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EDITORIAL

As some of you may know, Brian Ricketts is leaving UK Coal Mining Ltd. and therefore will be relinquishing his role as Chairman (Industry) of the CRF. I would like, on behalf of all of our readers and especially members of the Executive Committee of the Forum, to wish Brian all possible success and happiness in the future in his new role at the International Energy Agency in Paris. As those who have worked with Brian will appreciate, he has put great effort into raising the profile of the CRF and strengthening the ties between the coal community and academe. This, of course, was one of the underlying reasons for the formation of the CRF in the first place. Au revoir, Brian, bon chance and merci beaucoup!!

So it's not only goodbye to Brian but also goodbye to the DTI and hello to the DPEI! From now on the erstwhile Department of Trade and Industry will be known as the Department of Productivity, Energy and Industry. Can this be a good omen for the future of the coal community? Does this mean that as 'Energy' now features as part of the title of the new department that it will get the attention it needs and deserves? Let us all hope so.

The second meeting of the re-formed Coal Preparation Division was held at the University of Nottingham on April 6th. The editor felt that it was a well-supported and interesting meeting and notes on the presentations from this event appear later in this newsletter.

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Joint Coal Preparation Division / Minerals Engineering Society meeting entitled "Coal Preparation & Handling"

**held at the School of Chemical, Environmental & Mining Engineering, courtesy of the University of Nottingham,
6th April 2005**

The second meeting of the re-formed Coal Preparation Division, hosted by new chairman Mr Andrew Howells took place at the University of Nottingham on Wednesday 6th April. The meeting was well attended with 44 people finding their way into the Coates Building after the slightly more difficult task of finding a parking space!

After welcoming the attendees, Andrew asked Professor Nick Miles, Head of the School of Chemical, Environmental & Mining Engineering, to say a few words. Nick said that he was happy to host this meeting and that five of the last six meetings of the Coal Preparation Division had been held at Nottingham. He said that the focus had noticeably changed within parts of the school from coal to minerals. He also described how the university campus had changed and expanded over the last 20 or so years with outposts in Malaysia and China now operational.

Andrew opened Session 1: Coal Preparation: Where are we at present? Setting the scene in the UK and world wide, by introducing Mr Doug Jenkinson, former Head of the Coal Preparation Department of the NCB, now a Consultant. His paper was entitled "International Coal Preparation Congresses – Fifty Years On 1950-2005". Doug explained that following the devastation of the coalfields of Europe during World War II, the Allied War Commission felt it necessary to form a group to help reinstate coal production. A group of coal preparation engineers from France, Belgium, Holland, UK, USA and Germany met and a congress was organised and held in Paris in 1950, hosted by Cerchar. Meetings were held at four yearly intervals in different countries until 1966. There was then a gap of six years until 1972 when the congress finally met again in Paris. Early benefits arising from the meetings were the upgrading of coal cleaning technology linked to new R&D in the area, handling of fine coal and the preparation of standards. Nowadays the benefits still include standardisation of methods and procedures but also the development of a network of coal cleaning specialists and the possibility to visit and evaluate new technologies.

A number of new countries joined the congress in the late 1970's and also hosted some of the meetings. These new countries reflected the change in coal production from primarily Europe and North America to Australia, South Africa, Indonesia, Poland, India and China.

Doug Jenkinson then mentioned the XVth International Coal Preparation Congress to be held in Beijing in October 2006. There is a call for papers now open and synopses are to be in by June 2006. UK will have a specific allocation – three or four papers submitted through the Mineral Engineering Society. Subjects covered include – Plant design & construction; Management & Control; Blending, screening & crushing; Wet & Dry separation processes; Fine coal treatment, recovery & dewatering; Automation; Waste disposal; Optimisation of coal recovery.

As Mr S. Frankland was unavailable, it was not possible to obtain a world wide view of coal preparation and Session 1 was therefore closed at this point.

Session 2: Coal Preparation: What is being developed at present? kicked off with a presentation by Jon Brough of UK Coal Mining Ltd. entitled "The Current Scene in UK Coal Preparation". Jon summarised his presentation as; what is required from coal preparation plants, what the customer wants and how present plant performance is monitored. He then described three projects that are currently being carried out.

UK Coal's preparation plants have to clean ~24 million tonnes per annum of coal with an average ROM ash content of 35% and produce an average saleable yield of 65%. The preparation plants aim to maximise combustible recovery, plant potential, inferior coal blending operations and premium quality products. They also seek to minimise all stockpiles, i.e. ROM and products, and attempt to continuously reduce costs.

There are nine coal washery plants operating within UK Coal at present. These comprise three Dense Medium Plants, two Shale / Dense Medium Plants, two Baum Jig Plants, one Baum Jig / Dense Medium Plant and one Shale Medium Plant.

If customer requirements are not met, penalties are imposed. These involve damages or rejection for excessive ash (>19%), moisture (>18%), sulphur (>2.9%), chlorine (>0.6%). Damages or rejection will occur if volatile matter is outside a range 25% to 34%, as delivered. For calorific value below 22.5MJ/kg a penalty of £3 per tonne is levied.

Jon then discussed plant performance monitoring by first asking how and why it is done and then enlightening us. The 'how' involves data gathering on such parameters as plant potential, ROM stock levels, delays, number of quality complaints, coal losses in discard at certain RD's and effluent solids ash content. Plant potential is a figure which reveals the percentage of maximum output that has been achieved. For example, a 500t/h plant in one day could produce 12,000 tonnes – if it produced 6,000 tonnes in one day its plant potential would be 50%. The term delay refers to time not in operation, so if in one day a plant was inoperative for 6 hours, it would have a delay of 25%. The benefits of these activities are to enable accurate forecasting of stocks, allow site to site comparisons to be made and to identify trends at an early stage. It also allows quicker analysis of plant operation to identify problem areas.

Jon completed his presentation by describing four projects with which he has been involved. These included condition monitoring of weir pumps, rubber conveyor belting, inverter drives and motorised pulleys. Each of these activities showed cost savings and improved operational benefits. UK Coal Mining was, according to Jon, experiencing increased commercial pressure from customers and higher demands of their coal preparation plant. The company was responding by increasing plant monitoring activities and continuing to seek ways of driving operational costs down.

The next session was entitled "Polymer Development in Tailings Disposal" and was given by Mr Martin Edgar of Ciba Specialty Chemicals. The presentation was concerning the use of a product, known as Rheomax™ ETD, and how it can improve tailings disposal. The ETD in the product name stands for Enhanced Tailings Disposal. For the uninitiated, this process has to cope with problems such as the need for higher capital to dispose of tailings via larger land areas, the cost of recovering water and settling reagents, the slow rate of compaction of the

tailings and therefore delays in land rehabilitation. Environmental issues and a lack of control of the slurry rheology leading to a segregation of coarse and fines are other associated problems.

Rheomax ETD is a patented technology which uses rheology-modifying products to enhance tailings characteristics at the point of disposal. The modifiers are added in-line to the tailings and activate en route to the final disposal area. Martin described the use of this product in a case study involving a coal handling and preparation plant in South Eastern Australia. This plant produces high quality semi-soft coal for steel and power generation. Coal preparation is by a DM cyclone plant with spirals and stocks of ROM and product coal are maintained. The previous treatment method involved a large tailings dam, which had a long residence and drainage time.

The improved method involves three consolidation cells 200m long by 40 m wide. The treated slurry is discharged into one of these cells and its properties ensure that it consolidates into a dense, steeply sloping pile from which water run-off is very apparent, (a short video was shown to confirm this). Clear water collects at the end on the cell and is returned to the plant. After 24 hours the consolidated tailings are sufficiently compact to be removed by excavation. They are then taken to backfill the mine.

Another case study was mentioned where red mud was being dewatered. This process previously required the separation of mud from sand and treatment by different means. The use of Ciba products has enabled the red mud to be dewatered in a single process. The benefits of this system were said to allow the effective homogeneous co-disposal of sand and slimes and to allow an extension to the life of existing disposal sites. This is done by the use of controllable mud rheology which improves the retention of solids and frees the release of water. The process also requires low capital investment which minimises the land required for new disposal areas and supports rapid site rehabilitation.

Martin answered questions after his presentation, one of which involved dosing rates. The normal range is 30g to 400g/tonne of tailings and 200g/tonne was stated as being the 'average' dose. Details of costs were not, as I recall, disclosed.

The final presentation in this section was given by Mr Shane Sullivan of Metso Minerals Ltd. and was entitled "Tube Press High Pressure Filtration". Shane began by describing the evolution of his company in recent years via mergers and acquisitions. In 2001 this Finnish company acquired Svedala.

Metso offer a range of filtration devices depending upon the size of the solid particles to be removed. For greater than 2mm, vacuum filtration using drum or disc filters is recommended; a plate/chamber filter is used for particles ~100microns and a tube press is used for <10micron particles. Shane concentrated his talk on the characteristics and performance of tube presses. The device was developed in the late 1960's by English China Clays during the fuel crisis to reduce the cost of thermal drying of their very fine kaolinite materials.

The tube press is a membrane type filter press designed in cylindrical format and capable of operating at high filtration pressures of up to 140 bar. The use of these high pressures enables a higher degree of separation of the liquid and solid phases. It is suitable for processes which require very low cake moisture, e.g. smelters; where cake handleability is critical, e.g. underground slimes, where cake transport costs are high and where cake is to be disposed of to landfill.

The principle of operation is that filtration takes place between two concentric cylinders. The outer cylinder is the casing and the inner is the candle. The process slurry is pumped into the annular space between the filter media and the bladder. Hydraulic fluid, usually water, is then pumped between the bladder and the casing putting the slurry under pressure and causing filtration to take place. Upon completion the hydraulic fluid is removed from the unit using a vacuum until the bladder is dilated against the casing. The candle is then lowered and a pulse of air is blown between the candle and the filter media. This causes the filter cloth to expand, fracturing the cake which is discharged by gravity. The cycle is then repeated. Washing cycles can also be incorporated into the process.

A wide range of materials have been dried successfully using the tube press. Just a few of these include coal fines, calcium carbonate precipitates, gypsum residues, china clay, dyestuffs and metal concentrates. The tube press is unsuitable for fibrous materials, high SG, high temperature and high tonnage materials. Equally, low technology products, oily sludges and large particles are better handled using a different technology.

The lower limit for feed slurry concentration is around 15% with 30% being preferable. In addition to providing very dry filter cake, the tube press also produces zero suspended solids filtrates in many cases, allowing immediate disposal or direct recycling.

Session 3 was entitled Coal and Coal / Biomass handling: Where are we at present? Setting the scene in the UK and Worldwide. The first presentation was given by Mr David Graham of E.ON UK's Ratcliffe Power Technology Centre and Mr Graeme Smith of E.ON UK's Ironbridge Power Station. David began by briefly describing the integrated UK energy business that is E.ON UK. It comprises four groups; Energy Wholesale, Trading, Distribution and Retail. Energy Wholesale operates 10,500MW of generating capacity which includes coal-, and gas-fired plant as well as CHP and renewables power from such sources as wind, hydro and biomass. The distribution company is now known as Central Networks and E.ON UK has 9 million customers (including the editor!!). The Power Technology Centre supplies technical support to E.ON UK as a whole and many other external customers.

David posed the question why co-fire biomass? The reasons were that there is a rapid development of renewable generation capacity at this time which is utilising current plant and available fuels; it develops the energy crop market and helps to determine and resolve longer term issues related to biomass combustion. It may also have something to do with the Renewables Obligation (RO)!! The RO is a legal obligation on all licensed electricity suppliers to meet a defined percentage of retail sales from renewable sources. Generators earn certificates (ROC's) from power that is produced using acceptable renewable technologies including coal/biomass co-firing. Electricity retailers then buy the ROC's from generators. All coal-fired plants in the UK have used or are continuing to use biomass co-firing.

Biomass differs significantly from coal in many respects. It is much higher in volatile matter, oxygen content and reactivity but it is lower in ash content, calorific value and sulphur content. Biomass exerts a number of effects throughout the whole of the boiler system. From its supply and receipt into the power station and its storage and handling before milling, biomass can be problematical. Milling of biomass is generally difficult because of its fibrous nature. Its ash composition, being very different to that of coal, can affect fly ash quality, its collectability and ultimately its resale. Finally, biomass can have an impact on the emissions released from the power plant.

E.ON UK has a 1MW Combustion Test Facility (CTF) which uses proven scaling criteria with full scale plant. It has been used to investigate a wide range of fuels including straw, wood, tallow, palm oil expeller and meat & bone meal. It is highly instrumented and controllable and is fitted with combustion staging such as low NOx burners, flue gas recycle and reburn.

Biomass handleability depends on the types used and the blend ratio. Straw and grasses have a low bulk density due to their long, thin particles. The elastic and fibrous nature of grasses make them difficult to handle and large bunkers would be required. Cereal products have a higher bulk density than grass and being more regular in shape pelletise better. However, they respond badly to moisture and are prone to swelling. Agricultural and process byproducts tend to be granular, harder and less sensitive to the effects of moisture and are therefore easier to handle. Some materials tend to be dusty and oily products can also cause difficulty. Woody biomass is usually pelletised or burnt as sawdust.

Some work was published as early as 1996 on the relationship between hopper slot size needed to break a bridge against moisture content for different materials. Wood chips and sawdust showed a trend of increasing moisture being linked to a need for a larger slot, whereas pellets required a very small slot and milled canary reed grass a much larger slot.

Biomass co-firing trials typically only involve so-called 'clean' plant-derived biomass. Following successful CTF trials the biomass would be introduced into a single mill group of a boiler supplying several burners. If this was judged to be successful the whole unit would then be fired with the coal / biomass blend. The environmental impact of the co-firing regime would be established and after approval by the Environment Agency, a licence would be granted for commercial operation. Only at this stage would consideration be given to the development of a bespoke biomass blending plant.

At this stage Graeme Smith took over the presentation. Biomass bulk handling systems are likely to develop through a temporary stage via an interim system to a final commercial version. The temporary system would be used for an initial trial; it would be of limited capacity and would likely use the existing reclaim / conveyer system for blending. The interim system would usually involve early commercial operation. Any improvements and refinements learnt from this exercise would be incorporated into a permanent system. This would include fuel reception, conveying and biomass injection options.

One important issue for consideration when using biomass is the Health & Safety (H&S) implications. Whilst much is known about H&S issues of coal, which is rather inert, certainly at low temperatures, for biomass this is not the case. It is prone to self heating; it can be particularly dusty and is susceptible to bacterial and fungal degradation. Dust control can be achieved by the use of selected biomasses and pelletisation, where appropriate. Just-in-time deliveries and completely enclosed transfer points and conveyors also help. Dust extraction systems, water sprays and good housekeeping to ensure areas are kept as clean as possible are also beneficial.

Ironbridge and Kingsnorth power stations have systems where tipper lorries discharge into a bunker which feeds a silo. This in turn delivers biomass into the boiler house.

In conclusion, Graeme felt that co-firing is practical, environmentally beneficial and is making a real contribution to the UK Governments renewable targets. The operational implications of co-firing are significant and generally not fully

appreciated, i.e. H&S, technical and energy trading. The economics are complex and there is potential for the costs to outweigh the benefits if care is not taken. Biomass fuels need to be matched closely with the individual plant for which they are intended in order to gain optimum performance. Much valuable experience has been gained from the significant quantities of biomass fired by UK utilities which has also helped in dedicated plant development. Future biomass options continue to be studied including energy crops and the use of direct biomass injection.

After a quick break for lunch this session continued the theme of biomass co-firing as Mr Alan Myers of RWEpower plc gave his talk entitled "Direct firing biomass". Alan began by describing the original work done at Didcot 'A' using a 500m³ silo and top loading. It was stated that a contract for a 2,000m³ silo was to be awarded in the next two weeks. At Tilbury the biomass was tipped onto a moving belt but it was felt that they may consider adopting direct injection. This was because Tilbury needs all of its five mills to achieve maximum output and direct injection would enhance this as opposed to firing a blend which would lower output slightly.

A trial involving direct injection was undertaken at Aberthaw, which is a downshot unit designed to fire low volatile coal. The target was 7% heat input, which is equivalent to ~35 tonnes/h of sawdust. The obvious questions that needed answering were how should it be injected, where should it be injected and how much should be injected. The first type of injector tried was an eductor but it was found to deliver only two to five tonnes/hour. A rotary valve concept was also used which allowed the injection rate to be varied to eliminate contamination of the furnace bottom ash by incompletely burnt biomass. It was found that material <5mm would not cause contamination problems.

The current scheme involves wood chip, pellets and palm kernel expeller. It is on a much larger scale using large capacity silos, mills and blowers. It is in the course of construction at present.

Alan closed his presentation by explaining that RWE had burned ~8,000 tonnes of biomass and that there had been interest from other companies in what they are doing. RWEpower believe that they have made real progress with their coal / biomass activities and are preparing to expand the scale of their operations.

Mr Don Wilkinson of SSE's Ferrybridge Power Station gave the final presentation in this section which was entitled "The generation of electricity from solid renewables". Don disclosed that Ferrybridge had been co-firing biomass and coal since 2002 and consumes 2,000 tonnes of biomass every day. The annual requirement for biomass at Ferrybridge is 200,000 tonnes and this displaces 140,000 tonnes of coal. The amount of biomass burnt in 2004 was 6.4% by weight and the total amount of renewable generation so far is over 600,000MWh. The reasons for burning biomass were commercial, i.e. the government incentives of ROC's together with the environmental improvements of using low sulphur, carbon-neutral fuels.

There were a number of challenges to be faced involving technical implementation, health and safety issues, OFGEM verification, the environmental impact and logistics. The technical issues were how best to introduce the biomass and the view was to keep it simple. The biomass is mixed on site and co-milled with the coal. It was necessary to ensure that mill throughput and loading were maintained at the target level and this depended upon the type of biomass being burned.

SSE has taken the view from a health and safety standpoint that they will not burn anything which is more hazardous than pulverised coal. To ensure this, they have compared product safety data sheets and had explosivity and thermal stability tests carried out on candidate biomasses. The outcome of this work was that their PF code of practice was revised.

The environmental impact has been almost all positive. As well as being carbon-neutral and low in sulphur, biomass has low ash content and very low trace element content. It has also produced a slight lowering in NOx emissions. On the negative side, certain biomass, such as olive waste, gave an odour problem and the variation required to the IPC license has demanded extensive testing which involves a strict sampling and analysis regime.

To qualify for ROC's OFGEM must approve of any proposed fuels and the generator must have a credible accounting system in place. The procedure is stringent and full accountability is needed. The sampling and analysis protocols must be robust and ROC's will be revoked if OFGEM is not satisfied.

The logistics of biomass use can cause a headache for the station. Ferrybridge need to bring in large quantities of biomass into a site with relatively small storage and when the daily consumption can vary considerably subject to the price and demand from the electricity market. Plant breakdown and load degradation, (from using lower calorific value biomass), as well as quality control issues make it a challenging operation.

SSE has recently installed a new Solid Biomass Facility where up to 2,000 tonnes of two different biomasses can be stored. With DSEAR zone 22 approval, a dust extraction system and carbon monoxide monitoring it provides Ferrybridge with a modern, safe system to allow them to continue burning coal/biomass blends containing up to 30% by weight of biomass.

SSE is continuing to look towards further development of their co-firing systems with new sources of biomass of interest, such as sunflower husks, and is studying direct injection. This will allow, they believe, greater biomass variety and the use of energy crops.

In conclusion, Don said that in about two and a half years of co-firing almost 500,000 tonnes of biomass they had had no significant incidents. They had achieved substantial reduction in sulphur and carbon dioxide emissions and had obtained substantial commercial benefit. To achieve this they had had to keep the plant cleaner, perform more frequent sampling and analysis of their fuels, provide an audit trail and improve their lines of communication. However, on balance it was clearly worth the effort.

The next section of the meeting was entitled "Coal and coal/biomass handling: what is being developed at present" and was kicked off by Dr Richard Farnish of the University of Greenwich's Wolfson Centre who gave his talk "Overview of materials handling activities at The Wolfson Centre"

By way of background information Richard explained that The Wolfson Centre (TWC) was established in 1973 at Thames Polytechnic, Woolwich as a department within the School of Engineering. It developed its primary specialism in pneumatic handling which subsequently expanded into feeders, interfacing and vessel design. The centre relocated to Woolwich Dockyard in 1985 and its research areas widened to include product quality issues such as segregation, degradation and caking. In late 2005 the centre is once more relocating, this time to new laboratories in Chatham, Kent.

The centres activities span many sectors such as recycling, foodstuffs, plastics, aggregates, fertilisers and pharmaceuticals. Many of these activities entail industrial research and current projects involve optimisation of vessel design, wear in pneumatic conveyors, discharge consistency, segregation, degradation and on-line flowability,

Richard then listed four of the common types of problem encountered in industry. These included the need for equipment to be able to operate effectively with non-free-flowing or variable materials; segregation of blended materials; caking during storage (agglomeration); and wear in process plant (chutes, pneumatic conveyors, etc).

Richard explained that blocked flows of material out of silos can be caused by the formation of three different types of 'arch'. There is the cohesive arch, the mechanical arch or 'rat-holing'. The hang up of material can be attributed to poor silo design in terms of slope and discharge orifice, the type of material, the filling technique and the duration in the silo. Mathematical modelling and the testing of scaled versions of silos have helped to understand the nature of the problem.

Segregation within silos can also occur. This can be shown by plotting the variation of particle size with discharge time for a product flowing from a funnel flow vessel. TWC have developed a series of small segregation test rigs which allow them to accurately predict the segregation properties of larger devices and to understand the causes of segregation. Caking of materials in storage can be caused by poor feeder selection and / or inappropriate silo geometry.

Recent work on the handling of biomass and recycled wastes has shown problems where so-called 'standard' equipment has been found to be unsuitable for particles of non-uniform shape. It seems that the reliable measurement of flow characteristics is lacking which results in silo designers having minimal information with which to work. TWC have done work using a variety of equipment for the measurement of bulk density, wall friction and flow properties. These include annular and uniaxial shear testers and also empirical design verification using adjustable geometry test equipment.

Wear in process plant is another serious problem that has been addressed by TWC. A series of erosion test rigs and models have helped reduce the impact of erosion in process plant.

Richard summarised his presentation by observing that many well understood flow and quality issues continue to occur in industry through a lack of application of existing 'best practice'. The increasing use of biomass fuels for co-firing has introduced new challenges that demand a new approach to flow behaviour characterisation. Research work is currently underway at TWC to address these needs, in addition to continuing studies relating to air effect (?) segregation and caking behaviour.

The next presentation was given by Dr Ed Lester of the University of Nottingham and was entitled "Latest developments in the microwave processing of coal". Ed began by explaining why anyone would want to microwave coal. The reason is that by making its crushing easier, a saving in grinding energy and thus costs could be achieved. The energy required to pulverise coal represents about 6% to 8% of the boiler output and any savings can be seen to be of great benefit to the generator. Another option is possible and that is to increase mill output for the same cost and this would also be of interest to power plant operators.

The differences between conventional and microwave heating was explained and previous work on the microwave treatment of coal was mentioned. The major improvement that is being investigated at Nottingham is that the power of the microwave generator is much higher. Whereas a domestic microwave oven may be 700 to 800 watts the device used in this study can operate at around 8 kilowatts! Consequently, the coal needs only be exposed to such levels of microwave energy for short periods of time, i.e. seconds rather than minutes. This is also essential if a commercial device were to be considered as coal through put to the mills must not be hindered. Initial trials using Thoresby coal exposed to 8.5kW of microwave power for two seconds showed a definite improvement in grindability. The other concern regarding microwave treatment was what, if anything, does it do to the coal itself. A comparison of untreated and treated coal data showed the moisture content fell, but perhaps surprisingly, not excessively. It is felt that moisture does move within the coal particle and it is this, coupled with the possibility of partial vaporisation, which accounts for the lowering of coal grindability. Other coal properties showed small variations. Further trials on a series of world traded coals using 8kW and a much shorter exposure time of 0.1 seconds also showed benefits.

Ed concluded his talk by mentioning a BCURA project which is currently in progress to explain the mechanisms behind this interesting and potentially very useful application of microwave technology to coal preparation.

The next presentation was given by Dr Zhijun Zhong of the University of Edinburgh and was entitled "On-site assessment of coal handleability". Dr Zhong described the widespread problem of bunker and hopper blockages. These difficulties are commonly due to a combination of sticky coals and the use of poorly designed discharge vessels. As it is expensive and often difficult to modify existing silos the answer is to monitor the handling performance of coal consignments. Cohesion plays an important role in bunker blockage and, in the case of problematic coals it develops due to its stress history, moisture content, particle size distribution, blend composition and moisture history. It has long been recognised that coal handleability is difficult to predict and much effort, not all of it successful, has been put into solving the problem. Important bulk properties which affect handleability and can vary with time are moisture, fines content, size and ash content. Additionally, handling behaviour is known to vary non-linearly with these properties. The challenge has been to devise an accurate measurement of handleability which is also quick and repeatable.

The University of Edinburgh has developed its Edinburgh Cohesion Tester (ECT) in recent years which has shown much promise. In essence, the test involves the consolidation of a quantity of coal inside a metal cylinder. The cylinder is removed and the force needed to crush the unconfined cylinder of coal is measured. The test is done at a number of different moisture contents and different consolidation pressures. In most cases what emerges is that at a particular moisture content, a maximum strength is noted. This is termed the critical moisture content. This together with the magnitude of the unconfined crushing strength provides a good prediction of the handleability of the coal.

The ECT was trialled at Maltby and Thoresby collieries and West Burton and Fiddlers Ferry Power Stations. During blind trials it was found to accurately detect difficult coals. At Maltby colliery 750 cohesion tests were conducted on 50 coals from which all six of the problematic coals were identified.

As the ECT could only deal with fine coals, a larger sized apparatus which could handle 50mm sized coals and was automated was planned, designed and built. Two field trials were completed using the device known as the Automated

Edinburgh Consolidation Tester (AECT). These took place towards the end of 2004 at Kellingley colliery and Eggborough Power Station and Maltby colliery and Drax Power Station. A total of 72 samples were taken from 36 consignments and no handling problems were encountered, which was slightly disappointing from the testers' point of view! However, coal handleability was found to vary significantly within each consignment and good correlation between train discharging time and cohesion of the coals was observed.

Dr Zhang completed his presentation by describing a programme that has been developed at the University of Edinburgh for the safe blending of coals, including those with difficult handling properties, to meet particular specifications.

The final presentation of what had been a full and very interesting day was given by Mr Robert Carter of the Department of Electronics at the University of Kent. The title of his paper was "Digital imaging based on-line measurement of size distribution and mass flow rate of pulverised coal". The rationale for doing this work was the need to be able to measure and control the mass flow rate of pulverised coal to individual burner nozzles. To do this a knowledge of the particle size distribution and the velocity are needed.

Roberts work employs a cost-effective sensing strategy, through the use of a combination of sensing technologies that are suitable for industrial use. For the imaging sensor, a transparent section of pipe is used. A charge coupled device (CCD) camera looks into the pipe and particles are illuminated by a laser sheet. Clear images are produced.

The captured images of particle size and shape and the velocity derived from electrostatic measurements are combined with a density factor to calculate the overall mass flow rate. A test facility has been constructed using salt as the test material and good agreement between on- and off-line results has been shown. Trials using the RWEpower combustion test facility have also been completed.

Robert concluded his talk by restating that the feasibility and cost effectiveness of the system has been shown. As far as future work was concerned, it will consist of the improvement to the prototype system and further evaluation under industrial conditions.

The meeting came to an end around 4.00pm and the speakers were thanked for their presentations by the Divisional Chairman. In conclusion, and before wishing all visitors a safe journey home the Chairman took the view that the meeting had been a success and I think all attendees, including the Newsletter Editor, would certainly agree with him on that score.

Kyoto Protocol – World Coal Institute view

World Coal - March 2005:

The Kyoto Protocol came into force last month and now exists as a legally binding treaty. The treaty demands a 5.2% cut in greenhouse gas emissions by 2012, with each country having an individual target to meet. There is no doubt that this development will have an impact on the coal mining industry. However, it remains to be seen whether the effects will be negative or positive. The World Coal Institute has reacted by officially welcoming the focus on climate change and energy policy that it believes will result from the enforcement of the protocol. The Institute has said that the world will increasingly need to focus on practical solutions to balancing environmental considerations with continued access to low-cost energy. It believes that the coal industry has worked responsibly to reduce its environmental impact and can continue to improve on this in the future by significantly reducing greenhouse gas emissions as well as maintaining coal's vital

role as an energy source worldwide. Meeting the environmental challenge will require a more widespread use of cleaner, more efficient technologies at coal-fired power stations and the accelerated development of new OE zero-emissions coal technologies. The capture and storage of CO₂ from coal-fired power stations presents one of the most promising options for large-scale reductions in CO₂ emissions. Significant levels of investment in improved energy systems will be required to promote the cleaner future the world expects. Yet the lead times for energy investment and the lifetimes of those investments are long. If these investments are to be made, the industry will require greater clarity regarding the future trend of environmental regulations. Coal currently fuels approximately 40% of the world's electricity and will continue to be a important, low cost source of electricity.

Politicians ignoring environment

from www.politics.co.uk Friday, 22 Apr 2005

The three main parties are failing to pay sufficient attention to climate change and environmental issues according to some of the UK's leading scientists. The Royal Society is "disappointed" by the election campaign so far and the lack of focus on climate change or biodiversity. Greenpeace and Friends of the Earth have also raised concerns about the lack of environmental focus. In an open letter to the main parties, leading lights in the Royal Society said: "As we enter the last two weeks of the general election campaign, we wish to express our disappointment that the two biggest global threats to people and their environments, namely climate change and the loss of biodiversity, have not been given greater consideration by the three main political parties. We appeal to these three parties to devote more attention in the coming weeks to both these major issues, which will have a profound long-term effect not just on people in the UK, but across the world." It adds that while all the three main parties have accepted the principles of Kyoto, none of them have "presented convincing plans for meeting out long-term energy needs while reducing our carbon dioxide emissions significantly." Friends of the Earth said that while both Tony Blair and Michael Howard had promised to show leadership on climate change, both have been ignoring the issue during the election campaign. It pointed out that although the Liberal Democrats have said there was a "green thread" running through their manifesto, there were "serious concerns" about their practical record, pointing out that they opposed congestion charging in Edinburgh and candidates have objected to wind farms. FoE director Tony Juniper, said: "This conspiracy of silence does neither party any credit. Urgent decisions must soon be taken on transport, energy and industrial policy if the UK its carbon dioxide reduction targets. Our political parties must move the debate away from the margins to drive home the urgency of the situation." [But don't hold your breath! Ed]

Jobs in Australia for UK miners

WORLD COAL FEBRUARY 2005:

MIM Coal, based in Queensland, Australia, is offering British miners the chance to work in Australia. The move comes after the closure of the Selby coalfield in Yorkshire and recent criticism of UK Coal from the British Government. The Leader of the House of Commons expressed concern over UK Coal cutting production when the price of coal remains high. UK Coal has recently closed the Ellington Colliery in Northumberland, with the loss of 350 jobs. In contrast the Australian coal mining industry is flourishing. Anglo Coal has announced plans to launch the Dawson project, worth AU\$ 1 billion. Under the plan three mines will be joined together, Dawson South (Theodore), Dawson Central (currently the existing Moura mine) and Dawson North. The project is a joint venture between Anglo Coal and Mitsui. Potential output is forecast at 13 million tpa over a

projected 20 year production life. The Government of Queensland has backed the project, saying that it will be a boost to the region's export and employment levels, creating 200 new jobs. Centennial Coal, based in Sydney, has started its longwall mining operations in the Mandalong colliery in New South Wales. The company expects that the mine will yield 3.5 million tonnes this year and hopes to progressively increase production over consequent years to approximately 4 million tpa. The Mackay region of Queensland has reported significant economic growth as a direct result of the high demand for coal in Asia. Current high coal prices mean that a coal miner in the region can command an average salary of AU\$ 100,000, a factor which the region's officials are sure has propelled the area's recent economic boom. China's demand for coal from Queensland has increased by 50%. Life as a miner in Australia may well seem a lucrative prospect to miners made redundant through UK Coal's reduction in production.

Deep mines are hole lot of trouble for UK Coal

Edinburgh Evening News March 2005

UK Coal Ltd. has seen a raft of difficulties as its deep mines drive it into the red. Britain's biggest coal group blamed geological problems, industrial action and a poor operational performance for the "unsatisfactory" results, which came despite a more buoyant market for coal prices. The company, which has made bottom-line losses for the last four years, pointed out "decisive action" had been already taken by new chief executive Gerry Spindler in a bid to restore profitability by 2006. The South Yorkshire-based firm, which operates seven pits, made a pre-tax loss of £51.6 million. Mr Spindler said the firm had made "significant progress" in reshaping the business, including a new wage structure and a more structured daily maintenance regime. "It does not need further explanation to conclude the year has been unsatisfactory," he said. "Some of this is due to external factors, some due to internal issues which can and will be remedied. The causes of the shortfall comparing to last year can be explained and serve to demonstrate both the potential for improvement in the business and the challenges in 2005." In a bid to retain cash, UK Coal said it had cut its annual dividend payout to one penny a share, compared with five pence a share a year earlier. The deep mines made losses of £37.8m in 2004, following a drop in output to 12 million tonnes - from 14.8 million tonnes in 2003. The company described many of the problems as "fundamental operating flaws", including inadequate processes and the inability of construction projects to be completed without gaps in production. Rising coal prices failed to benefit the company as most of its output had already been sold. UK Coal reported an average selling price of £1.18 per gigajoule but said total production costs were £1.30 per gigajoule, up from £1.16 a year earlier. Operating losses before the cost of closing a flooded colliery at Ellington were £28.7m, compared with a deficit of £1.8m in 2003. The bottom-line losses contrasted with a figure of £1.2m a year earlier. The company said it expected 2005 to be "transitional year" with a better performance expected in the following 12 months. It added: "The improved markets appear durable and in combination with lower costs and increased productivity bodes well for the future." UK Coal was recently forced to tell North Yorkshire power station Drax that it would not be able to meet its supply contract in full following geological problems at its Kellingley colliery.

The death of coal

The Northern Echo 27th January 2005

The region's once-proud mining industry drew its final breath yesterday as the closure of the last North East pit was announced. The loss of Ellington Colliery, in Northumberland, and 340 mining jobs, signals the end of production in what was once the mightiest coalfield in the world. Operations ceased at the region's last deep mine on January 12, when 1,200 gallons of water a minute began flooding

the pit's only remaining production face, six miles off the coast, beneath the North Sea. After two weeks of attempting to pump out the water, colliery owner UK Coal yesterday informed workers the pit was shutting down. Chief executive Gerry Spindler said: "The loss of any mine in these circumstances is a bitter blow, particularly for our employees and the local communities in which they live. "However, the safety of our employees is paramount."

Hydrological experts estimated that more than 100m gallons could be contained in old workings and the surrounding strata from which the water is seeping. "While we have contained the flow, the face is flooded and mining adjacent reserves carries unacceptable levels of risk, " said Mr Spindler. "Therefore, we are left with no realistic option but to close the mine." National Union of Mineworkers' president Ian Lavery condemned the closure. He said: "We went into the meeting with the chief executive of UK Coal and within three seconds he told me the colliery was closing because of safety reasons. "It is absolutely ridiculous to play the safety card on an issue like this." Local MP Denis Murray, who worked at Ellington for 30 years, said: "I am bitterly disappointed in particular with the attitude of UK Coal. "I do not think they have given the workforce the opportunity to see if they can get the water pumped out."The Ellington workforce was recognised by UK Coal as its best in the country. This seems a very strange way to repay them." Alan Clarke, One NorthEast chief executive, said: "Today's announcement marks the end of an era in the North-East. "For generations, the coal industry underpinned the regional economy and we should never forget the important part it played in the social and economic fabric of our region. "We are already working with our public sector partners to put the necessary plans in place to offer the best possible opportunity of new employment for Ellington workers." Ellington was the last deep mine in the UK to extract coal from under the sea. It produced about 12,000 tonnes a week, most of which was supplied to the nearby Alcan smelting plant. UK Coal said Ellington made an estimated loss of more than £11m last year. It has remained open because of the Alcan contract, bolstered by Government subsidies, including a £2.1m grant last year. Ceasing production at the colliery will cost UK Coal about £10m, including redundancy payments. It has invested more than £8m in Ellington since 2001, much of it on equipment that has been lost on the flooded coal face. The first pit at Ellington was sunk in 1910, and at its height it employed 2,179 men above and below ground. It closed in 1994 with the loss of 1,200 jobs, but reopened a few months later as a privately-run concern by UK Coal predecessor RJB Mining. Councillor Michael Davey, leader of Northumberland County Council, said: "Even though there had been speculation, this announcement is a major blow for all those affected, as well as for the local economy."We are calling for the immediate setting-up of a task group to look at the regeneration of this part of the county, where Ellington has made such a contribution to the working lives of families and communities for decades." Arnold Baker, ward councillor for Ellington, said: "Monday was supposed to be the most depressing day of the year, but this is the most depressing day for a generation - because so many good, hard-working men have lost their jobs. "This will have a huge impact on their families. "It is going to be very difficult indeed to recover from this."

Carbon dioxide continues its rise

By David Shukman

BBC science correspondent, in Hawaii, Thursday, 31 March, 2005

The atmospheric concentration of the greenhouse gas carbon dioxide has reached a new high, say US researchers. The figures - 378 parts per million (ppm) - were gathered by a Hawaiian lab regarded by experts as one of the most reliable in

climate research. The rise in the past year is smaller than it was in the previous two years. But the trend remains upwards, as it has for every year since measurements began on top of the Mauna Loa volcano nearly half a century ago. The research was carried out by the US government's Climate Monitoring Diagnostics Laboratory, part of the National Oceanic and Atmospheric Administration (Noaa). The laboratory's director, Dr Pieter Tans, told the BBC: "The most striking thing about the data is that we've seen an increase in carbon dioxide levels every single year since 1958." At an altitude of 3,500m (11,500ft), the research station must rank as one of the world's most spectacular and most remote scientific outposts. Reaching it involves leaving the tropical heat and humidity of the Hawaiian coast and climbing up a narrow road that twists through barren fields of solidified lava. The thin Pacific air is ideal for this research since it is "well-mixed", meaning that there is no obvious nearby source of pollution, such as a heavy industry, or a natural "sink", such as forest which would absorb CO₂. For that reason the data from Mauna Loa has come to be seen as the benchmark by which atmospheric data is judged. According to Dr Tans, one significant finding is that the annual rate at which the CO₂ is rising has itself increased. The growth rate over the past decade was about twice as fast as that found in the 1960s. He says that variations in the growth rate year by year can be explained by natural factors; for example, changes in the rate at which plants and the oceans soak up carbon dioxide. But he and his colleagues conclude that the steady rise overall can be attributed to man-made emissions of carbon. Dr David Hoffman, director of Noaa's Climate Monitoring and Diagnostics Laboratory, said: "Even though man's contribution is not increasing dramatically - in fact it's steady - it is adding up; there's a cumulative increase." In the year that the long-awaited Kyoto treaty finally came into force, with its aim of constraining greenhouse gases, the latest evidence highlights what a challenge that will be.

China says coal mining deaths up 21%

(Agencies) Updated: 2005-04-05 15:27

The number of deaths in China's accident-plagued coal mines surged by nearly 21 percent in the first three months of this year despite a national safety crackdown, the country's top industrial safety official said Tuesday. Fires, cave-ins and other accidents killed 1,113 miners from January to March, up 20.8 percent over the same period in 2004, said Li Yizhong, the minister in charge of the State Administration for Work Safety. "Since the fourth quarter of last year, several particularly serious accidents have occurred, arousing widespread concern of the public," Li said at a news conference. In February, an underground explosion in China's northeast killed 214 coal miners in the country's deadliest reported mine accident since the start of communist rule in 1949. Another accident in March killed 72 coal miners in northern China. China's coal mines are the world's deadliest, with thousands of deaths a year blamed on lack of required equipment or indifference to safety rules. Communist leaders have promised repeatedly to tighten standards but accidents still kill an average of 16 miners a day. Li said China's Cabinet and Communist Party leadership "have been placing great importance on issues regarding work safety." The agency "has been cracking down on all kinds of illegal mining operations and rectifying mines that fail to meet work safety standards," he said. Efforts to shut down dangerous mines have been complicated by the country's soaring demands for power to drive its booming economy. The government has ordered emergency shipments of coal amid widespread blackouts, prompting mines to push their facilities beyond safe limits. Many smaller, unlicensed mines have reopened in response to the surging demand.

Coal to remain top energy source

www.chinaview.cn 2005-03-30

BEIJING, Mar. 30 -- A government analyst predicted that coal would continue to make up a large proportion of China's energy mix in the years to come. As such, in its future energy development plans, the country would need to focus on coal supply and demand. "Development of coal and electricity is the core of the development of China's energy industry," said Wang Jiacheng, deputy director of the Industrial Economics & Technical Economics Institute under the National Development & Reform Commission (NDRC). China's energy consumption and output hit historic highs last year. Consumption reached 1.97 billion metric tons of standard coal equivalent, up 17.4 percent, with coal use accounting for 68.7 percent of overall consumption, said Wang. Crude oil accounted for 21.8 percent, natural gas 2.8 percent, while water and hydroelectricity represented 6.7 percent. In contrast, total domestic energy output reached only 1.85 billion tons of coal equivalent, up 15.1 percent. "The energy structure centers on coal and will continue to do so," he said. Wang didn't give any estimates of future production and consumption. He also didn't elaborate on how China could develop effectively coal as an energy source. In the long term, traditional fossil fuels, mainly coal, oil and natural gas, were still expected to account for a sizable portion of the energy production and consumption mix, he said. By the end of 2020, China would add 1.1 billion tons of new coal production capacity and 150 gigawatts of hydropower generating capacity, Xu Dingming, director of the energy bureau under the NDRC, was quoted by the China Securities Journal as saying. In addition, China would increase its overseas oil production and speed up the development of nuclear power and new sources of energy, the newspaper said, citing Xu. China would also enhance its efforts in natural gas exploration and the construction of a gas pipeline network, he said. The energy plan had been approved by the State Council, which had also approved a plan to enhance railway transportation capacity to alleviate supply bottlenecks caused by a lack of transportation facilities, the paper said. While China has started "clean and green energy" projects and even passed a Renewable Energy Law on Feb. 28, it is just in the earlier stages of harnessing the sun, wind, water and nuclear energy as important sources of power. With fossil fuels still occupying a huge part of the energy equation, China must also focus on energy conservation, Wang said. According to him, the Chinese Government has put in place a medium-to-long term policy to cut the share of coal as the country's source of energy by 3 percent each year from 2003 to 2020. That would amount to a total savings of 1.4 billion tons of coal equivalent, Wang said. Last year, China was hit by its worst power crunch in two decades. More than half of its provinces suffered blackouts on a lack of generators and a shortage of coal, amid surging demand for energy. In the past several years, China has experienced rapid economic growth. However, the country's energy consumption has outpaced its economic growth. In 2003, China's gross domestic product grew 9.4 percent on year, while its energy consumption increased 13.5 percent.

(Source: Shenzhen Daily/Agencies)

Coal fuels carrying championships

BBC News, Monday, 28 March, 2005

It will be coal sacks at dawn when the 42nd World Coal Carrying Championships come to a West Yorkshire village. Men and women will carry a 50kg sack of coal on their backs for nearly a mile during the event at Gawthorpe, Ossett. The winner of the gruelling contest will be crowned the King or Queen of the "Coal Humpers". The tradition, held every Easter Monday, started in 1963 when a coalman bet a friend he could run faster from the village pub to the green. The men's current world record stands at 4mins 6secs and the women's at 5mins 3secs. Scarborough builder John Hunter will be on the sidelines this year after

announcing his retirement from the event following his win last year. The 40-year-old has won seven World Coal Carrying titles since 1990. David Jones of Meltham, the current world record holder, currently holds six of the top 10 times and last broke the record in 1995.

For the last two years organisers have staged a children's event which sees three different age groups battle it out for their own title.

Kentucky's first new coal-fired unit in 15 years goes on line

POWER – 16th March 2005

Kentucky's first coal-fired generating unit in 15 years has entered commercial service. It almost certainly won't be the last. East Kentucky Power Co-operative's 268-MW Gilbert unit at its 860-MW Spurlock, base load coal plant in Maysville is expected to usher in a wave of coal plant construction in Kentucky over the next half-decade or so. The \$400 million Gilbert, which went into commercial operation a month early and is named for a former East Kentucky director, is billed as the cleanest coal-fired generating unit in Kentucky and one of the *cleanest* in the U.S. It uses circulating fluidized bed technology that removes about 98% of sulfur dioxide and about 80% of nitrogen oxide emissions. East Kentucky, a Winchester-based generation and transmission co-op, said Gilbert is needed because of strong growth among the co-op's 16 member co-ops that buy wholesale power from East Kentucky. A 17th co-op, Warren Rural Electric Co-operative Corp. in Bowling Green, joins East Kentucky's system in April 2008. According to East Kentucky, Gilbert required nearly 700 workers to build and created 35 permanent jobs at Spurlock, boosting total employment at the plant to 190. Gilbert will pay more than \$9 million in property taxes during its first 20 years of operation. Construction started in late 2002. Gilbert is expected to primarily burn coal. However, it has the capability to burn several million tires and 150,000 tons of biomass, including sawdust and other wood products, annually. Late last year, East Kentucky unveiled plans for two additional 278-MW coal units - Smith 1 and Spurlock 4 - at the Smith station near Trapp in Clark County, Ky., and at Spurlock, respectively. Smith 1 is targeted for commercial operation in 2009, Spurlock 4 in 2008. The last major coal-fired facility to go on line in Kentucky was Louisville Gas and Electric's 547-MW Trimble County baseload plant in 1990. The plant is located along the Ohio River about 50 miles North East of Louisville. Altogether, Kentucky, the nation's third-largest coal producer, is home to 21 coal plants. LG&E is moving forward with plans to construct a 732-MW coal-fired expansion at Trimble. It would be in operation near the end of the decade. [How can they call it the *cleanest* when the owners do not begin to address the issue of CO₂ capture and storage? Ed.]

ENERGY STATISTICS

DTI, March 31, 2005

Interesting data has been included in the Newsletter, (at least I think it is, Ed!!), concerning the use and more importantly the changes in energy, fuels use and CO₂ emissions between 2003 to 2004.

Total energy production was 237.9 mtoe, **8.6% lower.**

Coal and other solid fuel consumption, **2.4% lower.**

Primary electricity consumption, **9.1% lower.**

Coal production (including slurry), **11.2% lower.**

Deep mined production, **19.8% lower.**

Open cast production, **7.8% lower.**

Imported coal, **13.4% higher**, (a record high level of 36.1 million tonnes).

Consumption by electricity generators, 4.9% lower.
Fuel used by generators, 0.9% lower.
Coal use, 5.0% lower.
Gas use, 6.7% higher (its highest ever level).

Total electricity supplied, 2.0% higher.

Provisional estimates of **CO₂ emissions** for 2004 indicate that they were **4% lower than in 1990**. The fall was due to fuel switching and increased energy efficiency, including generation efficiency at power stations. Emissions were around **2.5 million tonnes of carbon, 1.5% higher than in 2003**.

It seems that most of the measures are showing a rather depressing downward trend with the only increases being in the amount of coal that was imported and the amount of gas used, both at record levels; and the amounts of electricity supplied and CO₂ emitted.

Tailings

ATH Resources is seeking permission to open a further three coal mines in Scotland, including a plan to mine 500,000 tonnes of coal at Laigh Glenmuir in Ayrshire. 28-Feb-2005

China

FEBRUARY 2005: A coal liquefaction project, to be developed in China's northern Inner Mongolia Autonomous Region, may replace 10% of the country's oil product imports by 2013. Coal liquefaction is a process whereby heat and pressure are applied to coal to transform it into oil products. The project is expected to produce 1 million tpa of gas and gasoline from its first year of production in 2007. A project such as this is important to maintaining a stable economy and sustainable growth in China. This is especially the case in light of recent fluctuating oil prices, from which the new project will help provide some relief.

China

FEBRUARY 2005: Mitsui Babcock has developed a new generation of supercritical power plant boilers that provide efficient, environmentally cleaner power for coal fired power stations at the Changshu power plant in China. A power plant such as this, which is operating above the 'critical' pressure level, should be capable of reducing emissions by approximately 20%. Emissions could be reduced even further by co-grinding the coal with biomass. The supercritical technology at Changshu achieved the Hydraulic Test milestone in a quick time of 22 months. The programme typically takes 30 months. Mitsui's rapid completion was achieved by pumping the water in the boiler to 1.5 times working pressure, proving the manufacture and construction of parts to have been successful.

United States

MARCH 2005: California is considering setting a precedent in the US by implementing regulations on CO₂ emissions. The state has already adopted the country's first regulations on car emissions and is looking to further this move with a push for greater energy efficiency, conservation and use of renewable energy sources in the state. The California Public Utilities Commission held a conference last month, which aimed to identify 'best practice' to be followed by the companies that will be restricted by the new regulations. Although California itself does not predominately produce coal, it does import it from large plants in

surrounding Western States, such as Nevada, Utah, Arizona and New Mexico, for use in coal-fired power plants to generate electricity. Coal-fired power plants would be a key target under the new regulations. One suggestion by the regulators has been that the utilities factor in a 'carbon adder' when purchasing electricity supplies. This would be a financial tool that measures the cost of generating electricity with coal or gas in relation to the cost of generating it with renewable sources and the related potential energy saving.

Student Bursaries for 2005

Up to six travel bursaries for up to £300 are on offer to bona-fide full-time students wishing to attend appropriate coal-related conferences. To apply, please send the abstract submitted to the conference with a brief supporting letter from your supervisor to:

Prof. J.W. Patrick
SChEME
The University of Nottingham
Nottingham
NG7 2RD

The bursaries come with no obligations to the recipient other than to supply a short essay about his or her impressions of the conference to the Newsletter for inclusion in the next edition.

Update on new Research Fund for Coal & Steel (RFCS) Projects,

The projects listed which were above the 'Threshold' in the recent appraisal exercise in ranking order are listed below. The first ten appear to be confirmed with the next four provisional.

1. Development of a pilot scale flameless oxidation burner for ultra low NOx combustion of pulverised coal.
Budget 3.00M Euro, Funding requested 1.80M Euro
Co-ordinator = University of Stuttgart
Partners = EDF, MBEL, WS Warmprozesstechnik GmbH, Institut National des Sciences Appliquées de Rouen, Rheinische-Westfälische Technische Hochschule Aachen, Instytut Energetyki, Elektrownia Opole SA.
- 2= Advances in exploration methods and applications.
Budget 3.25M Euro, Funding requested 1.95M Euro
Co-ordinator = UK Coal Ltd.
Partners = Główny Instytut Górnictwa, Geocontrol S.A., Heriot-Watt University, Mines Rescue Service Ltd., TNO Nederlandse, Seismic Image Processing Ltd.
- 2= Researching the applications of innovative open wireless technologies
Budget 3.30M Euro, Funding requested 1.98M Euro
Co-ordinator = Deutsche Steinkohle AG
Partners = Asociación para la Invest. y el Desar. Industrial de los Recursos, DMT, Centrum Elektryfikacji I Automatyzacji Górnictwa, Mines Rescue Services Ltd., Rock Mechanics Ltd.
4. Utility scale CFB for competitive coal power.
Budget 3.41M Euro, Funding requested 2.05M Euro

- Co-ordinator = Technical Research Centre, Finland.
Partners = Foster Wheeler Energia Oy., Siemens AG, Endesa Generacion SA., Fundacion Circe – Centro de Investigacion de Recursos y Consul,
5. Development and experimental validation of a mathematical modelling methodology for oxy-fuel combustion for CO₂ capture in large power plants
Budget 2.16M Euro, Funding requested 1.30M Euro
Co-ordinator =Vattenfall
Partners = University of Stuttgart, Chalmers Tekniska Hogskola AB, NTUA, MBEL, FLUENT Europe.
 6. Development of a new generation of coal-derived environmentally-friendly pitches.
Budget 2.09M Euro, Funding requested 1.26M Euro
Co-ordinator =CSIC,
Partners = IC London, INETI, Industrial Quimica del Nalon S.A., Carbone Savoie, Wroclaw University of Technology.
 - 7=. Clean syngas from carbonaceous materials gasification for highly efficient electric energy generation.
Budget 2.52M Euro, Funding requested 1.51M Euro
Co-ordinator =CSM
Partners = INETI, Societa Technologie Avanzate Carbone SpA, Tecnatom SA, ENEL Produzione SpA, University of Nottingham, University of Newcastle-on-Tyne, Technip KTI SpA.
 - 7=. Coal catalytic co-gasification in an innovative rotary kiln gasifier.
Budget 2.16M Euro, Funding requested 1.29M Euro
Co-ordinator =CSM
Partners = INETI, Societa Technologie Avanzate Carbone SpA, ENEL Produzione SpA., University of Nottingham, Ansaldo Ricerche, University of Zaragoza.
 - 7=. Reduction of polycyclic aromatic hydrocarbon (PAH) emissions from coking plant.
Budget 2.06M Euro, Funding requested 1.24M Euro
Co-ordinator =University of Nottingham
Partners = Arcelor Research SA., CSIC, Inst. for Chem. Proc. of Coal, Monckton Coke & Chemical Co. Ltd.
 10. Development of more economical innovative support systems for gateroads under the influence of rock stresses.
Budget 2.92M Euro, Funding requested 1.75M Euro
Co-ordinator =DMT GmbH
Partners = Rock Mechanics Technology Ltd., Deutsches Steinkohle AG, Geocontrol SA, UK Coal Ltd., Glowny Instytut Gornictwa.
 11. Improved flexibility for mercury capture in combustion through developing novel sorbents.
Budget 2.58M Euro, Funding requested 1.55M Euro
Co-ordinator =University of Nottingham
Partners = MBEL, University of Newcastle on Tyne, CSIC, Hulleras del Norte SA., Ciemat, University of Stuttgart, ENEL Produzione SpA., E.ON Energie GmbH.
 12. Management of the impacts due to rock weathering and ageing processes in closing and closed mines affected by water rebound.

Budget 3.68M Euro, Funding requested 2.21M Euro

Co-ordinator =ISSeP

Partners = Asociation para la Invest. y el Desar. Industrial de los Recurs, Armines, Deutsches Steinkohle AG, Glowny Instytut Gornictwa, Institut. National de l'Environnement Industriel et des Risques, Poltegor Engineering Ltd., Rock Mechanics Ltd., University of Nottingham.

13. Lime-based CO₂ capture: retrofit options for low capture costs.

Budget 2.17M Euro, Funding requested 1.30M Euro

Co-ordinator =Cranfield University

Partners = CSIC, University of Stuttgart, Fundacion Circe – Centro de Investigacion de Recursos y Consul, Endesa Generacion SA.

14. Hydrogen production from advanced gasification processes.

Budget 2.47M Euro, Funding requested 1.48M Euro

Co-ordinator =University of Nottingham

Partners = Elcogas SA, CSIC, AUTH, CERTH, INETI, University of Limerick, CSM.

CALENDAR OF COAL RESEARCH MEETINGS AND EVENTS

Date	Title	Location	Contact
Wednesday 18th May 2005	Coal Research Forum and Coal Utilisation Subject Group Annual Meetings and Re- launch Meeting of the Environment Division.	Institution of Chemical Engineers, 165- 189 Railway Terrace, Rugby	Dr D J A McCaffrey The Coal Research Forum P.O.Box 154 Cheltenham GL52 5YL Tel : 01242-236973 Fax : 01242-516672 E-mail : info@coalresearchforum.org Dr M Whitehouse Casella CRE Energy Building 7/3 Vantage Point Business Village Mitcheldean GLOS. GL17 0DD Tel: 01594-546334 Fax: 01594-546342 Email: michaelwhitehouse@casellagro.com
16-17 June 2005	2005: Emerging Carbon Markets: Can They Deliver?	London, England	http://www.chathamhouse.org.uk/index.php?id=5&cid=72
27 th –30 th June 2005	Eighth International Conference on Energy for a Clean Environment	Lisbon, Portugal	Dr J L Toste de Azevedo, Instituto Superior Tecnico, Department of Mechanical Engineering, Av. Rovisco Pais, 1049-001 Lisbon, Portugal Tel: 00351-21-8417378 Fax: 00351-21-8475545 E-mail: cleanair2005@vianw.pt Web: http://navier.ist.utl.pt/cleanair
17 th –19 th August 2005	COAL-GEN 2005	San Antonio, Texas	Conference website for details http://cg05.events.pennnet.com/content.cfm?NavId=2072&Language=Engl To register: MAIL: COAL-GEN 2005 Registration Department 1421 S. Sheridan Road Tulsa, OK 74112-6600 USA E-MAIL: coal-gen@pennwell.com

Wednesday 14th September 2005	The BCURA/CRF Research Event, "The Presentation of Current Projects Funded through the BCURA/DTI Programme"	British Sugar Conference Centre, Holmewood Hall, Near Peterborough	Dr D J A McCaffrey The Coal Research Forum P.O. Box 154 Cheltenham GL52 5YL Tel : 01242-236973 Fax : 01242-516672 E-mail : info@coalresearchforum.org
11 th -15 th September 2005	22 nd International Pittsburgh Coal Conference	Westin Convention Center, Pittsburgh, PA,USA	Contact web site for details: www.engrng.pitt.edu/~pccwww/Planning.htm
Monday 10th October 2005	54th BCURA Robens Coal Science Lecture to be presented by Dr.A.R.Jones, E.ON plc., Power Technology Centre.	The Royal Institution, Albermarle Street, London	Mr J D Gardner, BCURA Company Secretary, Gardner Brown Ltd., Calderwood House, 7, Montpellier Parade, Cheltenham, GLOS. GL50 1UA Tel : 01242-224886 Fax : 01242-577116 E-mail : john@gardnerbrown.co.uk
9 th -14 th October 2005	2005 International Conference on Coal Science & Technology	Okinawa, Japan	Japanese Representatives to ICCS Prof. I Mochida , Kyushu University Dr. O Yamada , AIST General Secretary http://www.aist.go.jp/ Ms. Yoshimi Kunugi , AIST E-mail: iccst@m.aist.go.jp Telephone:0081-29-861-8423 Facsimile: 0081-29-861-8417
Wednesday 23rd or 30th November 2005	Joint Meeting of the IChemE Energy Conversion Technologies Subject Group and Coal Utilisation Subject Group, "The Future for Coal in Power Generation with Carbon Abatement Technologies".	IChemE Offices, 1, Portland Place, London.	Mr. S G Dawes, Treasurer of the Energy Conversion Technologies Subject Group, Tel and Fax : 01684-310798 E-mail : stepdawes@aol.com

June 2006	Meeting of the Coal Preparation Division, Title to be announced	Venue to be announced	Mr Andrew W Howells Norec Ltd. Ings Mill Dale Street Ossett West Yorkshire, WF5 9HQ Tel: 01226-730440 Fax: 01226-730688 Email: andrew.howells@norec.ltd.uk
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