

# About the Authors

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**Hartmut Baer** earned a master's degree in engineering at Technische Universität, Berlin, Germany. He started his professional career working as an operation engineer in the mineral oil industry. In 1979, he joined RAG AG, working in their cokemaking industry branch. Mr. Baer is now head of the staff division of the coke oven plant works directorate, Werksdirektion Kokereien, responsible for planning and construction of cokemaking plants and plant facilities, controlling, environmental protection, as well as research and development activities. Additionally, since 1997 he has been the managing director of the European Cokemaking Technology Center, ECTC. He is also a member of the German Cokemaking Committee, Deutscher Kokereiasschuß. Mr. Baer is the author of numerous papers and patents.

**Donald F. Baret** received a B.S. degree in mechanical engineering from the University of Pittsburgh in 1951 and is a registered Professional Engineer. He began his career in the steel industry as a design engineer at the U.S. Steel Ohio Works in Youngstown, Ohio. As a plant design engineer he gained experience in all phases of steel plant engineering. However, his principle duties were for the rebuild and design modifications to the plant's blast furnace facilities. In 1976 he became a member of the design team that engineered and started up the U.S. Steel Fairfield Works No. 8 blast furnace. After the blow-in of the Fairfield No. 8 blast furnace he supervised the engineering for the rebuilding and modernization of all of the U.S. Steel blast furnaces. In 1986 he retired from USX and was invited to join Hoogovens Technical Services, Inc. While with Hoogovens he managed engineering studies that were requested by various steel companies to determine the required improvements to upgrade their blast furnace facilities. He also was project manager for many projects that provided the engineering design for hot blast stove systems, blast furnace refractory linings, and integrated cooling systems that would assure a long blast furnace campaign life. In 1995 he retired from Hoogovens and is currently a blast furnace consultant for USX Engineers and Consultants, Inc. He is a member of the Association of Iron and Steel Engineers and its Subcommittee No. 27 on Steel Pressure-containing Components for Blast Furnace Installations and its Subcommittee No. 33 on Maintenance, Inspection and Repair of Torpedo Cars.

**Charles D. Blumenschein, P.E., D.E.E.**, is Senior Vice President of Chester Engineers, where he manages the Science and Technology Division. He received both his B.S. degree in civil engineering and his M.S. degree in sanitary engineering from the University of Pittsburgh. He has extensive experience in industrial water and wastewater treatment. At Chester Engineers, he is responsible for wastewater treatment projects, groundwater treatment investigations, waste minimization studies, toxic reduction evaluations, process and equipment design evaluations, assessment of water quality based effluent limitations, and negotiation of NPDES permit limitations with regulatory agencies. His experience includes conceptual process design of contaminated ground-

water recovery and treatment systems; physical/chemical wastewater treatment for the chemical, metal finishing, steel, and non-ferrous industries; as well as advanced treatment technologies for water and wastewater recycle systems. He has actively negotiated effluent limitations for numerous industrial clients and has served as an expert witness in litigation matters. In addition, he has authored several publications addressing various wastewater treatment technologies and the implications of environmental regulations governing industry.

**Jonathan A. Burgo** is currently a Research Consultant at the U.S. Steel Technical Center. He received B.S. and M.S. degrees in metallurgy and materials science from the University of Pennsylvania in Philadelphia. Jon has worked for Republic Steel Corporation, Bethlehem Steel Corporation and Eichleay Engineers Inc. in positions of increasing responsibility prior to joining U.S. Steel. He has authored several technical papers related to iron and steelmaking, and obtained a patent concerning control techniques related to casting technology. A member of the Iron and Steel Society, he served as Chairman of the Ironmaking Division in 1998-99 and is currently serving on the Board of Directors.

**Walter E. Buss** obtained his degree as Dipl. Ing. in mechanical engineering at the College of Engineering in Bochum, Germany in January 1966. He joined Firma Carl Still-Germany after graduation and held various positions in the field of coke oven, byproduct, and oven machinery design engineering, project engineering, construction supervision, and commissioning. In 1974, Mr. Buss was assigned as part of the initial Firma Still team in Pittsburgh to develop the coke plant engineering business in North America. He was Project Manager for Firma Still in contracts with U.S. Steel to build 6 m batteries at their Gary, Fairfield and Clairton Works. In 1981 he received an MBA from the University of Pittsburgh. From 1985 to 1993 Mr. Buss was appointed General Manager of the Davy Still Otto joint venture. Since 1994, he has been the Vice President and General Manager of Thyssen Still Otto Technical Services in Pittsburgh, the North American subsidiary of Thyssen Still Otto Anlagentechnik GmbH, Bochum, Germany.

**Albert Calderon** is President of Calderon Energy Co. of Bowling Green, located in Bowling Green, Ohio. A professional inventor, businessman and entrepreneur, he holds 33 U.S. and 27 foreign patents. He completed a course of study at Brothers College, Jerusalem in 1946 and relocated to the U.S. to study further. From 1949 until 1957 he was a freelance inventor. During this time he formed Calderon Automation, Inc. based on a new scrap charging method for open hearth furnaces. During the 1960s the Calderon method of scrap charging was adapted for BOF steelmaking. In 1969 he undertook a study of cokemaking for Inland Steel which led to involvement in developing a new closed system cokemaking process, the Calderon Cokemaking Process.

**Richard G. DiNitto** is the Group Executive of Operations and Marketing for Antaeus Energy. He has over 20 years of experience in business and operations management, sales and marketing, strategic environmental management, liability and risk management, mergers and acquisitions, geophysical investigations and exploration, and mining operations evaluations. Prior to joining Antaeus Energy, he held various management positions at several international engineering and manufacturing firms, including having managed ABB Environmental's Northeast USA Division. He has an M.S. and a B.S. in geology and geophysics from Boston College, was a former Licensed Site Professional in Massachusetts, and is a member of the National Class I Railroad Environmental Association and the American Society of Civil Engineers.

**Dennis J. Doran** is Market Development Manager for Primary Metals in the Basic Industry Group of Nalco Chemical Co. He received his B.S. in metallurgy and materials science from Carnegie Mellon University in 1972 and an MBA from the University of Pittsburgh in 1973. Prior to joining Nalco in sales in 1979, he was employed by Vulcan Materials in market research and business development for their Metals Div. and by Comshare, Inc. in sales and technical support of computer timeshare applications. His area of expertise involves the interaction of water with process, design, cooling and environmental considerations in iron and steelmaking facilities. His responsibilities include technical, marketing, and training support for the steel industry and non-ferrous market segments. Technical support activities have included travel in North America, Asia, and

Australia. He is a member of the Iron and Steel Society and AISE, and is a member of AISE Subcommittee No. 39 on Environmental Control Technologies.

**Raymond F. Drnevich** is the Manager of Process Integration for Praxair, Inc. Process integration focuses on developing industrial gases supply system synergies with iron and steelmaking technologies as well as technologies used in the chemical, petrochemical, and refining industries. He received a B.S. in chemical engineering from the University of Notre Dame and an M.S. in water resources engineering from the University of Michigan. In his 27 years at Praxair he has authored or co-authored more than 20 technical papers and 20 patents dealing with the production and use of industrial gases.

**Albert J. Dzermejko** is currently Director-Ironmaking Technology for Hoogovens Technical Services and is based in Pittsburgh, Pennsylvania. He is a mechanical engineer from the University of Pittsburgh, and also has a civil engineering technician certificate from Forbes Technical Institute. Al is responsible for blast furnace technology development, promotion and business development efforts for Hoogovens Technical Services worldwide. He has over 35 years experience in the iron and steel engineering and construction field, beginning his career at the Swindell-Dressler Company of Pittsburgh in 1964 as a piping systems designer for rolling mills and later joining Arthur G. McKee as a blast furnace design engineer. He joined Koppers Company Inc. of Pittsburgh and advanced from Design Engineer to Engineering Supervisor to Project Engineer and finally to Manager, Metallurgical Projects Department. He then joined the Carbon Products Division of Union Carbide Corporation (later UCAR Carbon Co.) of Danbury, Connecticut and advanced from Manager-Customer Technical Services to Director-International Sales to Corporate Fellow, Refractory Systems. Al has authored more than twenty technical papers on blast furnace technology and systems, and holds several blast furnace and stove equipment patents. He is a lecturer at the McMaster University Ironmaking Course, is currently Chairman of the Ironmaking Division of the Iron and Steel Society, and a member of Subcommittee No. 27 on Steel Pressure-containing Components for Blast Furnace Installations of the Association of Iron and Steel Engineers. He is also a member of the Eastern and Western States Blast Furnace and Coke Ovens Association.

**Jerome Feinman** received a B.Ch.E. from the Polytechnic Institute of Brooklyn in 1949, an M.S.Ch.E. from Illinois Institute of Technology in 1956 and a Ph.D. in chemical engineering from the University of Pittsburgh in 1964. He joined U.S. Steel Corporation in 1952 and held positions as a researcher, supervisor and consultant in the Applied Research Laboratory covering raw materials and ore reduction and process engineering and analysis. When he left U.S. Steel in 1980 to become Director of Technical Development for Occidental Oil Shale Inc. (OOSI) he was Research Consultant-Raw Materials and Ore Reduction. He left OOSI in 1982 to become an independent consultant offering technical and economic assistance in planning, conducting and evaluating projects in iron and steel production, fossil energy recovery and utilization and related technology. He published over 25 papers, was awarded 13 patents and edited two books published by the Iron and Steel Society: *Plasma Technology in Metallurgical Processing* (1987) and *Direct Reduced Iron—Technology and Economics of Production and Use* (1999). He contributed technical articles to several encyclopedias and published symposiums.

**Richard J. Fruehan** received his B.S. and Ph.D. degrees from the University of Pennsylvania and was an NSF post-doctoral scholar at Imperial College, University of London. He then was on the staff of the U.S. Steel Laboratory until he joined the faculty of Carnegie Mellon University as a Professor in 1980. Dr. Fruehan organized the Center for Iron and Steelmaking Research, an NSF Industry/University Cooperative Research Center, and is a Co-Director. The Center currently has twenty-seven industrial company members, including from the U.S., Europe, Asia, South Africa and South America. In 1992 he became the Director of the Sloan Steel Industry Study which examines the critical issues impacting a company's competitiveness and involves numerous faculty at several universities. Dr. Fruehan has authored over 200 papers, two books on steelmaking technologies and co-authored a book on managing for competitiveness, and is the holder of five patents. He has received several awards for his publications, including the 1970 and 1982 Hunt

Medal (AIME), the 1982 and 1991 John Chipman Medal (AIME), 1989 Mathewson Gold Medal (TMS-AIME), the 1993 Albert Sauveur Award (ASM International), and the 1976 Gilcrist Medal (Metals Society UK), the 1996 Howe Memorial Lecture (ISS of AIME); he also received an IR100 Award for the invention of the oxygen sensor. In 1985 he was elected a Distinguished Member of the Iron and Steel Society. He served as President of the Iron and Steel Society of AIME from 1990–91. He was the Posco Professor from 1987 to 1997 and in 1997 he was appointed the U.S. Steel Professor of the Materials Science and Engineering Department of Carnegie Mellon University.

**Neil J. Goodman** is Process Manager for Kvaerner Metals, Pittsburgh, Pa., where he is responsible for the technical management of blast furnace, BOF and HIs melt direct ironmaking proposals and contracts. He received a B.Sc. (Eng.), in metallurgy from the Imperial College, London, U.K. in 1979. Upon graduation he joined British Steel at Teesside Works and was assigned to the Redcar No.1 Blast Furnace and the Lackenby BOF technical departments. In 1983 he joined Kvaerner Metals U.K. (Davy International) and worked on blast furnace and BOF projects. He transferred to Kvaerner Metals in Pittsburgh in 1989 and has managed numerous blast furnace relines and upgrade projects and several Hi-Vap BOF cooling system installations. Most recently he has undertaken for Kvaerner Metals the technical management of the HIs melt process. He is a chartered engineer in the U.K. and a registered engineer in Europe. Additionally, he is an Associate of the Royal School of Mines and is a member of the Association of Iron and Steel Engineers, the Iron and Steel Society, the Institute of Materials in the U.K., the Eastern States Blast Furnace and Coke Oven Association, and the Engineers' Society of Western Pennsylvania. He has authored numerous blast furnace and BOF papers and presentations and is a lecturer at the McMaster University Ironmaking Course.

**Frederick W. Hyle** is Technical Director – Ironmaking, Coke and Chemical for USX Engineers and Consultants and is located at the U.S. Steel Gary Works in Gary, Indiana. He received a B.S. degree in chemical engineering from Lehigh University and an M.S. degree in business administration from Indiana University Northwest. He has held various positions in the process control, engineering, research, technology and operating departments at Gary Works over his 28 year career. He has co-authored several technical papers, been a lecturer at the McMaster University Intensive Course on Ironmaking, and received the J. E. Johnson Jr. Award from the Iron and Steel Society of the AIME. His areas of interest include process automation and advanced control systems and models for blast furnace optimization.

**David H. Hubble** was involved in refractory research, development and application for 34 years with U.S. Steel Corp. and continued as a consultant another five years following his retirement. Following graduation from Virginia Polytechnical Institute as a ceramic and metallurgical engineer, he was involved in all phases of steel plant refractory usage and facility startups in both domestic and foreign environments. He is the author of numerous papers and patents and has been involved in various volunteer activities since his retirement.

**Frank Keissling** is currently Director of Coke Marketing at Citizen's Gas and Coke Utility in Indianapolis, Indiana. He received a B.S. degree in chemistry from Marshall University in 1952. Frank has held numerous technical and operating positions at Allied Signal Corporation and Dravo Engineers and Constructors. His entire work career has been in the metallurgical coke industry.

**Hsien-Ming Lee** is currently a Patent Examiner at the U.S. Patent and Trademark Office in Washington D.C.. He graduated from the National Taipei Institute of Technology in metallurgical engineering in Taiwan in 1977. He started his career in the ironmaking field with China Steel Corporation in Taiwan in 1979. He received his M.S. in materials science and engineering from the University of Kentucky at Lexington, Kentucky in 1990. He was a Guest Researcher at the National Institute of Standards and Technology at Gaithersburg, Maryland from 1991 to 1994. In 1997 he joined U.S. Steel at the Technical Center as a Senior Research Engineer in the ironmaking area, where he was primarily involved in ironmaking and process modeling.

**Antone Lehrman** is a Sr. Development Engineer for LTV Steel Co. at the Technology Center in Independence, Ohio. He received a B.E. degree in mechanical engineering at Youngstown State University in 1970 and worked for Youngstown Sheet & Tube Co. and Republic Steel Corp. prior to their merger with Jones and Laughlin Steel Corp. His entire career has been focused in the energy and utility field of steel plant operations. He held the positions of Fuel Engineer, Boiler Plant Supervisor, and others prior to joining the corporate Energy Group in 1985.

**Charles J. Messina** is Director of Bulk Gas Sales in Cleveland, Ohio for Praxair, Inc. He received his M.S. in process metallurgy from Lehigh University in 1976. He also holds degrees in mechanical engineering and business administration. In 1976 he began his career in the steel industry at the U.S. Steel Research Laboratory, where he worked on steelmaking applications and process control; in 1981 he was transferred to the Gary Works. In 1983 he joined the Linde Division of Union Carbide as technology manager of the AOD process. He joined PennMet, located in Ridgway, Pa., in 1985 as vice president of operations and returned to Praxair, Inc. in 1986 as process manager of steelmaking and combustion. He was named sales manager, bulk gases in 1990 and was named technology manager, primary metals in 1992. His work included development BOF slag splashing, EAF post-combustion and Praxair's coherent jet technology.

**Joseph J. Poveromo** received his B.S. in chemical engineering from R.P.I. in 1968. After spending one year with Atlantic Richfield, he joined the Center for Process Metallurgy, State University of New York at Buffalo (SUNYAB) where he received M.S. and Ph.D. degrees. In 1974 he joined Bethlehem Steel Corp. at the Homer Research Laboratories where he advanced to the position of Research Consultant. In February 1993 he established his consulting company, RMI (Raw Materials & Ironmaking) in Bethlehem, Pa. His principal client is Quebec Cartier Mining Company for whom he serves as Directory-Technology, International. He also consults for steel companies and other companies in steel-related activities. Dr. Poveromo was elected a Distinguished Member in 1994 of the Iron and Steel Society of AIME, where he has served as Chairman of the Process Technology and Ironmaking Divisions. He is currently serving on the Iron Producing Division of AISE. His awards from the Iron and Steel Society include the J.E. Johnson Award in 1981, the John Chipman Award in 1984 and the T.L. Joseph Award in 1998 for his long-standing contributions to ironmaking technology. He has over 50 publications in the areas of blast furnace practice and raw materials improvements.

**James Richardson** has 40 years of coke plant experience in battery design and construction activities, facility start-ups, oven repairs, inspection services, heating and operations. These activities have included both domestic and foreign assignments. His career started as a shift operator with the former Koppers Company Inc., in Pittsburgh, Pa. and progressed to a management position in the Operating Department of the Engineering and Construction Division. His present position is Manager of Coke and Coal Chemicals Department for the Industry Division of ICF Kaiser Engineers Inc., located in the Pittsburgh, Pa office. Kaiser Engineers purchased the Engineering and Construction Division of Koppers Company in 1985.

**John A. Ricketts** is currently Senior Staff Engineer in the Ironmaking Operating Technology Department of Ispat Inland Inc. in East Chicago, Indiana. He received a B.S. degree in metallurgical engineering from the Illinois Institute of Technology in 1978. John has worked exclusively for Inland Steel for 21 years, holding numerous positions in both operations and technology at their 1940s vintage blast furnaces, their sinter plant, and at their world class No. 7 Blast Furnace. He has authored and co-authored 34 technical papers, taught at several Iron and Steel Society Continuing Education Shortcourses, is a regular lecturer at the McMasters University Ironmaking Course, and received the J. E. Johnson Jr. Award from the Iron and Steel Society of AIME. His hobby is investigating old ironmaking sites and collecting historical blast furnace literature.

**Ulrich Schwarz** obtained his degree as Dipl. Ing. in mechanical engineering at the College of Engineering in Bochum in February 1965. He joined Dr. C. Otto Company in Bochum, Germany after graduation. Mr. Schwarz held various positions in the field of coke oven battery design and process engineering. In 1976, Mr. Schwarz joined the McKee Otto organization in Cleveland, Ohio

and became involved in coke oven battery projects for various U.S. steel companies. In 1983, Mr. Schwarz returned to the parent company in Germany and was appointed General Manager of Coke Oven Battery Process and Development. Mr. Schwarz retired from active duty in 1998.

**Ronald J. Selines** is a Corporate Fellow at Praxair, Inc. and is responsible for efforts to develop and commercialize new industrial gas based iron and steelmaking process technology. He received an Sc.D. in metallurgy and materials science from MIT in 1974, has been actively involved in iron and steelmaking technology for the past 24 years, and has authored 11 publications and 12 patents in this field.

**Steven E. Stewart** is District Account Manager in Northwest Indiana for Nalco Chemical Co. He received a B.S. in biology from Indiana University in 1969 and received an M.S. in chemistry from Roosevelt University in Chicago. He has specialized in industrial water treatment during his 22 year career with Nalco. He has had service responsibility in all of the major steel manufacturing plants in Northwest Indiana. He has experience in power generation plants, cooling water systems, and wastewater treatment plants. He has been responsible for the startup and implementation of numerous automated chemical control and monitoring systems during his career.

**Joel L. Sundholm** is currently a Senior Development Engineer in the Coke Operations group of LTV Steel, where he has been employed since 1964. A native of Chicago, Mr. Sundholm earned a B.S. degree in mechanical engineering from Cornell University in 1963. He is a member of the Iron and Steel Society, Eastern States Blast Furnace and Coke Oven Association, the Coke Oven Manager's Association, and the Association of Iron and Steel Engineers where he has served as chairman of the Mechanical and Welding Division, chairman of the Coke Producing Division, and was a member of the Board of Directors. He also served as chairman of the AISI Tall Oven Task Group.

**E. T. Turkdogan**, a Ph.D. graduate of the University of Sheffield, was appointed in 1950 as Head of the Physical Chemistry Section of the British Iron and Steel Research Association, London. In 1959, he was invited to join U.S. Steel Corp. as an Assistant Director of research at the Edgar C. Bain Laboratory for Fundamental Research, Monroeville, Pa., as it was known prior to 1972. Subsequently he became a Senior Research Consultant at the Research Center of U.S. Steel. Upon retirement from USX Corp. in 1986, he undertook a private consultancy business entailing a wide range of industrial and research and development technologies, including technical services to law firms. He published approximately 200 papers in the fields of chemical metallurgy, process thermodynamics and related subjects, authored 13 patents and contributed to chapters of numerous reference books on pyrometallurgy. He authored three books: *Physical Chemistry of High Temperature Technology* (1980), *Physicochemical Properties of Molten Slags and Glasses* (1983) and *Fundamentals of Steelmaking* (1996). He received numerous awards from the British and American metallurgical institutes and in 1985 was awarded the Degree of Doctor of Metallurgy by the University of Sheffield in recognition of his contributions to the science and technology of metallurgy. He was further honored by a symposium held in Pittsburgh in 1994, which was sponsored by USX Corp. and the Iron and Steel Society of AIME. He is a Fellow of the Institute of Materials (U.K.), a Fellow of The Minerals, Metals and Materials Society and a Distinguished Member of the Iron and Steel Society.

**Hardarshan Singh Valia** is currently a Scientist at Ispat Inland Research Laboratories of East Chicago, Indiana. He received his B.S. (Gold Medal in Geology) and M.S. degrees in geology from Nagpur University, Nagpur, India, and his M.S. from Bryn Mawr College, Bryn Mawr and Ph.D. from Boston University, Boston. After being Assistant Professor of geology at Case Western Reserve University and Oberlin College, he joined the then Inland Steel Company in 1979 as a Research Engineer. He has received numerous awards including the Joseph Becker Award from the Iron and Steel Society for distinguished contributions in the field of coal carbonization and coal technology and also the American Iron and Steel Institute's President Medal. He has chaired many technical committees, taught numerous courses related to the steel industry sponsored by the Iron and Steel Society and McMaster University of Canada. He is the author of more than fifty scien-

tific papers, a book, and has contributed to many books, encyclopedia, and international conferences. His hobby is writing poetry and stories.

**John P. Wallace** is currently Director of Metals Technology for Eichleay Engineers, Inc. in Pittsburgh, Pennsylvania. He received a B.S. degree in chemistry from Geneva College, Beaver Falls, Pennsylvania in 1968. Prior to joining Eichleay, John worked for 30 years at U.S. Steel in various managerial positions in ironmaking operations, ironmaking engineering and raw material and ironmaking research. John is a member of the Association of Iron and Steel Engineers Subcommittee No. 27 on Steel Pressure-containing Components for Blast Furnace Installations, President of the Eastern States Blast Furnace and Coke Oven Association, and a member of the Iron and Steel Society.

**Rainer Worberg** was born in 1947 in Essen, Germany and has been Vice President, Engineering of Thyssen Still Otto Anlagentechnik since 1995. After studying mathematics and physics at the Universities Münster and Bochum, he joined Bergbauforschung in Essen in 1975 where he worked as a scientific employee in the field of cokemaking technology. He received his doctorate degree from the Technical University Clausthal in 1982. After that Dr. Worberg joined Carl Still company in Recklinghausen in 1983, where he was first responsible for process automation department. From 1993, he was also responsible for the coke oven department and from 1995 for the coke-making technology department.

**Robert W. Ziegler** has an M.S. in industrial engineering, an MBA and a B.S. in electrical engineering, all from the University of Pittsburgh. He is a Senior Systems Engineer in the Headquarters Systems and Process Control Department of the U.S. Steel Group of USX Corporation. He has worked in Applied Research and Development utilizing mathematical and statistical techniques in a variety of steel-related research projects. While in the Technology Implementation/Engineering Departments, he worked on the development and implementation of business/technical computer systems for joint ventures and a variety of computer process control applications ranging from raw materials mining and cokemaking through batch annealing; such applications have included computerized blast furnace control. Mr. Ziegler has been a member of the adjunct faculty at the Pennsylvania State University, Point Park College and the University of Pittsburgh. He has planned, organized, and conducted a number of industrial and academic training programs in the fields of business, engineering, computer science, and management. He holds the rank of Captain, USNR (Ret.) where he specialized in the fields of Naval Intelligence and Communications. He has been actively involved as a member of the U.S. Steel Year 2000 Project Office, and has participated in a number of AISE and AISI workshops, committees, and seminars on the Y2K topic.

