48TH MEETING

HELD AT

IOCL, BARAUNI REFINERY

ON

SEPTEMBER 15 - 16, 2000

उच्च प्रौद्योगिकी केन्द्र
(पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय)

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

उ.प्रौ.के./एस.ए.सी./
CHT/SAC/ 880

अक्तूबर 3, 2000
October 3, 2000

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. अपर सचिव (विपणन)/संयुक्त सचिव (रिफाइनरी)/सलाहकार (ई)/ओ.एस.डी.(रिफाइनरी)-पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
2. AS (M) / JS (R) / JS(E)/ Adviser (E) / OSD (R) - MOP&NG
3. सचिव, ओ.आई.डी.बी
3. Secretary,OIDB
4. सभी तेल कंपनियों के मुख्य कार्यकारियों को ।
4. Chief Executives of all Oil Companies.
5. पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय के सचिव के निजी वैयक्तिक सहायक को
5. PPS to Secretary, MOP&NG

विषय : पेट्रोलियम और प्राकृतिक गैस मंत्रालय की हाइड्रोकार्बन्स पर 48वीं वैज्ञानिक सलाहकार समिति की बैठक के कार्यवृत्त का परिचालन ।

Sub.: 48th Meeting of the Scientific Advisory Committee on Hydrocarbons of the Ministry of Petroleum & Natural Gas.

महोदय / महोदया,
Dear Sir / Madam,

पेट्रोलियम और प्राकृतिक गैस मंत्रालय की हाइड्रोकार्बन्स पर 15 और 16 सितम्बर, 2000 को इण्डियन ऑयल कॉ.लि., बरौनी रिफाइनरी में हुई वैज्ञानिक सलाहकार समिति की 48वीं बैठक के कार्यवृत्त की प्रति आपकी सूचना एवं आवश्यक कार्रवाई हेतु संलग्न है ।

Enclosed, please find a copy of the minutes of the 48th Meeting of the Scientific Advisory Committee on Hydrocarbons of the Ministry of Petroleum and Natural Gas held at IOCL, Barauni Refinery on 15 & 16 September, 2000, for your kind information.

धन्यवाद ।
Thanking you,

भवदीय,
Yours faithfully,

KRavikumar

(के. रविकुमार)
03/10/2000 कार्यकारी निदेशक
(K. Ravikumar)
Executive Director

संलग्न : यथोक्त
Encl.: As above.

प्रतिलिपि : 1. श्री के. पी. शाही, कार्यकारी निदेशक, इण्डियन ऑयल कॉ. लि., बरौनी रिफाइनरी
Copy to : 1. Sh. K.P. Shahi, Executive Director, IOCL - Barauni Refinery

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Minutes of 48th Meeting of the Scientific Advisory Committee (SAC) on Hydrocarbons of the Ministry of Petroleum & Natural Gas held on 15th & 16th September, 2000 at IOCL- Barauni Refinery

List of participants is enclosed as Annexure - I

Shri K.. P. Shahi, ED, Barauni refinery extended warm welcome to Prof. M.M. Sharma, Chairman, SAC, all other members of SAC and distinguished delegates / invitees from Oil industry & Research institutions. He expressed his pleasure for getting an opportunity to host the SAC meeting for the first time at Barauni refinery and stated that all the Baraunians were delighted to have the SAC members in their midst. He also recalled his association with SAC for five years during his tenure as Advisor (R) at MOP&NG.

Shri K. Govindarajan, DGM (TS), Barauni refinery, presented an overview of the refinery and explained various measures being taken by the refinery for augmentation, which inter-alia include, capacity expansion from 4.2 MMTPA to 6.0 MMTPA, additional secondary processing facilities in the form of Resid Fluid Catalytic Cracking Unit of 1.4 MMTPA capacity and Diesel Hydrotreater of 2.3 MMTPA capacity. He apprised the members about achievements of Barauni refinery in obtaining various awards & accreditations.

Prof. M. M. Sharma, Chairman, SAC expressed happiness to be at Barauni refinery and was delighted to visit the beautifully maintained Ecological park. He cherished the association of Shri K. P. Shahi with SAC and recalled his enthusiasm, positive attitude & contributions to SAC. He observed that with the commissioning of Haldia - Barauni crude pipeline, Barauni would no longer face constraint of crude availability and this would facilitate smooth operations of the refinery. He stated that oil refining today is a game of value addition to each stream. In this context, he cited the example of marketing high sulfur RPC to cement plants. He advised that Barauni should create business opportunities for C_8 to C_{12} olefins obtained from Coker, by their value addition into speciality solvents and petrochemicals. Concluding his remarks, he said, technology does not recognise remoteness of an area and future would belong to those who could think of unthinkables. He also thanked Shri K. P. Shahi and all the Baraunians, on behalf of SAC members and delegates, for the hospitality and excellent arrangements to make the 48th SAC meet a grand success.

The various Agenda items which were taken up for presentation / discussions and the decisions emanating from the deliberations are given below.

48.1 Proposal on "Setting up of 50 Bar High Pressure Air Flow Calibration and Test Facility" - FCRI, Palghat, Kerala.

48.1.1 Presentation and discussions

Shri M. S. Konnur, Director, FCRI made a presentation on the above proposal. He stated that FCRI is a reputed institution and has distinction of accreditation of NABL, CCE, Weights & Measures, DST, Underwriters Laboratory, USA etc.

It was informed that at present FCRI is involved in various performance tests for certification of flow related products and control devices using air, water and oil as the test media. The tests in air medium are done at present in the 20 bar blow down air test facility which has limitations in maintaining steady operating conditions for longer test duration.

The primary objective of this project is to assist in evaluation of high pressure flow products / meters used in various process industries such as fertilizer, chemical, petrochemical, thermal power plants, gas production/distribution lines, and custody transfer applications of natural gas etc. The proposed project will consist of a recirculating loop comprising of maximum test line of 300 mm diameter and with operating pressure of upto 50 bar (g) and flow capacity upto 6500 m^3/h. A reciprocating compressor with a variable speed motor will supply air to the recirculating loop at required static pressure and power required for the system will be around 1.25 MW.

The estimated project cost is **Rs. 15 crores**, with a completion period of 3 years.

During discussions Shri Konnur pointed out that funding of this project would not only upgrade the flow testing facilities in the country but may also facilitate generation of foreign exchange from neighbouring countries, instead of outgo of foreign exchange.

48.1.2 Decisions of the Committee

Based on the above presentation by Shri Konnur and the views expressed by the delegates, the Committee observed that the proposal of FCRI is sound in principle. However, it was decided that FCRI is to be advised to resubmit the proposal for recommendation by SAC after fulfilling the following conditions :

i. Financial & professional participation of ONGC, GAIL, NTPC and preferably Petronet LNG.
ii. In view of the high project cost, the total contributions of the collaborating organisations should be minimum 50% of the total project cost.
iii. The proposal should also give detail of R&D activities planned to be undertaken from the proposed facilities.
iv. FCRI will bring out likely business that could be generated from these facilities in India and also the possibility of international business.
v. The cost estimate must have provision for training of personnel in some reputed international institute having similar facilities.
vi. Time of project completion to be reduced to 2 years.

48.2 Proposal on "Development of Synthetic Aviation Lubricants and Technologies from renewable feed stocks to provide strategic, commercial and self reliance advantages to India"- IICT, Hyderabad

48.2.1 Presentation and discussions

Dr. K. V. Raghavan, Director, IICT and Dr. T. N. B. Kaimal, Dy.Dir., IICT while making the presentation on the above proposal, stated that India is totally dependent on developed countries for its requirements of aviation lubricants, which are of immense strategic importance in the defence preparedness of the country.

In view of the above, IICT in association with IOCL, R&D, NAL, HAL, GTRE and CEMILAC looked into the possibility of developing indigenous capabilities in Synthetic Aviation Lubricants (SALs). The group shortlisted OX-27 (meeting MIL-PRF-23699F) and OX-38 (meeting DEng RD 2487) specifications, for development in the initial phase. The processes for production of base stocks required for these lubricants from renewable feedstocks, earlier developed by IICT & IOC R&D, are proposed to be upscaled in the present proposal.

It was informed that the estimated cost of the project would be **Rs.17.32 crores** with completion time of 4 years. During discussions it emerged that the amount of business involved for SALs required by Defence is around Rs. 30 crore/ year.

From the project cost estimates presented by IICT, it was noted by Chairman, SAC that permanent equipment cost indicates expenditure of about Rs. 4.8 crore for Pilot Plant at IICT and about Rs. 3.3 crore for Bearing Test Rig at NAL. In this context, he emphasised that there is no fundamental difference in the esterification process and as such CHT/OIDB has already funded R&D project at IIP for "Development of Eco-friendly / Biodegradable Lubricants", which involves esterification of vegetable oils. He therefore advised IICT to get in touch with IIP to ascertain utilisation of their facilities for production of the base esters required for production of SALs. He also observed since Defence will be the major beneficiary of this project, funding of equipment such as Bearing Test Rig at NAL and testing expenditure, should be contributed by Ministry of Defence (MOD). IICT was, therefore, advised to review of the project cost in which the interest of all the organisations, viz., CSIR, MOD and IOC (R&D), deriving benefit from the project should be reflected through their financial participation.

48.2.2 Decisions of the Committee

The committee commended IICT for its efforts in successfully bringing together NAL, HAL, GTRE, CEMILAC and IOC (R&D) to formulate a joint R&D project of national importance. It was decided that the proposal may be resubmitted by IICT considering the following observations/ guidelines:

i. It is necessary to ascertain from the Scientific Advisor, MOD, whether indigenous production of proposed SALs is required for reasons of national security.
ii. For this purpose, there should be a meeting between all the organisations involved in the proposal to review the estimated project cost and it is expected that the total contribution from the collaborating organisations, who will derive benefit from the project, will be at least 50% of the estimated project cost.
iii. IICT should ascertain from IIP whether the facilities in their institution could be utilised for production of base esters required under this project.

48.3 Proposal on "New Methodology to study Lubricant interactions in Plastic deformation"- IIT, Delhi

48.3.1 Presentation and discussions

Dr. C. R. Jagga, Chief Scientific Officer (ITMMEC), IIT - Delhi, made a presentation on the proposed project. He pointed out that the lubricant - metal interactions are complex and the existing test methods do not simulate the plastic deformation condition and are

unsatisfactory. Further, the existing testing methods do not involve high sliding speed which is common in metal forming operations such as cold rolling of metal sheets.

These considerations point to the need for developing a test technique to study boundary lubrication characteristics of lubricants in plastic deformation at high sliding speed. Under the proposed R&D project, the existing rig at IIT - Delhi will be upgraded with further instrumentation and computerisation. The surface characterisation will be done by use of Image Analyser. The approach will involve oblique ball impact on the work - piece surface with a steel ball. By varying the angle of impact and height, large variations in sliding speed and load will be achieved.

The cost of the proposed project is estimated as **Rs. 33.93 lakhs**, with completion schedule of 2 years.

48.3.2 Decisions of the Committee

Taking cognizance of the interest expressed by Dr. S. P. Srivastava, ED, IOCL(R&D) to support the project, the Committee recommended the proposal for funding by CHT/OIDB, subject to financial participation of minimum 25 % by IOCL (R&D).

48.4 Proposal on "Development of catalyst for reducing sulphur in FCC gasoline with minimum octane loss" by IIP

It was informed by CHT that for above proposal presented in the 47th SAC meeting, IIP was advised by SAC to find a partner for financial participation. In this connection, CPCL has intimated IIP their consent to collaborate, after the proposal is cleared by SAC.

Taking congnizance of CPCL's willingness to support the project proposal, the Committee recommended the proposal for funding by CHT/OIDB, subject to 25% financial participation by CPCL.

48.5 Presentation on recently completed projects

48.5.1 Development of Catalytic Process for Isomerization of Waxy Feed Stocks - NCL, Pune

Dr. S. Sivasanker, Scientist - G, NCL made a presentation on above project, which was completed in July 2000. The objective of the project was to develop a catalytic process for the isomerization of waxy feedstocks into low pour, HVI lube base stocks.

He informed that NCL had earlier carried out preliminary work on development of a suitable silicoaluminophosphate (SAPO) catalyst with the support of CPCL and work under the above project was to scale up the catalyst preparation (Kg scale) and rigorous testing at the bench scale at NCL & CPCL..

Four different feedstocks were investigated for suitability for lube base stock production using isomerization catalyst. These were : hydrocracker bottoms from MRPL & Koyali, BHVGO and BN wax from CPCL.

The experimental work revealed, it was possible to isomerize the hydrocracker bottoms to produce high quality LOBS (pour points < -12°C with V I > 110) with high yields (>85%). The catalyst was operated without any noticeable deactivation for more than 300 hours in the case of the Koyali feed and for more than 400 hours in the case of the MRPL feed. The catalyst could also be regenerated without loss of activity. However other feedstocks, viz., BHVGO and BN wax were found to be unsuitable.

The committee noted that this has been one of the CHT funded projects completed as per schedule and it has a distinct possibility of commercialisation. Considering this, it was opined that there is a need to explore the prospects with IOCL - Koyali refinery.

48.5.2 Etherification of C_5 Olefins and light FCC Gasoline (IBP-105°C) - IIP, Dehradun

Dr. M. O. Garg, Scientist -G, IIP made a presentation on above project. He informed that interest for etherification of light olefins to oxygenates came up to reduce isopentene content in gasoline due to its high vapour pressure and high photochemical reactivity. The objectives of the project were to study etherification of C_5 olefins and light FCC gasoline and establish operating data of the process.

It was concluded from the studies that contaminants (peroxides, cations, bases and sulphur compounds) removal would be an essential step for better catalyst life. This has to be done by Alkali treatment followed by Water washing. For selective hydrogenation of dienes, Pd-APS catalyst was found most suitable. While conversion of isoamylenes obtained in a single pass was nearly 65 wt. %, further conversion could be achieved in another reactor in series. It was suggested by IIP that further work is required to be done by setting up a pilot plant at a refinery site.

While discussing the results of the study, Chairman remarked that CHT and refineries should actively consider looking into technologies for conversion of C_4-C_5 olefins into alkylates, which are in demand in USA and are being imported from Europe.

48.6 Review of status of ongoing R&D projects sponsored by CHT/OIDB

48.6.1 Dr. D. N. Saraf, Prof., IIT - Kanpur presented the status of the project on "R&D work on advanced control", which was started in June 1995 after signing of MOU. While reviewing the progress of the project and taking note of IIT - Kanpur's request for extension of project completion schedule to March 2001, Chairman advised IIT - Kanpur to expedite completion of the project. He also stated that the project should be completed in line with the decisions taken in the meeting of Coordination group held at IOCL - Mathura refinery on 13.7.2000.

48.6.2 Shri S. N. Sharma, Scientist - RPBD, CSIR presented the status of the project on "Production of microcrystalline wax using short path distillation technology", which was started in Feb. 1996. He informed that plant commissioning activities are in progress at IOCL - Digboi Refinery and the project is likely to be completed by end of December, 2000.

48.6.3 While reviewing the status of the R&D projects sponsored to EIL, Shri A. Soni, ED (R&D), EIL informed that there will be delay in completing the project on "Technology

development for hydrodynamics of Trickle Bed Reactors and cold flow studies : Phase-II" from the scheduled completion of Sept. 2000, because IIT - Delhi carrying out Phase-I of the project, is likely to complete their study in March, 2001.

As regards the project on "Development of flash zone entry device for vacuum column", he informed that the study on 4 versions of feed entry devices at EIL, R&D Centre will be completed by December, 2000. However the study on Vacuum column at Barauni refinery will depend on the unit shutdown when the column will be released to EIL for the experimental study.

48.6.4 As regards other ongoing projects, it was noted that by and large the progress is as per completion schedule.

48.7 Chairman, SAC again thanked the management of IOCL-Barauni Refinery and all the officers/ staff engaged in arranging the meeting and praised their efforts to make 48th SAC meeting a grand success.

48.8 It was decided that the next SAC meeting will be held at IIP, Dehradun during 3rd - 4th week of November, 2000 and the exact dates will be finalised by CHT and Dr. K. S. Jauhri of IIP, in consultation with Chairman, SAC.

48.9 The meeting concluded with a Vote of thanks to the Chair.

Annexure - I

48th Meeting of the Scientific Advisory Committee on Hydrocarbons of Ministry of Petroleum and Natural Gas

List of Participants

Members

1.	Prof. M. M. Sharma (Chairman)	Ex - Director	UDCT, Mumbai
2.	Dr. S. Varadarajan	Ex - Consultant,	Planning Commission
3.	Prof. K. Vasudeva	Ex-Head Chem. Engg. Dept.	IIT - Delhi
4.	Shri K. Ravikumar	Executive Director	CHT
5.	Shri A. P. Ram	OSD (R)	MOP&NG
6.	Dr. K. V. Raghavan	Director	IICT, Hyderabad
7.	Shri S. N. Sharma	Scientist	CSIR, New Delhi

Delegates / Invitees

8.	Shri K. P. Shahi	Executive Director	Barauni Refinery
9.	Dr. Sobhan Ghosh	Executive Director (RT)	IOC (R&D)
10.	Dr. S. P. Srivastava	Executive Director (LT)	IOC (R&D)
11.	Shri S. K. Phull	Executive Director	BPCL
12.	Shri A. Soni	Executive Director	EIL (R&D)
13.	Shri M. S. Konnur	Director	FCRI, Palghat
14.	Dr. K. C. Koshel	GM (Chem.)	ONGC, Dehradun
15.	Dr. M. O. Garg	Scientist - G	IIP, Dehradun
16.	Dr. K. S. Jauhri	Scientist - G	IIP, Dehradun
17.	Dr. S. Sivasanker	Scientist - G	NCL, Pune
18.	Dr. T. N. B. Kaimal	Head, Oils & Fats Div.	IICT, Hyderabad
19.	Prof. D. N. Saraf	Prof., Dept. of Chem Engg.	IIT - Kanpur
20.	Prof. A. Sethuramiah	Prof., (ITMMEC)	IIT - Delhi
21.	Dr. C. R. Jagga	Chief Sci. Off.,(ITMMEC)	IIT - Delhi
22.	Dr. G. G. Rajan	DGM (R&D)	KRL
23.	Dr. K. S. Balarman	DGM (R&D)	CPCL
24.	Dr. S. Banik	DGM	EIL (R&D)
25.	Dr. S. A. A. Rizvi	Scientist - E2	RRL Jorhat
26.	Shri B. Mascomani	CRE	FCRI, Palghat
27.	Dr. D. K. Tuli	Chief R&D Manager	IOC (R&D)
28.	Shri I. R. Borbora	Chief Engineer (PL)	Oil India Ltd.
29.	Dr. G. P. Rai	Sr. R&D Manager	BPCL
30.	Shri V. S. Shenoy	Sr. Manager - Tech	HPCL, Mumbai
31.	Shri S. Bhalla	Manager (Chem.)	GAIL
32.	Shri A. K. Jha	Manager (Mktg.)	BRPL
33.	Shri P. N. Dodeja	Addl. Director	CHT
34.	Shri S. K. Bahal	Joint Director	CHT