उच्च प्रौद्योगिकी केन्द्र
(पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय)

सीएचटी

**Centre for High Technology**
(Ministry of Petroleum & Natural Gas, Govt. of India)

उ.प्रौ.के./एस.ए.सी.–72/4072
CHT/SAC-72/

दिनाँक : 25 अप्रैल, 2013
Date: 25th April, 2013

सेवा में,
To,

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की हाईड्रोकार्बन्स पर वैज्ञानिक सलाहकार समिति के अध्यक्ष, सदस्यगण, स्थाई एवं विशिष्ट अतिथिगण (संलग्न सूचीनुसार)

**Chairman, Members, Permanent & Special Invitees of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG (as per list attached)**

विषय : पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की हाईड्रोकार्बन्स पर वैज्ञानिक सलाहकार समिति की 72वीं बैठक का कार्यवृत्त ।

**Sub: Minutes of the 72nd Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of Ministry of Petroleum & Natural Gas**

महोदय,
Dear Sir,

दिनाँक 30 मार्च, 2013 को द ललित होटल, बेकल, कसारगोड, केरल में हुई पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय की हाईड्रोकार्बन्स पर वैज्ञानिक सलाहकार समिति की 72वीं बैठक का कार्यवृत्त आपकी सूचनार्थ एवं आवश्यक कार्रवाई हेतु भेजा रहा है ।

Enclosed please find a copy of the Minutes of 72nd Meeting of the SAC on Hydrocarbons of Ministry of Petroleum & Natural Gas held on 30th March, 2013 at The Lalit Hotel, Bekal, Kasargod, Kerala, for your kind information and necessary action.

सादर,
With kind regards,

भवदीय,
Yours Sincerely,

बी. डी. घोष
25/4/13
(बी.डी.घोष)
कार्यकारी निदेशक
**(B.D.Ghosh)**
25/4/13
**Executive Director**

संलग्न : यथोक्त ।
Encl. As above

ओ.आई.डी.बी. भवन, टॉवर ए, 9 वॉ तल, प्लॉट नंबर 2, सैक्टर 73, नोएडा–201307 (उ. प्र.)
OIDB Bhawan, Tower "A", 9th Floor, Plot No. 2, Sector-73, Noida - 201307 (U. P.)
Tel. : 0120-2593701 Fax: 91-120-2593780/2593772, Email: .....b.d.ghosh.....@cht.in Website: www.cht.in
Liaison Office: C/o. OIDB, 301, World Trade Centre, 3rd Floor, Babar Road, New Delhi-110 001 Tel. : 91-11-23414692

## Chairman, Members, Permanent Invitees and Special Invitees to the Scientific Advisory Committee

| | | |
|---|---|---|
| 1. | Shri Arun Balakrishnan<br>C – 122, 12th Floor,<br>Trinity Tower,<br>DLF Phase – V,<br>**Gurgaon** – 122 002 | Chairman |
| 2. | Dr. J. P. Gupta,<br>Director,<br>Rajiv Gandhi Institute of Petroleum Technology,<br>Ratapur Chowk,<br>**Rae Bareli** – 229 316 (U.P.) | Member |
| 3. | Dr. M.O.Garg,<br>Director,<br>Indian Institute of Petroleum,<br>P.O.IIP, Mohkampur,<br>**Dehradun** – 248 005 (Uttarakhand) | Member |
| 4. | Dr. R. Kumar,<br>Professor Emeritus,<br>Department of Chemical Engineering,<br>Indian Institute of Science, Bangalore,<br>**Bengaluru** – 560 012 (Karnataka) | Member |
| 5. | Prof. Shantanu Roy,<br>Department of Chemical Engineering,<br>Indian Institute of Technology-Delhi,<br>Hauz Khas,<br>**New Delhi** – 110 016 | Member |
| 6. | Prof. G. D. Yadav,<br>Director,<br>Institute of Chemical Technology,<br>Nathalal Parekh Marg,<br>Matunga (East),<br>**Mumbai** – 400 019 | Member |
| 7. | Shri Ajay N. Deshpande,<br>Director (Technical),<br>EI Bhawan,<br>Engineers India Limited,<br>1, Bhikaiji Cama Place,<br>**New Delhi** – 110 066 | Member |
| 8. | Shri R. N. Choubey,<br>Director General,<br>Directorate General of Hydrocarbons,<br>OIDB Bhawan, Tower A, Sector 73,<br>**NOIDA** – 201 307 (U.P.) | Member |

| | | |
|---|---|---|
| 17. | Shri L. N. Gupta,<br>Joint Secretary (Refineries),<br>Ministry Of Petroleum & Natural Gas,<br>Shastri Bhawan,<br>**New Delhi** – 110 001 | Permanent<br>Invitee |
| 18. | Shri Mohan Lal,<br>Dy. Secretary (R&A),<br>Ministry Of Petroleum & Natural Gas,<br>Shastri Bhawan,<br>**New Delhi** – 110 001 | Permanent<br>Invitee |
| 19. | Shri P. S. Viswanathan,<br>Head (R&D),<br>Bharat Petroleum Corporation Ltd.,<br>Corporate R&D Centre, Plot no. 2 A,<br>Udyog Kendra (Behind Yamaha Motors),<br>Surajpur Industrial Area,<br>**Greater Noida** – 201 306 (U.P) | Permanent<br>Invitee |
| 20. | Shri G. Sri Ganesh,<br>Executive Director (R&D),<br>Hindustan Petroleum Corporation Ltd.,<br>17, Jamshedji Tata Road,<br>P.O. Box No. 11041,<br>**Mumbai** – 400 020 | Permanent<br>Invitee |
| 21. | Shri Ganesh Prasad,<br>General Manager (R&D),<br>Engineers India Limited,<br>Sector-16,<br>**Gurgaon** – 122 001 | Permanent<br>Invitee |
| 22. | Shri A. S. Basu,<br>Managing Director,<br>Chennai Petroleum Corporation Limited,<br>536, Anna Salai, Teynampet,<br>**Chennai** – 600 018 | Special<br>Invitee |
| 23. | Dr. B. Bhargava,<br>Director General,<br>ONGC Energy Centre,<br>15th Floor, South Tower, Core-4,<br>SCOPE Minar Complex,<br>Luxmi Nagar,<br>**New Delhi**-110 092 | Special<br>Invitee |

**Minutes of the 72nd Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG held on 30th March, 2013 at Lalit Hotel, Bekal, Kasargad, Kerala**

**1.0** Shri Arun Balakrishnan, Chairman, SAC chaired the Meeting. List of participants is enclosed as Annexure-1.

**2.0** Shri B.D. Ghosh, ED, CHT and Member Secretary of SAC welcomed the Chairman, members of SAC, invitees from oil industry, academia and research institutes to the 72nd SAC meeting.

Chairman in his opening remarks suggested that SAC meetings should be held at least thrice a year for regular review of the progress of the on-going projects for mid-term correction, if any, and also to ensure timely approval of new project proposals.

**3.0** Shri A.S. Pathak, Addl. Director, CHT presented the ATR of the Minutes of the 71st Meeting including the current status of the various projects and other pending issues.

**4.0** The clarifications provided by the Principal Investigators with regard to the following project proposals were reviewed and deliberated by SAC as detailed below:

**4.1 "Experimental and Simulation Studies on Coke Mitigation in Petroleum Refinery Systems" of BPCL-R&D and BITS, Pilani, Goa Campus**

Prof. Kumar, IISc, Bangalore opined that mere understanding of the coking phenomena as proposed in the project may not be adequate to meet the objective. Shri B.K. Datta, Director (R), BPCL, while agreeing with this observation, explained the importance of such knowledge for improved energy efficiency and turn around. With regard a query by Shri M.C. Singh, FA&CAO, OIDB, Shri P.S. Viswanathan, Head(R&D), BPCL-R&D informed that BPCL has already placed P.O. for procurement of the main equipment, viz., Falex Thermal Fouling Tester from USA from internal resources which will be utilised for this project.

**SAC accorded in-principle approval of the project and advised BPCL to submit the revised project proposal cost, contributions by BPCL with defined deliverables to CHT for review by a Sub-Committee (to be constituted by CHT) for final cost approval.**

**4.2 "An Integrated Approach for Bio-hydrogen production through combined dark and photo fermentative process" of HPCL and TERI**

TERI explained the difficulties in procuring/fabricating the 1000 litre photo reactor within the approved project cost of Rs 21.0 lakh and requested SAC to permit change in

the scope of work / deliverables and allowing TERI to undertake scale-up studies in 100 litre reactor instead of 1000 litre reactor. TERI also requested for extension of project completion schedule by one year and additional funding of Rs. 11.7 lakh (towards manpower for the extension period).

Prof. Kumar opined that scale up of the photo reactor from 100 litre to 1000 litre may not be challenging considering that the former is good enough for proof of concept. He also requested TERI/HPCL to explore the possibility of converting municipal waste to hydrogen.

**SAC, after detailed deliberations was of the view that there was no need for scale up to 1000 litre and approved the change in scope to 100 litre and extension of time period by one year. As regards the cost overrun, CHT informed that any cost overrun are to be borne by HPCL/TERI as per MOU. However, HPCL desired to have a revision in the original project cost and additional funding Rs 11.7 lakh. This shall be put up to Steering Committee of HCF for consideration and approval.**

**5.0 Finalization of Methodology for R&D Awards**

5.1 Dr. S. Banik, Adv. (T), CHT made a detailed presentation covering the background and proposed methodology for Institution of Best Indigenously developed technology/ process.

5.2 The various aspects with regard to procedure/methodology for the R&D awards were deliberated by SAC and summary of the observations and suggestions are as under:

- The award should be financially rewarding to the inventors
- The award should be annual and relate to fiscal year
- The proposed development should be free from litigation for consideration
- Inventors/awardees : Preferably their name should be in the patent (sealed/applied for). However, organization's recommendation would be treated as final.
- Award Committee shall consist of following members :

| | | |
|---|---|---|
| Chairman | : | Chairman (SAC) |
| Convenor | : | ED (CHT) |
| Members | : | 2 from oil industry<br>2 from CSIR/National Institutes of repute<br>2 nominated by SAC (either SAC Members or SAC nominated expert) |

5.3 The detailed methodology for institution of the R&D Award, as approved by SAC, is given in Annexure-2.

**6.0 Methodology for R&D Project Review, approval & implementation**

6.1 As advised by Chairman, SAC during the 71st Meeting, Prof. S. Roy, IIT-D had circulated his observations with regard to R&D Project Review, approval & implementation. The same was deliberated by SAC.

It was suggested that to imbibe discipline in project implementation and timely completion, part of the project overheads and/or contingency (e.g. 50%) could be withheld and released only after the project is successfully completed. It was also opined to ensure timely release of funds and these could also be linked to the actual progress of the project, reviewed at each stage to the extent feasible. Prof. S. Roy also remarked that to achieve the project objectives, the project review and detailed technical assessment could be done through a sub-committee involving independent technical experts (knowledgeable in specific project area/s).

**SAC advised that on case to case basis and based on requirement an empowered Project Steering Committee may be formed to review the concerned project and guide the project team as may be required.**

**7.0 Presentation and discussion on New/Revised Project Proposals**

**7.1 Development of process know-how for indigenous production of Biphenyl for thermic fluid and other application – by BPCL-R&D**

Based on the recommendation of SAC, Dr. B.L. Newalkar of BPCL-R&D presented the details of revised proposal. It was informed that the project would be undertaken in two phases. Cost of Phase-I of the project is Rs. 260 lakh with completion schedule of 36 months. The project cost of Rs 260 lakh excludes cost towards infrastructure, consumables, catalyst evaluation, manpower etc. which will be borne by BPCL-R&D. Phase-II would be taken-up subsequently. Prof. Kumar advised BPCL to look into the other applications for Biphenyl to enhance the commercial viability of the project as it is quite likely that power generation with CSP (Concentrated Solar Power) in future may be using molten salt.

**SAC advised BPCL-R&D to submit a note to CHT addressing the commercialisation issues. The project has been approved in principle.**

## 7.2 Hydroprocessing of Residues – by IIP, Dehradun & HPCL-R&D

The subject proposal was earlier presented in 71st Meeting of the SAC. Based on recommendation of the SAC, the proposal was modified and presented again by Dr. S.K. Maity of IIP. Objective of the project is to develop catalyst for hydroprocessing of heavy oil and residues, catalyst preparation for hydro demetalization (HDM), Hydro desulphurization (HDS) and slurry phase hydrocracking.

The project is proposed to be carried out in two phases with Catalyst development in Phase-1 and Phase-2 covering scale up of catalyst manufacture and pilot plant for the process.

The estimated cost of Phase-I activities is Rs. 638.9 lakh excluding the cost of Rs 600 lakh towards new facilities at HPCL-R&D which will be borne by HPCL. The project completion schedule is 36 months for Phase-1.

SAC deliberated on the merits of the project and suggested that such projects should be taken up in mission mode with active participation by oil companies. Directors from IOC-R&D, BPCL, HPCL and IIP agreed to join the consortium. It was suggested that engineering company EIL should also join.

**SAC advised to organise a workshop on the project topic and finalize the methodology for carrying out the project by the consortium. IOC-R&D agreed to organise the workshop in April/May 2013 at IOC-R&D Centre.**

## 7.3 Development of Improved 3-phase reactor configuration for hydroprocessing applications – BPCL-R&D and EIL-R&D

Dr Ravikumar, BPCL-R&D presented the details of the project proposal.

Conventionally hydroprocessing of refinery hydrocarbon feedstocks is carried out in co-current flow trickle bed reactors, in the presence of large excess hydrogen causing higher feed vaporization and higher pressure drop across the reactor. Also due to accumulation of reaction products i.e. $H_2S$ and ammonia, reaction rate is inhibited. To overcome these deficiencies, BPCL-R&D & EIL-R&D proposed radial flow type reactor configuration. In the proposed reactor configuration, hydrogen is fed from a central pipe and flows towards the outer annular conduit after contacting liquid flowing downwards over the catalyst bed.

The estimated cost of the project is Rs. 12.70 crore with a time schedule of 36 months. Activities to be carried out by BPCL-R&D and EIL-R&D were also presented.

During deliberation on the proposal some members expressed apprehension about hydrodynamic operability of the reactor system. As such; the proposed configuration may present engineering challenges for ensuring uniform flow distribution.

**SAC advised that an expert committee may be formed to study the proposal in detail and submit recommendation to CHT/SAC for further action.**

**7.4 Design and Development of Poly-ionic Liquid Membranes for Sweetening of Natural Gas and Bio-fuel Production – RGIPT, Rae Bareli**

Dr U. Ojha, RGIPT made a detailed presentation about the project proposal.

The broad objectives of the project proposals are :

a) Preparation of hydrophilic block co-polymers with ionic liquid pendant groups for use as gas separation membranes.
b) Preparation of enzyme attached polymer supported nano-particles membranes for degradation of cellulose to bio-fuel.

The estimated cost of the project is Rs.277 lakh with completion schedule of 36 months.

**SAC observed that the project is proof of concept in nature and the intended beneficiaries of the project could be ONGC, OIL and GAIL. Therefore, it was advised that RGIPT may explore collaboration with one of the beneficiaries and put up the proposal to SAC for consideration.**

**8.0 Presentation & discussion on ongoing / completed R&D Projects**

**8.1 Coal to Liquid (CTL) Fuels Technology Project of EIL-R&D and BPCL-R&D**

Dr R.N. Maiti, EIL-R&D and Dr Ravikumar, BPCL-R&D presented the detailed progress on the ongoing project which has primarily four major components :

- Gasification pilot plant
- Gas clean-up and conditioning
- FT – technology development
- Basic Design for a Demo Plant

First 2 parts are being carried out by EIL-R&D and while FT technology is by BPCL-R&D and the basic design of demo plant to be carried out jointly.

The project zero date is July 2009 with scheduled completion of 45 months, i.e., April 2013. Total cost of the project is Rs. 33.0 crore .

BPCL-R&D informed that they have successfully completed their part of the project and have developed suitable FT-Catalyst. The catalyst has been tested extensively in laboratory bench scale unit. Draft reports covering their part of activities was handed over by Director (R), BPCL to SAC, Chairman.

EIL-R&D highlighted the various milestones achieved so far and problems being faced with regard to development of gasifier and gas cleaning system. EIL-R&D requested for extension of the schedule by 12 months.

**SAC reviewed the progress made by EIL and approved extension of project schedule by 12 months.**

8.2 **'Development of Mathematical Model and Simulation Package for Gasification of mixture of Indian Coal and Petcoke' – BPCL-R&D/IIT-Madras**

Prof. Pushpavanam, IIT, Madras gave a detailed technical presentation on the Fluidized Bed Gasifier model and simulation studies carried out by IIT-M as part of the project deliverables. Validation of the model requires pilot plant data which is to be generated at EIL-R&D as part of the CTL project.

The project was completed within the approved cost of Rs.50.81 lakh. However, the completion schedule was extended twice and finally the project was completed in December 2012 against the original schedule of June 2011. BPCL-R&D confirmed that all the deliverables under this project have been met.

IOC-R&D offered to collaborate with BPCL-R&D/IIT-M for validation of the model and agreed to share experimental data being generated in their pilot plant.

**SAC agreed to consider the project as completed.**

8.3 **'Desulphurization of Fuel Oil using Solvent Extraction Route' – CPCL & IIP**

Dr M.O. Garg, Director, IIP presented the status on progress of the project. The total cost of the project is Rs.116.7 lakhs and schedule of 30 months i.e. Sept. 2014.

IIP informed that all the experimental studies depend on the total sulfur analysis of the end products. Since the existing sulfur analyser is facing frequent failure, IIP requested SAC approval for procurement of a new total analyser costing about Rs 20 lakh under the overall equipment budget with out any implication on the overall project cost. This is proposed to be procured in place of microwave unit for continuous column costing about Rs 22 lakh.

**SAC accorded approval for the above.**

## 9.0 Other issues

### 9.1 "Hydrogen Generation Through Thermo-Chemical Processes" by ONGC Energy Centre (OEC)

OEC presented the status of the above project being funded under Hydrogen Corpus Fund (HCF). The project involves hydrogen production through 2 routes, namely, sulphur-Iodine (S-I) and Copper Chloride (CuCl). The approved cost of the project is Rs. 12.40 crore with schedule completion of 5 years w.e.f. from May 2010 (date of signing of MOU).

OEC informed that the entire project is being carried out in fully collaborative mode through IIT-Delhi, UICT, IICT etc. instead of part collaborations envisaged in the original proposal approved by the Steering Committee of HCF.

OEC further informed that they had initiated the project activities in collaboration with various institutes prior to the approval of the project and had already signed MOUs with these institutes which included IPR sharing model also.

CHT informed SAC that the execution methodology being adopted by OEC is not in line with the approved funding pattern including non-compliance of MOU provisions including IPR issues. In view of the deviations with regard to the execution methodology, it has become very difficult to regulate the financial progress and release of funds.

**SAC remarked that such major deviations should be avoided and advised OEC to take with CHT for addressing the concerns raised by them.**

### 9.2 Indigenous Manufacturing of Refining Catalysts in India – Presentation by IOC-R&D

Shri S. Rajagopal, ED(RT), IOC-R&D briefed about the need for setting up indigenous catalyst manufacturing facility. It was informed that currently Indian Refineries have FCC catalyst/additive demand of 40120 MTPA, DHDS/DHDT catalyst demand of 3000 MTPA and hydrocracker catalyst of 950 MTPA. Most of these catalysts are procured from various MNC companies. IOC-R&D, NCL and IIP have developed proven catalyst & additives and these are being used in isolated cases. The reason for limited use of indigenous catalyst is mainly lack of catalyst manufacturing facility.

IOC-R&D has proposed for creation of a catalyst manufacturing facility at Dahej, where IOC-R&D has already procured land. The proposed capacity of the plant would be : FCC catalyst : 15000 MTPA and Hydroprocessing catalyst : 1000 MTPA. The approximate cost of the project is Rs. 311 crore with a ROI of 26.4%.

IOC-R&D proposed following funding pattern for the project :

| | | |
|---|---|---|
| IOCL/HPCL/BPCL | : | 34% |
| OIDB Grant | : | 33% |
| Soft Loan from OIDB | : | 33% |

**SAC advised IOC-R&D to submit a comprehensive proposal by IOC, HPCL & BPCL.**

**10.0** The meeting concluded with thanks to the Chair.

**Annexure-1**

**72nd Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG held on 30th March, 2013 at Lalit Hotel, Bekal, Kasargad, Kerala**

**List of participants**

| | Name | Designation | Organisation |
|---|---|---|---|
| 1 | Arun Balakrishnan | Chairman | SAC |
| 2 | Mohan Lal | Dy. Secretary | MoP&NG |
| 3 | Dr R. Kumar | Hon. Professor | IISc, Bangalore |
| 4 | Prof. G.D Yadav | Vice Chancellor | I.C.T. Mumbai |
| 5 | Dr. Shantanu Roy | Member-SAC | IIT, Delhi |
| 6 | Dr R.K. Malhotra | Director (R&D) | IOCL |
| 7 | K. Murali | Director (R) | HPCL |
| 8 | B.K. Datta | Director (R) | BPCL |
| 9 | Dr M.O. Garg | Director | IIP |
| 10 | A.S. Basu | MD | CPCL |
| 11 | B.D. Ghosh | ED | CHT |
| 12 | M.C. Singh | FA&CAO | OIDB |
| 13 | B.K. Namdeo | ED – IT&S | HPCL |
| 14 | S. Rajagopal | ED (RT) | IOCL-R&D |
| 15 | G. Sri Ganesh | ED, R&D | HPCL |
| 16 | P. Padmanabhan | ED (Ref. Co.) | BPCL |
| 17 | Dr P.S. Viswanathan | Head, R&D | BPCL |
| 18 | Dr V. Ravikumar | Chief Manager (R&D) | BPCL |
| 19 | Dr Bharat L. Newalkar | Sr. Manager (R&D) | BPCL |
| 20 | Dr N.V. Choudary | GM, R&D | HPCL |
| 21 | Dr P.V.C. Rao | DGM R&D) | HPCL |
| 22 | Dr S.G.T. Bhat | Consultant | HPCL |
| 23 | Dr S. Pushpavanam | Professor | IIT, Madras |
| 24 | Dr R.N. Maiti | AGM | EIL |

| | Name | Designation | Organisation |
|---|---|---|---|
| 25 | Dr S.K. Maity | Principal Scientist | IIP |
| 26 | Dr D. Parvatalu | DGM (Chem) | ONGC Energy Centre |
| 27 | Dr Sanjukta Subudhi | Fellow | TERI, New Delhi |
| 28 | Dr O. Ojha | Asst. Professor | RGIPT |
| 29 | A.S. Pathak | Addl. Director | CHT |
| 30 | Dr S. Banik | Advisor | CHT |

**Annexure-2**

## Institution of CHT Award for " Best Indigenously Developed Technologies/Processes"

### 1.0 Background

The Governing Council of CHT has accorded approval for institution of R&D award for 'Best Indigenously Developed Technology/Process' to incentivize and encourage R&D efforts in the Oil Industry. CHT had developed a methodology for giving the award which was deliberated in the 72nd SAC Meeting held on 30th March, 2013. Incorporating recommendations of SAC Award Methodology is finalized.

### 2.0 Objectives of the CHT Award

The objective or aims of this award 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.

Main objective of this award is to recognize 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 . The CHT Award is expected to be a prime award in the Hydrocarbon Sector.

### 3.0 Frequency of Award

Every year

### 4.0 Type of Award

Cash for awardees and citation for the organisation

### 5.0 General Criteria

### 5.1 Technology / Process

- Indigenous Development
- Period: Not before 5 years from date of application (for award) filed.
- Should be available for the benefit of the Nation. (Royalty may be paid for the usage of technology).

- Could be individual Indian Organization or collaboration with Indian partner.
- Development through international collaboration
  - Indian Partner's share must be more than 51% and technology should be available for national use.
- Could be novel product also.
- Developed Technology has not been out rightly transferred to another party for one-time payment.

### 5.2 Technical Criteria

- Technology/Process/Product is innovative. If similar technologies/processes already exist, innovation at least in some aspects of existing technology/process has been achieved.
- Have distinctive innovative features
- Already patented or patent filed
- Commercialized and benefits of the technology/process demonstrated
- Competed with commercially available technologies
- If the technology has been commercialized in-house, details of the performance need to be furnished to the Award Committee
- Technology must be energy efficient
- It should meet all HSE requirements
- If not commercialized, has it been demonstrated at reasonable scale e.g. 1000 bbl/day product
- Has FTO i.e. freedom to operate for indigenous application been done or the Technology/Process has not been challenged in a court of law.

### 5.3 Award Criteria

- Individual or group of individuals preferably not exceeding 5 would be eligible for cash award
- Application should be made by the organization
- Organization would get citation
- As special case, superannuated employee can also be considered for award along with other employees
- All awardees' name preferably be in the patent application or patent granted.
- In case of international collaboration, individuals belonging to Indian organization would be eligible for cash award. Others would get only citation.

## 6.0 Application Procedure

The application should contain following :

i) Name of the Technology/Process/Product
ii) Names of individuals, organization
iii) Detailed write up on the technology including figure, tables etc.
iv) Copy of published literature on existing similar technologies
v) Copy of patent or patent application
vi) Copy of publications on the technology
vii) Details of the commercialized unit
viii) Certificate from the licensee
ix) If the innovation has been recognized/awarded by any other institution, details of the same should be furnished.

**General Conditions**

- The organization should forward the application
- Application may be rejected if adequate technical details are not provided
- The award may not be given if all applications are found unsuitable
- The application will not be returned to the applicant
- Decision of the committee is final. No further correspondence would be entertained.
- Strict confidentiality of the application along with technical details would be maintained.
- CHT reserve the right for adequate publicizing the award and awardee.

## 7.0 Composition of Award Committee

The Award Committee would consist of following members:

i) Chairman – SAC Chairman
ii) Convenor – ED(CHT)
iii) Members – 6 Nos.
  - 2 from Oil industries
  - 2 from CSIR/IITs/ National Institute of repute
  - 2 from SAC nominated members or experts