



# उच्च प्रौद्योगिकी केन्द्र

(पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)

**Centre for High Technology**

(Ministry of Petroleum & Natural Gas, Govt. of India)

No. CHT/MOP&NG/1403

21<sup>st</sup> December 2018

Ministry of Petroleum & Natural Gas,  
Govt. of India  
Shastri Bhavan  
New Delhi-110 001

Attn.: Shri Noas Kindo, Under Secretary

Sub: Annual Report 2018-19 of the Ministry of Petroleum & Natural Gas

Dear Sir,

This has reference to your letter No. R-12042/17/2018-OR-II/P-27803 dated 19<sup>th</sup> December, 2018 on the above subject.

As desired, the information pertaining to Centre for High Technology for the Annual Report 2018-19 of the Ministry of Petroleum & Natural Gas (as on 31<sup>st</sup> December 2018) is enclosed for your kind perusal.

Yours faithfully,

(Brijesh Kumar)

Executive Director

Encl. : As above

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## Annual Report 2018-19 of the Ministry of Petroleum & Natural Gas

### Material pertaining to Centre for High Technology (as on 31<sup>st</sup> December 2018)

#### **1.0 Introduction**

Established in 1987, Centre for High Technology (CHT) acts as the Technical Wing of MOP&NG for implementation of scientific and technological programmes of Govt. of India. Major functions of CHT include:

- Performance Benchmarking of Refineries and Pipelines
- Performance Improvement in Refineries through Best Practices, Special Studies, Operational Improvement and Process Technology
- Energy Efficiency Improvement in Downstream Hydrocarbon Sector
- Petroleum Product Quality Improvement
- Sharing of Best Practices and Information & Knowledge Dissemination
- Integration with Alternative Energies and New Initiatives in Downstream Sector for Future Sustainability
- Promoting Innovations and R&D in Downstream Hydrocarbon Sector. Co-ordination of activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG

#### **2.0 Major activities undertaken by CHT during 2018-19**

##### **2.1 Performance Benchmarking**

Performance Benchmarking of PSU refineries for the Study Cycle 2018 has been initiated through M/s Solomon Associates (SA), USA. The Data Coordinators' Seminar was conducted by SA with participants from all refineries on 29<sup>th</sup>/30<sup>th</sup> November, 2018 at CHT. The Study Results will be available by November, 2019.

Performance Benchmarking Study for Pipelines (Liquid, Gas, LPG and SPMs) for 2018 cycle has also been initiated for the first time.

##### **2.2 Refinery Performance Improvement**

- **Energy Efficiency Improvement Study of PSU Refineries:** Refineries are included in PAT (Performance Achieve and Trade), under which each refineries is mandated to meet the Specific Energy Consumption Targets set for 2018-19. CHT was actively associated with BEE for target setting and has been monitoring the progress. CHT also initiated Energy Efficiency improvement studies for PSU refineries for Process Side through EIL and for Utilities Side through PCRA which were completed.

A Roadmap for Energy Reduction in PSU refineries till 2030, aligning with India's NDC of 33-35 % reduction in Specific Energy Consumption over base year of 2005, has been prepared.

- **Development of Water Consumption Norms and Reduction of Water Footprint for Refineries** through EIL has been initiated and currently in progress.
- **Approach Paper on demand side steam management** based on the best practices and Indian realities is planned through M/s KBC, Singapore and is expected to be completed by March, 2019.
- **Performance Improvement Programme of PSU Refineries:** CHT, along with industry, finalised refinery-wise consultants for undertaking comprehensive Performance Improvement Programme of 9 PSU refineries in the First Phase. The Study for balance refineries will be taken up in 2<sup>nd</sup> phase.
- In order to improve energy efficiency and reduce energy consumption, CHT, in association with refineries, organizes **Surveys** every year in the areas of i) **Furnace/ Boiler Efficiency** and ii) **Steam leak**. These two areas are taken-up every alternate year. Survey in the area of Furnace/ Boiler Efficiency was conducted during January, 2018. Survey in the area of Steam Leak will be conducted during January, 2019.

### 2.3 23<sup>rd</sup> Refining & Petrochemicals Technology Meet (RPTM)

23<sup>rd</sup> RPTM, organised by CHT in association with BPCL, will be held during 12-14 January, 2019 in Mumbai. The Theme of the Meet is "Aligning Refineries towards Sustainable Future". Around 1000 delegates/invitees from India and abroad are expected to participate in the Meet.

23<sup>rd</sup> RPTM will have presentation of around 80 papers spread over 15 Technical Sessions and about 60 papers in Poster Sessions along with 16 Exhibition Stalls.

### 2.4 Indigenous Technology Development

CHT co-ordinates the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG in identifying and funding of research projects for downstream hydrocarbon sector. SAC approves and steers projects of national importance and refining operations. SAC is headed by Dr Anil Kakodkar, an eminent Scientist and DAE Chair Professor, BARC.

During 2018-19, SAC had two meetings till December 2018: 82<sup>nd</sup> meeting on 11<sup>th</sup> September 2018 and 83<sup>rd</sup> meeting on 17<sup>th</sup> November, 2018. SAC had detailed review of the on-going projects and new project proposals.

## 2.5 Performance Awards

CHT is actively associated with the following Annual Awards instituted by Ministry of Petroleum & Natural Gas, Government of India:

- Refinery Performance Improvement Award
- Oil & Gas Conservation Fortnight (OGCF) Award
- Innovation Award

The Awardees for the first two categories are selected by the selection committee set up by MoP&NG. For the Innovation Award, the Awardees are selected by the committee constituted by Chairman, SAC, based on guidelines of Governing Council of CHT.

Refinery Performance Improvement Awards for 2017-18, OGCF Award for 2018 and Innovation Awards for 2017-18 have been finalised by the Committee and will be presented to the winners during the Inaugural function of the 23<sup>rd</sup> Refining & Petrochemicals Technology (RPTM) on 12<sup>th</sup> January, 2019 in Mumbai.

## 2.6 Knowledge Dissemination and Experience Sharing

- **Activity Committee Meetings:** With the aim of sharing of best operational practices & improvements and dissemination of information on latest developments, CHT organised various Activity Committee Meetings in critical areas/ technologies in refining sector and pipelines operations. A new Activity Committee Meeting on "Quality Control" was started. Currently, 15 Activity Committees are in place.
- A Compendium on Best Practices, including Takeaways from Activity Committee Meetings and Innovations in refining sector was prepared and shared with all refineries.
- Discussion Forums on 10 major areas concerning the downstream hydrocarbon has been created on CHT portal. Specific queries can be posted by the authorised coordinators from PSU companies for seeking answers from an Expert Panel.
- A Workshop on "Improvement in Project Execution Strategies" was organised by CHT & EIL on 8<sup>th</sup> December, 2018 at EIL, Gurgaon.

## 2.7 Lab Co-relation Programme

CHT initiated "Inter Laboratory Correlation Programme" for better coordination of product quality at industry level. MS, HSD and ATF have been covered under this programme. The First Level of the Programme comprising one refinery from each zone

& labs was completed in Oct 2018. The Second Level, covering intra-zone, involving all refineries and major PPL/ Mktg. installations of the zone and one R&D lab was launched on 11<sup>th</sup> December, 2018 and is expected to be completed by May 2019.

## **2.8 Swachhata Ranking for PSU/JV Refineries**

Started in 2017, Swachhata Ranking of PSU/JV Refineries is a new initiative of the Ministry of Petroleum & Natural Gas. Refineries are ranked based on the Swachhata Index developed by Centre for High Technology.

Swachhata Ranking for 2018 for PSU/JV Refineries is currently in progress.

No. CHT/MOP&NG/

28<sup>th</sup> November 2017

**Ministry of Petroleum & Natural Gas,  
Govt. of India  
Shastri Bhavan  
New Delhi-110 001**

**Attn: Shri Pawan Kumar, Under Secretary**

**Sub : Annual Report 2017-18 of the Ministry of Petroleum & Natural Gas**

Dear Sir,

This has reference to your letter No. R-12042(11)/301/2017-OR.II/E-16866 dated 6<sup>th</sup> October 2017 on the above subject.

As desired, the information pertaining to Centre for High Technology for the Annual Report 2017-18 of the Ministry of Petroleum & Natural Gas (as on 31<sup>st</sup> December 2017) is enclosed for your kind perusal.

Yours faithfully,

**(Brijesh Kumar)  
Executive Director**

**Encl. : As above**

## Annual Report 2017-18 of the Ministry of Petroleum & Natural Gas

### Material pertaining to Centre for High Technology (as on 31<sup>st</sup> December 2017)

#### **1.0 Introduction**

Established in 1987, Centre for High Technology (CHT) acts as the Technical Wing of MOP&NG for implementation of scientific and technological programmes of Govt. of India. Major functions of CHT include assessment of technology requirement, operational performance evaluation and improvement of the refineries. CHT acts as a focal point of oil industry for centralised technical assistance, knowledge dissemination, performance data base, exchange of information and experience sharing. CHT also coordinates funding of research work in downstream hydrocarbon sector and pursue the programmes of "Scientific Advisory Committee on Hydrocarbons" of MOP&NG.

#### **2.0 Major activities undertaken by CHT during 2017-18**

##### **2.1 Performance Benchmarking of PSU Refineries**

Performance Benchmarking of 15 PSU refineries, 4 lube units and 1 JV Refinery (BORL) for the Study Cycle 2016 through M/s Solomon Associates (SA), USA was completed in September 2017. The findings of the Study were presented by SA to all the participating refineries as well as MoP&NG.

The major findings of the Study are as under:

- Energy Cost continues to be a major component of Opex.: 74 % in 2016
- 17.5 % reduction in EII from 120 in 2010 to 99 in 2016
- PSU refineries have consistently achieved better than World's Best EII Peer Group performance in the Process Fired Furnace Efficiency category
- Reducing the Steam System Size is a large opportunity area for EII improvement
- Large reduction in Steam System Size since benchmarking : > 9.5 MMT per year reduction in steam usage

##### **2.2 21<sup>st</sup> Refinery Technology Meet (RTM)**

21<sup>st</sup> RTM organised by CHT in association with HPCL during 20-22 April, 2017 at Visakhapatnam was a grand success with participation of around 800 delegates/invitees from India and abroad. The Theme of the Meet was "Refining to Petrochemicals – The Way Ahead".

The Meet was inaugurated by Hon'ble Minister, Petroleum & Natural Gas, Government of India Shri Dharmendra Pradhan, in the presence of Secretary, P&NG; Joint Secretary(R), MoP&NG; CMD, HPCL and Heads/Senior Executives from oil industry. A

total of 74 oral papers spread over 16 Technical Sessions and 82 posters were presented during the 3 day Meet. 12 Exhibition Stalls were put up by leading technology/service providers showcasing their services. Apart from Indian oil companies, leading global consultants/technology providers like Shell, UOP, Chevron, ExxonMobil, Haldor Topsoe, Axens, KBR, DuPont, Solomon, Lyondell Basell, Grace, Univation, Mitsui Chemicals etc. participated in the Meet.

### **2.3 Indigenous Technology Development**

CHT co-ordinates the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG in identifying and funding of research projects for hydrocarbon sector. SAC approves and steers projects of national importance and refining operations. SAC is headed by Dr Anil Kakodkar, an eminent Scientist and DAE Chair Professor, BARC. SAC had its 80<sup>th</sup> meeting on 6<sup>th</sup> September, 2017 and reviewed the completed and 11 on-going R&D projects. The project on "Development and durability Testing of Ethanol-Diesel Blend Engine" of ARAI, Pune recommended by SAC was approved by the Executive Committee of CHT in its 22<sup>nd</sup> meeting held on 20<sup>th</sup> June, 2017.

In order to attract more participation from Academia and exploit the research expertise /capabilities available in Indian universities/Institutions and also to strengthen the interface between R&D establishments & Industry, CHT has been inviting research proposals through EOI.

EOI has been issued 3 times since July 2016. In all 31 projects, including 4 projects in hydrogen research area have been received. The proposals are screened and modifications are advised by Steering Committee nominated by Chairman SAC. The last 3<sup>rd</sup> meeting of the Steering Committee was held on 3<sup>rd</sup> October 2017.

### **2.4 Energy Efficiency Improvement Study and Performance Audit of PSU Refineries**

The Energy Efficiency Improvement Study and Performance Audit of 15 PSU Refineries by EIL is in progress and will be completed by March 2018. An Umbrella Agreement with EIL for TSA has been finalised in consultation with refineries for detailing of energy saving schemes at  $\pm$  30% cost for obtaining in-principle approval. The Agreement enables simplified and quick work order from refinery on single page format with only scheme specific details like objective, deliverable, time lines, etc. The Agreement was signed jointly by CHT & EIL on 15<sup>th</sup> September, 2017.



## **2.5 Mandatory Energy Audit (MEA)**

CHT, on behalf of industry, had engaged PCRA for carrying out MEA of 12 PSU refineries (excluding IOCL-Guwahati, Digboi and Paradip, who are not part of PAT, and BPCL-Kochi who have already completed MEA) The Audit was completed in June 2017.

## **2.6 Performance Improvement of Refineries**

The EOI and the Tender Document for Performance Improvement Programme for PSU refineries have been finalised along with refineries. It is planned to cover 9 refineries under the 2017-18 study cycle. Refinery-wise consultant shall be finalised by the Committee of CHT and Refineries by the first week of April 2018.

## **2.7 Performance Awards**

CHT is actively associated with the following Annual Awards instituted by Ministry of Petroleum & Natural Gas, Government of India:

- Refinery Performance Improvement Award
- Oil & Gas Conservation Fortnight (OGCF) Award
- Innovation Award

The Awardees for the first two categories are selected by the selection committee set up by MoP&NG. For the Innovation Award, the Awardees are selected by the committee constituted by Chairman, SAC, based on guidelines of Governing Council of CHT.

CHT was involved in co-ordination, data validation/compilation and providing necessary technical support to the Committees for finalising the awards.

Refinery Performance Improvement Awards for 2016-17, OGCF Award for 2017 and Innovation Awards for 2016-17 have been finalised by the Committee and will be presented to the winners during the Inaugural function of the 22<sup>nd</sup> Refining & Petrochemicals Technology (RPTM) on 13<sup>th</sup> January, 2018 at Bhubaneswar.

## **2.8 Activity Committee Meetings**

With the aim of sharing of best operational practices & improvements and dissemination of information on latest developments, CHT organised various Activity Committee Meetings in critical areas/ technologies in refining sector and pipelines operations.

## **2.9 Perform, Achieve and Trade (PAT) Scheme implementation in refineries**

BEE has already notified refinery-wise target for Specific Energy Consumption for achievement by 2018-19. The Technical Committee headed by CHT, has worked out the normalisation methodology and factors to be applied over the actuals for performance assessment for the year 2018-19.

## **2.10 Swachhata Ranking 2017 for PSU Refineries**

Swachhata Ranking of PSU Refineries is a new initiative of the Ministry of Petroleum & Natural Gas. The inter-refinery survey of 17 Public and 2 Joint Sector Refineries has been conducted and these refineries have been ranked based on the **Swachhata Index** developed by Centre for High Technology. The **Swachhata Index** is based on infrastructure available at Refineries not only for its own Employees but also for its Contract Laborers, Cleanliness, Systems and Processes including waste generation and disposals, initiatives taken for Swachhata awareness and its campaign, waste paper recycle and reuse, processing municipal waste in Refineries, etc.