

PROJECT REFERENCE LIST

300 admtd/day Nonwood Fibre Market Pulp Mill

Prefeasibility study for a 300 mt/day nonwood market pulp mill including R&D work, process design and equipment selection, developed inputs for material balance, prepared functional specifications for major equipment, supplier investigations and price quotes, capital and operating cost estimating, and financial analysis.

Client: Confidential
Location: Mexico
Materials: Agave tequilana wastes
Products: Market pulp

10 mt/day Demonstration Nonwood Fibre Pulp & Paper Mill

Assisted in client's prefeasibility study for a 10 mt/day demonstration nonwood pulp and fine paper mill based on cereal straw, flax straw, industrial hemp - critiqued client's flow sheets, assisted in finalizing flow sheets, developed inputs for material balance, prepared functional specifications for major equipment, supplier investigations and price quotes.

Client: Confidential
Location: Canada
Materials: Cereal straws, flax straw, industrial hemp
Products: Fine paper

Non-Food/Non-Feed Uses of Agricultural Products - Phase 3

Phase 3 covered possible applications and markets for nonwood plant fibres from agricultural crop residues and fibre crops - prepared section on challenges and opportunities for pulp and paper and reviewed other sections on bast fibre applications in various end-products.

Client: Agricultural and Agri-Food Canada
Location: Canada
Materials: Cereal straws, flax straw, industrial hemp, switch grass, corn stalks
Products: Pulp, paper, paperboard, nonwovens, geotextiles, composites.

Molded Pulp Products

Developed design parameters and equipment selection for a molded pulp project.

Client: Confidential
Location: Canada
Materials: High fibre content sludge
Products: Molded pulp products

Non-Food/Non-Feed Uses of Agricultural Products - Phase 1

As a subcontractor to the prime consultant, prepared two reports giving an expert review and assessment of available technologies and market opportunities within the North American pulp and paper industry and the North American fibreboard industry for potential end-products that could be produced using agricultural residues and fibre crops.

Client: Agricultural and Agri-Food Canada
Location: Canada

Materials: Cereal straws, flax straw, industrial hemp, switch grass, corn stalks
Products: Paper, paperboard, fibreboard, panel board

Nonwood Fibre Market Pulp and/or Fine Paper Mill

Prefeasibility study including market research and R&D for a TCF market pulp and/or integrated pulp and paper mill. The study investigated three project alternatives: a) 60,000 admtd/year flax/hemp market pulp mill; b) integrated pulp and paper complex producing 36,000 admtd/year flax/hemp market pulp and 200,000 mt/year uncoated printing and writing paper; c) integrated pulp and paper complex producing 200,000 mt/year uncoated printing and writing paper.

Client: 3448746 Canada Ltd. (Prairie Pulp and Paper Co.)
Location: Manitoba, Canada
Materials: Cereal straws, flax straw, industrial hemp and purchased deinked market pulp, cotton linters pulp and/or softwood kraft
Products: Flax/hemp market pulp and/or printing & writing paper

485 admtd/day Bamboo Market Pulp Mill

Technical advice to the prime consultant (SNC-Lavalin Cowan, Montreal, Canada) for a technical and commercial study for a 170,000 admtd/year bamboo market pulp mill including development of R&D program and advice on fiber line process design for market pulp production from bamboo.

Client: Far East Pulp and Paper Ltd., Hong Kong
Location: Fengshun, China
Materials: Bamboo (4 primary species)
Products: Bleached market pulp

Corn Stalks Pulp & Fine Paper Mill - Part 2

Pulp mill basic engineering using Hurter/Byrd patented process for corn stalks pulping and complete review of prefeasibility study by prime consultant and development of alternative financial projections of a 200,000 mt/year fine paper mill based on corn stalks

Client: Mells Industries, LLC, Des Moines, Iowa, USA
Location: Iowa, USA
Materials: Corn stalks & purchased deinked market pulp, cotton linters pulp, softwood kraft pulp
Products: Printing & writing paper

Corn Stalks Pulp & Fine Paper Mill - Part 1

Directed research and development work at North Carolina State University (NCSU) and fiber line process design for a prefeasibility study of a 200,000 mt/year fine paper mill based on corn stalks. During the work, Mr. Robert Hurter and Dr. Medwick Byrd of NCSU developed a patented low energy pulping and bleaching process for nonwood plant fiber raw materials (US Patent 6,302,997).

Client: Mells Industries, LLC, Des Moines, Iowa, USA
Location: Iowa, USA
Materials: Corn stalks & purchased deinked market pulp, cotton linters pulp, softwood kraft pulp

Products: Printing & writing paper

300 admt/day Recycled Fibre Market Pulp Mill - Part 3

Business plan and financial scenarios report for 105,000 mt/year deinked recycled fiber market pulp mill.

Client: Richmond Trading Inc.
Location: Saint John, NB, Canada
Materials: Sorted mixed office wastepaper (MOW)
Products: DIP market pulp

300 admt/day Recycled Fibre Market Pulp Mill - Part 2

Fiber raw material study for 105,000 mt/year deinked recycled fiber market pulp mill from office wastepaper.

Client: Richmond Trading Inc.
Location: Saint John, NB, Canada
Materials: Sorted mixed office wastepaper (MOW)
Products: DIP market pulp

260 mt/day Newsprint Mill

Process selection, capital cost estimates and operating cost estimates for 85,000 mt/year newsprint mill.

Client: Jang Publishing Group
National Management Consultants
Location: Pakistan
Materials: Wastepaper, purchased pulp
Products: Newsprint

230 admt/day Bleached Bagasse Market Pulp Mill

Preliminary review of project documentation for 80,000 mt/year bleached bagasse market pulp mill.

Client: Paradigm Technologies Inc., Saint John, NB, Canada
Location: South East Asia
Materials: Sugarcane bagasse
Products: Bleached market pulp

Neswprint, Linerboard and/or Fine Paper Mill

Market study, prefeasibility study for three project alternatives (newsprint, linerboard, printing & writing paper) and detailed study for 90,000 mt/year newsprint mill.

Client: National Industrialization Company (NIC)
Location: Saudi Arabia
Materials: Wood, wastepaper, purchased pulp
Products: Newsprint, linerboard and/or printing & writing paper

Environmental Assessment Study

Environmental assessment for detailed feasibility study to expand and rehabilitate 65,000 mt/year bleached hardwood kraft pulp mill and add 140,000 mt/year paper machine.

Client: World Alliance Merchant Finance Co., Cambridge, MA, USA

Mill: Brown & Root Forest Products, Houston, TX, USA
Location: Bukoza S.A.
Location: Vranov nad Toplou, Republic of Slovakia
Materials: Beech, purchased softwood kraft
Products: Coated paper (C2S free-sheet)

300 admt/day Recycled Fibre Market Pulp Mill - Part 1

Project review prefeasibility study for 300 mt/day deinked recycled fiber market pulp mill from office wastepaper.

Client: Richmond Trading Inc.
Location: Saint John, NB, Canada
Materials: Sorted mixed office wastepaper (MOW)
Products: DIP market pulp

150 admt/day Bleached Sisal Market Pulp Mill

Detailed techno-economic feasibility study for 150 mt/day bleached sisal market pulp mill based on a TCF process for bleaching nonwood pulps developed by HurterConsult - process proven in laboratory and pilot plant trials. Process uses currently available and proven technology to minimize technical risk.

Client: Tanzania Sisal Authority
Location: Tanzania
Materials: Sisal
Products: TCF bleached market pulp

285 mt/day Kraft Paper & Paperboard Mill

Project identification prefeasibility study for 100,000 mt/year kraft paper and paperboard mill.

Client: A. H. Zamil Group of Companies
Location: Saudi Arabia
Materials: Wastepaper, purchased pulp
Products: Kraft paper, paperboard

Mill Expansion & Rehabilitation

Project identification prefeasibility study for expansion and rehabilitation of existing 65,000 mt/year bleached hardwood kraft market pulp mill and the addition of 140,000 mt/year paper machine.

Client: World Alliance Merchant Finance Co., Cambridge, MA, USA
Mill: Bukoza S.A.
Location: Vranov nad Toplou, Republic of Slovakia
Materials: Beech, purchased softwood kraft
Products: Coated paper (C2S free-sheet)

120 mt/day Sack Kraft & Fine Paper Mill

Detailed techno-economic feasibility study for 40,000 mt/year paper mill for production of sack kraft and writing and printing paper.

Client: Pakistan Papersack Corporation Ltd., Karachi
Location: Muzaffargarh, Pakistan
Materials: Purchased pulp, wastepaper
Products: Sack kraft, printing & writing paper

Flax Pulp Market Survey Update

Update of market survey on flax pulp production, consumption and pricing in Western Europe.

Client: Arbokem Incorporated, Vancouver, BC, Canada
Location: Western Europe
Materials: Flax
Products: Market pulp

Pakistan Pulp & Paper Industry Sector Study

Pulp and paper industry sector study to assess the size of Pakistan's market, local production capability, and potential for increasing Canadian pulp & paper exports to Pakistan. Study also investigated the potential for Canadian equipment suppliers to establish joint venture manufacturing facilities with local fabricators.

Client: Canadian High Commission, Islamabad, Pakistan
Location: Pakistan

300 mt/day Bagasse Pulp & Fine Paper Mill

Preliminary engineering, flow sheets, layouts, mill description, capital and operating cost estimates, financial analysis for detailed feasibility study of 300 mt/day printing and writing paper mill.

Client: Group Inc., Montreal, Canada
Location: Kous, Egypt
Materials: Sugarcane bagasse, purchased woodpulp
Products: Printing & writing paper

Hand Made Specialty Papermaking

Report assessing the technical issues of developing a cottage industry in Kenya for production of handmade specialty papers using local nonwood raw materials.

Client: African Project Development Facility, Nairobi
Location: Kenya

Mill Expansion & Modernization

Technical study for expansion and modernization of existing pulp and paper mill to increase the capacity of the pulp mill, wastepaper pulping system and paper machine; including consideration of the impact of the expansion on existing services and utilities.

Client: Papeleras y Cartones S.A.
Location: Medellin, Colombia
Materials: Cypress, pine, eucalyptus
Products: Bag paper, kraft paperboard

120 admt/day Bleached Sisal Market Pulp Mill

Detailed techno-economic feasibility study for 120 mt/day bleached sisal market pulp mill.

Client: Celulosa Dominicana
Location: Monte Cristi Province, Dominican Republic
Materials: Sisal

Products: Bleached market pulp

Pakistan Printing & Writing Paper Sector Study

Comprehensive sector study of the writing and printing paper industry in Pakistan covering local markets, raw materials, imports, and review and analysis of ten producing mills. The study also developed criteria for NDFC to use in evaluating and analyzing future writing and printing paper projects proposed for Pakistan.

Client: National Development Finance Corp., Karachi, Pakistan
Location: Pakistan
Materials: Wheat & rice straw, kahi grass, sugarcane bagasse, cotton wastes, cotton linters, pine, eucalyptus, wastepaper, imported pulp
Products: Printing & writing paper

300 mt/day Bagasse Pulp & Fine Paper Mill

Comprehensive technical evaluation of a printing and writing paper mill under consideration for financing.

Client: National Development Finance Corp., Karachi, Pakistan
Location: Pakistan
Materials: Sugarcane bagasse, purchased woodpulp
Products: Printing & writing paper

Bagasse Market Pulp Mill Alternatives

Capital cost estimates and financial analysis for 170, 300 & 435 mt/day bagasse market pulp mills.

Client: Rothwells Limited, Perth, Australia
Location: Australia
Materials: Sugarcane bagasse
Products: Bleached market pulp

Flax Pulp Market Survey

Market survey on flax pulp production, consumption and pricing in Western Europe.

Client: Arbokem Incorporated, Vancouver, BC, Canada
Location: Western Europe
Materials: Flax
Products: Market pulp

Pulp Mill Addition Feasibility Study

Detailed feasibility study for addition of 11 mt/day pulp mill to existing 15 mt/day printing and writing paper mill.

Client: Conapel S.A., Guatemala City, Guatemala
Location: Ocosito, Guatemala
Materials: Sugarcane bagasse, wastepaper, lemon grass
Products: Printing & writing paper

120 mt/day Nonwood Printing & Writing Paper Mill

Detailed techno-economic feasibility study for 120 mt/day printing and writing paper mill.

Client: Pakland Paper Limited, Karachi, Pakistan
Location: Thatta, Pakistan
Materials: Sugarcane bagasse, wheat straw, rice straw, purchased softwood pulp
Products: Printing & writing paper

150 mt/day Kraft Paper Machine Addition

Detailed techno-economic feasibility study for addition to existing facilities of 50,000 mt/year kraft paper machine to produce sack kraft, linerboard and corrugating medium.

Client: Societe Nationale Tunisienne de Cellulose
Location: Kasserine, Tunisia
Materials: Wastepaper, imported woodpulp, esparto grass
Products: Sack kraft, linerboard, corrugating medium

42 mt/day Superfine Paper Mill

Detailed techno-economic feasibility study for 42 mt/day superfine paper mill for producing cigarette paper, tipping paper, plug wrap paper, copy tissue, bible paper and airmail paper.

Client: International General Contractors & Engineers, Cairo, Egypt
Location: 6th October City, Egypt
Materials: Purchased woodpulp, esparto grass pulp, flax
Products: Specialty fine papers

18 mt/day Tissue Mill

Detailed techno-economic feasibility study for 18 mt/day tissue mill.

Client: Bank Tuniso-Koweitienne de Developpement Tunisie
Location: Tunis, Tunisia
Materials: Purchased woodpulp
Products: Tissue paper

Mill Rehabilitation Plan

Two (2) technical review studies of Khulna Newsprint Mills rehabilitation program.

Client: Canadian International Development Agency (CIDA), Hull, Quebec, Canada
Location: Khulna Newsprint Mills, Khulna, Bangladesh
Materials: Tropical hardwoods
Products: Newsprint

100 mt/day Molded Products

Preliminary design of a 100 mt/day wastepaper line for molded egg and fruit trays, prepared basic specification, reviewed vendor proposals, report to client.

Client: Confidential
Project: 100 mt/day wastepaper line
Materials: Grade #6 wastepaper
Products: Molded trays

Kraft Pulp Mill Liquor Balance

Preparation of kraft pulp mill liquor balance for existing pulp mill and proposed expanded facilities including additional pulping capacity, oxygen delignification and a chemical recovery system.

Client: Babcock & Wilcox Industries, Cambridge, Ontario, Canada
Project: Severo Ceske Papirny Mill Expansion
Location: Steti, Czechoslovakia
Materials: Pine, fir, alder, oak

Bamboo Pulp & Offset Printing Paper Mill

Conceptual & basic process engineering, process flow sheets, preliminary equipment layouts and equipment specifications for 100 mt/day offset printing paper mill and 150 mt/day pulp mill; for CIC Inc. initial proposal and subsequent proposal revisions. Work included five technical/marketing trips to China, assistance in equipment selection, and assistance in contract negotiations.

Client: Canadian Industrial Consortium Inc., Montreal, Quebec, Canada
Project: Fujian Shaowu Bamboo Pulp & Fine Paper
Location: People's Republic of China
Materials: Bamboo, purchased pulp
Products: Offset printing paper, market pulp
Award: CIC Inc. awarded a contract of about \$40 million for the supply of equipment, machinery and services to the project

Bamboo Pulp & Offset Printing Paper Mill

Conceptual & basic process engineering, process flow sheets, preliminary equipment layouts and equipment specifications for 100 mt/day offset printing paper mill and 150 mt/day pulp mill; for CIC Inc. initial proposal and subsequent proposal revisions. Work included five technical/marketing trips to China, assistance in equipment selection, and assistance in contract negotiations.

Client: Canadian Industrial Consortium Inc., Montreal, Quebec, Canada
Project: Sichuan Ya'an Bamboo Pulp & Fine Paper Mill
Location: People's Republic of China
Materials: Bamboo, Masson pine, spruce
Products: Offset printing paper, market pulp
Award: CIC Inc. awarded a contract of about \$35 million for the supply of equipment, machinery and services to the project

Bamboo/Pine Pulp & Kraft Linerboard Mill

Conceptual and basic process engineering, process flow sheets, preliminary equipment layouts and equipment specifications for 120 mt/day kraft linerboard mill and 150 mt/day pulp mill; for CIC Inc. initial proposal and subsequent proposal revisions. Work included five technical/marketing trips to China, assistance in equipment selection, and assistance in contract negotiations.

Client: Canadian Industrial Consortium Inc., Montreal, Quebec, Canada
Project: Fujian Jian'Ou Kraft Linerboard Mill
Location: People's Republic of China
Materials: Bamboo, Masson pine
Products: Linerboard, market pulp

Bamboo Pulp & Offset Printing Paper Mill

Conceptual & basic process engineering, process flow sheets, preliminary equipment layouts and equipment specifications for 60 mt/day offset printing paper mill and 115 mt/day pulp mill; for CIC Inc. initial proposal and subsequent proposal revisions. Work included five technical/marketing trips to China, assistance in equipment selection, and assistance in contract negotiations.

Client: Canadian Industrial Consortium Inc., Montreal, Quebec, Canada
Project: Chongching Yuzhou Bamboo Pulp & Paper Mill
Location: People's Republic of China
Materials: Bamboo, purchased pulp
Products: Offset printing paper, market pulp

120 mt/day Bagasse Pulp & Fine Paper Mill

Basic process engineering, process flow sheets, preliminary equipment layouts and equipment specifications for 120 mt/day pulp and paper mill for producing writing and printing papers; for CIC Inc. proposal.

Client: Canadian Industrial Consortium Inc., Montreal, Quebec, Canada
Project: Pakland Paper Ltd., Karachi, Pakistan
Location: Thatta, Pakistan
Materials: Sugarcane bagasse, wheat straw, imported woodpulp
Products: Printing & writing paper

300 mt/day Bagasse Pulp & Fine Paper Mill

Basic engineering, equipment selection, process flow sheets and preliminary equipment layouts for 100,000 mt/year printing and writing paper mill; for H.A. Simons proposal.

Client: H.A. Simons (Overseas) Ltd., Vancouver, B.C., Canada
Project: Kous Paper Project
Location: Kous, Egypt
Materials: Sugarcane bagasse, purchased woodpulp
Products: Printing & writing paper

Mill Expansion & Modernization - National Paper Company

National's Engineering Consultant for modernization and expansion of existing pulp mill and paper and board mill from 40,000 mt/y to 90,000 mt/y in a budget of US\$ 44 million, funded by the World Bank. Services included, in part, basic engineering, preparing specifications for equipment supply packages, bid analysis, implementation monitoring, detailed engineering and implementation of services and connections between equipment packages, assistance in startup and commissioning, and supervision of training program.

Major improvements and equipment packages included in part: addition of turbogenerator; modification and expansion of stock preparation systems for paper machines 1, 2, 3, 4, 5 and 6; addition of a wastepaper repulping and cleaning system, modifications to paper machines 1, 2 and 3; rebuild and expansion of paper machines 4, 5 and 6; expansion of finishing room and warehouse, and modernization of white water and effluent systems.

Client: National Paper Company
Location: Alexandria, Egypt
Materials: Imported woodpulp, wastepaper, rice straw
Products: Printing & writing paper, MG paper, linerboard, corrugating medium, low-grade board

Mill Expansion & Modernization - RAKTA Paper Company

RAKTA's Engineering Consultant for modernization and expansion of existing pulp mill and paper and board mill from 45,000 mt/y to 90,000 mt/y with a budget of US\$ 36 million, funded by the World Bank. Services in part included: basic engineering, preparing specifications for equipment supply packages, bid analysis, implementation monitoring, detailed engineering and implementation of services and connections between equipment packages, assistance in startup and commissioning, and supervision of training program.

Major improvements and equipment packages included in part: addition of a chloralkali plant, rebuild No. 3 paper machine to double its capacity, rebuild of the duplex board machine to double its capacity, addition of a bagasse pulp repulping and screening system, addition of a wastepaper repulping and screening system, and modifications to mill services, the pulp mill, and the stock preparation and broke system.

Client: RAKTA Paper Company
Location: Alexandria, Egypt
Materials: Rice straw, sugarcane bagasse, imported woodpulp, wastepaper
Products: Printing & writing paper, bag paper, linerboard, duplex board



Wheat Straw Market Pulp Mill

Provided expert opinion on a new process for producing wheat straw market pulp.

Client: Confidential
Location: USA
Materials: Wheat straw
Products: Market pulp

Nonwood Fiber Market Pulp Mill

Provided expert advise and design services for a nonwood fiber market pulp mill.

Client: Confidential
Location: USA
Materials: Confidential
Products: Market pulp

Specialty Paper Mill

Provided expert advise and financial analysis for order-of-magnitude study for a new specialty paper mill.

Client: Danforth Group LLC
Location: USA
Materials: Purchased pulps
Products: Confidential

Bamboo Substitutes

Evaluation of bamboo species that could be used as substitutes for softwood based on fiber characteristics, biomass production per hectare per year and growing conditions based on an extensive literature review.

Client: Confidential
Location: Brazil

Biomass Preparation Trials for Biofuel Production

Provided expert advise on the preparation of biomass for biofuel production using special commercially available equipment. Observed pilot plant trials and provided advise on the commercial facility design.

Client: Confidential
Location: Confidential
Materials: Confidential
Products: Liquid biofuels

Digester Capacity Increase

Provided expert advice on how to increase the capacity of a horizontal tube digester by 15%, cost estimating and identified potential risks to other areas of the bleached bagasse pulp mill.

Client: Carvajal Pulpa y Papel
Location: Cali, Colombia
Materials: Sugarcane bagasse
Products: Printing/writing paper

New Technology Evaluation

Reviewed new technology for semi-chemical wheat straw pulp production developed in the United Kingdom, provided risk assessment for potential investor.

Client: Siata DS, Inc., USA
Materials: Wheat straw
Products: Market pulp

Bagasse for Cellulosic Biofuels

Provided expert advise on preparing sugarcane bagasse for cellulosic biofuel production.

Client: Iogen Energy Corporation, Canada
Materials: Sugarcane bagasse
Products: Cellulosic biofuels

Alternative Nonwood Fiber Raw Material

Provided expert advice on mill modifications required to prepare, clean and process a new nonwood fiber raw material to replace sugarcane bagasse.

Client: Grupo Papelero Scribe SA de CV
Location: Orizaba, Mexico
Materials: *Pennisetum purpurem* (Elephant grass, napier grass)
Products: Printing/writing paper

Nonwoods for Dissolving Pulp Production

Provided expert advice on various nonwood fiber raw materials and their suitability for dissolving pulp production.

Client: Confidential
Location: USA
Materials: Various nonwood fibers
Products: Dissolving pulp

Carpet Recycling

Provided expert advice on the use of pulp & paper equipment for processing and recycling old wall-to-wall carpeting to reclaim the nylon, polypropylene and carpet sand.

Client: Modular Carpet Recycling
Location: USA
Materials: Waste wall-to-wall carpet
Products: Separated nylon, polypropylene, carpet sand

Bagasse for Use in Cellulosic Biofuels

Provided expert advice on the use of sugarcane bagasse for pulp & paper production and for cellulosic biofuel production. Advised on CAPEX requirements and scalability of major equipment.

Client: Confidential
Location: USA
Materials: Sugarcane bagasse
Products: Cellulosic biofuels



Pulp Mill Conversion

Visited an abaca market pulp mill to determine if it could be converted to produce bleached bagasse market pulp. Prepared report covering technical issues relating to the conversion and solutions to allow bagasse pulp production.

Client: Confidential
Location: Philippines
Materials: Abaca, sugarcane bagasse
Products: Bleached market pulp

Production Audit/Rationalization

Visited ABC Paper, recommended solutions to several problems in the pulp mill, advised client on grade lines to be produced on 3 smaller paper machines, provided advice on operating problems on 4th large paper machine, advised client regarding new market opportunities in the "green" market in North America, advised client on "green" certification requirements.

Client: ABC Paper Limited
Location: Saila Khurd, India
Materials: Wheat straw, local grasses, hardwood, purchased woodpulp
Products: Uncoated printing/writing papers

Recyclability of Tree Free Paper

Provided expert opinion on the recyclability of TreeFrog 100% tree-free multi-purpose copy paper produced from 25% bleached bamboo chemical pulp and 75% bleached sugarcane bagasse chemical pulp. Arranged laboratory testing that confirmed recyclability of the paper within USA wastepaper mix.

Client: TreeZero, LLC
Location: Norcross, GA, USA
Materials: Bamboo, bagasse
Products: Multi-purpose copy paper

Wheat Straw for Molded Products

Provided overview of producing high yield semichemical pulp from wheat straw for use in molded products. Identified most promising processes and equipment based on cost effectiveness and product quality.

Client: Confidential
Location: USA & International Operations
Materials: Wheat straw
Products: Tableware, clamshell packaging

Production Program Audit/Rationalization

Visited PROPAL 1, recommended solutions to several problems in the pulp mill, advised client on the grades of paper best suited to high bagasse content, reviewed production program, advised regarding "green" market opportunities in North America, advised regarding "green" market requirements and green certification.

Client: Productora de Papeles S. A. (PROPAL)
Location: Cali, Colombia
Materials: Sugarcane bagasse, purchased softwood pulp

Products: Uncoated and coated printing/writing papers

Pilot-Scale Pulping System

Developed specifications for a horizontal tube digester system with feed system and blow tank, issued specifications to preselected vendors, analysed proposals and reported to client.

Client: Confidential
Location: Canada
Materials: Agricultural crops & residues
Products: Confidential

Fiber Preparation System Audit - Cellulosic Biofuel Demo Plant

Inspected existing fiber preparation system for nonwood fiber raw materials that was experiencing problems with excessive stones, sand and dirt and recommended system additions to provide well cleaned fiber to the digester.

Client: Confidential
Location: USA
Materials: Confidential
Products: Cellulosic ethanol

Alternative Nonwood Fiber Mill-Scale Trial

Provided expert advice during a mill-scale trial of an alternative nonwood fiber raw material to replace sugarcane bagasse.

Client: Grupo Papelero Scribe SA de CV
Location: Orizaba, Mexico
Materials: Pennisetum purpurem (Elephant grass, napier grass)
Products: Wet lap pulp, printing/writing papers

Nonwoods for Tissue & Personal Hygiene Products

Provided overview of various nonwood fibers that can be used in tissue and personal hygiene products. Identified most promising nonwood fibers based on cost effectiveness and product quality.

Client: Confidential
Location: USA & International Operations
Materials: Sugarcane bagasse, cereal straws, bamboo, reeds, grasses, etc.
Products: Tissue, personal hygiene products

Nonwoods for Molded Products

Provided overview of various nonwood fibers that can be used in molded products. Identified most promising nonwood fibers based on cost effectiveness and product quality.

Client: Confidential
Location: USA & International Operations
Materials: Sugarcane bagasse, cereal straws, bamboo, reeds, grasses, etc.
Products: Tableware, clamshell packaging



Bagasse Molded Products & Copy Paper

Provided expert advice on bagasse products and revised client web site for technical aspects.

Client: The Sugar Cane Paper Company
Location: USA
Materials: Sugarcane bagasse
Products: Tableware, clamshell packaging, copy paper

Bagasse Pulp Mill Audit

Provided solutions for operating problems and high bagasse costs at an existing bagasse pulp mill including identification of an alternative fiber raw material for the mill.

Client: Grupo Papelero Scribe SA de CV
Location: Orizaba, Mexico
Materials: Sugarcane bagasse
Products: Wet lap pulp, printing/writing papers

Bagasse Recycled Fiber

Provided justification that sugarcane bagasse could be considered as a recycled fiber raw material based on FSC definitions of recycled raw materials. Government of Mexico has since granted bagasse a "recycled fiber" designation.

Client: Grupo Papelero Scribe SA de CV
Location: Orizaba, Mexico
Materials: Sugarcane bagasse
Products: Wet lap pulp, printing/writing papers

Nonwood Fiber Dissolving Pulp

Provided expert advice regarding the use of nonwood fiber raw materials for the production of dissolving pulp for use in specialty chemicals.

Client: Confidential
Location: USA
Materials: Sugarcane bagasse, bamboo, giant reeds, industrial hemp, flax, cotton linters

BCTMP Whole Stalk Kenaf Pulp Mill - Part 3

Inspection of equipment to be used for preprocessing the kenaf prior to mechanical pulping.

Client: Andritz Inc., Vienna, Austria
Project: 100,000 mt/year BCTMP pulp mill
Location: Vietnam
Materials: Kenaf
Products: BCTMP market pulp

Patent Application Review

Reviewed a patent application and examiner's responses with respect to providing responses for the client to the patent office.

Client: Alberta Research Council
Project: Details confidential

Nonwood Fiber Pulp & Paper Mill Chemical Recovery

Provided options for nonwood fiber preparation systems, desilication systems and black liquor chemical recovery systems.

Client: Prairie Pulp & Paper Inc.
Project: 200,000 mt/year fine paper mill
Location: Manitoba, Canada
Materials: Wheat straw, oilseed flax straw
Products: Printing & writing paper

Nonwood Fiber Biofuels Seminar

Presented a seminar on nonwood fiber raw material harvesting, storage and preprocessing for hydrolysis/fermentation and gasification applications for biofuel production.

Client: Andritz Ltd.
Location: Quebec, Canada
Materials: Cereal straws, prairie grasses, sugarcane bagasse, flax, hemp, jute, bamboo, giant reeds

Renewal of Closed Greenwood Market Pulp Mill

Provided expert advice regarding alternative possible projects for the renewal of a closed groundwood market pulp mill including molded products and biomass to energy generation.

Client: Confidential
Location: Quebec, Canada
Materials: Nonwood fibre raw materials, waste wood, peat

BCTMP Whole Stalk Kenaf Pulp Mill - Part 2

Provided expert advice regarding a novel approach towards preparing and cleaning whole stalk kenaf raw material for delivery to the refiners as well as establishing the basis for process guarantees.

Client: Andritz Inc., Vienna, Austria
Project: 100,000 mt/year BCTMP pulp mill
Location: Vietnam
Materials: Kenaf
Products: BCTMP market pulp

Grant Funding Application Review (2006)

Reviewed 39 applications for grant funding in the agricultural sector.

Client: Alberta Agricultural Research Institute, Edmonton, Alberta, Canada

Urban Forest Recyclers Inc., Swift Current, SK, Canada

Prepared specifications and tender documents and solicited bids for a 100 ton per day wastepaper recycling for two new mills.

Location: Swift Current, SK, Canada
Materials: Wastepaper
Products: Molded trays



Research & Development Work on Straw Mulch

Project manager for research and development work to soften straw mulch to increase pumpability. Developed RFP for work to be carried out in labs, set test conditions, monitored lab work.

Client: Confidential
Location: North America
Materials: Straw
Products: Mulch

Grant Funding Application Review (2005)

Reviewed 47 applications for grant funding in the agricultural sector.

Client: Alberta Agricultural Research Institute, Edmonton, Alberta, Canada

Industrial Hemp Pulp Mini-Mill Review & Commentary

Reviewed and commented on concept for a mini-mill based on industrial hemp. Developed alternative concepts including recommendations for process selections to minimize environmental discharges.

Client: ITRAB, Linköping, Sweden
Project: Mini-pulp mill
Location: Sweden
Materials: Industrial hemp
Products: Market pulp

Used Kraft Pulp Mill Inspection

Visual inspection and assessment of a 400 t/d bleached hardwood kraft pulp mill and report on its condition and suitability for relocation. Assessment covered cooking, brown stock washing, screening & cleaning, bleach plant, evaporators, recovery boiler and recausticizing system.

Client: Industrial Exchange Corporation, Richmond, VA, USA
Location: Maine, USA

BCTMP Whole Stalk Kenaf Pulp Mill - Part 1

Provided expert advice regarding various methods for preparing and cleaning whole stalk kenaf raw material for delivery to the refiners.

Client: Andritz Inc., Vienna, Austria
Project: 100,000 mt/year BCTMP pulp mill
Location: Vietnam
Materials: Kenaf
Products: BCTMP market pulp

Research & Development Work on Oil Palm Empty Fruit Bunches (EFB)

Project manager for developing appropriate cooking and bleaching conditions for EFB raw material and production of pilot scale unbleached and bleached papers using the EFB pulp. Established test conditions and directed test work carried out at a USA-based laboratory/pilot plant.

Client: Eko Pulp & Paper Sdn. Bhd., Malaysia
Project: 100,000 mt/year BCTMP pulp mill
Location: Malaysia
Materials: Oil palm empty fruit bunch

Investigation of Alternative Cellulose for Termite Bait

Technical assistance/investigation of alternative lower cost cellulose sources and grinding/milling systems.

Client: ENSYSTEX, North Carolina, USA

EPYTEK S.L., San Sebastian, Spain

Technical assessment and review of a black liquor chemical recovery system developed in Spain for small to medium scale wood and nonwood pulp mills.

Changing World Technologies, West Hempstead, NY, USA

Technical assessment of patented thermo-depolymerization (TDP) process for use in the pulp and paper industry including chemical recovery and organic waste treatment, and assistance in market development.

Spixel Inc., Beauharnois, Quebec, Canada

Expert advice on expansion of pulp mill capacity and capabilities.

Project: Pulp mill expansion
Location: Beauharnois, Quebec
Materials: Cotton rag
Products: Currency, high quality writing paper

Consoli Consulting Company, Media, PA, USA

Member of Peer Review Panel for life cycle analysis (LCA) on the use of cereal straw in directory grade papers.

Project: LCA Peer Review Panel
Location: North America
Materials: Wheat straw
Products: Directory paper for telephone directories

INNOTECH, Newtown, CT, USA

Innovation/brainstorming expert session on the use of a new biodegradable polymer in the pulp and paper industry.

Project: Expert Session
Location: North America
Materials: New polymer

Urban Forest Recyclers Inc., Swift Current, SK, Canada

Technical report on the use of agricultural residues in molded egg trays.

Location: Swift Current, SK, Canada
Materials: Wheat straw, flax straw, wastepaper
Products: Molded trays



New Fibre Crop, North America

Review and analysis of costs for producing and processing new crop fiber into pulp for high groundwood content papers.

Client: Confidential
Location: North America
Materials: Confidential
Products: Newsprint, high groundwood content papers

Pulp and Paper Research Institute of Canada

Vancouver Laboratory, Vancouver, BC, Canada

Technical review of PAPRICAN's report on Nonwood Pulping Technologies to identify opportunities for producing pulp from agricultural residues in Alberta, Canada

Project: Review of Nonwood Pulping Technologies
Location: Alberta, Canada
Materials: Wheat straw
Products: Pulp

Phillips Fox, Perth, WA, Australia

Expert witness report concerning a failed bagasse market pulp mill project.

Location: Australia
Materials: Sugarcane bagasse
Products: Market pulp

U.S. Department of Agriculture, Washington, D.C., U.S.A

Technical and commercial review of several applications for financial support for research and development of new technologies which would lead to commercial use of domestic nonwood fibers by the U.S. pulp and paper industry.

U.S. Department of Energy, Golden, Colorado, USA

Technical and commercial review of applications for financial support for research and development of new technologies which would lead to commercial use of domestic nonwood fibers by the U.S. pulp and paper industry.

Asian Development Bank, Manila, Philippines

Technical seminars sponsored by the Asian Development Bank to strengthen the People's Republic of China government implementation capacity in the pulp and paper sector. Over a period of three (3) months, the seminars covered feasibility study and tender document preparation, the latest trends and technology in kraft pulping and short sequence bleaching, effluent treatment and environmental impact, bagasse newsprint production and nonwood fiber pulp and paper production. Technical analysis of seven operating pulp and paper mills also was carried out including recommendations for improving mill operations.

Client: Guangxi Bureau of Light Industry Project
Location: Nanning, P.R. of China
Materials: Sugarcane bagasse, cereal straws, bamboo, softwood, hardwood

Products: Printing & writing paper, kraft papers, newsprint, linerboard

Canadian Investor Group

Assessment of the value of 350 mt/day bleached softwood market mill assets and financial projections concerning the long-term viability of the mill (for potential purchaser).

Mill: Celulosa de Guatemala, S.A.
Location: El Rancho, Guatemala
Materials: Softwood
Products: Bleached market pulp

Canadian International Development Agency (CIDA)

Hull, Quebec, Canada

Procurement advisory services, specifications, bid analysis, monitoring and transportation services for \$2,800,000 line of credit from CIDA to the Khulna Newsprint Mills.

Project: Khulna Newsprint Mills Balancing, Modernization, Rehabilitation & Expansion Program
Location: Khulna, Bangladesh
Materials: Tropical hardwoods
Products: Newsprint

Simons Eastern, Atlanta, Georgia, USA

Assistance in developing package bidding documents.

Project: Panafrican Paper Mills (E.A.) Ltd.
Location: Webuye, Kenya
Materials: Softwood
Products: Newsprint, printing & writing paper, sack kraft, linerboard

Zenith Paper Company, Banah, Punjab, India

As Zenith's Technical Consultant for a five year term, assisted management of existing 30 mt/day writing and printing pulp and paper mill including improvements to existing operations and reduced costs, replaced imported long fiber wood pulp with in-house cotton liners pulping, increased production to 50 mt/day, and provided training for technical personnel.

Location: Banah, Punjab, India
Materials: Cotton linters, wheat straw, rice straw, hessian (jute bags), wastepaper
Products: Printing & writing paper