96/05685 Quantitative electron spectroscopic analysis of the surface chemistry of bituminous coal
Weitzsacker, C. L. and Gardella, J. A. *Energy Fuels,* 1996, 10, (1), 141-148.
ESCA has been used to analyze coals from four seams: Illinois No. 6, Kentucky No. 9, Upper Freeport, and Pittsburgh. The coal was analyzed in raw, milled, and agglomerated forms. The coal was simultaneously analyzed for the effects of different storage conditions over a 17 month period. Over the 17 month period no significant oxidation of these coals was detected by ESCA.

96/05686 Quantitative X-ray diffraction determination of mineral phases in coal and its application to the study of mineral transformation in utilisation processes
Dale, L. S. *et al., Coal Sci. Technol.,* 1995, 1, 127-130.
Describes the quantitative X-ray diffraction, with data analysis by the Siroquant software package, which was applied to the analysis of mineral phases and organic matter content in coal, coal ash, and coal slages, without the need for ashing. The mineral content was within 10% of the value determined by chemical analysis.

96/05687 R113 boiling heat transfer modeling on porous metallic matrix surfaces
Danilova, G. N. and Tikhonov, A. V. *Int. J. Heat & Fluid Flow,* Feb. 1996, 17, (1), 45-51.
An experimental method for simulating fibermetal and screen surfaces by winding several layers of thin wire on the tube is proposed, temperature field measurements across the height of a layer appearing possible. Tests were carried out for R113 boiling at atmospheric pressure and for heat fluxes from 7 kW/m^2 to 100 kW/m^2. Test results, including heat transfer coefficients and temperature fields, are presented. These are interpreted qualitatively.

96/05688 Residential gas detectors using the optical process
Pichery, M. T. *GAZ d'aujourd'hui,* Jun. 1996, 120, (6), 271-279. (In French)
At present, only gas detectors with semi-conductor sensors are available on the market for residential gas detection. However, recent studies of residential gas detectors have shown that none of them meet the requirements stated in the draft European standard prEN 50194 (2). Their sensitivity to poisoning and drifts has been the major causes of this. In the early 1990s the Research and Development Division of Gaz de France began studies to develop gas detectors which meet these standards. As a result, two other technological developments likely to meet the demands of the residential gas detection market are planned. The first involves using catalysts. This process is more often used in the industrial sector but could meet the demands of the residential sector too because of low costs thanks to thin coating technology developed by INERIS and LETI.

96/05689 Search for a safe sense medium for coal float and sink testing
Quinn, G. W. *et al., Queensland Coal Australia,* Mar. 1996, 2, (4), 10-15.
The authors discuss how it has long been recognised that the organic solvents commonly used for float and sink testing of coal have detrimental effects on some coal property analyses. There are also well known occupational health and safety risks associated with these liquids. However, it is less well known that these solvents can also have a considerable effect on float and sink tests, particularly for porous coals.

96/05690 Solubility limitations in the determination of molecular mass distributions of coal liquefaction and hydrocracking products: 1-methyl-2-pyrrolidinone as mobile phase in size exclusion chromatography
Herod, A. A. *et al., Energy Fuels,* 1996, 10, (3), 743-750.
The use of THF As mobile phase in size exclusion chromatography (SEC) has been found to lead to partial loss of sample and to give anomalous results in the characterization of a liquefaction extraction and its hydrocracking products. The problem has been resolved by using NMP as mobile phase in SEC, showing significant fractions of sample eluting at the exclusion limit of an identical SEC column. This fraction has not previously been observed in SEC chromatograms obtained in THF.

96/05691 Some aspects of atomic absorption spectrometry application for the refinery plant needs
Kowalewska, Z. *Pet. Coal,* 1995, 37, (2), 68-93.
Describes an investigation of the applications of atomic absorption spectrometry of crude oil and distillation products.

96/05692 Spectral analysis of boundary-layer transition on a heated flat plate
Wang, T. and Zhou, D. *Int. J. Heat & Fluid Flow,* Feb. 1996, 17, (1), 12-21.
A spectral analysis was made for a boundary layer undergoing laminar-turbulent transition over a heated flat plate with free-stream turbulence intensities of 0.5% and 6.4%. Detailed boundary-layer measurements were made with a three-wire probe that simultaneously measured two velocity components and the temperature.

96/05693 Structural analysis of mesophase pitch with high-resolution, high-temperature ^{13}C-NMR
Murakami, K. *et al., Carbon,* 1996, 34, (2), 187-192.
The structural parameters of mesophase pitch with optical anisotropy have been successfully obtained by using high-temperature ^{13}C-NMR spectroscopy. Well-resolved spectra were obtained from the mesophase pitch with the addition of pyrene, which played the role of solvent for a quinoline-insoluble rich mesophase pitch during NMR measurement at 573 K. The resolution of NMR spectra was improved due to the decline in viscosity, without any influence on the chemical shift for aliphatic carbons.

96/05694 Study of the thermal performance of a multi-layer PCM storage unit
Brousseau, P. and Lacroix, M. *Energy Convers. Mgmt.,* May 1996, 37, (5), 599-609.
A model for prediction of the thermal performance of a multi-layer PCM (phase change material) storage unit is presented.

96/05695 Surface tension of coal extract in organic solvents
Hayasaka, K. *et al., Energy Fuels,* 1996, 10, (1), 262-263.
Describes how the surface tension of solutions of coal extracts [i.e. acetone soluble (AS), and pyridine soluble-acetone insoluble (PS)] in N-methyl-2-pyrrolidinone or pyridine was measured at 25° by the Wilhelmy plate method.

96/05696 TVA's hunt for better turbine monitoring and reduced outage
Khalid, T. and Mattila, R. *MPS, Modern Power Systems,* May 1996, 16, (5), 59, 61, 63.
Laser based turbine diagnostics and analysis equipment developed by Imatran Voima in Finland has been used by the Tennessee Valley Authority to monitor dynamic behaviour movements in power station generating trains. The system enables misalignments to be diagnosed and corrected speedily, preventing accelerated wear and potential component failure.

96/05697 Unique experiences with process analyzer applications in a synthetic crude oil facility
Verhappen, I. *Adv. Instrum. Control,* 1995, 50, (2), 269-279.
Discusses several of the unique aspects of applying online process analyzers at a synthetic crude oil facility located in Northern Alberta are discussed. Topics include techniques used to overcome problems due to the highly viscous nature of the product streams as well as means of preserving the sample integrity in the severe winter operating environment where the facility is located.

96/05698 What's new in metering
Gas Engng. Mgmnt., Jan.-Feb. 1996, 36, (1), 10-14.
Reports that Ofgas are looking to open up the meter installation market in Britain and further progress on the European Commission's Measuring Instruments Directive which will encompass gas meters.

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Supplies, Policy, Economics, Forecasts

96/05699 Conservation tillage and the use of energy and other inputs in US agriculture
Uri, N. D. and Konyar, K. *Applied Energy,* Jun. 1996, 54, (2), 75-102.
An important issue with regard to the overall effectiveness of conservation-tillage practices in reducing the impact of agricultural production on the environment concerns what happens to energy, pesticide and fertilizer use as these practices are more extensively adopted. To gain some insight into this, the conservation-tillage adoption decision is modelled.

96/05700 Energy – The key to an ecologically sustainable development
Fritsch, B. *Energy & Environment,* 1996, 7, (2), 107-121.
In this paper, facts are presented which show that limits are not so much in the area of physical factors, e.g. energy and resources, but rather in our ability to learn and to absorb the speed of technological change, both in psychological and in political terms. Thus, the problems were are confronted with are neither of a purely physical nor of a purely economical nature. From a wider perspective, it becomes obvious that man is involved in three interrelated conflicts. He is: in conflict with nature (environment); in conflict with his fellow men (war); and in conflict with himself (identity between the inner and outer world).