

43RD MEETING

HELD AT

EIL, R&D CENTRE, GURGAON

ON

OCTOBER 9 - 10, 1998

उच्च प्रौद्योगिकी केन्द्र

(पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय)

पाँचवां तल, कोर 6, स्कोप कॉम्प्लेक्स, 7, इन्स्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली - 110 003

Centre for High Technology

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

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उ.प्रौ.के./एस.ए.सी./
CHT/SAC/

नवम्बर 2, 1998
November 2, 1998

सेवा में,
TO,

1. पेट्रोलियम और प्राकृतिक गैस मंत्रालय की वैज्ञानिक सलाहकार समिति के सभी सदस्यों को ।
1. All Members of the Scientific Advisory Committee on Hydrocarbons of the Ministry of Petroleum & Natural Gas.
2. सभी तेल कंपनियों के मुख्य कार्यकारियों को ।
2. Chief Executives of all Oil Companies.

विषय : पेट्रोलियम और प्राकृतिक गैस मंत्रालय की हाइड्रोकार्बन्स पर 43वीं वैज्ञानिक सलाहकार समिति के कार्यवृत्त का परिचालन ।

Sub.: 43rd Meeting of the Scientific Advisory Committee on Hydrocarbons of the Ministry of Petroleum & Natural Gas - Circulation of Minutes.

महोदय,
Dear Sir,

पेट्रोलियम और प्राकृतिक गैस मंत्रालय की हाइड्रोकार्बन्स पर 9 और 10 अक्टूबर, 1998 को इंजीनियर्स इंडिया लिमिटेड (अनुसन्धान एवं विकास केन्द्र), गड़गाँव में हुई वैज्ञानिक सलाहकार समिति की 43वीं बैठक के कार्यवृत्त की प्रति आपकी सूचना एवं आवश्यक कार्रवाई हेतु संलग्न है ।

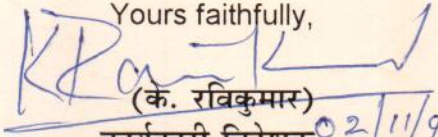
Enclosed, please find a copy of the minutes of the 43rd Meeting of the Scientific Advisory Committee on Hydrocarbons of the Ministry of Petroleum and Natural Gas held at EIL, R&D Centre, Gurgaon on 9 & 10 October, 1998, for your information and necessary action.

Also enclosed are copies of articles circulated by Prof. M.M. Sharma, Chairman, SAC during the Meeting.

धन्यवाद !
Thanking you,

भवदीय,

Yours faithfully,


(क. रविकुमार)
कार्यकारी निदेशक 02/11/98

(K. Ravikumar)
Executive Director

संलग्न : यथोक्त

: 2 :

प्रतिलिपि : प्रो. एम.एम. शर्मा,
502, सौरभ,
प्लॉट नं. 39, कुन्दुर मार्ग,
स्वास्तिक पार्क, चैम्बूर,
मुम्बई - 400 071.

Copy to : Prof. M.M. Sharma,
502, Saurabh,
Plot No. 39, Kundur Marg,
Swastik Park, Chembur,
Mumbai - 400 071.

1. सलाहकार (आर) / सलाहकार (इ) / संयुक्त सचिव (आर)/संयुक्त सचिव(इ)
/ सहायक सचिव (एम) / उप सचिव (सी.सी.)
1. Adviser(R) / Adviser (E) / JS (R) / JS (E) / AS (M)/ DS (CC)
2. एफ.ए. एवं सी.ए.ओ., ओ.आई.डी.बी.
2. FA & CAO, OADB
3. पेट्रोलियम और प्राकृतिक गैस मंत्रालय के सचिव के निजी सचिव को ।
3. PPS to Secretary, MOP&NG

**Minutes of the 43rd Meeting of the Scientific Advisory Committee on
Hydrocarbons of the Ministry of Petroleum & Natural Gas held
on 9 & 10 October, 1998 at EIL, R&D Centre, Gurgaon**

List of participants is attached.

Shri K. Satyanarayan, CMD, EIL extended a warm and hearty welcome to the Chairman, SAC, other distinguished members of the SAC and all the invitees. He highlighted the great emphasis laid by EIL on indigenous development of technology, he said that it was a matter of pride to EIL that today around 80-85% of the equipment for any big project / refinery could be manufactured and delivered at India as compared to 20% in the past. In this regard, CMD, EIL acknowledged the tremendous support extended by SAC in development of indigenous technology through the various R&D projects. He mentioned that outcome of some of the completed R&D projects have been very encouraging specially w.r.t. the projects in the area of distillation and furnace studies.

He, however, expressed concern that inspite of promising results, specially w.r.t. utilization of structured packing in Barauni Refinery crude column the oil industry members were not coming forward for utilization of the indigenous technologies that have been developed. In this regard, he welcomed SAC's suggestion to include an industrial partner in all the R&D projects, which would also help in the successful commercialisation of the projects in future.

Dr. S.J. Chopra, Director (T), EIL thanked the SAC for their extensive support rendered in the various R&D projects and said that EIL was committed to complete the projects as per the recommendations of SAC, though there were some delays in completion of the projects.

Dr. B.S. Gill, Head, EIL, R&D made a brief presentation on the R&D activities of EIL. The presentation covered details of the various CHT funded projects, highlights of projects, other than those funded by CHT viz. furnace simulation studies, high turn down distributors, NO_x reduction, fibre film contactor, furnace efficiency studies, Gamma Ray Scanning, liquid phase H₂S oxidation etc. He also mentioned regarding the collaborative R&D projects with IOC (R&D) for deep cut technology, optimisation studies, etc.

Prof. M.M. Sharma, Chairman SAC, emphasized that the Scientific Advisory Committee of MOP&NG has been striving hard since 1982 to usher interactions among Scientific & Academic institutions, R&D institutions & Industry members to pursue technological improvements and developments. He mentioned, that EIL, R&D Centre, also was created at the recommendation of SAC. He highlighted the various major changes that have taken place in the world viz

merger of AMOCO - BP and shutting down of around 50% of the refineries in Germany, since the address given by him at the tenth RTM at Mumbai in Feb'98. He emphasized on the following points :

- 1) It is very difficult to justify the existence and profitable operation of small refineries and hence merger of refineries in India, to be given importance.
- 2) Refineries have to become energy companies, and produce and export power for justifying their economic viability.
- 3) All out efforts have to be made to complete the R&D projects as per schedule. Funds have been forthcoming from MOP&NG and we land into a very uncomfortable situation if there is extensive delay in the completion of projects.
- 4) While responding to CMD, EILs remark on the utilisation of structured packing, he emphasized that EIL will have to compete with the other suppliers and prove the superiority w.r.t. performance and cost.
- 5) More discussions and proactive manouvers is given technology should be generated. Sulphur disposal would pose no problems as there was lot of demand for sulphur.
- 6) There is ample scope for syngas, which is a key to production of DME, H₂, Methanol, Ammonia etc. Hence R&D proposals on syngas production and conversion should be given emphasis.

Prof. Sharma congratulated Dr. A.K. Bhatnagar, on his elevation to Director (R&D), IOCL and also his inclusion in the Board of Directors of IOCL.

The agenda items were taken up for discussion :

43.1 Presentation by EIL on "Potential Yield and Energy Benefits in Indian Refineries" - A Process Integration Approach.

Dr. M.K. Joshi, DGM, EIL made the above presentation, covering issues related to technology selection / addition, energy conservation options impact of environmental stipulations etc. for optimum yield and energy benefits.

Gujarat Refinery was taken up for bench marking study as a starting point and suggestions for carrying out studies addressing all systems, sub-systems, hardware for overall improvement in yield and energy have been made by EIL.

43.2 Presentation by IIP, Dehradun on Proposal on "Studies for the Development of Polymer Modified Bituminous Binder".

Dr. Himmat Singh, of IIP-Dehradun made the above presentation.

The project is a collaborative effort between IIP and CRL and involves development of a process for making improved quality Bitumen by incorporating polymeric materials like SBS, EVA, ADP etc. into the available feed stock at CRL, Cochin.

The total cost of the project is Rs. 23.5 lakhs, with IIP cost of Rs. 16.5 lakhs and Rs. 7.0 lakhs to be borne by CRL.

Completion schedule of the project is estimated to be 18 months.

IIP informed that the proposal has been put up to the CRL board and final confirmation / approval for financial participation by CRL is awaited.

Chairman, SAC and other members of SAC observed that the CRRI, Delhi has done a lot of work in this area and so IIP should also examine the involvement of CRRI in the project.

Action : IIP / CRL

- 43.3 Presentation by IIP-Dehradun on "Development of Catalyst & Technology is Atmospheric Residue Hydrotreatment" by IIP.

Dr. T.S.R. Prasada Rao, Director, IIP informed that funding of the project by BPCL to the furnace of 25% of the total cost is under active consideration by BPCL board. Detailed formulation of the feasibility report has been undertaken by IIP for putting up to the BPCL board.

Action : IIP/BPCL

- 43.4 Presentation on "Development of Technology for Tracer Studies in FCCU" by EIL, R&D

Presentation on the above proposal was made by EIL, R&D in the 42nd SAC Meeting at IIP Dehradun. It was then suggested that the proposal will be taken up after clearance on financial participation by BPCL.

It was informed by Dr. S. Banik DGM, EIL-R&D Centre that confirmation has been received from BPCL for sharing 20% of the overall project cost.

SAC recommended the proposal for funding by OADB/CHT at a total cost of Rs. 64.6 lakhs only, out of which Rs. 12.92 lakhs will be borne by BPCL. FE component of the total cost of US \$ 80,000.

Action : CHT

- 43.5 Presentation on "Sheet Metal Structured Packing - Parl Pak - Phase II" by EIL, R&D.

Dr. S. Banik, DGM, EIL-R&D made presentation on the project "Sheet Metal Structured Packing - Parl Pak - Phase II", which has recently been completed and report is under preparation.

Dr. Banik informed that enquiries have been received from BRPL for the packing and EIL has submitted their offer based on Barauni Refinery test run data. Also discussions are on for use of the packing in the FCC main Fractionator revamp at MRL and also BPCL. EIL is hopeful of commercializing the packing since the performance compares with the best available.

Chairman, SAC and other members of SAC appreciated the work done by EIL and made note that the Sheet Metal Structured Packing - Parl Pak Phase-II is promising in terms of capacity, mass transfer efficiency and heat transfer efficiency.

- 43.6 Presentation on Development of Zeolite Based Catalytic Reforming Catalyst by IIP.

Shri Y. Kuchal, Scientist, IIP-Dehradun made a presentation for development of technology for zeolite base catalytic reforming catalyst having better selectivity, activity and stability than the conventional available catalysts. Chairman, SAC and the other members of SAC, observed that the cost of project as submitted by IIP was on a very high side. IIP shall bring down the project cost to Rs. 65.0 lakhs and furnish a revised cost estimate with detailed break up of each item.

Action : IIP

- 43.7 Presentation on "Molecular Modeling and Simulations in Petroleum Refining" by IIP-Dehradun.

Shri Siddhartha Ray, Sr. Fellow, IIP - Dehradun made the above presentation.

Chairman, SAC and other members of SAC suggested IIP to review the proposal keeping a specific area in focus and furnish a revised proposal in the next SAC meeting.

Action : IIP

43.8 Presentation by EIL on "Refractories in Petroleum Refining"

Shri Raut, of EIL made a detailed presentation covering the various types of refractory lining systems, limitation related to the refractory lining job, different types of refractory design adopted in FCC units, and the other process heaters, types of anchor materials, performance of refractory lining, criteria for lining design and selection of materials, properties of refractories etc. He also dwelt upon the importance of design, material selection, detailed engineering and proper application for a successful and reliable refractory lining.

The following areas were identified for further studies :

- 1) Lining design software
- 2) Use of NDT Methods for evaluation of refractory
- 3) Finite Element Analysis of Lining.

After deliberations at length, Chairman, SAC and other members of SAC felt that consideration in this area could be given and invited EIL to put up proposal for work in the above identified areas in the next SAC meeting. However, while preparing the proposal, sulphur content in fuel will be restricted to 1% wt. Also EIL will talk to CCGRI before putting up the proposal.

Action : EIL

43.9 Presentation by IIP Dehradun / EIL on "Recovery of Ultra Pure Helium from Natural Gas".

Shri Shivraj of EIL made a presentation in the above proposal.

The project is a Collaborative effort amongst IIP-Dehradun, EIL, CSMCR, EIL and NCL - Pune.

Based on request by OIL & ONGC, a joint proposal for collaborative development of PSA technology for Methane / Nitrogen separation was submitted to OIL. The proposal was reformulated as per OIL's suggestion to include technology development for Helium Extraction. OIL has now requested for techno-economic feasibility for the extraction to be established.

The present proposal considers technology development for recovery of Helium from Rajasthan gas. Though the concentration of He in the gas is very low for economic extraction by present day standards, strategic importance of Helium could override the economic factors. Chairman, SAC and other members of SAC felt that the proposal could be taken up in future, if there is a Government directive.

43.10 Presentation by IIP - Dehradun on "Separation of Olefins from FCC Off Gases".

Dr. A.N. Goswami, Scientist, IIP-Dehradun, made a presentation on the above proposal. Details of Membrane based Absorption process for Olefin - paraffin separation, PSA process for olefin recovery along with economic benefits were discussed.

Chairman SAC and members SAC agreed that absorptive separation is an important area and needs consideration. However, IIP should bring along a refinery partner before putting up the final proposal for consideration by SAC.

Action : IIP

43.11 Presentation by IIP on "Development of Catalyst for Deep Catalytic Cracking".

Based on request made by Chairman, SAC, Dr. Uma Shankar, Scientist, IIP, Dehradun had made a presentation in the 41st SAC, on Deep Catalytic Cracking of heavy residues into light olefins for important petrochemicals, oxygenates and alkylates.

The present proposal is a financial proposal giving details of fund requirement for the project. The total project cost as furnished by IIP is Rs. 84.0 lakhs.

Chairman, SAC and other members SAC felt that the cost estimates were on a very high side and advised IIP to bring down the cost to Rs. 50.0 lakhs.

IIP shall furnish the details of the revised cost estimate.

Action : IIP

43.12 Presentation by EIL/IIP on the proposal for "Removal of SO₂ from Flue Gases".
Dr. S. Banik, DGM, EIL and Dr. Ms. Asha Masohan, Scientist, IIP - Dehradun made a joint presentation on the above proposal.

Data on the national ambient air quality standards for SO₂, SO₂ emission standards and emission for the Indian refineries were presented. Also sources of SO₂ and avenues for SO₂ abatement were discussed.

The proposal considers development of a process technology using the regenerative gas absorption process, at IIP and demonstration of the process at EIL, R&D Centre where furnace already exists.

Chairman, SAC & members, SAC felt that the proposal was worth considering. Chairman, SAC advised IIP to identify the major sources of SO₂ in the refinery and also match with the H₂S quantum generated from the hydro desulphurisation units, before putting up the final proposal.

Action : IIP

43.13 Presentation by EIL/IIP on "Supercritical Extraction for Solvent Deasphalting".

Shri A.K. Jain, Manager, EIL, R&D made a presentation on the above proposal and discussed the existing capabilities of IIP/EIL/HPCL solvent deasphalting process and the development plan for the supercritical process.

Chairman, SAC & other members felt that there was a lot of merit in the project and recommended the proposal for funding by OIDB/CHT at a total cost of Rs. 140 lakhs, with a contribution of Rs. 30.0 lakhs from HPCL. A detailed break up of the total cost estimate shall be furnished by IIP/EIL.

Action : IIP/EIL

43.14 Presentation by IIP-Dehradun on "Identification and Estimation of Polynuclear Aromatic Hydrocarbons in fuel and engine exhaust emissions.

Dr. Pradeep Kumar, Scientist, IIP-Dehradun presented the above proposal for setting up appropriate methods and generation of data of total aromatics and polycyclic aromatic hydrocarbons in diesel fuel and study the variation of particulate matter and individual PAH (Polycyclic Aromatic Hydrocarbon) content of diesel fuels and engine variables.

The total cost of the project is Rs. 105 lakhs.

After detailed review of the cost estimates, Chairman SAC & other members recommended the proposal for funding at a cost of Rs. 45.0 lakhs. IIP shall furnish the details of the revised cost break up.

Action : IIP

43.15 Presentation by CSIR on "Enhancing Capacity of Pipelines for Transportation of Crude and Petroleum Products".

Shri S.N. Sharma, Scientist, CSIR informed the members that the second interactive meet on the above subject was held at the CSIR, HQ, New Delhi on 12.8.98 under the chairmanship of Prof. K. Vasudeva, in which DG, CSIR was also present.

After detailed discussions amongst the representatives from the various oil industry organizations, areas were identified which needed R&D inputs for enhancing the life of the pipelines. Groups have been constituted for formulating specific project proposals for submitting to CSIR in the following identified areas :

- 1) Residual Life Assessment of Pipelines
- 2) Cathodic Protection System
- 3) Coatings
- 4) Microbial Induced Corrosion
- 5) Risk Analysis & Management.

Chairman, SAC suggested that proposals for Restoration of capacity of the existing pipelines operating at lower capacity may also be considered.

Action : CSIR

43.16 Dr. H.R. Bhojwani, CSIR, HQ, New Delhi presented the status of the project on "Technology Development for production of Feed Stocks for Microcrystalline Wax from Vacuum Residues using Short Path Distillation Technology".

The project is now expected to be completed by Dec.'99. The order for the SPD unit is expected to be placed by end Oct.'98 as against revised schedule of August'98, leading to an anticipated delay of 3 months. However, there is a possibility of recovery of 2 months time through early supplies, installation and commissioning.

The approved cost of the project is Rs. 1353 lakhs. The cost of the project is expected to increase due to the variation in Re - \$ party. However, the SPD unit cost in foreign exchange remains almost unchanged.

CSIR requested SAC to approve the revised cost estimate with revision in FE cost by 30% (1045 to 1360 lakhs), with AOD contributing the rest Rs. 250 lakhs shortfall.

Chairman SAC & other members felt that the project is of National importance and with specific reference to the North East, it is of even greater importance. This is a forward looking project for upgradation of bottom of barrel to Microcrystalline wax, which is a value added product. Hence the committee recommended the approval of the project for funding by CHT/OIDB w.r.t. revision

in foreign exchange cost by 30% i.e. to Rs. 1360 lakhs from Rs. 1045 lakhs, with IOCL-AOD, expected to contribute balance Rs. 250 lakh shortfall.

- 43.17 Chairman SAC and all members of SAC emphasized that all project proposals to be put up for consideration by SAC should be sent at least one month in advance to CHT, for distribution to the members. Proposals which are not received, will not be included in the agenda item.
- 43.18 Prof. M.M. Sharma, Chairman SAC thanked the management and all members of EIL for their efforts in making the meeting successful.
- 43.19 The next meeting of the Scientific Advisory Committee will be held at Auriya, UP. The tentative dates for the next meeting is 12 & 13 Feb., 1999. The dates will be finalised as per advise of Chairman, SAC.

43rd Meeting of the Scientific Advisory Committee on Hydrocarbons
of Ministry of Petroleum & Natural Gas

List of Participants

Members

S/Shri

1. Prof. M.M. Sharma, Chairman, SAC
2. Dr. A.K. Bhatnagar, Director (R&D), IOC
3. K.P. Shahi, Adviser (R), MOP&NG
4. Dr. S. Vardarajan, President, INSA
5. Prof. K. Vasudeva
6. Prof. A.P. Kudchadkar
7. Dr. K.V. Raghavan, Director, IICT
8. Dr. T.S.R. Prasada Rao, Director, IIP
9. Dr. S.J. Chopra, Director (T), EIL
10. S.N. Sharma, Scientist, CSIR
11. K. Ravikumar, ED, CHT

Others

12. S.N. Jha, Director (R&D), IOCL - Part
13. Dr. B.S. Gill, DGM (R&D), EIL
14. Dr. S. Banik, DGM, EIL
15. Dr. D. Ram Babu, Asstt. GM, EIL
16. A.K. Jain, Manager, EIL
17. R. Chawla, Dy. Mgr., EIL
18. T.K. Sarkar, Mgr., EIL (R&D)
19. Dr. P.K. Sen, DGM, EIL (R&D)
20. S.P. Rao, ED (O&M), GAIL
21. Dr. A. Rastogi, DGM, GAIL
22. S.C. Tandon, GM (T), IOC (R&D)
23. S. Ghosh, ED, IOC (R&D)
24. Dr. R.P. Verma, GM, IOC (R&D)
25. Dr. G.P. Rai, Sr. R&D Mgr., BPCL
26. Dr. A. Datta, Sc. G., IIP, Dehradun
27. Dr. Himmat Singh, Dy. Director, IIP, Dehradun
28. V.K. Kapoor, Dy. Director, IIP, Dehradun
29. G.S. Dang, Engineer, IIP, Dehradun
30. M. Anwar, Sc. 'F', IIP, Dehradun
31. Pradeep Kumar, Sc. 'F', IIP, Dehradun
32. Dr. S.K. Singhal, Sc. E-II, IIP, Dehradun
33. Dr. A.N. Goswami, Sc. E-II, IIP, Dehradun
34. Dr. Y.K. Kucchal, Sc. E-II, IIP, Dehradun
35. Siddharth Rao, Sc. 'F', IIP, Dehradun
36. S.K. Bej, Sc. E-I, IIP, Dehradun
37. Ms. Asha Masohan, Sc. E-I, IIP, Dehradun
38. M.K. Bhatia, GM (Ops.), ONGC
39. Dr. G.G. Rajan, DGM (R&D), CRL
40. T. Sita Ramaiah, DGM (Tech.), HPCL- M
41. A.S. Rao, DGM, HPCL-M
42. Dr. K.S. Balaraman, DGM (R&D), MRL
43. I.P. Baruah, CQCM, IOC (AOD), Digboi
44. P. Dhar, DGM (Projects), IBP Co. Ltd.
45. A. Rajvanshi, Mgr. (Projects), IBP Co. Ltd.
46. P. Singh, SM (R&D), PCRA
47. C.P. Bezboruah, Head (R&D), BRPL
48. S.K. Sil, Director, CHT, New Delhi
49. Ms. Gita Dutta, Jt. Director, CHT, New Delhi