

# **BRITISH COAL UTILISATION RESEARCH ASSOCIATION, (BCURA).**

## **LIST OF PROJECTS FUNDED THROUGH THE BCURA COAL RESEARCH PROGRAMME.**

### **Projects funded 1978 to 1985, (no Numbering system).**

UNIVERSITY OF SHEFFIELD, (1978 to 1985)

Funding to the Coal Technology Group, (to establish a Coal Technology Unit).

UNIVERSITY OF CAMBRIDGE, (1978 to 1983)

“Characterisation of Catalysts”, (Study of Carbon and Carbon Supported Catalysts)

INDEPENDENT RESEARCHER, (1978 to 1980)

“The Elucidation of some Chemical Aspects of the Plastic Stage of Coal Carbonisation”, Dr.M.Bennett

UNIVERSITY OF CAMBRIDGE, (1978 to 1982)

“Study of Coal Utilisation in Industry”

UNIVERSITY OF NEWCASTLE, (1978 to 1986)

Support to the Northern Carbon Research Laboratories for Work into Coal Research, (to establish an Energy Centre), including the purchase of a Leitz Microscope.

WARREN SPRING LABORATORY, (1978 to 1980)

“Study of the Rheological Properties of High Solid Content Materials”

UNIVERSITY OF CAMBRIDGE, (1980 to 1984)

“Study of the Combustion of Volatiles in a Fluidised Bed”

UNIVERSITY OF CAMBRIDGE, (1981 to 1985)

“Gasification of Coal in a Fluidised Bed”

IMPERIAL COLLEGE, (1981 to 1984)

“Production of Calcium Carbide, Silicon Carbide and Alumina from Waste Materials”, Prof.P.Grieverson

UNIVERSITY OF CAMBRIDGE, (1982 to 1985)

“Study of Novel Catalysts for Syngas Conversion”

MIDDLESEX POLYTECHNIC, (1984 to 1986)

“Dew Point of Mixed Vapours”

UNIVERSITY OF SURREY, (1984 to 1986)

“Diagnosis of Local Gas and Particle Flow in Fluidised Beds”

**Projects funded after 1985, (under the “B” Numbering system).**

B3 QUEEN MARY COLLEGE, LONDON, (01/10/85 to 30/09/88)

“A Coalification Index based on the Porphyrins”, Prof R Bonnet

B4 UNIVERSITY OF NEWCASTLE, (01/02/87 to 31/01/89)

“Surface Reactivity and Structure of Carbon and Coals : Causes, Validity and Control”, Prof H Marsh

B5 UNIVERSITY OF CAMBRIDGE, (01/02/87 to 21/07/90)

“Mechanism of Coal Burning in a Fluidised Bed with Special Reference to Overbed Burning”, Prof J Davidson

B7 UNIVERSITY OF BATH, (01/10/87 to 30/09/89)

“The Role of Active Sites in the Combustion and Gasification of Coal Char”, Dr B McEnaney

B8 UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY, (01/10/87 to 31/03/89)

“Building Damage through Combustion Derived Emissions”, Prof Wood

B9 UNIVERSITY OF SHEFFIELD, (15/02/88 to 14/02/91)

“Volatilisation of Inorganics from Coal and Ash”, Prof B B Argent

B11 UNIVERSITY OF CAMBRIDGE, (01/10/89 to 30/09/92)

“Fast Fluidisation”, Prof J Davidson

B12 LOUGHBOROUGH CONSULTANTS, (01/10/90 to 30/09/93)

“Mechanism of Catalysed, Solvent-Mediated Coal Dissolution”, Dr J W Patrick

B13 UNIVERSITY OF NEWCASTLE, (01/10/90 to 30/09/93)

“Studies of NO<sub>x</sub> and SO<sub>x</sub> Formation”, Prof H Marsh, Dr K M Thomas and Mr S D Brown

B14 ASTON UNIVERSITY, (01/10/90 to 31/03/92)

“Rapid Microwave Pyrolysis of Coal”, Prof W R McWhinnie

B16 HERIOT-WATT UNIVERSITY, (01/10/91 to 30/09/93)

“Laser Mass Spectrometric Analysis of Coal Materials”, Dr J E Parker, Dr P John and Dr C A F Johnson

B17 IMPERIAL COLLEGE, (01/07/91 to 30/06/93)

“Investigation of the Fundamentals of Carbon Burnout in Pulverised Fuel Combustion”, Dr J R Gibbons, Prof F C Lockwood and Dr J Williamson

B18 UNIVERSITY OF STRATHCLYDE, (01/10/91 to 30/09/94)

“Influence of Conformational Changes in the Macromolecular Structure of Coals on Pyrolysis and Liquefaction Behaviour”, Dr C E Snape and Dr P J Hall

B19 UNIVERSITY OF NOTTINGHAM, (01/04/92 to 31/03/95)

“Coal Beneficiation and Liquefaction”, Dr M Cloke and Dr N Miles

B20 UNIVERSITY OF SHEFFIELD, (01/01/92 to 31/12/94)

“Sulphur Distribution in Key British Coals and Trace Element Concentrations in Sulphide Minerals”, Prof A Spears

B21 UNIVERSITY OF LEEDS, (01/12/91 to 31/05/94)

“New Electrochemical Methods for the Analysis of Coal and Coal-Derived Products”, Prof K D Bartle and Dr N Taylor

B22 UNIVERSITY OF OXFORD, (01/05/92 to 30/04/93)

“Towards a Fundamental Understanding of Fluidised Beds”, Dr S Hogan and Dr J R Ockendon

B24 ASTON UNIVERSITY, (01/06/92 to 31/05/93)

“Rapid Microwave Pyrolysis of Coal”, Prof W R McWhinnie

B25 LOUGHBOROUGH UNIVERSITY, UNIVERSITY OF NEWCASTLE, IMPERIAL COLLEGE LONDON AND UNIVERSITY OF LEEDS, (01/10/92 to 30/09/96), (BCURA/ECSC Project).

“Environmentally Unfriendly Coal Species in Gasification Processes”, Prof J W Patrick, Dr K M Thomas, Dr J Williamson and Prof A Williams

B26 HERIOT-WATT UNIVERSITY, (01/10/91 to 30/09/93),  
(continuation of Contract B16)

“Laser Mass Spectrometric Analysis of Coal Materials”, Dr J E Parker, Dr P John and Dr C A F Johnson.

B27 IMPERIAL COLLEGE, (01/10/93 to 30/09/94)

“Characterisation of Polar Materials Derived from Coal Using Thin Layer Chromatography and Other Methods”, Dr R Kandiyoti.

B28 UNIVERSITY OF LEEDS, (01/02/94 to 31/03/95)

“Use of Sulphur Isotope Ratio Analysis to Assess Selectivity of Chemical Analyses and Extractions for Different Forms of Sulphur in Coals”, Dr S H Bottrell.

B29 UNIVERSITY OF CAMBRIDGE, (01/12/93 to 30/11/95)

“The Evolution of Pollutants during the Devolatilisation of Coal in a Fluidised Bed”, Dr A N Hayhurst.

B30 UNIVERSITY OF STRATHCLYDE, (01/10/94 to 30/09/97)

“The Low Temperature of NO<sub>x</sub> by Carbon”, Dr P J Hall

B31 IMPERIAL COLLEGE, (01/10/94 to 30/09/97)

“Fundamentals of Coal Char Thermal Deactivation under Combustion Conditions”, Mr N V Russell, Dr J R Gibbons and Dr J Williamson.

B32 IMPERIAL COLLEGE and ASTON UNIVERSITY, (01/03/95 to 28/02/98),  
(BCURA/ECSC Project).

“Enhancement of Hydrocracking Reactivities of Liquefaction Extracts with Novel Catalysts”, Dr R Kandiyoti and Prof W R McWhinnie.

B33 UNIVERSITY OF NOTTINGHAM, (01/10/95 to 31/12/98)

“Structure and Reactivity of Coal Fractions Related to Coal Characterisation using Total Reflectance Histograms”, Dr M Cloke.

B34 UNIVERSITY OF SURREY, (01/10/95 to 31/03/99)

“The Effects of Microstructure on the Flow and Handling Properties of Coal”. Prof U Tuzun and Dr D M Heyes.

B35 UNIVERSITY OF GLAMORGAN, (01/06/95 to 31/05/99)

“The Monitoring and Control of Stoker-Fired Boiler Plant by Neural Networks”. Dr S J Wilcox and Prof J Ward. Extended as “The Control of Chain Grate Stoker Boilers using Neural Networks”, Mr A Chong, Dr S J Wilcox and Prof J Ward.

B36 CRE GROUP LIMITED, (01/04/98 to 31/03/01)

“Maintaining the CRE Coal Bank”. Dr D G Richards

B37 UNIVERSITY OF LEEDS,

“Chemical and Isotopic Studies of Organic Sulphur and Sulphate-Oxygen in British Coal”, Mr R J Newton, Dr S H Bottrell and Mr M D B McCarthy

B38 IMPERIAL COLLEGE LONDON, UNIVERSITY OF BATH, UNIVERSITY OF STRATHCLYDE AND HUDDERSFIELD UNIVERSITY, (01/10/95 to 30/09/99), (BCURA/ECSC Project).

“Fundamentals of Coal Gasification: Thermal Methods”. Dr D R Dugwell, Prof R Kandiyoti, Prof B McEnaney, Dr P J Hall, Prof E L Charsley and Dr D Read

B39 UNIVERSITY OF EDINBURGH, (01/06/96 to 30/06/01)

“Handling Characteristics of Coal” Prof J M Rotter and Dr J Y Ooi. Extended (1) as “Handling Characteristics of Coal – Industrial Application of a Coal Handlability Tester” Prof J M Rotter and Dr J Y Ooi and (2) as “Enhanced Handlability through Coal Blending using Multi-parameter Optimisation”, Dr Z Zhong, Dr J Y Ooi and Prof J M Rotter

B41 UNIVERSITY OF SHEFFIELD, (01/10/96 to 31/03/01)

“Prediction of Behaviour of Trace Elements in Industrial Combustion and Gasification Systems”. Prof J H Sharp, Dr D Thompson and Prof B B Argent

B42 UNIVERSITY OF STRATHCLYDE, (01/10/96 to 30/09/00)

“Development of Gas Chromatography-Isotope Ratio Mass Spectrometry (GC-IRMS) for Molecular Recognition Problems in Coal Science and Utilisation”, (Phase 1) and “Application of GC-IRMS to Molecular Recognition Problems in Coal Science and Utilisation”, (Phase 2). Prof C E Snape (Strathclyde) and Prof A E Fallick (Scottish Universities Research and Reactor Centre).

B43 UNIVERSITY OF LOUGHBOROUGH AND UNIVERSITY OF NOTTINGHAM, (01/04/97 to 31/03/00)

“The Prediction and Effect of Coal Particle Size on Coal Reactivity in Combustion and Gasification”. Prof J W Patrick and Dr A Walker (Loughborough) and Dr M Cloke and Dr N J Miles (Nottingham)

B44 UNIVERSITY OF LEEDS AND IMPERIAL COLLEGE, (01/10/97 to 30/09/00)

“Chemical Structure of the Very High Molecular Weight Constituents of Coal”. Prof K D Bartle (Leeds) and Prof R Kandiyoti and Dr A A Herod (Imperial College)

B46 IMPERIAL COLLEGE, (01/04/99 to 31/01/01)

“Assessment of Heat Treatment on PF Carbons by Intrinsic Char Reactivity Distribution Measurements” Dr J R Gibbins (Imperial College)

B47 UNIVERSITIES OF SHEFFIELD AND LEEDS, (01/07/99 to 31/07/02)

“A Comparison of Predictions and Experimental Observations of Trace Elements Partitioning during Combustion of PF with Inert Additives in a 20kW Combustor”. Dr D Thompson (Sheffield) and Dr B M Gibbs (Leeds)

B48 IMPERIAL COLLEGE AND UNIVERSITY OF EDINBURGH, (01/04/99 to 31/03/00)

“The Investigation of Calcium Based Liquid Phase Formation in Pressurised Gasifier Environments”. Prof. R Kandiyoti and Dr D R Dugwell (Imperial College) and Dr S Elphick (Edinburgh)

B49 QUEENS UNIVERSITY OF BELFAST, (01/04/00 to 31/03/02)

“NO<sub>x</sub> Emission Modelling for the Operation and Control of Power Generation Boilers” Dr S Thompson

B50 UNIVERSITY OF NOTTINGHAM, (01/04/00 to 31/03/01)

“The Effects of High Carbon-In-Ash on Particulate Emissions from Pf Combustion and the Effect on Electrostatic Precipitation Performance”. Dr M Cloke, Dr E Lester, Dr J K Walters and Dr D W P Thomas.

B51 UNIVERSITY OF GLAMORGAN, (01/11/99 to 30/04/03)

“Neural Modelling and Control of Coal Fired Boiler Plant”, (NEUROMON)”. Dr S J Wilcox and Prof J Ward

B52 UNIVERISITIES OF SHEFFIELD, (01/04/01 to 30/09/01)

“The Use of Laser Ablation ICP-MS for the Analysis of PFA”, Prof.D.A.Spears and Dr.C.A.Booth

B53 IMPERIAL COLLEGE, (01/04/01 to 31/10/03)

“Covalent Molecules or Aggregates? An Investigation of “Large” Coal-Derived Molecules”, Prof.R.Kandiyoti, Dr.D.R.Dugwell and Dr.A.A.Herod.

B54 UNIVERSITY OF EDINBURGH, (01/04/01 to 31/08/04)

"Arching Propensity in Coal Bunkers with Non-Symmetric Geometries", Dr.J.Y.Ooi and Prof.J.M.Rotter.

B55 IMPERIAL COLLEGE, (01/04/01 to 31/04/05)

“Investigation of the Reactivity of Gasification Chars and the Optimisation of Process Design”, Prof.R.Kandiyoyi, Dr.D.R.Dugwell and Dr.N.P.M.Paterson.

B56 THE UNIVERSITY OF BATH, (01/10/01 to 30/09/05)

“Advanced Characterisation of Industrially-Important Coal-Based Carbons”, Dr T J Mays.

B57 EMC ENVIRONMENTAL ENGINEERING Ltd., (01/04/01 to 31/03/04)

“Maintaining the BCURA Coal Bank”, Mr J Powis.

B58 THE UNIVERSITY OF NOTTINGHAM, (01/10/01 to 30/09/03)

“Advanced Image Analysis for Coals, Chars and Blends”, Dr M Cloke, Dr E Lester and Mr P Langston.

B59 THE UNIVERSITY OF STRATHCLYDE. (01/10/01 to 30/09/04)

“The High Pressure Interactions of Coal with CO<sub>2</sub> : Implications for CO<sub>2</sub> Disposal and CH<sub>4</sub> Displacement from Coal Seams”, Prof P J Hall.

B60 THE UNIVERSITY OF KENT, (01/09/02 to 31/08/05)

“Three-Dimensional Visualisation and Quantitative Characterisation of Fossil Fuel Flames using Digital Imaging Techniques” Prof Y Yan

B62 THE UNIVERSITY OF EDINBURGH, (01/09/02 to 31/08/04)

“Large Scale Semi-Automated Tester for Rapid Assessment of Coal Handling Performance” Dr J Y Ooi and Prof J M Rotter

B63 THE UNIVERSITY OF EDINBURGH, (01/07/02 to 31/12/03)

“Experimental and Numerical Analysis of Turbulence in Interacting Low NO<sub>x</sub> Burner Flows in Coal-Fired Furnaces” Prof W J Easson

B65 THE UNIVERSITY OF NOTTINGHAM, (01/10/02 to 30/09/05)

“The Partial Removal of CO<sub>2</sub> from Flue Gases using Carbon recovered from PFA”  
Dr.M.Cloke, Prof.C.E.Snape, Prof.J.W.Patrick and Dr.E.Lester

B66 THE UNIVERSITY OF GREENWICH, (01/10/02 to 30/06/07)

“Direct On-Line Measurement of Wall Friction of Coal as an Indicator of Handleability” Dr.M.Bradley and Dr.R.J.Farnish.

B67 IMPERIAL COLLEGE, (01/07/03 to 30/06/06)

“A Study of the Behaviour of Coal Injected into the Blast Furnace”, Prof. R. Kandiyoti and Prof. D. R. Dugwell.

B68 THE UNIVERSITY OF KENT, (01/06/03 to 31/05/06)

“On-line Measurement of Size Distribution and Concentration of Pulverised Fuel Using Digital Imaging Techniques”, Prof. Y. Yan.

B69 THE UNIVERSITY OF GREENWICH, (01/10/03 to 30/09/07)

"Handling Characteristics of Biomass/Coal Mixes for Co-Firing : Measurement Techniques and Establishing Benchmarks”, Dr. M.S.A. Bradley.

B70 IMPERIAL COLLEGE, (01/07/03 to 30/09/04)

“Optimisation of Coal Fired Power Plant Performance when using Flue Gas Scrubbers for CO<sub>2</sub> Capture”, Dr. J.R. Gibbins and Dr. R. Crane.

B71 THE UNIVERSITY OF GLAMORGAN, (01/06/03 to 31/05/05)

“Improved Design of Sparge Pipe Air Distributors for Fluidised Bed Combustion Systems”, Prof. J. Ward, D.R.Garwood, T.Maksoud and Mr.M.Fisher.

B72 TES BRETBY, (01/04/04 to 31/03/07)

“The Maintenance of the BCURA Coal Bank”, Mr G Bradley.

B73 IMPERIAL COLLEGE, (01/10/04 to 30/09/07)

“The Selection of Low Cost Sorbents and Process Conditions for Mercury Capture from Flue Gases”, Prof R Kandiyoti and Prof D R Dugwell.

B74 CRANFIELD UNIVERSITY, (01/10/04 to 30/09/07)

“The Properties and Combustion Characteristics of Coal-Derived Fuels for Industrial Gas Turbine Applications”, Prof J B Moss and Ms B Bunkute.



B75 IMPERIAL COLLEGE, (Dept. of Mech. Eng), (01/10/04 to 31/10/05)

“Effect of Coal Type and Oxyfuel Combustion Parameters on Pulverised Coal Ignition”, Dr C Man and Dr J R Gibbins.

B76 UNIVERSITY OF NOTTINGHAM, (01/09/04 to 31/12/05).

“Microwave Pre-treatment of Coal and Coal Blends to Improve Milling Performance”, Dr S Kingman and Dr E Lester.

B77 THE UNIVERSITY OF NOTTINGHAM, (01/10/04 to 31/03/07)

“The Effect of Additions of Biomass on PF Combustion Efficiency and Ash Properties during Coal/Biomass Co-Combustion”, Dr E Lester, Dr A W Thompson and Dr M Cloke.

B78 IMPERIAL COLLEGE LONDON, (01/01/06 to 31/12/07)

"Coal-biomass Ash Deposition during Deeply-staged Combustion", Mr F Wigley.

B79 UNIVERSITY OF LEEDS, (01/01/06 to 31/12/07)

"Co-firing Coal/Biomass and the Estimation of Burnout and NO<sub>x</sub> Formation", Prof A Williams, Dr J M Jones and Prof M Pourkashanian.

B80 IMPERIAL COLLEGE LONDON, (01/10/06 to 30/09/09)

"Characterising Biomass Particle Behaviour under Co-combustion Conditions", Dr.J.R.Gibbins.

B81 IMPERIAL COLLEGE LONDON, (01/01/07 to 31/12/08)

"Coal Mineral Transformations under Oxy-fuel Combustion Conditions", Mr.F.Wigley.

B82 IMPERIAL COLLEGE LONDON, (01/10/06 to 30/09/09)

"Improvements in Amine Flue Gas Scrubbing Systems for Coal Fired Power Plants", Dr.C.S.Adjiman, Dr.A.Galindo, Prof.G.Jackson and Dr.J.R.Gibbins.

B83 THE UNIVERSITY OF NOTTINGHAM, (01/10/06 to 30/09/09)

“Mercury Oxidation by Fly Ash Constituents and Flue Gases and its Optimisation for the Development of Mercury Control Technologies”, Dr.M.Maroto-Valer and Prof.C.E.Snape.

B84 UNIVERSITY OF GLAMORGAN, (01/10/06 to 30/09/09)

"Optimisation of Fluidised Bed Combustion of Mixtures of Coal and High Moisture Content Biomass", Dr.D.R.Garwood, Prof.J.Ward, Dr.S.J.Wilcox and Mr.M.Fisher.

B85A UNIVERSITY OF BIRMINGHAM, (01/10/06 to 30/09/08)

"On-line Condition and Safety Monitoring of Pulverised Coal Mills Using a Model Based Pattern Recognition Technique", Dr.J.Wang and Prof.H.Wu.

B86 TES BRETBY, (01/04/07 to 31/03/10)

"The Maintenance of the BCURA Coal Bank", Mr.G.Bradley.

B87 UNIVERSITY OF SOUTHAMPTON, (01/10/07 to 30/09/10)

"Enhancing Mercury Capture by Wet FGD Systems", Dr.S.M.Ullrich and Prof.T.W.Tanton.

B88 UNIVERSITY OF CARDIFF, (01/10/07 to 30/09/10)

"Environmental Impact of Carbon Capture from Coal Fired Power Plant by Amine Absorption", Prof.K.Williams, Prof.A.Griffith and Dr.M.Spratt.

B89 UNIVERSITY OF GREENWICH, (01/10/07 to 30/09/10)

"Improved Performance of Discharge Equipment for Coals with Poor Handling Characteristics", Prof.M.S.A.Bradley and Mr.R.J.Farnish.

B90 UNIVERSITY OF KENT, (01/10/07 to 30/09/10)

"Dynamics and Movement Behaviours of Biomass/Coal Flow", Prof.Y.Yan.

B91 IMPERIAL COLLEGE LONDON, (01/01/08 to 31/12/09)

"The Interactions of Coal-Biomass Ash with Supercritical Boiler Materials", Mr.F.Wigley.

B92 UNIVERSITY OF LEEDS, (01/10/08 to 31/03/09).

"Applying Coal Milling Technologies to Thermally Pre-treated Biomass – Proof of Concept", Prof.J.M.Jones and Prof.A.Williams.

B93 CRANFIELD UNIVERSITY, (01/10/08 to 30/09/10).

"The Effects of Impurities for Capture Technologies on CO2 Compression and Transport", Dr.A.Bosoaga and Mr.J.E.Oakey.

D J A McCaffrey,  
BCURA Technical Officer,  
July 2009.