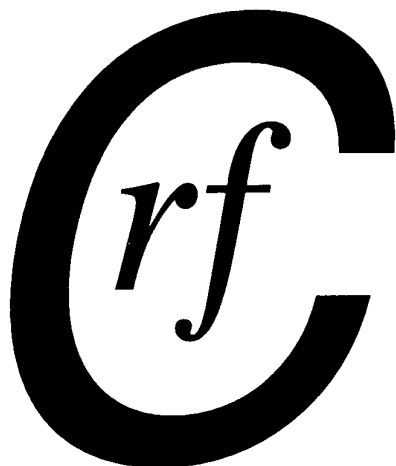


NEWSLETTER

of the

*Coal Research
Forum*



Edited by: Dr Svenja Hanson

EDITOR'S COMMENTS:

Welcome to the September 2001 Newsletter. My initial fears that this newsletter might be lacking in volume on account of the famous 'summer hole', when the beaches are full and the offices empty, proved unfounded. Only one CRF event, the joint meeting of the environmental and characterisation divisions at Drakelow Business Centre in June, took place this trimester. But I received generous, highly informative contributions from Brian Ricketts and Heather Tilley, for which I am truly grateful. On this note I'd like to encourage everybody who feels he (or she) has some views or information to share: Fire up those word-processors, the next dead-line for contributions is at the end of December, and I'm really looking forward to hearing from you!

Sadly, there also is some bad news; Frank Berry says his final farewell to our long-standing and well respected member Bill McWhinnie, who sadly passed away this summer.

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Obituary

William Robin McWhinnie, known by all as Bill, was born in London in 1937. He attended Chislehurst and Sidcup Grammar School and won a Queens Scholarship to Queen Mary College in the University of London to read chemistry. He graduated with First Class Honours in 1958 and pursued postgraduate research at Queen Mary College investigating dipyriddy complexes of first row transition metals and applying ligand field theory to interpret their properties.

After a brief spell as a lecturer in Colombo, Sri Lanka, Bill took up a lectureship at Queen Elizabeth College in the University of London. His research into coordination chemistry and the organic chemistry of tin continues to be cited in the literature.

Bill moved as a reader to Aston University in 1967 and was appointed professor of inorganic chemistry in 1975 thus giving him the distinction of being the youngest professor of chemistry in the United Kingdom at that time. It was in Aston that Bill developed his interests in organotellurium chemistry. He identified new synthetic routes and applied physical techniques, particularly infrared-, nmr- and Mössbauer-spectroscopy, to the characterisation of these compounds. The highlight of his work is probably the stabilisation of the tritelluride. His work is held in high esteem at the international level, he was regularly invited to lecture at international conferences.

Bill developed a variety of activities in the chemistry of coal and established good relationships with colleagues within that

community. He was a member of the Coal Research Forum and for a two-year period in the mid-nineties he was an academic representative on the Executive Committee.

Bill was also committed to the Royal Society of Chemistry playing a leading role at local level over three decades and being a member of Council in recent years.

Bill played a major role in management at Aston. He was involved in the leadership of the Department of Chemistry for over 30 years. His finely honed managerial and administrative skills were recognised in Aston and he served as a Pro Vice Chancellor. Bill was not just a scientist and a leader, he was also a man of the arts. While Pro Vice Chancellor Bill established an arts centre in Aston Triangle.

Bill was held in high esteem by his colleagues. His integrity, humour, kindness and generosity turned many a professional relationship into friendship. He was selfless in the support he gave to younger colleagues in the development of their careers often creating opportunities for them to develop their professional lives. Many colleagues remain indebted to him for his wise advice, support and encouragement.

His life was interrupted in November last year when a brain tumour was diagnosed. Despite surgery and treatment he sadly passed away in the early hours of 23rd May. Our thoughts are with his wife Vinitha and his sons Sean and Neil at this difficult time. *extract from the address given by Professor Frank Berry at the funeral service*

The 4th UK Meeting on Coal Research and its Applications

It has by now almost become a tradition that in the years the ICCS conference is not taking place the CRF locally fills the gap with a UK Meeting on Coal Research and its Applications. After Loughborough in 1996, Nottingham in 1998 and Aston in 2000, the 4th Meeting will be hosted by **Imperial College** in London. The venue was first suggested at the Executive Meeting following this year's AGM and later confirmed after a closer look at cost and availability. The first meeting of the Organising Committee in July set the date for the conference to be the **16th to 18th September 2002**.

The organising Committee to date consists of :

* Mike Cloke (University of Nottingham) - Chairman

* David McCaffrey (McEnergy Consultancy) - Treasurer

* Alan Thompson (University of Nottingham) - Secretary

* Denis Dugwell (Imperial College) - Local Representative

* Will Quick (Powergen) - Representative from Industry

* Ed Jamieson (Innogy) - Representative from Industry

The call for papers is going to go out shortly and it is hoped that publicity material will be out in time to distribute at the San Francisco ICCS. In addition to the 'old favourites', next year's Meeting is going to include two new topics, co-processing of coal with biomass and waste and CO₂ reduction issues, to further widen the remit.

ECSC – Coming to an End.....

As you are probably all aware, the ECSC Treaty will expire on the 23rd June 2002. With it the current ECSC RTD programme (1997-2002), covering mining technology and coal utilization, is also drawing to a close. The Commission intends to organise a **final symposium on the ECSC Coal Research Programme**. This meeting is planned to take place in Luxembourg on 24th and 25th June 2002.

Now is the time to come forward with suggestions, ideas and comments to pass on to the four UK members on the Coal Research Committee regarding the contents of this meeting. It is important for them to get as much feed-back as possible before the next meeting of the Coal Research Committee on 16th and 17th October 2001, so that they can agree and present a unified UK position.

.....well, not the end exactly

The debate how to approach the expiry of the ECSC treaty as been going on since the early nineties. Whereas renewal was soon ruled out, concrete proposals of how to proceed only emerged in recent years. An EU Commission press release (DN: IP/00/984) from September 2000 details a proposed legal package under which the assets and liabilities of the ECSC are transferred to the European Community and the Commission entrusted with the management of those funds. Their net revenue, an estimated 45 million Euro per year, will be used for coal (27.2%) and steel (72.8%) research. The specific research programme will be managed along similar lines as existing ECSC ones. According to Cordis RTD-News item 17026, released in July 2001, the allocation of financial resources

Also, if you are mainly involved in research, you may not know that the rules for state aid to the coal industry expire at the same time as the ECSC treaty (I did not until yesterday). Unlike for research funding, the Commission has adopted new regulations to apply from 24.7.2002 until 31.12.2100 (press release DN:IP/01/1080). I thought a quote from the press release sounded quite interesting: "Despite efforts made to modernise, rationalise and restructure the coal industry under the ECSC Treaty, most of the Community coal

Suggestions regarding authors, topics and titles of papers to be presented would be very helpful, as would proposals of persons or organisations who should receive information about the meeting. It is, for example, planned to invite representatives from central and eastern European countries. Consideration is also being given to the possibility of organising, in parallel, a small technical exhibition. Suggestions relating to this would also be welcome.

David McCaffrey has kindly agreed to act as the "post-box" for the ideas and suggestions (address, e-mail and phone number are on the cover page). Please make your voice heard and get in touch with him by 30th September 2001 at the latest.

for R&D following the expiry of the ECSC treaty was specifically mentioned by S. Kubla, chair of the Industry Council during the Belgian Presidency, when he announced his work plan for the next six months. He is intending to finalise the agreement on the allocation of funds to coal and steel research after the expiry date. An unofficial agreement was reached at the Industry Council meeting on 15 May, but confirmation or adjustment is pending until the European Parliament has given its opinion, which is expected to happen in September. As the editor has been unable to locate any 'unofficial sources', the content of this agreement cannot be revealed until it is made official.

produced cannot compete and will not be able to compete with imports from third countries. ... This aid will help to maintain access to coal reserves and thus guarantee that a certain capacity of coal production is available to cover any contingencies that could affect the energy market in the long term." Does or does that not sound like the realisation that we do need an indigenous coal industry after all? Admittedly it goes on to stress the need for the gradual closure of the pits making the biggest losses, but surely these are not in the UK.

Interestingly, on the same day, another press release (DN:IP/01/1081) informed us that the UK (government) has been authorised to grant 34.3 million Euro aid to the coal industry. That is £21 million, over £20 million earmarked for the Selby complex. According to the release, restructuring of the aid receiving units should enable them to continue their activities beyond 2002 without the need for

further financial support. At first glance the aid authorised seems small compared to the 991million Euros authorised as state aid to the French mining industry earlier in the year (DN:IP/01/745, 23/5/2001). Reading on it does, however, become clear that part of the purpose of the French aid is reduction of activity, namely staggering closures until 2005.

Wakefield Clean Coal Seminar: A Sustainable Future - The Role of UK Coal

Friday 9th March saw politicians, officials, industrialists and other prominent figures from the world of clean coal technologies assemble in the historic City of Wakefield. For those who were unable to attend, Brian Ricketts provides a full report of the seminar organised by the Coalfield Communities Campaign and the Yorkshire Coal Task Force.

The Government's energy policy is to ensure *secure, diverse and sustainable supplies at competitive prices*. Coal's role in providing security and diversity was recognised by all speakers. Its environmental challenges continue to be solved, and even coal's high carbon intensity may not become a handicap if modern technologies are properly embraced. Mick Clapham MP, chairman of the Parliamentary Coalfield Group, opened the seminar with an upbeat assessment of the coal industry's position, reflecting on events that led to the 1998 White Paper on energy sources for power generation. He observed that high gas prices had reversed the decline in coal consumption such that the industry now faces opportunities rather than challenges.



Front row: Nigel Yaxley, RJB; Mick Clapham, MP; Rt Hon Michael Meacher, MP, Minister for the Environment; Middle row: David Bowe, MEP; Alec Galoway, RJB; Back row: Gary Foreman NACODS, Pat Carragher BACM.

RJB Mining's (now UK Coal) Nigel Yaxley stood in for Richard Budge who had stepped down just a week or so before the seminar. As Director of Generator Sales, Yaxley set the scene, beginning with the remarkable fact that coal burn at UK power stations rose by 14% in 2000, reversing the past trend. Energy Paper 68, published by the Department of Trade and Industry (DTI) during 2000, fails to predict this rise and expects gas to account for 75% of electricity generation by 2020. Yaxley questioned how, with declining nuclear output, and the relatively insignificant contribution from renewables, the UK could maintain fuel diversity if coal was allowed to decline as anticipated by the DTI. He showed that the situation in Europe is no better: already dependent on imports for 50% of its demand, this is set to rise to 70% by 2030. With much of the world's proven gas reserves in politically unstable regions of the world, Yaxley questioned the growing reliance on imported gas, quoting an MOD document that identifies this very issue as a possible cause of future conflict. Consolidation in the coal industry, such that over 50% of world production is controlled by just five major companies (now just four: BHP Billiton, Glencore, Rio Tinto and Anglo) was the justification given by Yaxley for maintaining a strong UK coal industry.

If coal is to continue to play a significant role in power generation, then cleaner plants, some perhaps with carbon capture and sequestration will be needed. This will need Government support, and RJB has long called for a Clean Coal Obligation requiring electricity suppliers to purchase specified amounts of electricity from clean plants, operating much like the Renewables Obligation, but at just one-third of the cost.

Yaxley spoke of initiatives at RJB Mining to improve environmental performance, including

the construction of small power plants running on mines gas to reduce methane emissions. The company continues to promote the Integrated Gasification Combined Cycle (IGCC) power station at Kellingley Colliery based on the proven Texaco process.

Next on stage was the Department of Trade and Industry's recently appointed Director of Coal Policy, Rob Wright who provided the official view on an industry facing environmental and competitive challenges. He explained the operation of the UK Coal Operating Aid Scheme, designed to help *"those elements of the industry with a long-term future to overcome short-term difficulties"* but warned that there would be a *"winding-down"* of subsidies once the European Coal and Steel Community (ECSC) Treaty of 1951 ends in July 2002. Recognising that coal could be competitive within a green agenda, he covered the DTI's current clean coal R&D programme with an emphasis on underground coal gasification (UCG).

The prospect of recovering coal reserves beneath the North Sea has been the stimulus for the DTI's renewed interest in underground gasification. If successful, it would lessen the environmental impact of coal extraction by providing syngas for power generation, chemicals manufacture and even hydrogen production.

The work on UCG, begun by the Coal Authority, has now been transferred to the DTI and a five year programme is underway as part of the DTI wider activities in cleaner coal, totalling around £4 million per year. The future role of clean coal demonstration projects would be reviewed later in the year by the DTI (see separate article for an update on this).

David Bowe MEP for Yorkshire and Humberside presented his view from the European Parliament on an industry that he felt had now *"turned-the-corner"*. He sits on the influential Environment, Public Health and Consumer Policy Committee, and was a key negotiator earlier this year when the Large Combustion Plants (COM(1998)415) and National Emission Ceilings (COM(1999)125) Directives entered the conciliation process between Parliament, Council and the Commission. He suggested that such environmental frameworks would get tougher for coal in the future. On the question of what follows the ECSC treaty in July 2002, he stated that funds would still be available to fund coal (and steel) related R&D activities. Earlier, Rob Wright had suggested up to £10 million per year for coal, with the UK receiving around 20% of this.

Another of the many keynote speakers was Pedro Sampaio de Nunes, Director of Conventional Energies within the European

Commission's Transport and Energy Directorate in Brussels. He focussed on the Green Paper on security of energy supplies (COM(2000)769) noting the growing reliance around Europe on imported supplies, especially gas. The policies proposed by the Commission to alleviate any potential supply problems include promotion of renewables, demand-side management (increased efficiency, perhaps promoted by the Commission's long-desired energy tax), and improved relationships with those countries able to supply natural gas, including a *"strategic energy partnership"* with Russia. Nunes said that fossil fuels would underpin the European energy economy for some years to come, but he could not explain the absence of fossil fuels from the proposed Framework VI Programme, urging MEPs and others with influence to ensure that this is changed.

The Green Paper talks of maintaining access to EU coal reserves by keeping a number of collieries open to keep a core expertise within Europe, ready and waiting to expand production should we experience an energy shock. In contrast to the speaker from the DTI, Nunes stated that a new regime of financial aid would be drafted to address the expiry of the ECSC Treaty next year: *"the inevitable disappearance of coal production in the EU which would otherwise occur is not acceptable for social and regional reasons, and would increase the risks and uncertainties regarding the long-term energy supply"*. Nunes felt the UK coal industry was in a good position following restructuring to compete in the future.

On technology, Nunes supported gasification since it offered the potential to reduce CO₂ emissions by 25% and was able to consume a variety of fuels such as coal, Orimulsion and wastes.

Environment Minister Rt Hon Michael Meacher MP, fresh off a plane from Brussels where he had attended an Environment Council meeting, stated that the Government is *"committed to reviewing the case for a demonstration plant of new clean coal technologies"* and would begin work shortly on a review of longer-term energy sources. Not surprisingly, given his audience, Meacher painted a positive picture of the coal industry, an industry to which he *"remains very committed"*, recognising especially the diversity that it brings to UK energy supply. With FGD retro-fitted to existing plants, he anticipates a future for coal in the UK within the framework of the recently *"hard-won"* deals under the LCPD and NECD (which Germany and Denmark opposed). Interestingly, he stated that these deals were based on an average sulphur content of 1.7%. On clean coal technologies, he was less

positive, believing that they cannot compete with gas; however he foresaw a growing demand from China and India where UK exporters could win business to benefit the global environment.

Ken Fergusson, then Chief Executive of the Coal Authority asked if nuclear should be playing a bigger part given that it produced no CO₂ emissions; a question surely designed to incite Meacher who is known to be anti-nuclear. Meacher proved himself as a skilful politician, not denouncing nuclear but highlighting the problem of nuclear waste disposal and coming down in favour of renewables and even clean coal.

Ron Knapp, Chief Executive of the World Coal Institute put Meacher on the spot by asking if CO₂ emissions from coal use were reduced to zero, would the Government provide the same level of subsidy as it does for renewables? Meacher was intrigued, and provided a rhetorical answer: why not subsidise zero emission coal plant, after all it is the DTI's policy to create a level playing field within energy markets...

Colin Godfrey, formerly Market Development Director at RJB Mining but now an independent energy consultant, asked Meacher how the UK would meet its Kyoto commitment given that carbon emissions were once again rising following the massive increase in coal consumption during 2000. Meacher, unaware of this development, could provide no answer but was clearly concerned by the implications of rising coal burn.

Steve Fothergill of the Coalfield Communities Campaign asked about the departure of Richard Budge, suggesting that this was the most significant development in the coal industry, and not rising gas prices or the EC's energy security Green Paper. Was it not a victory for shareholders and what would happen to Budge's commitment to keep the largest possible industry alive? Meacher described Budge as an "abrasive" character and whilst agreeing that he had been a hugely influential figurehead, confessed that he had no idea about the reasons nor effect of his departure. Nigel Yaxley however was able to respond with confidence on behalf of RJB Mining, stating that the company was never a one-man-band and the management team, including some in the audience, were equally committed to maintaining a viable industry. Adrian Gobbi of Zygon Ltd, a private investor in RJB Mining, spoke glowingly about the company's prospects, with or without Richard Budge.

The afternoon session was devoted to more technical presentations, notably from Peter

Whitton of Progressive Energy and David White, an independent consultant who has written extensively on clean coal technologies, including reports for the Financial Times and is Chair of the Institution of Chemical Engineers Energy Conversion Technology Subject Group.

Peter Whitton described his company's plans for a 450 MWe IGCC power station located near Blyth, to the north of Newcastle. The concept includes consuming a mixture of coal and petcoke to provide fuel costs that, according to Whitton, would make the IGCC plant (almost) competitive with natural gas combined cycle power stations. Whitton showed that the UK would need to install substantial new generation capacity over the next decade as demand grew and nuclear plants were decommissioned. If only natural gas was selected for this new capacity, then the UK would quickly become dangerously reliant on imported gas - hence the need to gasify coal. He asked that the Government supports the introduction of IGCC in the UK by "pump-priming" the market with tax incentives or capital grants.

David White presented a very detailed account of the status of gasification around the world and why it is the preferred choice for economies moving towards a more sustainable future. The ability to easily capture CO₂ from syngas, produce hydrogen, power fuel cells and consume waste materials places IGCC in a unique position for the long-term. In the shorter term, gasification builds on the unqualified success of gas turbines which have displaced steam turbines for high efficiency power generation applications.

The seminar concluded with an authoritative overview of the coal industry from Pat Carragher, General Secretary of the British Association of Colliery Management. He recalled that in 1992, during the Government's coal review, a report by Rothschild predicted that only 12 collieries would survive. In fact, 31 pits were privatised and 17 remain in production. He called for the Government to be pro-active in ensuring that coal has a sustainable future in the UK. In particular, it must support the construction of new, commercial-scale, integrated gasification combined cycle power stations to produce clean electricity from coal, particularly "mine-mouth" projects. Neatly summarising the thrust of the seminar.

*Brian E Ricketts, 29 August 2001
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The Cleaner Coal Technology Programme

In the previous newsletter, some information was provided on the current Cleaner Coal Technology Programme through Web-Watch. This article aims to bring the reader up to date with the status of the current programme.

In April 1999 the Department of Trade and Industry (DTI) launched the new Cleaner Coal Technology Programme, after a detailed review of future research requirements as part of the new Foresight exercise was completed. This programme was allocated £12 million for the first three years of the six year programme. The programme aims to provide a catalyst for UK industry to develop cleaner coal technologies (CCTs) and obtain an appropriate share of the growing world market for the technologies. This is achieved through four programme objectives ie.

- To help industry meet the technology targets determined by the Foresight Energy Panel Task Force for advanced power generation.
- To encourage fundamental coal science research in support of the Foresight recommendations in collaboration with the Engineering and Physical Sciences Research Council (EPSRC), and the British Coal Utilisation Research Association (BCURA).
- To encourage the development of an internationally competitive cleaner coal component industry and promote UK expertise and know-how in the main export markets
- To examine, in partnership with the Coal Authority and industry, the potential for developing the UK coal bed methane resource and underground coal gasification technology

In order to achieve these objectives the new programme was split into the R&D Programme and the Technology Transfer and Exports Promotion Programme. Though these programmes are managed independently of each other, the DTI has set up the Advisory Committee on Cleaner Coal Technologies (ACCCT), one of whose major functions is to ensure that, where appropriate, the two programmes are complementary.

R&D PROGRAMME

Mott MacDonald Ltd, an independent UK-based international engineering company, was appointed to manage the Clean Coal

Technology R&D Programme in April 1999. Their role involves initiating an annual call, which reflects the changes in policy, advances in technology and the achievements of the previous year's programme. They will also evaluate all the proposals received for technical as well as commercial feasibility and provide guidance to successful organisations with their final proposals. Mott MacDonald will also negotiate contractual terms and agree deliverables within each project, monitor each project, identify and resolve project problems, assess each project's value to the programme as a whole and make suggestions for follow up work.

If you would like to participate in the R&D programme, you need to wait for a 'Call for Proposals' to be made. This is generally announced on the DTI Cleaner Coal Technology Programme website (www.dti.gov.uk/cct/proposal.htm). Eligible topic areas for submission are described here. These generally fall within the priority areas identified by the Foresight Task Force, and are generally focussed on power generation. The Task Force list is not exhaustive and other areas, which a proposer can clearly identify as offering benefits to the cleaner usage of coal in the power industry, will be considered. Once you have identified the priority area that your proposal comes under it is important to plan your submission as soon as possible and to identify collaborative partners.

THE TECHNOLOGY TRANSFER AND EXPORT PROMOTION PROGRAMME

ETSU, part of AEA Technology plc, have responsibility for managing the Cleaner Coal Technology Programme, covering technology transfer and exports promotion activities. The programme aims to promote the results of successfully completed R&D and it ensures that they are taken up by industry as soon as possible. Results are widely disseminated to support the UK Governments wide environmental policies, particularly to assist developing countries to utilise CCTs.

This is achieved through a variety of activities. This includes:

- Developing a broad base of publications. Examples include the Export Directory of CCTs, capability brochures of UK expertise in a particular technology area (eg mining, coalbed methane), technology status

reviews of particular CCTs eg flue gas desulphurisation, best practice brochures, newsletters and trade mission newsletters.

- Carrying out trade promotional activities such as running trade missions and exhibiting at key international events.
- Developing collaborative projects with overseas organisations. Currently, the main focus countries for such projects are China and India.

Many of the projects within this programme are recruited by competitive tender. Notices requesting expressions of interest to undertake these projects are posted on the DTI website (www.dti.gov.uk/cct/news.htm).

COALBED METHANE (CBM) AND UNDERGROUND COAL GASIFICATION (UCG)

During the review that led to the initiation of the new programme, the potential for CBM and UCG were examined because both these technologies provide an alternative way of

obtaining energy from coal without mining. This is of particular interest in the UK, because significant quantities of the remaining unmined coal seams are at a depth that makes them uneconomical to mine with current technology. This technology area is also the responsibility of ETSU and is managed as part of the Cleaner Coal Technology Transfer Programme. Many of the current round of collaborative projects fall within these technology areas.

Again, these projects are recruited by competitive tender, with notices requesting expressions of interest posted on the DTI website (www.dti.gov.uk/cct/news.htm).

For more information on both programmes, you can contact the DTI directly, view the DTI website (www.dti.gov.uk/cct) or contact Dr Keith Burnard, Programme Manager at ETSU (01235 432120) or Mr Allan Wooll, Programme Manager at Mott MacDonald (01273 365000)

Heather Tilley
ETSU

21 August 2001

Characterisation of Coals to predict the Environmental Impact of Combustion Processes

Joint Meeting of the Environmental and Characterisation Divisions
held 27th June at Drakelow Business Centre (TXU)

On a swelteringly hot summers day about 40 participants assembled at TXU's Drakelow Business Centre to take in six talks covering various aspects of coal characterisation and its relevance to environmental coal combustion issues. The meeting was organised by the two division chairmen, P Cooper (TXU) and M Cloke (University of Nottingham), who, I think, deserve a big thank you for the time and effort invested. There was a good mix of participants from industry and academe, and this was reflected in the talks, which divided equally between industrial and academic presenters, much in the spirit of the CRF. The timing for the presentations was generous and each talk generated plenty of questions and comments from the audience. Another thank you should go to TXU for the provision of the conference room, coffee and a plentiful lunch buffet.

After a brief welcome from P Cooper the morning session, chaired by M Cloke, started off with a presentation by W Quick (Powergen) about the 'Pollution Inventory'. It was introduced in 1998 as a vehicle for supplying pollution data to the EA (Environment Agency), with the final aim of improving reporting and public access. Members of the JEP (Joint Environment Programme), which includes all companies running power plants in England, have adopted a common methodology, making reported results easier to compare between companies. Emission data for the power stations in the UK is consistent and is in line with data collected in the US. This newsletter is not long enough to include all the detailed information on monitoring the different species of air, water and land pollutants presented in the talk, but I would like to include one bit of statistical data that can be produced from pollution

monitoring: In 1970 208mt CO₂ were released by coal-fired power stations, and 80mt by transport. By 1998 the amount of CO₂ released from coal-fired power-stations had reduced to 149mt, whereas the amount originating from transport had increased by 50mt to 130mt.

The second talk was presented by T Beely (Innogy) and gave an overview of the different areas in power plants that rely on coal characterisation for smooth operation. Different properties of coals need to be known to evaluate handling and stockpiling, milling and combustion behaviour. Additional information evaluates the behaviour of the ash and likely emissions. Many of the traditional tests yield insufficient information to evaluate a coal completely and advanced characterisation often is too slow for rapid decision-making. There is still scope for improving prediction models, possibly by tailoring empirical models towards individual power stations. Coal identification is paramount, and it would be very helpful for optimising the system if it could be conducted on-line to determine exactly which coal enters any burner at any one time. She ventured to predict the 'hot' environmental issues for the future as advanced NO_x abatement, the more accurate measurement of trace elements and PM10s.

The following presentation was given by C. Harris (Powergen) and focussed on fly-ash removal from flue gas, which is undertaken almost exclusively by ESP (Electrostatic Precipitation) in this country. Even though removal efficiency for the ash usually exceeds 99.9% it has become an issue with the tightening of the emission limit from 140 to 50 mg/m³ in April this year. One of the problems is the carbon in ash, which typically makes up 6%. It does not share the electrical properties that makes the ash collectable by this method and tends to concentrate in the outgoing fraction from the precipitator. Collection efficiencies between 60 and 99.8% have been quoted. One way to solve the problem is re-designing the precipitator to create low velocity areas near the collection plate to reduce the chance of re-entrainment, but that requires expensive refurbishment. Also, commercial additives are available to enhance carbon collection. Or it might be possible to install char collectors as used in lignite burning power stations. Further research will be conducted trying to characterise coals in terms of the carbon in ash they produce to optimise conditions in the precipitator for specific coals. J. Jones (University of Leeds) gave the final talk in the morning session. She presented the

findings from a collaborative project on co-combustion of coal and biomass. The motivation was to improve public health in Poland by improving the domestic heating with coal, and the study was carried out on a 30kW domestic boiler. The burning of briquettes containing one third pine sawdust and two thirds a of medium volatile Polish coal was compared to burning the wood and the coal on their own. NO_x and SO_x were both found to be much lower for the briquettes than for coal on its own and lower even than they would have been if the components behaved in an additive manner. PAHs, alkyl-PAHs, phenols and VOCs all also showed this remarkable reduction. And the char was found to differ in that it contained more oxygen than pure coal char. On the basis of TGA and the analysis of the gas compositions from pyrolysis and combustion it was proposed that the high oxygen gas from the pyrolysis of the biomass interacted beneficially with some species given off during coal pyrolysis to eliminate some precursors for combustion-related pollutants.

The afternoon session chaired by P Cooper contained two further presentations. The first one was given by N Russell (University of Sheffield) and was concerned with predicting the slagging and fouling propensity of coal ash. The work described was carried out at Imperial College. Ash deposits were formed from a set of different coals by using an entrained flow reactor and were examined using SEM with EDS. It was found that the order of increasing slagging propensity was not predicted by any of the existing prediction models, i.e. the Fe₂O₃ content, the base/acid ratio or the Batelle Index. CaO and Fe₂O₃ limits between which slagging occurred could however be defined. For the two South African coals, which were found to have the lowest slagging propensity, an explanation was put forward as to why they might form a thin, little-sintered deposit. Their ash composition would place them in a different part of the phase diagram, and thereby cause them to solidify by a different method which is less conducive to sintering.

The final talk of the day by M Cloke asked the question if petrography has any practical use for power generators. In short, the answer was 'Yes'. Vitrinite reflectance, as a mean, is the standard indicator for coal rank. It usually has a normal distribution around the mean, so that a reflectance histogram with multiple peaks is a good indicator that blending has occurred, which also shows in the form of a high standard deviation (>0.1). Taking petrography one step further, a grey-scale histogram of all

the maceral groups can be employed to predict the % unreactives, which correlates well with burn-out. The methods employed at the University of Nottingham are currently being further refined to attempt to isolate individual coal particles and analyse them for maceral associations. Useful information can also be derived from examination of the char morphology, which can contribute to predicting burn-out. Petrographic analysis is particularly interesting for 'marginal' coals,

where small variations matter to a larger extent than in middle-of-the-range ones.

P Cooper brought the meeting to a close by thanking all the speakers and attendees. I certainly do not regret attending. It was a very interesting day on which a wide variety of topics were discussed, and, I think, nobody went home without having learned something new. So I would like to close this account of the meeting with another final thank you to the organisers and our hosts at TXU.

s.h.29/06/01

Government Announces Review of the Case for Support of Cleaner Coal Technology Demonstration Plant

On 25th June 2001, the Government announced that it would hold the long promised review into cleaner coal technologies and whether there is now a need to support their demonstration and deployment. This announcement coincided with the Prime Minister's statement that the Cabinet Office Performance and Innovation Unit would be conducting a full review of the Government's energy policy (see <http://www.cabinet-office.gov.uk/innovation/2001/energy/energyscope.shtml> for further details of this important review).

A cleaner coal consultation document has been published by the Department of Trade and Industry (<http://www.dti.gov.uk/cct/cctdemoconsult.pdf>) and you are invited to submit comments before 1st October 2001. Both reviews are scheduled to be completed before the end of the year; we await the conclusions with interest and hope that clean coal technology is given the boost it deserves.

The following extract from Hansard is the answer given by the Secretary of State for Energy, Mr Brian Wilson in response to a written Parliamentary Question tabled by Mr Pickthall MP, Labour member for West Lancashire.

Question: To ask the Secretary of State for Trade and Industry if she intends to assess the case for supporting a demonstration plant (or plants) for cleaner coal power generation technology and if such a review is to be undertaken when does she expect to report on its findings?

Answer: I can announce that a new review will commence this month and is expected to report its findings at the end of the year.

Its Terms of Reference are:

To assess the value of a cleaner coal demonstration plant from four key perspectives:

1. It will specifically take account of the relative benefits and costs, in comparison to other sustainable energy technologies, arising from the use of cleaner coal plant for power generation in the UK to:

* Support the Government's climate changes policy objectives through the reduction of CO₂ emissions in the longer term and assessing the potential for CO₂ capture and sequestration.

* The contribution it would make to the overall energy policy objectives of the Government "to ensure secure, diverse and sustainable supplies of energy at competitive prices".

2. It will complement other ongoing work looking at energy choices in the context of the need to make substantial reductions in greenhouse gas emissions over the longer term. Within the context of using coal for power generation, such choices should not only cover cleaner coal plant but also alternative means for extracting the energy from coal, e.g. underground coal gasification.

3. It will consider the four main technical options currently available, each of these will be assessed in the review to determine which is the most appropriate both in terms of value for money and environmental impact. These are:

* Retrofitting cleaner coal technology components to existing combustion plants.

* Retrofitting coal gasification plant to older combined cycle stations.

* New build of supercritical or coal gasification on a brown field site.

* Cleaner coal plant with CO₂ capture and storage.

4. It will determine the feasibility of a demonstration project/programme in terms of:

* Value for money in terms of promoting the wider use of cleaner coal generation plant including benefits to the UK economy and the potential for export sales.

* The various types of plant amenable to clean coal technology.

* The cost per tonne of carbon saved, compared to other sustainable technologies.

* The emerging evidence on the viability, security, environmental impact and acceptability of capture and storage technologies.

* The impact which overseas support schemes have actually had for cleaner coal plant, particularly in the United States, EC and Japan.

* State aid issues.

* The appropriate use of economic instruments to recognise the environmental case for cleaner coal plant, alongside other technologies.

The nature of the competition or procurement route to support the building of a demonstration projects(s) should agreement be secured to develop it.

Brian E Ricketts, 30 August 2001

The Energy Review and the Press

I am glad that B. Ricketts has found some proof that the government is aware of the existence of coal and has put it to paper in the previous article. Looking at the national press at the time the Energy Review was announced, I had serious grounds for doubt. It seemed merely a question of the probability of a 'nuclear revival' and, to a lesser extent, if renewables will or will not be able to deliver. I've kept a few cuttings to illustrate the point.

"A revival of nuclear energy in Britain came a step closer yesterday with the revelation that Tony Blair has set up the first government-wide review in 20 years of Britain's energy needs. The research is to be conducted by the Performance and Innovation Unit, the thinktank directly answerable to the prime minister. A number of senior government ministers privately believe that a revival of nuclear power is inevitable if Britain is to maintain security of energy supply. Ministers believe renewable energy, such as wind power, cannot fill the void. Nuclear power is gradually being phased out, but Labour has shelved a manifesto commitment not to build nuclear power stations."

Patrick Wintour, chief political correspondent, Guardian, Tuesday June 19, 2001

"TONY BLAIR has commissioned a review of where Britain's electricity is to come from over the next 50 years which industry sources believe will inevitably lead to a revival of

nuclear power. Mr Blair said the review had been set up to enable the Government to respond to the recommendations of the Royal Commission on Environmental Pollution last year which said 50 new nuclear power stations would be needed to give Britain the energy it uses today without adding to global warming. The commission said Britain would also need 200 offshore windfarms, 7,500 wave power devices and a tidal barrage across the River Severn."

By Charles Clover, Daily Telegraph, (Filed: 26/06/2001)

"On Monday Tony Blair appointed Brian Wilson, the energy minister, to chair a Cabinet Office review of energy needs and policy for the next 50 years to be carried out by Whitehall's performance and innovation unit. There is a very large nuclear lobby in the UK not least including the chairman of the review, Brian Wilson."

Paul Brown, David Gow and Jane Martinson in New York, Guardian, Thursday June 28, 2001

"British Nuclear Fuels is to put forward plans to the government to build at least four, preferably six, new nuclear stations on the same sites as its existing ageing Magnox power plants that are closing after 40 years of service."

Paul Brown, environment correspondent, Guardian, Friday June 29, 2001

CALENDAR

Date	Title	Location	Contact
24 th -25 th September 2001	EU-Australia Coal Conference "Coal Opportunities in the 21 st Century"	Quellenhof Hotel Aachen Germany	Dr. R. G. Jung DMT Montan Consulting GmbH Am Technologiepark 1 D - 45307 ESSEN e-mail: r.jung@dm.de or Energetic Consulting M. Ruchser "EU-Australien Kohle-Konferenz" Matthias-Grünewald-Str. 1 - 3 D - 53175 Bonn e-mail: info@en-consulting.com Internet: www.en-consulting.com
30 th September to 5 th October 2001	11 th International Conference on Coal Science "Exploring the Horizons of Coal"	Palace Hotel San Francisco CA	Hosted by The National Energy Technology Laboratory (NETL) http://www.netl.doe.gov
Monday 15th October 2001	The 50th BCURA Robens Coal Science Lecture/ The 1st CEA David Gunn Memorial Lecture	The Painters' Hall, 9 Little Trinity Lane, London, EC4V 2AD	Attendance strictly by ticket only which for the lecture can be obtained free of charge from: CEA, 1A Clarke Street, Ely Bridge, Cardiff, CF5 5AL For an application form for tickets please see section 14, "An Invitation to the Coal Science Lecture" of www.bcura.org
21 st November 2001	" A Selection of UK Papers from the International Coal Science Conference, 2001, San Francisco, USA "	Tapton Hall, The University of Sheffield	David McCaffrey The Coal Research Forum P.O. Box 154 Cheltenham GL52 5YL Tel: 01242 236973 Fax: 01242 516672 e-mail: david.mccaffrey@easynet.co.uk
4th-7th December 2001	18th Annual International Pittsburgh Coal Conference "Coal's International Future: The Technical Challenge"	Newcastle, New South Wales, Australia	http://www.engrng.pitt.edu/~pccwww/
16-18 th September 2002	4 th UK Meeting on Coal Research and its Applications	Imperial College, London	Dr A W Thompson SChEME University of Nottingham Nottingham NG7 2RD Tel: 0115 9514198 Fax: 01159514115 e-mail: alan.thompson@nottingham.ac.uk