

TECHNICAL DIRECTOR

BARRATT, DEREK J

50 years of experience in copper concentrator operations and metallurgical process design and operation on projects worldwide. Responsible for conceptual development and co-ordination of metallurgical test work and development of process flowsheets, conceptual plant design, equipment selection, layout and capital, and operating cost estimates. Specialist with 35 years' experience in comminution, particularly SAG milling, in-house specialist on SAG mill design and operation. Metallurgical study design, start-up, commissioning, and operating experience on facilities around the world.

EMPLOYMENT

2000-2016 DJB Consultants, Inc., North Vancouver, B.C., Canada, President and Principal Consultant specializing in comminution studies, equipment selection, and operation.

1988-2000 Fluor Corporation, Vancouver, B.C., Canada, specialist Consulting Engineer in comminution studies, equipment selection, and operation.

1970-1988 Wright Engineers Ltd., Vancouver, B.C., Canada, Senior Metallurgical Engineer and Project Manager responsible for process input to and execution of Feasibility Studies and selected Projects.

1967-1970 Cyprus Sulphur and Copper Co. Ltd., Assistant Mill Superintendent, Limni Mines, Cyprus, responsible for the supervision of operating and maintenance crews, maintenance schedules, and metallurgical development for a 1,500 tpd concentrator processing copper-pyrite ores containing a variety of copper minerals including oxides and sulphates.

1963-1967 Sherritt Gordon Mines Ltd., Mill Engineer, Lynn Lake, Northern Manitoba, Canada, responsible for mill process design and development for the 4,000 tpd copper-nickel sulphide concentrator; design, construction and operation of a pilot plant; conceptual design, equipment selection, capital and operating cost development for a feasibility report for a 3,000 tpd copper-zinc concentrator at Fox Lake, Manitoba. Previous positions, shift boss and research assistant.

1960-1961 McIntyre Porcupine Mines Ltd., Trainee Mill Operator, Schumacher, Ontario, Canada, involving regular shift operation in crushing, grinding, gravity concentration, flotation, cyanidation and bullion production. Laboratory Assistant, duties involving routine mill process control and development test work for potential copper production.

EDUCATION

B.Sc., Mineral Technology, Royal School of Mines, University of London, 1963, A.R.S.M.

LANGUAGES

English: Fluent
Spanish: Conversant
French: Conversant

TRAINING

Introduction to Computers
Professional Management for Consulting Engineers (Management by Objectives).

PROFESSIONAL ASSOCIATIONS

- Associate of the Royal School of Mines
- Association of Professional Engineers of British Columbia
- Life Member, Canadian Institute of Mining, Metallurgy, and Petroleum
- Fellow, The Institute of Materials, Minerals, and Mining, formerly The Institution of Mining and Metallurgy, and Overseas Member of Council for Canada (1985-1993)
- Chartered Engineer, U.K.
- Member, The Society for Mining, Metallurgy, and Exploration of AIME: Chairman, (1987-1988), Concentration Committee; Past Chairman, (1983-1984), and Member (1980-1986), Crushing and Grinding Committee.

AWARDS

2003 INCO Medal for lifetime achievement in the field of mineral comminution awarded by the Canadian Institute of Mining, Metallurgy, and Petroleum at the CIM Annual Meeting in Montréal, P.Q.

2006 Art MacPherson Award for significant contributions to comminution awarded by the Canadian Mineral Processors Division of CIM at SAG' 2006 Conference in Vancouver, B.C.

PUBLICATIONS

Author of 45 technical papers concerning grinding and SAG milling in particular and mineral processing in general, which have been published in journals and presented at conferences in Canada, U.S.A., China, Chile, and Perú.

In May, 1991, served as lead lecturer for the Comminution School organized by the SAIMM in Johannesburg, R.S.A., and as a contributor to a SAIMM Colloquium in June, 1995.

Vice-Chair and Co-Editor of the SAG '96 Conference held in Vancouver, B.C., October 6-9, 1996.

Chair and Co-Editor of the SAG 2001 Conference held in Vancouver, B.C., September 30 to October 3, 2001.

Committee Secretary and Technical Advisor to the SME Mineral Processing Plant Design, Practice, and Control Symposium held in Vancouver, B.C., October 20-24, 2002.

DJB CONSULTANTS, INC. (2000-2016)

Independent Consultant

Specializing in the review and optimization of grinding circuits and the specification of input to test work programs, feasibility studies, and basic engineering for grinding circuit equipment selection and design, and in-house development of the Bond Work Index-based Millpower2000 Grinding Simulation Program. Also available for the independent evaluation of mineral processing plants, in the post-commissioning or expansion planning stages.

Las Bambas Project, Minera Las Bambas, Provincia de Apurimac, Perú (2014-2016)

Site Visit to review scope of work for a geometallurgical comminution study prior to commissioning and plant start-up. Planning for sampling PQ drill core and execution of a test work program for four test protocols on a "same sample basis" for 141 geometallurgical samples.

Sepon Operations, MMG Limited, Laos (2014)

Site Visit to review grinding operations for a single-stage SAG Mill and optimization of circuit conditions considering the effect of Run-of-Mine ore types, oversize hard rock, and material handling problems, both inside and outside of the SAG Mill, on power draw, mill speed, and feed rate.

Twin Metals Project, *Twin Metals Minnesota LLC*, Minnesota, U.S.A. (2012-2014)

Review and interpretation of comminution test results, simulation of grinding circuit options, and preparation of reports at a pre-Feasibility level.

Expansion Project, *Minera Aguas Teñidas S.A.*, Spain (2013)

Review of comminution test work, plant surveys, grinding simulations, and mill sizing with recommendations for the addition of a new grinding line in a plant expansion using Ball Mills.

Radomiro Tomic Project, *CODELCO-Chile*, Chile (2013-2016)

Review of pilot plant test work with recommendations for completion of a test program in a comminution study, followed by mill sizing studies and predictions of mill throughput for selected grinding circuit options from comminution test results on a set of geometallurgical samples as part of a pre-Feasibility Study.

Strange Lake Rare Earth Project, *Melis Engineering Ltd.*, Saskatoon, Canada (2012)

Preliminary mill sizing, CAPEX, and OPEX parameters for a 183 tph plant for Quest Rare Minerals with optional flowsheets (wet and dry grinding in SAG and HPGR circuits).

OCI Trona Project, *OCI Chemical Corporation Wyoming L.P.*, Green River, Wyoming, U.S.A. (2011-2013)

Review and analysis of grinding operations in trona (sodium carbonate) with recommendations for selection of equipment in a potential expansion.

Lomas Bayas Sulphide Project, *Xstrata Copper*, Santiago, Chile (2011-2012)

Selection of samples for comminution tests, interpretation of test results, mill sizing, and prediction of throughput for selected grinding circuit options as part of a pre-Feasibility Study.

Centinela Project, *Antofagasta Minerals plc*, Santiago, Chile (2011)

Review of comminution tests, interpretation of test results, mill sizing, and prediction of throughput for selected mine plan options as part of a pre-Feasibility Study.

Member, Peer Review Panel for Assessment of Comminution Circuit Options (2012)

Catalina Huanca, *Minera Catalina Huanca S.A.*, Lima, Perú (2010-2011)

Review and analysis of comminution circuits and projections of mill throughput for expansion possibilities using test results from geometallurgical samples.

Guanajuato Expansion Project, *Axxent Engineering*, Surrey, B.C., Canada (2010-2011)

Review and recommendations for expansion of the grinding circuit at Endeavour Silver in Mexico and a review of equipment sizing.

Relincho Project, *Teck Resources Limited*, Vancouver, B.C., Canada (2010-2012)

Selection of samples for comminution tests, interpretation of test results, mill sizing, and prediction of throughput for selected grinding circuit options as part of a pre-Feasibility Study.

Michiquillay Project, *Anglo American Michiquillay S.A.*, Cajamarca, Perú (2010-2013)

Participation in a Workshop for SNC-Lavalin, Chile in 2010. Conduct grinding simulations for two groups of samples: 99 in 2011 and 126 in 2013, both to assist Fluor-Chile. Assist AAMSA in positioning PQ drill holes for selection of 79 samples in 2012.

El Galeno Project, *SNC Lavalin Chile*, Santiago, Chile (2010-2011)

Review of comminution tests, interpretation of test results, mill sizing, and prediction of throughput for selected grinding circuit options as part of a pre-Feasibility Study.

Condestable, *Minera Condestable, S.A.*, Lima, Perú (2010-2013)

Review and analysis of comminution circuits, potential expansion possibilities, and the regrind circuit.

Santo Domingo, Iris, and Iris Norte, Far West Mining Ltd., Vancouver, B.C., Canada (2010-2011)
Selection of samples for comminution tests, interpretation of test results, mill sizing, and prediction of throughput for selected grinding circuit options as part of a pre-Feasibility Study.

Toromocho Project, Minera Chinalco Perú, Lima, Perú (2010)
Audit of the Design and Manufacture of Gearless Mill Motors for duty at 4,800 amsl.

Quebrada Blanca, Teck Resources Limited, Vancouver, B.C., Canada (2009-2011)
Selection of samples for comminution tests, interpretation of results, mill sizing, and prediction of throughput for selected grinding circuit options as part of a pre-Feasibility Study and leading into a Bankable Feasibility Study.

Mantoverde, Anglo American Norte S.A., Santiago, Chile (2008-2010 & 2014-2015)
Selection of samples for comminution tests, interpretation of results, mill sizing, comparison of performance for different grinding circuit types, including HPGR.

Botija and Colina, Minera Petaquilla S.A (now Cobre Panama), Panama City, Panama (2007-2009)
Selection of samples for comminution tests, interpretation of results, mill sizing, and prediction of throughput for a 150,000 tpd project.

Las Bambas, Antapaccay, and El Pachon, Xstrata Copper Servicios Corporativos, Santiago, Chile (2008-2009)
Review of comminution test data, interpretation of results, and prediction of throughputs for given mill sizes and motor power combinations.

Quellaveco Project, Anglo American Quellaveco S.A., Lima, Perú (2007-2015)
Review of pilot plant test work and comminution test results, interpretation of results, and prediction of throughputs for given mill sizes and motor power combinations.
Review of mill and motor specifications and bids.

Antamina, “Interested Underwriters” c/o Crawford & Company (SA)(Pty)Ltd., Johannesburg, R.S.A. (2008)
An Opinion on tripping of the SAG Mill and its Motor during 2007 and 2008.
Review and analysis of operating data and equipment criteria.

Reko Diq Project, Antofagasta Minerals plc, Santiago, Chile and **Barrick Gold Corporation,** Toronto, Ontario, Canada (2007 and 2008)
Review of comminution test data, interpretation of results, and prediction of throughputs for given mill sizes and motor power combinations.

Esperanza, Antofagasta Minerals plc, Santiago, Chile (2006-2008)
Specification, supervision, and review of pilot plant test work, comminution test results, interpretation of results, mill sizing, and prediction of throughputs for a 90,000 tpd plant.

Post-commissioning review with recommendations (2011-2012)

Las Brisas Project, Gold Reserve, Inc., Spokane, Washington, U.S.A. (2006-2007)
Review of comminution and geotechnical test data, interpretation of results, and prediction of throughputs for given mill sizes and motor power combinations. Comparison of results with those from use of the JK SimMet Protocol, and recommendations for future work.

Pueblo Viejo, Barrick Gold Corporation, Toronto, Ontario, Canada (2006)
Review of comminution test data, equipment sizing for different crushing and grinding circuit types, including HPGR and single-stage SAG milling, and prediction of circuit throughputs. (Sub-contract to Fluor).

Minto, *Minto Explorations Ltd.*, Vancouver, B.C., Canada (2006-2007)

Consulting services to the Design team at Hatch for a 1,500 tpd to 3,000 tpd plant, review of comminution test data, interpretation of results, and projection of throughputs for given mill sizes and motor power combinations.

Review of grinding operations (2009) and a review for expansion possibilities (2011)

Mirador Project, *EcuaCorriente S.A.*, Quito, Ecuador (2006-2007)

Due diligence of comminution test data and predictions of throughput for given mill sizes and motor combinations with recommendations for optimum operation.

La Candelaria, *Phelps Dodge Corporation*, Copiapo, Chile (2006)

Evaluation of grinding operations and recommendations for circuit optimization.

Kabanga Project, *Falconbridge Technology Centre*, Sudbury, Ontario, Canada (2005 & 2007)

Review of comminution and geotechnical test work, and sizing of comminution equipment at the scoping study and pre-Feasibility study level for a nickel project in Tanzania.

Buzwagi Project, *Barrick Gold Corporation*, Toronto, Ontario, Canada (2005)

Review of comminution and geotechnical test work, and sizing of comminution equipment at the scoping study level for a gold project in Tanzania.

Escondida, *BHP Billiton Chile*, Santiago, Chile (2005)

Review of tertiary grinding objectives, various consultant inputs, and sizing of tertiary regrind ball mills.

Mt. Keith Concentrator, *WMC Resources Ltd.*, Western Australia (2005)

Review of operating data and comminution test work and recommendations on flowsheet options for processing stockpile and sulphide nickel ores.

Pebble Project, *Northern Dynasty Mines, Inc.* Anchorage, Alaska, U.S.A. (2004-2007)

Planning and direction of geo-comminution drilling and selection of core intervals for sampling and testing, evaluation of test results, entry of grinding power calculations into the mine block model, and sizing of comminution equipment for a 220,000 stpd copper-gold-molybdenum resource at the pre-Feasibility study stage.

Pebble Project, *Pebble Limited Partnership*, Anchorage, Alaska, U.S.A. (2008-2012)

Completion of various optimization studies

Cerro Casale Project, *Placer Technical Services Limited*, Vancouver, B.C., Canada (2005)

Review of comminution test data, sizing of grinding equipment, and estimation of mill feed rates and operating consumables for a proposed gold project in Chile.

Huckleberry Mine, *Norcast*, Toronto, Ontario, Canada (2004)

Evaluation of the SAG mill operation.

Evaluation of SAG mill operation for *Huckleberry Mines Limited* (2007)

Red Chris Project, *AMEC*, Vancouver, B.C., Canada (2004)

Review of comminution test work for a Feasibility study.

Chuquicamata Concentrator, *CODELCO-Chile*, Calama, Chile (2004)

Evaluation of the SAG mill operation.

Sar Cheshmeh, *METSO Canada*, Kirkland, Québec, Canada (2004)

Assistance in commissioning a SAG/Ball mill circuit expansion in Iran.

Marlin Project, *Glamis Gold Corporation*, Reno, Nevada, U.S.A. (2004)

Planning for, on-site selection of samples, review of comminution test work, and mill equipment sizing for a 4,000 tpd gold project in Guatemala. (Sub-contract to Fluor).

Cerro Verde Project, *Phelps Dodge Corporation*, Phoenix, Arizona, U.S.A. (2004)

Review of comminution test work and mill equipment sizing for the primary sulphide stage in an updated Feasibility study. (Sub-contract to Fluor).

Salobo Project, *CVRD*, Brazil (2003-2004)

Review of comminution test work and mill equipment sizing for autogenous grinding of a copper- gold ore in preparation for a Feasibility study. (Sub-contract to Fluor – JP Joint Venture).

Disputada and El Soldado Mines, *Anglo American Sur S.A.*, Santiago, Chile (2003-2012)

Review of operating data, comminution test work, recommendations for optimizing mill throughput, and a plant expansion (Disputada), simulations for mill equipment sizing in various plant expansion options, and review of plant operations (El Soldado).

Cowal Project, *Barrick Gold Corporation*, N.S.W., Australia (2003)

Review of comminution test work and projection of mill feed rates over a range of ore hardness for equipment selection (Sub-contract to SNC-Lavalin).

Raglan Mine, *Société Minière Raglan du Québec Ltée*, Canada (2003 & 2006)

Assessment of a SAG mill/ball mill/pebble crushing circuit option for the existing autogenous grinding plant. Review of SAG Mill capability and its Motor system.

Member, Peer Review Panel for Assessment of Production Objectives (2012)

Cristalino Project, *CVRD*, Brazil (2003)

Review of SAG mill/ball mill/pebble crushing and flotation circuits as part of a pre-Feasibility study. (Sub-contract to Fluor Corporation - Minerconsult Engenharia).

Nezhdaninskoye Gold Mine, *Basic International Development Corp.*, New York, N.Y., U.S.A. (2002)

Report on the Nezhdaninskoye gold mine, Republic of Sakha (Yakutia), to assist Shimoda Capital Advisors in evaluating Celtic Resources Holdings plc.

Esquel Project, *Compañía Minera El Desquite S.A.*, Chibut Province, Argentina (2002)

Review and analysis of geological and geotechnical data, recommendations for compositing samples for comminution testing, evaluation of test results and sizing of grinding equipment for processing siliceous gold - silver ore in a number of circuit alternatives as part of a Feasibility study. (Sub-contract to Fluor).

San Bartolomé Project, *Coeur D'Alène Mines Corporation*, Potosi, Bolivia (2002)

Review of geological data, selection of composite samples for comminution testing, evaluation of test results and sizing of grinding equipment for processing siliceous silver ores in a number of circuit alternatives as part of a Feasibility study. (Sub-contract to Fluor).

Dreifontein Gold Mine, *Goldfields of South Africa*, Johannesburg, R.S.A (2001)

Review of comminution data and selection of SAG mills. (Sub-contract to Fluor).

Williams Operating Company, *TeckCominco/Barrick/Homestake*, Ontario, Canada (2001)

Review and analysis of SAG mill shell liner designs and their predicted effect on power draw.

Lac des Iles Project, *North American Palladium Ltd.*, Ontario, Canada (2001)

Review of primary crushing and grinding operations and recommendations for improvement in throughput.

Voisey's Bay Project, Voisey's Bay Nickel Company Limited, Labrador, Canada (2001)

Initial assessment of the technical feasibility of primary autogenous grinding.

Peer Review of a Bankable Feasibility Study for autogenous/semi-autogenous grinding circuit design (2003).

Review of grinding operations shortly after start-up (2005).

Gamsberg Zinc Project, Anglo Operations Limited, South Africa (2001)

Review of grinding test work, geotechnical test data, and projection of primary and secondary mill sizes and installed motor power.

El Teniente Project Expansion, CODELCO-Chile, Chile (2001)

Review and evaluation of pilot plant test work, equipment specifications, operating parameters, and equipment bids for a 25,000 tpd expansion processing harder ore.

Review of plant operations (2008).

Andina Project Expansion, CODELCO-Chile, Chile (2001)

Review and evaluation of pilot plant test work, geotechnical parameters, and grinding operations in preparation for sizing crushing and grinding equipment for a 67,000 tpd open pit expansion. (Sub-contract to Fluor).

Pascua Lama Project, Barrick Gold Corporation, Chile (2001)

Review of grinding parameters, on-site selection of bulk samples and testing wet grinding process alternatives. (Sub-contract to Fluor).

Milpo, Cia. Minera Milpo S.A., Perú (2001)

Preliminary review of concentrator operations.

El Brocal, Sociedad Minera El Brocal S.A., Perú (2001)

Review of grinding operations and sizing of grinding equipment to achieve production objectives.

Los Pelambres Project, Cia. Minera Los Pelambres, Chile (2001-2005)

Evaluation of plant operations and recommendations for increasing throughput from 108,000 tpd. Specification, supervision, and evaluation of pilot plant test work and mill equipment sizing for an expansion.

Operations review prior to and post-commissioning of re-powered SAG mills (2006-2010)

Clarabelle Concentrator, INCO Limited, Ontario, Canada (2000)

Review of regrinding operations and recommendations for classification equipment. (Sub-contract to Fluor).

Project Troilus, Les Mines Inmet, Quebec, Canada (2000-2003)

Review of crushing and grinding operations and recommendations for optimizing throughput. (Sub-contract to Fluor).

Review of grinding operations (2007).

Confidential, Sweden (2000)

Evaluation of plant operations in a zinc-lead concentrator.

Collahuasi Concentrator, Cia. Minera Doña Ines de Collahuasi, S.A., Chile (2000-2001)

Review of plant operating data, grinding test work, and projection of grinding and re-grinding equipment requirements for an expansion. Review of equipment bids.

Prediction of mill throughput for Optimization Studies of three grinding lines (2011-2012) and a fourth grinding line (2015).

WRIGHT ENGINEERS LIMITED (1970-1988)

FLUOR CORPORATION (1988-March, 2000)

1999-2000 Operations Review and Optimization for the 60,000 tpd SAG grinding and regrinding circuits at Collahuasi, Chile, increasing capacity to 69,000 tpd.

1998 Commissioning Engineer for the 80,000 tpd SAG grinding circuits at Minera Alumbrera, Argentina.

1992 Commissioning Engineer for the 8,000 tpd CIL gold plant expansion at Rosario Dominicana, S.A., Dominican Republic.

1991 Commissioning Engineer for the SAG mill circuit as part of INCO's Mill Rationalization Scheme at the Clarabelle concentrator.

1979-2000 Metallurgical Consultant for various projects at the conceptual, pre-Feasibility, Feasibility, Basic Engineering, or post-Commissioning Stage: Canada Tungsten, Real de Angeles, Thompson Creek, Key Lake, Cyprus Bagdad, Rio Tinto Minera, El Teniente, Getchell, Premier Gold, Milpo, Arcata, Caylloma, Pirites Alentejanas, Neves Corvo, Mt. Isa Copper Project, Mt. Milligan, Agnew (Leinster) Nickel, La Candelaria Project, Kennecott Copperton Concentrator, Freeport Indonesia, Palabora, Potgietersrust, Highland Valley Copper, Collahuasi, Alumbrera, Fimiston, Konkola, Batu Hijau, Lake Cowal, Cadia Hill, Kambalda, Boddington, Flin Flon, Escondida Phase III, Lisheen, Cuajone, Mt. Keith, Voisey's Bay, Lobo Marte, Escondida Norte, Petaquilla, Caraiba, Miduk Copper, Endako, Las Cruces, Project Troilus, Sungun Copper, Mt. Polley, Los Pelambres, and Round Mountain.

1987 Project Manager for design modifications, engineering, procurement, construction management, re-commissioning and operations management of a 100 tpd gold recovery plant from flotation concentrate (CIL/CIP) at Buckskin, Nevada, U.S.A.

1983 Project Manager for the design and construction management of the Lupin Gold Plant Expansion to 1,250 tpd, N.W.T., Canada.

1980-1981 Project Manager for the design and construction management of the Escalante 500 tpd silver plant, S.W. Utah, U.S.A.

1977-1978 Project Manager for basic engineering, co-ordination of sub-consultants, and preparation of capital and operating cost estimates for re-commissioning a 6,000 tpd molybdenum concentrator and infrastructure and expanding it to 12,000 tpd, Kitsault, B.C., Canada.

1973-1976 Project Manager for technical economic studies on complex copper-silver-antimony ores for a 5,000 tpd concentrator and concentrate leaching plant, Equity Silver, B.C., Canada.

1973-1997 Project Manager and Consulting Metallurgist for various technical economic studies: Carajas Copper Project Grinding Circuit alternatives, Brazil; Cerro Verde Sulphide Copper Project, Perú; Cia. Minera Las Torres gold-silver plant, Mexico; Bailadores zinc-lead-silver property, Merida State, Venezuela; Crownite Diatomaceous Earth Processing Plant, Quesnel, B.C., Canada.

1970-1973 Assistant Project Manager for the design, scheduling, and contracts administration of the 10,000 tpd copper-zinc ore crushing and concentrator complex at Ruttan Lake, Northern Manitoba, Canada.

1970-1979 Metallurgist for Process development and plant design of copper, copper-zinc, lead-zinc, and complex sulphide plants involving fine grinding, differential flotation, and concentrate leaching: Ruttan Lake 10,000 tpd copper-zinc plant; Tara Mines 10,000 tpd lead-zinc plant; Equity Silver 5,000 tpd copper-silver-antimony complex sulphide plant; Pinos Altos 2,000 tpd complex sulphide project; Disputada 80,000 tpd copper-molybdenum project.

Project Manager

Responsible for the concept and co-ordination of various engineering and ancillary disciplines and the preparation of cash flows and economic evaluations in the preparation of Feasibility studies. Also on assigned design projects, responsible for the management and co-ordination of various engineering disciplines, as well as the estimating, scheduling, purchasing, expediting, and construction management functions.

Senior Staff Consultant, Metallurgy Specialist

Input to Feasibility studies, plant operations reviews, project evaluations, internal quality control and development of grinding circuit design, including the application of computer software such as "GRINDPOWER" and "CHARGEPOWER" (in-house) and simulation packages, the conduct of laboratory and pilot plant programs and plant commissioning.

Metallurgical Consultant (Grinding)

Round Mountain, Round Mountain Gold Corporation, Nevada, U.S.A. (2000)

Review of grinding test work, analysis of a single-stage SAG milling operation, and recommendations for increasing throughput.

Los Pelambres Project, Cia. Minera Los Pelambres, Chile (2000)

Evaluation of plant operations and recommendations for increasing throughput from 85,000 tpd.

Mt. Polley Concentrator, Imperial Metals Corporation, B.C., Canada (2000)

Review of grinding operations and optimization studies for increasing throughput.

Sungun Copper Project (Iran), Svedala Industries Canada Inc., Canada (1999)

Review of grinding and flotation test work, mill equipment sizing and recommendations for optimizing equipment design.

Concentrate Regrind Mill Project; Iron Ore company of Canada, Quebec, Canada (1999)

Review of grinding test work and mill equipment sizing for a new concentrate regrinding operation.

Project Troilus, Les Mines Inmet, Quebec, Canada (1999)

Review of crushing and grinding operations and recommendations for optimizing throughput.

Las Cruces Project, Rio Tinto Technical Services Limited; Bristol, U.K., Spain (1998)

Analysis of ore reserve and comminution data and mill equipment sizing for a 3,000 tpd massive sulphide copper concentrator as part of a preliminary Feasibility study.

Endako Mines, Thompson Creek Mining Ltd., B.C., Canada (1998)

Review of crushing and grinding operations and recommendations for optimizing throughput.

Miduk Copper Project (Iran), Svedala Industries Canada Inc., Canada (1998)

Review of grinding test work, mill equipment sizing and recommendations for pilot plant testwork.

Caraíba Copper Project, Mineração Caraíba, Brazil (1998 and 1999)

Review of grinding operations and recommendations for autogenous/semi-autogenous grinding options. Specifications and evaluation of pilot plant test work. Review of mill equipment sizing and recommendations for modifications.

Petaquilla Project, Teck Corporation, Panama (1997)

Analysis of comminution data and mill equipment sizing for 90,000 tpd and 120,000 tpd options.

Escondida Norte Project, *Minera Escondida Limitada*, Chile (1997)

Review of grinding test work, mill equipment sizing, and conceptual plant design for a 60,000 tpd concentrator option.

Lobo Marte Project, *Teck Corporation*, Chile (1997)

Specification and review of batch grinding test work and mill equipment sizing for a Feasibility study.

Voisey's Bay Project, *Voisey's Bay Nickel Company Limited*, Labrador, Canada (1997)

Evaluation of grinding circuit design and recommendations for mill equipment sizing and flowsheet.

Hunters Road Nickel Project, *Anglo American Corporation Services Limited*, Zimbabwe (1997)

Audit report on test work, flowsheet and mill equipment sizing.

Freda Rebecca, *Ashanti Goldfields Ltd.*, Zimbabwe (1997)

Troubleshooting vibration problems and recommending methodology for their elimination.

Cleveland Potash, *Minorco Services (U.K.) Limited*, London, UK (1997)

Development of a SAG milling concept.

Mt. Keith Nickel Concentrator, *Western Mining Corporation*, Western Australia (1997)

Evaluation of the plant operations and recommendations for additional grinding equipment.

Cuajone Concentrator, *Southern Perú Copper Corporation*, Perú (1996-1998)

Review of operating data and recommendations for plant design and sizing new ball mills for a 64,000 tpd expansion project.

Lisheen Project, *Minorco*, Eire (1996 & 1997)

Review of grinding circuit design and recommendations for mill equipment sizing and flowsheet.

Escondida Phase III, *Minera Escondida Limitada*, Chile (1996)

Evaluation of plant operations and recommendations for increasing throughput.

Flin Flon Concentrator, *Hudson Bay Mining and Smelting Co. Ltd.*, Manitoba, Canada (1996 & 1998)

Evaluation of plant operations and alternative flowsheets for increasing throughput.

Boddington Gold Mine, *Worsely Alumina Pty. Ltd.*, Western Australia (1996, 1997, & 1999)

Review of comminution test data, study of alternative crushing and grinding circuits, estimation of production criteria, sizing of equipment and specification, supervision, and evaluation of pilot plant test work for the Basement Ore Development Project in the review, pre-Feasibility and Feasibility study stages using a 40 ft dia. SAG mill and 24 ft dia. ball mills.

Kambalda Nickel Concentrator Expansion, *Western Mining Corporation*, Western Australia (1994-1995)

Review of pilot plant data, sizing of equipment, audit of equipment designs, and performance, and establishment of production rates for different ore types in a 26 ft diameter, 3,500 kW fixed-speed SAG mill to process 1.45 million tpy nickel ore.

Operations Review; Multigold, *Gencor Limited*, South Africa (1995)

Evaluation of plant operations and bottlenecks, and recommendations for increasing throughput.

Cadia Hill, *Newcrest Mining Limited*, N.S.W., Australia (1995)

Review of comminution test data, estimation of production targets, mill equipment sizing, and recommended future test work beyond a Feasibility study to process up to 17 million tpy of low grade gold ore.

Lake Cowal Project, *North Limited*, N.S.W., Australia (1995)

Review of batch grinding test work, estimation of production targets, mill equipment sizing, and recommendations for future test work beyond a Feasibility study to process six million tpy of hard siliceous gold ore.

Batu Hijau Project, Newmont Gold Company, Indonesia (1994-1999)

Specification and review of batch grinding test work, recommendations for drilling test core, mill equipment sizing, and estimation of production targets for optimization and Feasibility studies of a 120,000 tpd copper/gold mine leading into basic engineering, equipment specifications and purchase.

Post-commissioning review (2000-2001).

Konkola Deep Mining Project, Zambia Consolidated Copper Mines, Zambia (1994-1997)

Review of pilot plant data and recommendations for further test work. Specification, supervision, and evaluation of pilot plant test work, and sizing of equipment for six million tpy of copper ores.

Fimiston Expansion Project, Kalgoorlie Consolidated Gold Mines Pty., Western Australia (1994)

Specification, supervision and evaluation of pilot plant test work, sizing of equipment, and establishment of production targets for a 36 ft diameter 12000 kW geared drive variable speed SAG mill and existing ball mills at up to 7.5 million tpy of hard gold ores.

Bajo de la Alumbreira Project, MIM/International Musto Explorations, Argentina (1992-1995)

Specification and evaluation of batch and pilot plant test work, sizing of the equipment, and establishment of production targets for two 36 ft diameter 18,000 hp gearless drive variable speed SAG mills and companion ball mills at 70,000 - 90,000 tpd production rate of copper/gold ores.

Post-Commissioning Review and Commissioning Engineer for the Performance Test (1997-1998).

Collahuasi Project, Cia. Minera Doña Ines de Collahuasi, S.A., Chile (1993-1994)

Specification, supervision and evaluation of pilot plant test work, and sizing of equipment for SAG/ball mill and alternative grinding circuits. The completed project is designed to process 60,000 tpd of secondary copper ores and 90,000 tpd of primary sulphide ores.

Review of grinding operations (1999).

Operations Review, Johannesburg Consolidated Investment Company, Limited, now Amplats Management Services (Proprietary) Ltd., Potgietersrust, South Africa (1993-1996 & 1999)

Evaluation of plant operations and recommendations for increasing throughput.

Copper Concentrator, Highland Valley Copper Corporation, B.C., Canada (1993)

Review of plant operations and specification of additional grinding equipment to SAG/ball mill and autogenous (ABC) grinding circuits (five lines) for the purpose of increasing copper output.

Palabora Phase 3 Underground Mining Study, Rio Tinto South Africa, South Africa (1992-1993)

Review of operating data, specifications, supervision and evaluation of pilot plant test work, establishment of production targets for the existing autogenous and conventional plants, and preparation of design criteria to optimize grind and recovery of copper and heavy minerals.

95K and 105K Expansion Projects, Freeport Indonesia, Indonesia (1992-1993)

Review of pilot plant and operating plant data, sizing and review of equipment sizing, and establishment of production targets for a 34 ft. diameter 14,250 hp gearless drive variable speed SAG mill and companion ball mill (8,500 hp each) circuits to process up to 60,000 tpd of copper/gold ores.

Post-commissioning review (1995).

Kennecott Corporation, Copperton Concentrator, RTZ Technical Services Limited; Bristol, U.K., Utah, U.S.A (1992)

Review of operations and predictions for future performance on ores from Bingham Canyon through three 34 ft diameter 12,000 hp DC and one 36 ft diameter 16,000 hp gearless drive variable speed SAG mills and companion ball mill circuits for a nominal 112,000 tpd capacity.

Yakabindie Nickel Project, *Dominion Resources Pty.*, Western Australia (1991)

Review of test work and sizing of semi-autogenous grinding circuits for a 20,000 tpd plant.

Clarabelle Concentrator, *INCO Limited*, Ontario, Canada (1988-1991)

Review of pilot plant data, sizing and specification of equipment, establishment of production targets, and commissioning of a 32 ft diameter 11,000 hp DC variable speed SAG mill as part of INCO's Mill Rationalization Scheme and expansion of the conventional plant at Clarabelle to 40,000 tpd.

Audit of Clarabelle grinding operations (1991).

La Candelaria Copper Project, *Phelps Dodge Corporation*, Chile (1990)

Review of pilot plant data, sizing of equipment, and establishment of production targets for a 36 ft diameter 16,000 hp gearless drive variable speed SAG mill and companion ball mills at 26,000 to 30,000 tpd production rate of copper/molybdenum ores.

Agnew (Leinster) Nickel Concentrator, *Western Mining Corporation*, Western Australia (1990)

Review of pilot plant data, sizing of equipment, and establishment of production rates for different ore types in a 32 ft. diameter 7,500 kW fixed speed SAG mill to process 6,000,000 tpy nickel ore.

Review of grinding operations (1995).

Uitkomst Nickel Project, *Anglo American Corporation*, South Africa (1990) 20,000 tpd review.

Mt. Milligan Project, *Continental Gold Corp.*, British Columbia, Canada (1990)

Review for a Feasibility study on processing 60,000 tpd copper-gold ore.

Mt. Isa Copper Concentrator, *Mount Isa Mines*, Queensland, Australia (1989)

Review of pilot plant data and sizing of equipment for two 32 ft. diameter 5,000 kW fixed speed SAG mills to process 17,350 tpd.

Polymetallic Concentrator, *Pirites Alentejanas S.A.*, Portugal (1988)

Review of pilot plant data and sizing of equipment for a 3,000 tpd autogenous grinding circuit processing complex copper/lead/zinc/silver ores.

Premier Gold Mine, *Westmin Resources Limited*, British Columbia, Canada (1987)

Specification, supervision, and evaluation of pilot plant test work, sizing and specification of equipment for 3,000 tpd of complex gold ore.

Getchell Project, *FirstMiss Gold*, Nevada, U.S.A. (1985-1987)

Specification, supervision, and evaluation of pilot plant test work, sizing and specification of equipment for 3,000 tpd of complex gold/silver ores.

Colon Concentrator, *CODELCO Division El Teniente*, Chile (1983-1987)

Specification, supervision and evaluation of pilot plant test work, sizing and specification of equipment, establishment of production targets and basic engineering for a 36 ft. diameter 15,000 hp gearless drive variable speed SAG mill and companion ball mills as part of the expansion of the conventional plant to process 110,000 tpd primary sulphides.

Review of grinding operations and recommendations for expansion to process harder ores. (1998).

Plant Expansion and Optimization, *Rio Tinto Minera, S.A.*, Spain (1984-1986)

Development and evaluation of several alternatives leading to the expansion of the crushing and grinding circuits to 15,000 tpd for the gold/silver plant and increasing the efficiency of the 22,000 tpd copper plant.

Operations Review, *Cyprus Bagdad*, Arizona, U.S.A. (1986 & 1995-1996)

Evaluation of plant operations and grinding circuit efficiency.

Gold Concentrator, *Teck-Corona*, Ontario, Canada (1984) 1,000 tpd grinding circuit.

Key Lake Uranium Plant, *Cameco (formerly Key Lake Mining Corp.)*, Saskatchewan, Canada (1984)
700 tpd uranium ore.

Escalante Project, *Ranchers Exploration and Development Corp. (now Hecla)*, Utah, U.S.A. (1980)
800 tpd of silver ore.

Molybdenum Concentrator, *Cyprus Mines Corporation*, Idaho, U.S.A. (1979)
25,000 tpd grinding circuits.

Copper-Molybdenum Concentrator, *Quintana Minerals Corporation*, New Mexico, U.S.A. (1979)
15,000 tpd grinding circuit.

Silver/Lead/Zinc Concentrator, *Real de Angeles*, Zacatecas, Mexico (1979)
Review of test work and sizing of conventional grinding equipment for the 10,800 tpd silver/lead/zinc concentrator.

Tungsten Concentrator Expansion, *Canada Tungsten Corporation*, Y.T., Canada (1979)
1,000 tpd conventional grinding circuit.

Metallurgical Consultant

CIL Plant, *Rosario Dominicana, S.A.*, Cotui, Dominican Republic (1992)
Commissioning engineer during the pre-commissioning, start-up and plant operations phases for a 8,000 tpd CIL plant converted from a CCD gold/silver operation.

Heap Leaching Project, *Arizona Copper Company (AZCO)*, Arizona, U.S.A. (1990)
Evaluation of crushing testwork and test blasts for the 30,000 tpd heap leaching project.

Complex Sulphide Ore Study, *Neves Corvo (Somincor)*, Portugal (1989)
Review and assessment of process test work and plant design concepts for processing complex sulphide ores.

Evaluation, *Cominco Exploration Ltd.*, B.C., Canada (1987)
Evaluation of metallurgical projections for a stock offering.

Operations Review, *Minera Milpo, Arcata and Caylloma*, Perú (1984-1987)
Review of current practice and the design of improved flowsheets for these lead/zinc/silver plants.

Project Manager & Metallurgical Consultant

Carajas Copper Project, *CVRD*, Brazil (1988 & 1994-1997)
Review of pilot plant data and technical-economic study for alternative grinding circuits.

Cerro Verde Sulphide Stage, *Minero Perú*, Arequipa, Perú (1985)
Technical-economic study and semi-autogenous grinding test work for the 20,000 tpd sulphide stage.

Complex Copper-Silver-Antimony Ores, *Sam Goosly (now Equity Silver Corporation.)*, B.C., Canada (1973-1976)
Development, supervision, and evaluation of laboratory and pilot plant tests applied to complex copper/silver/antimony ores. Preparation of technical-economic studies for a 5,000 tpd concentrator and concentrate leach plant

Silver/Gold Concentrator, *Compañía Minera Las Torres, S.A.*, Guanajuato, Mexico (1973)
Technical-economic study for a 2,000 tpd silver/gold mine complex and concentrator.

Zinc/Lead/Copper/Silver Mine and Concentrator, *Ministerio de Minas y Hidrocarburos*, Venezuela (1973-1974)
Preliminary Feasibility study for a 500 tpd zinc/lead/copper/silver mine and concentrator.

Diatomaceous Earth Plant, *Crownite Industrial Minerals*, B.C., Canada (1973-1975)
Review of the operation and the design and construction of modifications to the 100 tpd plant.

Project Manager

Buckskin CIP Plant, *Sonora Mining Corporation*, Nevada, U.S.A. (1987)
Design modifications, procurement, construction management and operations management for the Buckskin, Nevada CIP operation treating gold concentrates from the Jamestown Mine.

Lupin Plant Expansion, *Echo Bay Mines*, N.W.T., Canada (1983)
Design engineering, procurement and construction management for the mill expansion to 1,500 tpd.

Escalante Silver Concentrator and Ancillary Facilities, *Ranchers Exploration and Development Corporation (now Hecla)*, Utah, U.S.A. (1980-1981)
Design engineering, procurement, and construction management for the 800 tpd concentrator and ancillary facilities.

Molybdenum Concentrator, *Amax Canada Ltd.*, B.C., Canada (1977-1978)
Basic engineering, capital and operating cost studies for re-commissioning a 6,000 tpd concentrator and expanding it to 12,000 tpd. Project scope included town site, roads, tailing disposal, water supply, power supply, dock facilities and ancillary buildings.

Metallurgist

Polymetallic Concentrator, *Hudson Bay Mining and Smelting Co. Ltd.*, Manitoba, Canada (1977-1978)
Review of current practice and the design of improved flowsheets for the Snow Lake concentrator to process 3,800 tpd of copper-zinc and copper/lead/zinc ores.

Disputada (80,000 tpd) and Pinos Altos (2,000 tpd), *Exxon Corporation* (1978-1979)
Review of test work, development of process and plant design concepts for technical-economic studies related to these properties.

Lead/Zinc Concentrator, *Tara Mines*, Navan, Eire (1972)
10,000 tpd of lead/zinc ores.

Copper/Nickel Concentrator, *Giant Mascot Mines*, B.C., Canada (1972)
Copper/nickel separation process.

Assistant Project Manager & Metallurgist

Polymetallic Concentrator, *Chester Mines (Sullivan Group)*, New Brunswick, Canada (1970).
Prospect (2,000 tpd).

Copper/Zinc Concentrator, *Sherritt Gordon Mines Ltd.*, Manitoba, Canada (1971-1973)
Design, equipment specification and contract administration for the Ruttan Lake 10,000 tpd copper/zinc concentrator.

TECHNICAL PAPERS

1. Barratt, D.J., Weston, E.J., and Murray, J.E., 1978, "Noranda Mines Limited - Boss Mountain Division", Milling Practice in Canada, CIM, Montreal, P.Q.
2. Sharp, M.V., and Barratt, D.J., 1979, "Improving the Material Flow in the Fox Mine Concentrate Bins", Proceedings of Tenth Annual Meeting of the Canadian Mineral Processors of CIM, Ottawa, Ontario, January.
3. Barratt, D.J., 1979, "Semi-Autogenous Grinding: A Comparison with the Conventional Route", CIM Bulletin, November.
4. Barratt, D.J., and Pearce, R.G., 1982, "Capital and Operating Cost Estimation", McGill University Seminar, Montreal, P.Q., March
5. Barratt, D.J., and Sochocky, M.A., 1982, "Factors which Influence Selection of Comminution Circuits", Chapter 1, Design and Installation of Comminution Circuits, A.L. Mular and G.V. Jergensen II, Editors.
6. Barratt, D.J., 1982, "The Escalante Project", American Mining Congress, Las Vegas, October.
7. Barratt, D.J., 1982, "Performance Risk", Proceedings of Second Mineral Economics Symposium, Risk Management in Mining, CIM, Vancouver, B.C., November.
8. Barratt, D.J., 1983, "Minimizing Risk in Plant Design with Semi-Autogenous Circuitry", Proceedings of First National Workshop on Autogenous Grinding of Ore, Santiago de Chile, September.
9. Barratt, D.J., and Beattie, M.J.V., 1984, "Applied Mineralogy in Flowsheet Development", Proceedings of Second International Congress on Applied Mineralogy in the Minerals Industry", Los Angeles, February.
10. Barratt, D.J., Andrews, S.J., Fernie, A.D., and Pendreigh, R., 1984, "Recent Developments in the Mineral Processing Industry", Proceedings of Mineral Processing and Extractive Metallurgy, Kunming, Yunnan Province, Peoples Republic of China, IMM, London, November.
11. Barratt, D.J., and Allan, M.J., 1986, "Testing for Autogenous and Semi-Autogeneous Grinding: A Designer's Point of View", Minerals and Metallurgical Processing, May.
12. Barratt, D.J., 1986, "Grinding Circuit Design: Concepts for Small Mines", Proceedings of Mining Latin America, Santiago de Chile, IMM, London, November.
13. Barratt, D.J., and Pendreigh, R., 1986, "Refractory Gold –Process Options", Proceedings of XVIII Convencion de Ingenieros de Minas, Lima, Perú, November.
14. Barratt, D.J., and Scott, J.W., 1987, "Testwork Selection and Design for Grinding Circuits: An Engineering Company Viewpoint", presented at CIM District 6 Meeting, October.
15. Barratt, D.J., and Vivanco, F., 1987, "Development of the Semi-Autogenous Grinding Alternative for the Concentrator Expansion at El Teniente", Proceedings of Copper '87, Santiago de Chile, November.
16. Barratt, D.J., 1989, "An Update on Testing, Scale-Up and Sizing Equipment for Autogeneous and Semi-Autogeneous Grinding Circuits", Proceedings of the First International Conference on Advances in Autogenous and Semi-Autogenous Technology, A.L. Mular and G.E. Agar, Editors, September.

17. Barratt, D.J., and McElroy, R.O., 1989, "Heap Leaching for Precious Metals", Proceedings of Simposio de Mineralurgia Peruana, TECSUP, Lima, Perú, August.
18. Barratt, D.J., Pendreigh, R., and Bacon, W.G., 1990, "Rehabilitation and Modifications to Sonora Gold Concentrate Leaching Facility at Buckskin, Nevada", presented at CIM District 6 Meeting, September.
19. Barratt, D.J., et alia, 1991, "Practical Design of Comminution Processes", Proceedings of a School, SAIMM, Johannesburg, May.
20. Barratt, D.J., and Matthews, B.D., 1991, "GRINDPOWER: Computer Based Program for the Sizing and Selection of Grinding Circuits", Proceedings of Computer Applications in the Mineral Industry, R. Poulin, R.C.T. Pakalnis, and A.L. Mular, Editors, September.
21. Barratt, D.J., 1992, "Design of Pebble Crushing Circuits", presented at SME Annual Meeting, Phoenix, Arizona, February.
22. Barratt, D.J., 1994, "Variable Speed SAG Mills: Motor Capability vs. Mill Capability", Mining Engineering, November.
23. Barratt, D.J., and Matthews, B.D., 1995, "Autogenous and Semi-Autogenous Grinding Circuits: A Means of Predicting the Effects of Ore type on Downstream Processes", Proceedings of a Colloquium on Interactions between Comminution and Downstream Processing, SAIMM, June.
24. Barratt, D.J., Brodie, M.N., and Pfeifer, M.A., 1996, "SAG Milling Design Trends, Comparative Economics, Mill Sizes and Drives", Proceedings of the Second International Conference on Autogenous and Semi-Autogenous Grinding Technology, A.L. Mular, D.J. Barratt, and D.A. Knight, Editors, Vancouver, October.
25. Barratt, D.J., Matthews, B.D., and deMull, T., 1996, "Projection of SAG/AG Mill Sizes, Mill Speeds, Ball Charges and Throughput Variation from Bond Work Indices", Proceedings of the Second International Conference on Autogenous and Semi-Autogenous Grinding Technology, A.L. Mular, D.J. Barratt, and D.A. Knight, Editors, Vancouver, October.
26. Jackson, I., and Barratt, D.J., 1998, "Mill Design Methodologies", Proceedings of Mineral Processing Design School, SAIMM, Johannesburg, September.
27. Barratt, D.J., Basic, J., Dunlop, G.A., and Phillips, R., 1999, "Autogenous and Semi-Autogenous Grinding: Laboratory and Pilot Plant Studies", Proceedings of Mineral Processing and Hydrometallurgy Plant Design, World's Best Practice, Australian Mineral Foundation, July.
28. Barratt, D.J., and Brodie, M.N., 2001, "The "Tent" Diagram and What it Means", Proceedings of the Third International Conference on Autogenous and Semi-Autogenous Grinding Technology, D.J.Barratt, M.J.Allan, and A.L. Mular, Editors, Vancouver, October.
29. Sylvestre, Y., Abols, J., and Barratt, D.J., 2001, "The Benefits of Pre-Crushing at the Inmet Troilus Mine", Proceedings of the Third International Conference on Autogenous and Semi-Autogenous Grinding Technology, D.J.Barratt, M.J.Allan, and A.L.Mular, Editors, Vancouver, October.
30. Villanueva, F., Ibanez, L., and Barratt, D.J., 2001, "Los Pelambres Concentrator Operating Experience", Proceedings of the Third International Conference on Autogenous and Semi-Autogenous Grinding Technology, D.J.Barratt, M.J.Allan, and A.L.Mular, Editors, Vancouver, October.

31. Barratt, D.J., and Sherman, M., 2002, “Factors which Influence the Selection of Comminution Circuits”, Proceedings of Mineral Processing Plant Design, Practice, and Control Symposium, A.L.Mular, D.N.Halbe, and D.J.Barratt, Editors, Vancouver, SME, October.
32. Hanks, J., and Barratt, D.J., 2002, “Sampling a Mineral Deposit for Metallurgical Testing and the Design of Comminution and Mineral Separation Processes”, Proceedings of Mineral Processing Plant Design, Practice, and Control Symposium, A.L.Mular, D.N.Halbe, and D.J.Barratt, Editors, Vancouver, SME, October.
33. Barratt, D.J., and Sherman, M., 2002, “Selection and Sizing of Autogenous and Semi-Autogenous Mills”, Proceedings of Mineral Processing Plant Design, Practice, and Control Symposium, A.L.Mular, D.N.Halbe, and D.J.Barratt, Editors, Vancouver, SME, October.
34. Barratt, D.J., 2007, “Autogenous and Semi-Autogenous Grinding” Mineral Processing Seminar, McGill University, Montréal, May.
35. Barratt, D.J., 2007, “Geo-Comminution” Workshop, Rio Tinto Technology and Innovation, Snowbird, Utah, August.
36. Barratt, D.J., and Doll, A.G., 2008, “Testwork Programs that Deliver Multiple Data Sets of Comminution Parameters for use in Mine Planning and Project Engineering”, Proceedings of PROCEMIN, Santiago de Chile, October.
37. Barratt, D.J., 2009, “Grinding Circuits: What to Look Out for in Design”, Plenary Session, Proceedings of Recent Advances in Mineral Processing Plant Design”, D. Malhotra, P.R.Taylor, E.Spiller, and M. Levier, Editors, Tucson, October.
38. Doll, A.G., and Barratt, D.J., 2009, “Case Studies on the Effect of Sample Dimensions on Comminution Testwork Results”, Proceedings of PROCEMIN, Santiago de Chile, December.
39. Doll, A.G., Barratt, D.J., and Godoy, R.S., 2010, “Microcracking versus the Phantom Cyclone; Comparing SAG Mills and HPGR on a Consistent Basis”, Proceedings of PROCEMIN, Santiago de Chile, December.
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42. Barratt, D.J., and Zuñiga, M., 2013, “Geometallurgy vs Plant Development” and “Geometallurgy vs Plant Design”, Proceedings of the II Ecuentro Internacional Metalurgia, Plantas y Procesos, Lima, Perú, November.
43. Barratt, D.J., and Zuñiga, M., 2014, “Geometallurgy for Comminution Studies”, Proceedings of IOM3 Geometallurgy 2014, London, United Kingdom, June.
44. Barratt, D.J., and Zuñiga, M., 2014, “Comminution Testwork in a Geometallurgical Plan and Assessment of Confidence in Projections of Mill Feed Rates” Proceedings of GEOMET2014, Santiago de Chile, December.
45. Barratt, D.J., et alia, 2015, “Some Reasons for and not Meeting Initial Production Targets”, Proceedings of IOM3 “Mine to Market” Conference 2015, Cambridge, United Kingdom, December