units will be phased out due to low demand of fuel oil, Delayed Coking will continue to be the preferred technology for bottom upgrading. He highlighted various challenges faced by Delayed Coker at present to reduce the coke make as well as different problems for DCU operations.

Shri Bhijesh Kumar, Executive Director, CHT in his keynote address emphasised the utility of both Delayed Coking and visbreaking technologies in the present refining scenario, in spite of being very old technologies. He touched upon various activities of CHT with special emphasis on three key areas of concern for Indian refining industry, viz., PAT Scheme, Auto Fuel Policy and Margin Improvement. He highlighted the potential in Delayed Coker, considering the operational gaps identified in the Solomon Benchmarking Studies. He also stressed the utility of forums like Activity Committee Meetings for sharing the knowledge for creating a pool of experience for future references and overall development of Indian Petroleum Industry. As the mechanical features are of very high importance for DCU operation, Shri Bhijesh Kumar advised to include M&A aspects in the future ACMs for Delayed Coker.

In his inaugural address, Shri A.P. Raghav, Vice President, BORL, stressed the importance of Activity Committee Meet, especially for the new refineries like BORL and HMLEL. He requested all the participants to deliberate in key areas for DCU like reduction in coke make, sulphur reduction in coke, drum vibration, additives, etc. He expressed hope that the Activity Committee Meet will achieve its desired objectives with proper sharing of operating experiences/practices and other technological issues.

The Technical Sessions were convened by Shri D. Chakraborty, GM (TS&HSE), IDCL, Gujarat Refinery. The technical sessions on both the days were highly interactive and all the participating refinery units shared their experiences with respect to operational highlights, best practices, trouble shooting, modifications, etc. R&D Centres of IDCL, HPCL and EIL presented the developmental activities carried out in the field of Delayed Coker & Visbreaker.

Participants of 11th Activity Committee Meeting on Hydro-processing & Hydrogen Generation

Participants at 7th Activity Committee Meeting on Delayed Coker & Visbreaker
अंतर्राष्ट्रीय योग दिवस

ब्राह्मण के प्राचीन, मानवीय भौतिक, नागरिक और आर्थिक जीवन के स्थायी संरचना के लिए समय का समय पर योग दिवस का उपयोग किया जाता है। योग दिवस का आर्थिक स्तर से भी महत्त्वपूर्ण है। यह माननीय और सांस्कृतिक स्तर पर महत्त्वपूर्ण है।

राजनीति व विद्युत पदार्थ

भावभूषन अवलंबित

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