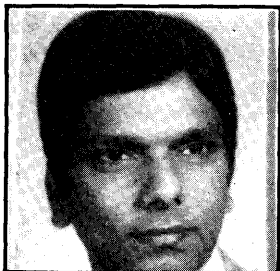
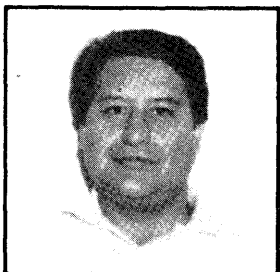


LISBOA 90



A. GAMA XAVIER

Born in 1942, Dr. Gama Xavier was educated at the University of Coimbra and Cologne, and then Munich where he obtained his Doctorate in Geology. From 1962 to 1976, he was with the Institute of Geology at Munich. He then transferred to PETROBAS in Rio de Janeiro, Brazil where he was Head of Department of Marine Minerals Research. He is at present Assistant Professor at the Technical University of Lisbon and specializes in heavy metals in the environment. He is the author of several international papers.



ALFREDO FRANCO

Born in 1952 in Angola. Graduate in 1976 at the Faculty of Mining, Instituto Superior Técnico of Lisbon University. Involved in the specification, supervision and evaluation of laboratory and pilot plant grinding and flotation testwork for development of the Aljustrel Complex Ore Project at Minemet Reserche in France, Adaro in Spain, and Sala and Boliden in Sweden. Designed and supervised construction and start-up of the Aljustrel Pilot Plant. After 1982 has been the Metallurgical Engineer responsible for the testwork and Somincor's copper plant design and start-up. Currently is the Metallurgical Manager of Somincor's copper and tin plants responsible for the supervision of operating process, maintenance and laboratory departments.

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ANDREW A. SOBEK

Andrew A. Sobek earned his BS and MS degrees in Soil Science from West Virginia University. He joined the BFGoodrich company in 1985 as the technical manager of ProMac Systems for mine acid control. He is responsible for all technical aspects of the business, including marketing support and new product development. He has authored over 60 reports and professional papers in pedogenesis of drastically disturbed soils, analytical methods development for characterizing coal overburden materials, and acid mine drainage prediction and control technologies.

BARBARA METCALFE

Born in Leeds, West Yorkshire, England in 1948. Was educated at the Lawnswood High School, Leeds, and the University of Nottingham. In 1971, Miss Barbara Metcalfe, obtained a BSc Honours degree in Botany. She worked as a Water Pollution Control Chemist and, as an Assistant Chemist/Botanist. From 1976, to 1983, she worked as Botanist, responsible for evaluation of organic manures derived from sewage sludges by growth trials, metal uptake into plant tissues, etc. Miss Barbara Metcalfe has worked in the field of water pollution control with several bodies. She is currently working as a Biologist with Yorkshire Water Services Ltd., where she is involved in studies of the use of sewage sludges in reclamation of coal mining wastes. Miss Metcalfe is the author of several papers.

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CARLOS FRÍAS

Obtained Chemical Engineering degree in 1981 from Seville University. Initial training sponsored by the National Institute of Industry (INI) was completed at the ENSIDESA Metallografical Department. In 1984 joined Rio Tinto Minera as metallurgist in the Gold & Silver Plant. After a year was appointed head of the Hydrometallurgy Laboratories, which in 1987 took responsibility of all mineral investigation. Currently all efforts are centred around the extraction metallurgy of gold and silver and complex sulphides, and additionally the recovery of metals from acid mine water. Complementary to the current field of work, in 1988 obtained a Diploma in Environmental Engineering from the Industrial Engineering School in Seville.

CARLOS ROMARIZ

Professor Carlos Romariz was born in Lisbon, Portugal, in 1920. He obtained a doctorate in Geology from the University of Lisbon. He is presently a Lecturer in Applied Geology and Environmental Science.

LISBOA 90



COLIN I. JONES

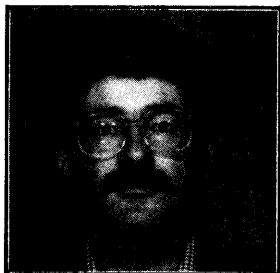
Born and educated in South Wales, U.K.. He obtained a First Class Honours Degree in Mining Engineering in 1971 from the University of Wales. Currently he is the Production Manager at the Neves-Corvo Copper and Tin Mine, Portugal. From 1982 to 1986, Mr. Jones was employed with RTZ in the Cornish Tin Industry, first as Underground Manager at Wheal Jane Mine and then as General Manager at South Crofty Mine. Prior to employment with the RTZ Group he worked in the Mine Contracting and Coal Industries in the U.K.



D.K.SINHA

A graduate in Mining Engineering from BHU, holder of the First Class Colliery Managers Certificate, Post-graduate in Industrial Engineering and Operation Research from IIT, Kharagpur and Doctorate of Technical Science and Systems from Moscow Mining Institute, Dr. Sinha holds the Chair of Professor and Head of the Department of Industrial Engineering and Management at Indian School of Mines, Dhanbad. He is presently Director of the Indian School of Mines, Dhanbad. His earlier positions were as faculty member of the IIT., Kharagpur, prior to which he served the mining industry in India in managerial positions in the Indian Copper Corporation and Turner Morrison and Co. Ltd. Dr. Sinha was the recipient of the National Mineral Award, Govt. of India in 1975 for his pioneering contribution in O.R. and computer application in the Indian Mining Industry. He received the MGMTI medal for his paper in 1981 and awarded the Distinguished Alumni Award of BHU. He is also the recipient of the I.E.(I)'s Rajendra Prasad Gold medal in 1988. Dr. Sinha has been actively engaged in industrial consultancy and management development programmes. He is currently the Chairman of the Society of Social and Business Management, Dhanbad, and President of the Coal-field Management Association, Dhanbad, and Chairman of Dhanbad Local Centre of Institution of Engineers (I) and the Computer Society of India, Dhanbad Chapter. He is the author of over 120 publications in mining and management.

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DAVID G. RICHARDS

Born near London, England, in 1953. BSc.(Mining Geology) from Imperial College, University of London, 1975. Employed in underground tin mine, Cornwall, 1975 to 1977; underground mine development project from gold and silver, Saudi Arabia, 1977 to 1979; underground tin mine, Cornwall, 1979 to 1986. From 1986 to present: Chief Geologist, Somincor, during development, commissioning, and operation at Neves Corvo underground tin-copper mine, Portugal. Special interests: mine geology and sampling, ore reserve estimation methods, mining hydrogeology, environmental impact of mining.



DONALD A. BENEDETTI

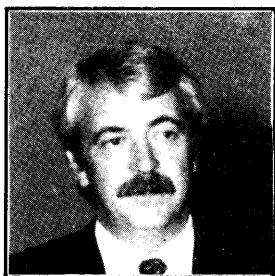
Donald A. Benedetti, BA, MS, is a graduate of Lafayette College, Pennsylvania and California - University of Pennsylvania. Employed by the BFGoodrich Company since 1987, he is an environmental engineer of ProMac Systems for acid mine control. He is responsible for site evaluations, supervision of field construction projects and site monitoring. He conducts applications research for all ProMac products and studies to modify existing products and assist in new product development. He coordinates monitoring programs for customer sites with management and consultants.

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ERNEST JA. KIPKO

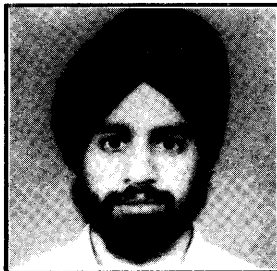
Director General of STG Association based in Antrasit, Voroshilovgrad Region, USSR. A 1955 Geological Prospecting graduate of Sverdlovsk Mining University. He received his C. Sc. degree in 1967 and his D. Sc. degree in 1974 in the Field of Mining Construction. Professor Kipko has authored more than one hundred and twenty papers and several books covering various aspects of grouting technique. His present professional activities are in the management, organization and scientific guidance in design, research and execution of grouting projects.



FERNANDO REAL

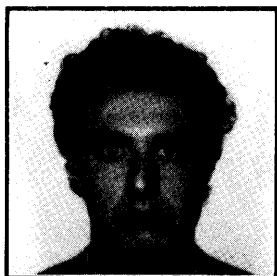
General Manager at Neves-Corvo Mine, Portugal. Mining Engineer from Instituto Superior Técnico, Lisbon Technical University. Assistant Professor of mining from 1973 to 1975 at Luanda University, Angola, and from 1979 to 1983 at Lisbon Technical University. Worked in the mining industry since 1971, in Mozambique, Angola and Portugal in underground operations for fluorspar, tungsten, copper. At present, is the General Manager of Neves-Corvo Mine, having been involved since 1981.

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GURDEEP SINGH

Obtained his PhD (in Applied Chemistry) from Indian School of Mines on his dissertation entitled " Nature Occurrences & Effects on Acid Mine Drainage from some Coal Mines of North Eastern Coal Mines of India " in 1983 and received his Bsc. (Hons) & Msc. in Chemistry from University of Delhi. After spending about three years as research student, he was promoted to Lecturer since June 1983 in the Dept. of Chemistry, Fuel & Mineral Eng. at the Indian School of Mines, Dhanbad. He happened to be the founder-member of the newly-established centre for Mining Environment at the same Institute which is sponsored by the Ministry of Environment and Forests. Currently he is an Assistant Professor and has been in charge of the various academic and research activities of the centre since Nov. 1985. He has published 40 papers and his research interests are in the field of air & water pollution in mining areas & their control, land reclamation and on mine water corrosion.



HENRIQUE ALVAREZ GAMA

Graduated in Chemical Engineering in 1979 from Lisbon Higher Institute for Engineering. Responsible for Pollution Control laboratory of Quimigal chemical company at Barreiro from 1984 to 1987. Responsible since 1987 for the Environment Department at Somincor's Neves-Corvo Mine.

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JACEK LIBICKI

Born in 1934 at Krakow, Poland. M.Sc. in Geology at the University of Wroclaw in 1957. Doctors degree in Hydrogeology at the University of Mining and Metallurgy at Kracow in 1977. Professional career: 1958-Field Geologist in mineral resources prospection. Presently Chief Geologist at Poltegor. Author of dewatering plants, detail designs and consultant for over fifty large opencast mine operation in difficult hydrogeological conditions in Poland and twenty five countries. Principal Investigator of two extended research projects on influence of coal refuse disposals in openpits on groundwater quality, published in Poland and USA. Chief Coordinator of next eight projects dealing with environmental aspects of opencast mining. Chief of Group of Departments of Geology, Geomechanics, Dewatering and Environmental Protection in Poltegor. Member of Executive Council of IMWA and author of many papers in international journals.



JOHANNES MAREE

Born in South Africa in 1953. Bsc Honours in Chemistry from the University of the Orange Free State in 1974, MSc in 1975; B.Com from University of South Africa 1980; PhD in Chemistry from U.O.F.S. in 1988. Since 1976 has worked at the Division of Water Technology, C.S.I.R., Pretoria, South Africa, where he is currently Specialist Researcher. Topics of specialisation are biological and chemical treatment of industrial effluents.

LISBOA 90



JOHN PALMER

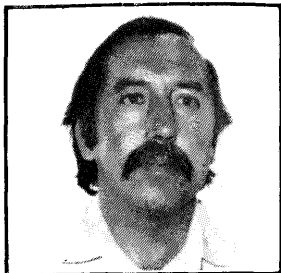
John Palmer is Director of Environmental Sciences with Richards, Moorehead and Laing Limited, consulting engineers, environmental scientists and landscape architects. An applied ecologist by training, he has degrees from the University of London, Wales and York. Much of his career has been spent researching, lecturing or consulting in land reclamation after mining. At Richards, Moorehead and Laing, he has been responsible for feasibility studies and design of many schemes for the reclamation of metalliferous mine sites. He is a founder member of REGRO, the British Land Reclamation Group, which is a society for those involved in land reclamation.



JOSÉ JOAQUIM FERNANDES NUNES

Obtained his degree in Geology from Luanda University, Angola, in 1973, with further degrees in Engineering Geology from Lisbon New University (1978), and Hydrogeology from Barcelona Polytechnic University (1980). Professional activity has been in the areas of hydrogeology and engineering geology in Portugal and Angola, and he is currently Director of the Water Resources and Agronomy Department of Hidroprojecto Consultants.

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JOSÉ MANUEL CARDOSO DUARTE

Born in Condeixa-a-Nova, Portugal in 1948; graduated in Chemical Engineering from the University of Lisbon-IST in 1972. Obtained degrees of PhD from London University (1982) and IST (1958). Visiting Professor of Industrial Biotechnology at Lisbon Pharmacy Faculty from 1982-87. Professional activity: Director of Research and Development-Biotechnology, for QUATRUM, State organic company from 1981 to 1984; since 1984 Researcher at LNETI, responsible for the department of Chemical Industry Technology and the Biotechnology Unit. Research interests include process control of fermentation, Bio-leaching of complex sulphides, and fungal technology for the paper industry. Has represented the Portuguese government in several international committees on Biotechnology. Member of several national engineering and scientific committees and societies.



M.K. BOTZ

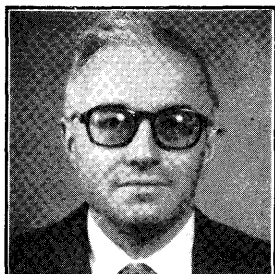
Hydrogeologist with over 20 years of experience in hydrogeological and mining resource developments in the western United States. Mr. Botz received a Geological Engineering degree from the University of Nevada - Reno; an M.S. degree in Engineering from the University of California - Berkeley in 1962, and completed the Doctorate course in Hydrology at the University of Arizona in 1968. He has worked for engineering consulting firms in California and Colorado and worked as a research hydrogeologist for the Montana Bureau of Mines and Geology and the Montana Water Quality Bureau. For the past 14 years, he has been consulting on hydrogeology, mining, and water resources development projects. Mr. Botz has worked on many mining projects in the western United States. He is a registered professional engineer and is president of Hydrometrics, Inc. in Helena, Montana.

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MARIA FRANCISCA SILVA

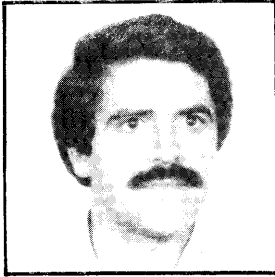
Graduated in Chemical Engineering from the University of Lisbon, Instituto Superior Técnico in 1970. Professional experience has been as a consulting engineer in the areas of Sanitary and Environmental Engineering. Currently Assistant Director of the Environmental Department of Hidroprojecto Consultants. Specialising in the design of water and waste water treatment plants for urban and industrial areas, and Environmental Impact Studies.



ONOFRIO SAMMARCO

Born in 1936. Dr. in Electrical Engineering at the University of Naples. Dr. in Mining Engineering and Ph.D. at the University of Rome. Head of the National Department of Mines (Grosseto District). Member of the Research Group of the Institute of Mining - Ppt. of Ch. Mat. Min. and Met. Eng. - University of Rome, since 1968. Member of the Experts Committee in Stabilization of Ventilation, and the Noxious Gases Mines Safety and Health European Commission, Luxembourg. Executive Council Member of IMWA. He is author of several papers concerning Mine Ventilation, Mine Gases, Mines under Water Hazard, Inundations Prevention, Hot Mines, Geothermal Energy.

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PEDRO CARVALHO

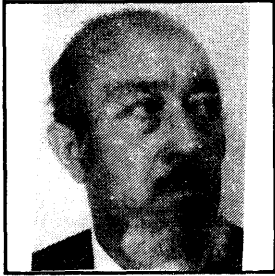
Graduated in Geology from Oporto University, Portugal in 1979. Worked for 11 years as Mine and Exploration Geologist in Neves-Corvo Mine. He is currently Head of Exploration for Somincor. Responsible for the hydrogeological study, with special interest in mine drainage production and water control. He has published 5 technical papers on Neves Corvo Geology and Hydrogeology. Presently, he is an Executive Counciller of the International Mine Water Association, and General Secretary of the Symposium Lisboa 90.



PETER J. NORTON

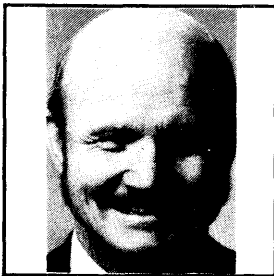
Principal of Peter J. Norton Associates, an independant consultancy to the mining and quarrying industry based in Richmond, N. Yorkshire United Kingdom. The company specializes in open pit mine design, slope stability, geotechnics and other environmental matters. Dr. Norton obtained his first degree in Geology at Newcastle University in 1966 and joined the National Coal Board with whom he had various posts, culminating in the position of Research and Development Manager. He obtained his PhD in 1983 at Nottingham University Mining Department for his research into groundwater control in surface mining. He is the author of over 20 papers and a visiting lecturer and external examiner to several universities.

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RAFAEL FERNANDEZ-RUBIO

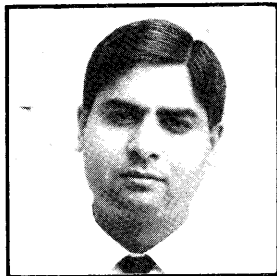
President of FRASA, a consulting firm based in Madrid, Spain, specializing in Mine Water and Mine Environment topics, with experience in near forty countries. Founder member of IMWA, he was it's first General Secretary. He was elected IMWA President at the Granada Congress in 1985, and re-elected in 1988 in Melbourne. Born in 1932, graduated Mining Engineer from Madrid School of Mines in 1961, he obtained his Ph degree from Madrid Politechnical University in 1965. His current position is Professor of Hydrogeology at Madrid School of Mines, and Director of the International Postgraduated Course of Hydrogeological Technology. He has published three books and more than 170 technical papers, dealing with mine water environmental impacts. He received the World Ecological Award in 1989 for his consultancy work for the mine industry. He has been Visiting Professor and External Examiner for universities in more than twenty countries.



ROY WILLIAMS

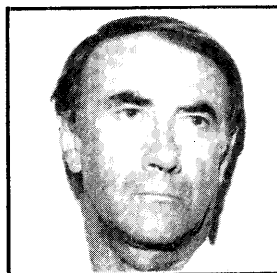
Professor of Hydrogeology in the College of Mines and Earth Resources at the University of Idaho. His responsibilities include directing the research of graduate students and conducting research on mine hydrology, mineral resource waste management, and related ground water problems. From 1972 to 1974, served on Intergovernmental Personnel Exchange Act appointment with U.S. Bureau of Mines in Washington D.C. From 1978 to 1980, was Director of the Idaho Mining and Mineral Resources Research Institute. Aside from these four years, has been connected with the hydrogeology program at the University of Idaho in several capacities. Advisor to several federal and state agencies on ground water contamination and waste management.

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VIJAY RASTOGI

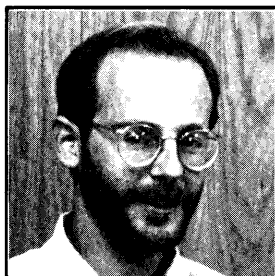
Vijay Rastogi, BSME, MSME, MBA, PE, is a graduate of Banaras Hindu University, India, the University of Missouri, and the University of Dayton. Employed by the BFGoodrich Company since 1967, he has held a variety of corporate planning, corporate development, and management positions; currently as business manager of ProMac Systems for acid mine control. He has been responsible for developing ProMac Systems from a laboratory technology into a commercial business. ProMac products have now been used commercially since 1987 in 13 states for mine land reclamation and for prevention of acid drainage from coal, refuse and spoil piles. More than 700 acres of areas affected by coal, gold and silver mining have now been treated with ProMac products.



VLADIMIR STRASKRABA

President of Hydro-Geo Consultants, Inc., a firm located in Denver, Colorado, specializing for over 11 years in consulting for the mining industry. Graduated from the School of Mines in Ostrava, Czechoslovakia, in 1958. He received a M.S. degree in Geological Engineering. Worked as a consultant for the mining and water resources industries in Czechoslovakia, Italy and U.S.A. His interests focus on mine drainage problems and on the environmental impacts of mining on water resources. He has published 15 technical papers related to the mining hydrology.

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SCOTT E. MASON

Geochemist with three years experience in hydrogeo-chemistry. Mr. Mason earned a Bachelor of Science degree in Geology from Ohio State University in 1984 and a Master of Science degree in Geochemistry from Pennsylvania State University in 1987. Since 1987, as a consultant with Hydrometrics, Inc., he has investigated a variety of water quality problems associated with mineral extraction, acid mine drainage, metal refining, and hazardous waste storage in the central and western United States.

STUART MILLER

Director of Stuart D Miller & Associates, a specialised consulting company based in Sydney, Australia, he has 18 years experience in environmental and soil geochemical aspects of mining, waste management, rehabilitation, land reclamation and soil pollution. Dr. Miller has a B.Sc Agriculture (University of Sydney, Australia), M.App.Sci.(University of NSW, Australia) and Ph.D.(Yale University;USA). Before establishing SMA in 1983 he worked with industry and government organizations. He has a broad practical working experience and has worked on more than 60 mining projects located in Australia, New Zealand, Papua-New Guinea, and several other countries. He is an advisor to the Australian Nuclear Science and Technology Organization on Environment Canada on the prediction and control of acid mine drainage. Dr. Miller's mining waste experience includes waste rock, overburden and processing wastes (tailings) from coal, oil shale, base metal, precious metal and uranium mining operations. Particular expertise is in the characterization, classification and management of sulphide containing wastes; prediction of acid mine drainage (AMD); and mine waste material toxicity assessment.