CFRI NEWSLETTER

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Established in November 1946, Central Fuel Research Institute is a unique Institute of its kind in India under CSIR, New Delhi to conduct research in different areas of Fuel Science and Technology with emphasis on coal and lignite.

Mission: Enhance the position of the Institute as a premier R&D centre for technology development and transfer by forging strategic alliance with other agencies and continuously strive for excellence in the area of potential expertise for generation of basic knowledge, innovation, and advanced concepts in science and technology for economic, efficient, and environmentally safe energy management.

SAMPLING AND ANALYSIS OF IMPORTED COAL UNLOADED AT VIZAG AND HALDIA PORTS *(Sponsored by SAIL, Kolkata)*

The task of sampling of imported coking coals unloaded at Vizag and Haldia ports and their analyses was awarded by Steel Authority of India (SAIL), Calcutta. The vessels: (a) MV Nordems and (b) MV Achillieus carrying imported coal from various countries were unloaded at both Vizag and Haldia ports. The coal was sampled (for both general analysis and total moisture) while the cargo discharged it on the wharf. After suitable preparation of the sample, it was characterized for proximate, CSN, sulphur total moisture and petrographic analysis.

FEASIBILITY STUDIES ON THE CLEANING POTENTIALITIES OF WARDHA VALLEY COALS *(Sponsored by:Ambuja Cement Limited, Mumbai)*

The coal samples from five different mine sites of Western Coalfield Limited, Nagpur have been tested for their characterization including size analysis and size-wise washability both at CFRI, Dhanbad and CFRI Unit Nagpur. CFRI carried out detailed washability investigations on the coals of all five individual mines viz. Balarpur, Sasti and Niljai Open Cast mines & Naglon (Majri) and Sasti Underground mines. Exhaustive basic data required to study the feasibility on the cleaning potentiality of all the individual coals were generated. With the basic washability data, the possibility of recovering cleans at various ash levels was predicted by computer simulation. Attempts to identify washers for the coals tested were made and beneficiation circuits were also developed, apart from suggesting the suitable flow sheet.

COAL CARBONIZATION ACTIVITIES

R&D Activities of Carbonization Division are going on under three projects. The purpose is coke making from different raw materials by different techniques depending on experimental results carried out in the laboratory for different types of coal. Suitable blends are prepared and charged in appropriate coke oven for coke making followed by testing of the resulting coke in Laboratory for different usages. One of the projects involves utilization of Jhama in making cokes by blending it with washery coal fines or other coal. From several runs encouraging observations have been found. Other area of activity includes the designing of non-recovery type coke oven. Eco-friendly technology for low capital cost intensive (semi/fully mechanized) and improved non-recovery type hard coke oven has been developed. The capacity range of such batteries of ovens is 100 to 250 tpd. Coke ovens are of two types i.e. Pusher and Drag types. CFRI has also developed and designed low cost red brick chimney of about 60 meters height (maximum temperature 1000^0C) suitable for such batteries. In addition to this, consultancy and supervision jobs during erection and commissioning of the plant at site are undertaken. Presently such four consultancy jobs have been assigned. An industrial briquette plant has been developed and designed utilizing coke breeze as a substitute of costly coke.

CHAPTER IN A BOOK

Dr Rajesh Kumar, Scientist has contributed a chapter on the topic *"Ergot a disease of plant but useful as medicine for human beings"* in the book 'Biological Diversity: Current Trends', published in Nov. 2004 by the Department of Biological Sciences, Rani Durgavati University, Jabalpur.

PAPER PUBLISHED

Samit Mukherjee and S. K. Srivastava, Kinetics and Energetics of High Sulfur North Eastern Indian Coal Desulphurization Using Acidic Hydrogen Peroxide. *Energy & Fuels*, 2004, 18, 1764-1769

PAPER FOR CONFERENCE

Shripal Singh and M.K.N. Yenkie, Scavenging of priority organic pollutants from igneous waste using granular activated carbon, has been accepted for International Conference on Environmental Science and Technology to be held from 23 to 26 Jan. 2005 at New Orleans, Louisiana, USA.

CATALYSIS SOCIETY OF INDIA

Dr Subhash Chandra Ray, Scientist 'F' has been elected as a member for the Executive Committee of the Catalysis Society of India for the period 2005-07.

REVIEWER OF ENERGY & FUELS

Dr Samit Mukherjee, Research Associate has been nominated as a reviewer of *Energy & Fuels*- a journal of American Chemical Society.

PRESENTATION

1.Dr Kalyan Sen, Director, CFRI made a presentation on his visit to USA during 27 Sept. to 1 Oct. 2004 on 27.10.04

2.Shri. Debabrata Chattopadhyay, Faculty Member, Management Training Institute, SAIL, Ranchi made a presentation on "The Knowledge Based View of Technological Innovations and Its Implication for R & D Organizations" on 10.11.04. This was a part of his Ph.D. work. He also collected the data through questionnaires from the scientific staffs.

3.Shri. Debjyoti Mishra, Financial Advisor, ICICI, Prudential Life Insurance made a presentation on 'Benefit of 80 CCC (1) Scheme for Tax Payer Employees' on 6.10.04.

VIGILANCE AWARENESS WEEK

Vigilance Awareness Week was observed from 1st Nov. to 6th Nov. 2004. Dr. S. C. Agarwal, Income Tax Commissioner, Dhanbad inaugurated the programme on 1st Nov. 2004 and addressed the gathering. An essay competition was arranged for the staff members on the subject "Responsibilities of Individuals to Eradicate Corruption in Public Office/Institute. This week long programme came to an end on 6th Nov. 2004 with valedictory function. Shri P. C. Agarwal, G. M., Eastern Coalfields, Bhowrah Area was the Chief Guest. Shri Agarwal addressed the house and also distributed the prizes to successful participants of the essay competition. A lecture of Shri N. C. Jha, Superintendent of Police, Criminal Bureau of Investigation, Dhanbad Branch on 'Practices Adopted to Prevent Corruption in Governmental Offices' was also arranged on 10.11.04.

Shri N. C. Jha, Suprintendent of Police, CBI, Dhanbad Branch delivering a lecture

QAUMI EKTA OBSERVED

Qaumi Ekta Divas was observed on 19th Nov. 2004. This Divas is observed on the birth day of Late Smt. Indira Gandhi, who continuously worked for the sake of communal harmony in the country and ultimately was shot dead by an act of communal violence. On this occasion, a meeting took place, where all the staff members took pledge. Stamps for communal harmony were sold to raise the funds for poor and orphan children rendered destitute in the heinous act of communal violence through out the country.

BOOK EXHIBITION

A book exhibition was organized during 22-24 Nov. 2004. Seven book sellers/agents participated actively from Dhanbad, Ranchi, Howrah and New Delhi. The purpose of organizing this exhibition was to bring awareness about the book reading among the readers and also to provide information about the latest books available in the market. This exhibition was organized and arranged by the Library Department of the Institute. The main beneficiary was the Library, which purchased the books in bulk on the request of scientific, technical and administrative staff of the Institute.

NEW PROJECTS RECEIVED

1.Consultancy during repairing, modifications, subsequent erection and commissioning of existing non-recovery type coke oven for M/s Auroma Coke Ltd, Dhanbad.
2.Consultancy during erection and commissioning of non-recovery type coke oven for MV International (2nd phase).
3. Consultancy in connection with imported coal of Tata Power, Chembur, Mumbai.
4. Washability study of natural coke (Jhama) from CV Area and Burragarh Area, BCCL, Dhanbad.
5. Heat recovery coke oven – a cheap energy efficient environment friendly alternative of coke making (HR COKE 2005).
6. Sampling and analysis of imported coal unloaded at portends (MV NORDEM)
7. Washability study of coal supplied by M/s Bhusan Limited, Sambalpur, Orissa
8. Sampling and analysis of imported coal unloaded at **portends** (MV Achillieus)
9. Beneficiation of coal slurry from Nandan Washery by froth flotation technique.

TECHNICAL REPORTS SUBMITTED

1. Feasibility studies on the cleaning potentiality of Wardha Valley Coals.
2. Extrapolatory washability studies on char from sponge iron plant.

MOU SIGNED

1.Okasha Coke Industries, Vill-Paiki, P.O.- Digwar, Hazaribagh, Jharkhand for the process-design know-how for setting up of soft coke plant of 12 ovens on 14.10.04.
2.K.D. Cokes, Lohia House, MG Road, Guwahati-785001, Assam for the process-design know-how for setting up a battery of improved beehive coke ovens for manufacture of coke on 19-10-04..
3. Pride Coke Pvt. Ltd. Harlalka Bhawan, Opp. Shanti Sabha, Guwahati for the process-design know-how for setting up a battery of improved beehive coke ovens for manufacture of coke on 19.10.04.
4. JDB Coke, GS Road, Jorabat, Kamrup, Assam for the process-design know-how for setting up a battery of improved beehive coke ovens for manufacture of coke on 28.10.04.
5. ACM Fuels Pvt. Ltd., 210 Shanti Bhawan, Bank More, Dhanbad-826001 for the process-design know-how for setting up a battery of improved beehive coke ovens for manufacture of coke on 03.12.04.
6. Tycoons Industies Pvt. Ltd., British Indian Street, Kolkata-700069 for the process-design know-how for setting up a battery of improved beehive coke ovens for manufacture of coke on 13.12.04.

APPLIED FOR PATENT IN PCT, USA AND INDIA

1. A system for cooling flue gas coming out of a pulverized coal fired furnace-Dr. A. Mukherjee, S. Biswas, M. Kumar, S. G. Sahu, A. Choudhury and Dr. K. Sen
2. A system for collection of samples of char and/or unburnt coal, bottom ash from pulverized coal fired furnaces- Dr. A. Mukherjee, S. Biswas, M. Kumar, S. G. Sahu, A. Choudhury and Dr. K. Sen

PATENT INFORMATION: COAL AND ITS UTILIZATION

1.USP Appl. No.20040228789 Nov. 18, 2004
Title: Method of Controlling Swelling and Shrinkage during Synthesis of Coke

Inventors: Stiller, Alfred; Chen, Chong

*Abstract***:** Methods of treating a carbon foam precursor to facilitate subsequent foaming of the material at low pressures, which may be of the order of about 0.5 to 1.5 atmospheres, are disclosed. In one embodiment, the carbon foam precursor is subjected to partial de-volatilization under controlled conditions with subsequent foaming being effected at low pressure. The carbon foam precursor may be one of various forms of coal including raw coal, coal extract mesophase pitch, synthetic mesophase pitch or petroleum based pitch. The pre-foaming treatment of the carbon foam precursor may remove a portion of the internal blowing agent and may alter the fluidity of the carbon foam precursor matrix. In another embodiment, the precursor after being converted into a powder is subjected to oxidation prior to foaming. Also a high density carbonaceous material is produced by oxidizing a carbonaceous feedstock to remove from the feedstock volatile gases followed by solvent treatment to remove hydrocarbons, thereby providing a carbonaceous feedstock, which when coked will produce a material of higher density.

2.USP Appl. No. 20040237809, December 2, 2004,
Title: Coal Dewatering System and Method
Inventors: McIntosh, Malcolm John; Huynh, Danh Quan
Abstract: The invention relates to a coal dewatering system, method and apparatus. The dewatering system includes a pre-heater vessel (82) comprising a chamber (101) for heating coal, an inlet means (84) to permit the passage of coal into the chamber (101), and an outlet

means (86) for permitting the passage of coal from the chamber (101). The dewatering vessel also includes a heating means (98) associated with the pre-heater vessel (82) to heat coal contained in the chamber (101) and a non-return valve means (92) to substantially prevent heated coal removed from the pre-heater chamber (101) via the outlet means (86) from re-entering the pre-heater vessel (82) via the outlet means (86). The dewatering system further including a dewatering unit (60) adapted to receive the heated coal from the outlet means (86) via the non-return valve means (92) and to thereby dewater the coal.
(Source: www.uspto.gov)

WORLD AROUND

ECO-FRIENDLY CHEMICAL CLEANING PROCESS FOR BOILERS

Scientists at Bharat Heavy Electricals Ltd. (BHEL) have developed an environment-friendly chemical cleaning process for boilers that relies on an organic chemical in place of hydrochloric acid. The process uses ethylene diamine tetraacetic acid (EDTA) and was adopted in a boiler at NALCO (Angul), 120 MW Unit-8. On completion of the EDTA chemical cleaning at the NALCO Unit-8, water wall tube sample was cut at 16m elevations to ascertain the effectiveness of this chemical cleaning process.

The inner surface of the tube was free from rust and having a uniform coating of the protective magnetite. Sample coupons placed in the drum were free of rust and the surface was coated with a uniform protective layer.

The scientists have also developed a simple waste treatment technique for the disposal of the spent EDTA chemical solution as part of the process that involves an aeration technique to facilitate natural biodegradation of the effluent effectively.

The EDTA chemical cleaning process has been found to be more eco-friendly and has the advantage of considerable cycle time reduction in power project commissioning schedule. (*Source: Chemical Weekly Nov. 30, 2004, pp. 163)*

LIGNITE HUMIC ACID

Humic acid works as an organic amendment to the soil and improves soil fertility leading to augmentation of crop yield. Lignite being a low rank coal contains about 60% humic acid. Through a research project under S&T Grant, NLC developed the technology of extracting humic acid from lignite. A plant at NLC was set up for the purpose, which is producing humic acid as potassium humate in solid form. Further, to assess the influence of humic acid on soils and its effect on growth of crops, a follow-up S&T project was also undertaken. To examine the influence of lignite humic acid on soil properties, pot and field experiments were conducted in a poly-green house constructed under the project and the findings were as follows:

(i) For capsicum and hybrid tomato crops sprayed with 0.1% humic acid solution, an increase of 38% yield was observed.
(ii) Flower plants, viz. rose and jasmine, etc. grown in soil treated with humic acid, showed considerable growth.
(iii) The maximum yield of onion 150.7 g/pot was from the treatment, which received 20 Kg/ha humic acid and 100% NPK in pot cultures. The same treatment in the field, recorded a high yield of 18.7 t/ha at Nathegoudenpudur, Tamil Nadu.
(iv) Field experiments conducted at Narasipuram and Ponnegoundenpudur (Coimbatore district), to test the effect of lignite humic acid on yield and quality of cotton and maize, recorded high yields of 31.7Q/ha and 65.76 Q/ha respectively from the treatment, which received 20-30 Kg/ha humic acid plus 100% NPK fertilizer.

The results thus achieved through the S&T project have subsequently been demonstrated for the benefit of local farmers.
(Source: Highlights of Research, Coal S&T Programme, CMPDI, Ranchi, 2004)

CFRI IN MEDIA

1.Mosquito eradication possible under Government's involvement – Dr Sen, Prabhat Khabar (19.10.2004).
2.Scientists to visit malaria affected area after Chhat– Dainik Jagaran (17.11.2004).
3.Book exhibition kicks off at CFRI – Prabhat Khabar and Hindustan (23.11.2004).

EVENTS AHEAD

1. Republic Day Celebration on 26 Jan. 2005
2. National Science Day on 28 Feb. 2005

CONTACT ADDRESS

Director, Central Fuel Research Institute
P.O.-FRI, Dhanbad -828108, Jharkhand, India.
Telephone – EPABX: (0326) - 2381001 to 2381010, 2381152, 2381173, 2381195, 2381200
FAX: (0326)-2381113, 2381385, 2460395,
Email:dnb_dcfri@sancharnet.in
Website: http://www.cfrindia.com

Compiled and Edited by Dr S. K. Srivastava, Dr L. C. Ram and Dr Rajesh Kumar; Secretarial Assistance by Shri R. N. Sharma and Shri Samir Acharjee; Published by Director, CFRI, Dhanbad.