

fuel and energy abstracts

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97/03289 Measures used to tackle environmental problems related to global warming and climate change resulting from the use of coal

Hoppe, J. A. *Proc. Annu. Int. Pittsburgh Coal Conf.*, 1996, 13, (2), 1316–1321.

Measures used to control environmental problems related to global warming and climate change resulting from coal combustion, particularly in China are outlined in this review.

97/03290 Mitigation of global warming under sustainability constraints

Ishitani, H. *et al.* *Energy Int. J.*, February/March 1997, 22, (2/3), 223–227. The issues of restrictions on resources and environmental impact are considered for sustainable energy technologies. In order to estimate life-cycle efficiencies and greenhouse gas emissions a database was developed and sustainability limitations on resource depletion and emissions are defined. In conclusion, the paper declares the present world energy system to be unsustainable. The effect of sustainability on cost-effectiveness is also discussed.

97/03291 Monitoring system for the operation of the main ventilation system

Vorontsov, A. G. *et al.* *Ugol' Ukr.*, 1996, (4), 27–28. (In Russian)

Describes personal computer-based monitoring of coal mine ventilation.

97/03292 Moving-bed materials for removal of dust from waste gases

Imada, K. *et al.* *Jpn. Kokai Tokkyo Koho JP 08,299,735 [96,299,735]* (Cl. B01D46/38), 19 Nov 1996, Appl. 951134,668, 9 May 1995, 4 pp. (In Japanese)

Porous granular materials with granule diameter 1–10 mm and porosity 20–60% are the moving-bed materials used. The porous granular materials are cokes and/or granulated slag and these are used for removal of dust from waste gases of sintering furnaces, blast furnaces and coke ovens of steel and non-ferrous metal industries.

97/03293 N₂O emissions from fluid burning equipment

Juchelkova, D. *et al.* *Proc. Annu. Int. Pittsburgh Coal Conf.*, 1996, 13, (2), 1144–1149.

Despite the fact that studies of nitrogen oxides, their emissions and impact on environment have been conducted for a long time, only NO and NO₂ were considered. Common evaluation of nitrogen oxides as NO_x mostly covers only higher nitrogen oxides. For a long time, N₂O has not been considered to be an important pollutant, due to its low reactivity. N₂O has recently become the subject of intense research and discussion, because of its increasing concentration in the atmosphere. Although this concentration is more than 1000 times inferior to the concentration of CO₂, the nitrous oxide may contribute significantly to the greenhouse effect, the relative strength of IR absorption being at least 200 times more than CO₂.

97/03294 Non-catalytic oxidation of waste-slurried coal with oxygen: identification of fulvic acids and acute toxicity

Bergh, J. J. *et al.* *Fuel*, 1997, 76, (2), 149–154.

The aqueous oxidation fraction (filtrates) of coal were investigated for their composition and toxicity in order to gain information about process safety measures and potential use of the oxidation products as antibacterial agents. Coal was oxidized with oxygen at 180°C at 4 MPa constant pressure. Fractions of the crude filtrate were sublimed, distilled, and extracted with di-Et ether and EtOH. Almost 50 different acids were identified. Primary acute toxicity studies were carried out on rats, using the crude aqueous solution and the drum-dried product. Apart from local irritation caused by their acidic nature, neither of these fractions exhibited significant acute toxicity in the animals.

97/03295 Occupational noise in coal mining—a continuing problem

Bartholomae, R. C. *Proc. Annu. Int. Pittsburgh Coal Conf.*, 1996, 13, (2), 959–964.

The history of mining noise and its control since passage of the Coal Mine Health and Safety Act of 1969 is presented. Topics discussed include: mining occupational noise problems in USA; effectiveness of current technology; future mining noise regulations; and current status of occupational noise in mining.

97/03296 Optimization of NO_x reduction with low-NO_x burners and over-fire air on a coal-fired utility boiler

Li, B. W. *et al.* *Transp. Phenom. Combust., Proc. Int. Symp.*, 8th, 1995, (Pub. 1996), 2, 1189–1199. Edited by Chan, S. H., Taylor & Francis, Washington, DC.

Increasingly stringent controls for acid rain precursors from stationary sources are being implemented in response to world-wide concern over acid deposition. Coal-fired utility boilers are often targeted as they are significant sources of these pollutants. Computer modelling tools were used to evaluate the impacts of burner tuning and combustion modification on NO_x emissions from a large coal-fired utility boiler. The subject of this study was a 650 MW, utility boiler which was retrofit with low-NO_x burners to comply with local limits on NO_x emissions. To evaluate the factors which could potentially be impacting the performance of the low-NO_x burners and

to assess the feasibility of boiler modifications to reduce NO_x emissions to the desired level, computational models were used to simulate the boiler and burner processes. A furnace combustion and heat transfer model and a one-dimensional chemical kinetics model were used. Results indicated the thermal conditions in the boiler were not impacting the effectiveness of the low-NO_x burners and that modifications to the burners or boiler to improve flame staging would significantly reduce NO_x emissions.

97/03297 Optimization of SO₂ and NO_x emissions in a hydrothermal system

Suarez, P. M^o. and Bayon, L. F. *Inf. Tecnol.*, 1996, 7, (6), 49–54. (In Spanish)

In an attempt to minimize pollutant emissions in a hydrothermal system, a functional analytic optimization technique was developed. The proposed algorithm helped solve the problem of reduction of atmospheric emissions, such as SO₂ and NO_x caused by operating a fossil-fuelled thermal generator. The development of the technique is discussed.

97/03298 Optimization of the electrofilter installation in a 370-MW hard coal power station block

Onland, H. and Apelt, O. *VGB Kraftwerkstsch.*, 1996, 76, (12), 1009–1016. (In German)

The use of a control device for the optimization of an electrofilter unit for flue gas treatment in a 370-MW hard coal power station is reported. Better separation behaviour and lower energy consumption was achieved by the new electrostatic filter control equipment (EFS). The EFS controls the dust resistance values, the feed water input, the electrical efficiency of the dedusting, and the dust density before and after the flue gas desulfurization (FGS) plant.

97/03299 Peat as a natural ion exchanger for water purification system in Urals

Barushnikova, T.N. *Izv. Vyssh. Uchebn. Zaved., Gorn. Zh.*, 1996, (5–6), 139–153. (In Russian)

97/03300 Performance, energy and global warming issues of R-410A, a HFC replacement for HCFC-2

Spatz, M. W. *AIRAH J.*, November 1996, 50, (11), 30–35.

A promising replacement for R22 is provided by the azeotropic mixture R410A (50% R125/50% R32). System tests carried out by leading air conditioning and heat pump manufacturers show improvements of 2% to more than 7% in energy efficiency relative to R22. The bin method is applied to representative performance from these tests to analyse energy consumption and total equivalent warming index (TEWI) for a typical split-system residential heat pump operating in the heating mode. R22 and R410A are compared. With higher coefficient of performance and higher capacity for the 410A a significant seasonal energy saving of 8% and a 9% decrease in TEWI can be achieved.

97/03301 Pilot field study of petroleum contaminated waste stabilization

Tuncan, M. *et al.* *Environ. Geotechnol., Proc. Int. Symp.*, 3rd, 1996, 1, 393–404. Edited by Fang, H.-Y. Inyang, H. I., Technomic, Lancaster, Pa.

Varying amounts of petroleum hydrocarbons, organic and inorganic chemicals and metals are found in petroleum drilling wastes, which affect the physical and chemical processes in soil and water after the release is completed. Petroleum drilling wastes, disposed of in open pits known as mud-pits, were stabilized in the laboratory to find economical proportions of drilling waste, fly ash, lime, and cement. After completion of these studies, a field study was conducted. Petroleum drilling wastes were stabilized with a pozzolanic lime, fly ash, and cement, producing chemical and physical stable and mech. handleable new products. These products were then used as sub-base material in a pilot field study. Parameters involved in such a determination included strength, permeability, durability, leachate, pH, and oil and total metal content of stabilized mixtures. In addition, the microstructure and fabric features of the stabilized specimens were observed.

97/03302 Pilot plant development of a new catalytic process for improved electrostatic separation of fly-ash in coal fired power plants

del Valle, J. *et al.* *Pr. Nauk. Inst. Chem. Technol. Nafty Wegla Politech. Wroclaw.*, 1996, 55, (Catalysis and Adsorption in Fuel Processing and Environmental Protection), 43–55.

To aid flue gas conditioning in coal fired power plants, a new catalytic process has been developed. Vanadium and platinum catalysts on ceramic honeycomb monoliths for oxidation of SO₂ to SO₃ have been tested and evaluated at pilot scale.

97/03303 Poisoning by coal smoke containing arsenic and fluoride

An, D. *et al.* *Fluoride*, 1997, 30, (1), 29–32.

A disease was subject to investigation in the village of Bazhi, Zhijin County, Guizhou Province, People's Republic of China. The symptoms include skin pigmentation, keratosis of the hands and feet, dental discoloration, and generalized bone and joint pain, stiffness, and rigidity. The arsenic and fluoride levels of coal, water, air, food, urine, and hair were measured in Bazhi and a control village, Xinzhai, in which coal with a low arsenic