Company Overview
Company Profile

Gas Cleaning Technologies LLC (GCT), established in 1995, has built a reputation as a responsive, solutions-driven organization with strong technical qualifications and a proven record of accomplishment by delivering high quality, niche process engineering services at cost competitive prices. GCT provides specialized process engineering and multi-disciplinary capabilities to the minerals, ferrous and non-ferrous metals industries.

Areas of specialization include:
- Process evaluation and optimization
- Process development
- Material and heat balances
- Computational Fluid Dynamics modeling
- Pyro- and hydrometallurgical plant design
- Furnace design
- Process engineering
- Process gas handling and cleaning system design
- Heat recovery and energy optimization
- Process plant fugitive emissions control
- Field testing and monitoring
- Waste water treatment
- Bulk materials handling
- Evaluation of new processes

Scope of services includes but is not limited to feasibility / conceptual studies, basic and detailed engineering, and plant commissioning support.

GCT’s goal is to exceed customer expectations by always focusing on a strong commitment to employee health and safety, as well as improving the environment and addressing compliance requirements through sustainability projects. Engineering solutions are developed with these factors in mind, coupled with a solid understanding of process operations. GCT successfully executes strong schedule performance and effective cost control, and delivers innovative, high quality projects and services. The end results of our engineering efforts are improved plant operating performance, employee safety, and a cleaner environment.
Process Evaluation and Optimization

GCT performs a wide range of process evaluation studies for existing ferrous and non-ferrous metallurgical plant operations. Typical studies involve entire plant and process audits, energy audits, determination of requirements for best operating practices and evaluation of upgrades required for process equipment. Specific tasks may include:

- Evaluation of process flowsheets for existing processes
- Development of process flowsheets for new processes
- Techno-economic evaluation of new process technologies
- Pilot scale testing for new process technologies
- Process vessel design/re-design
- Development of process sensors to provide enhanced process control
- Development of modified operating practices
- Benchmarking of raw material consumption in process operations
- Debottlenecking and process optimization for ferrous, non-ferrous industries

Non-Ferrous Process Technology

GCT staff has experience to create, establish and execute integrated technology solutions for pyrometallurgical and hydrometallurgical applications relating to the primary and secondary processing of Copper, Nickel, Zinc, Lead, Cobalt, Gold, Silver and Precious Metals. Specific capabilities may include:

- Development and Conducting of R&D programs
- Development and Implementation of Operational Improvements Programs and Practices
- Coordination of benchmarking activities at process operations
- Selection of process equipment
- Detailed material and heat balances for pyrometallurgical smelters
- Engineering Design of Pyrometallurgical Plants
- Engineering Design of SX/EW plants
- Assistance in developing business plans

Engineering Design of Process Vessels and Furnaces

GCT staff has experience in the engineering design of kilns, roasters, furnaces, and other process vessels in the metals industry. Our design applications offer:

- Process design and metallurgical expertise
- Unique design application and expertise in copper cooling technologies and refractories
- Design of high power and high productivity process vessels
- Design of various furnace types (electric furnace, bath smelting furnace, flash smelting furnace, blast furnace, kilns, rotary vessels, cupola, fluid bed, and solid/gas reaction)
- Long campaign life, operating time, and less maintenance
- Specialized applications to obtain high processing rates
- Numerous proven retrofit improvements and greenfield installations
- Commissioning, ramp-up and debottlenecking/optimization expertise
Process Gas Handling and Cleaning System Design

GCT has extensive experience in gas handling system design for both ferrous and non-ferrous metallurgical furnaces, including drying, calcining / roasting, smelting / melting, heating, and refining. Specific capabilities surrounding process gas handling system design include:

- Process gas characterization
- Process gas heat recovery, including waste heat boilers, heat exchangers, thermal fluids, and power generation
- Process gas conditioning, including combustion chambers, water-cooled ducts, and evaporative coolers
- Flue gas desulfurization (FGD)
- Process NOx control
- Gas cleaning system equipment selection, including baghouses, scrubbers, dry and wet electrostatic precipitators (ESPs)

Process Plant Fugitive Emissions Control

GCT staff has extensive experience in reducing fugitive emissions from plants in order to achieve environmental compliance requirements. GCT also has expertise in the engineering and design of industrial ventilation systems. Specific GCT capabilities in the areas of fugitive emissions prevention and industrial ventilation include:

- Protecting employees and equipment from heat stress and dust exposure
- Field measurements and emissions quantification
- Secondary emissions control
- Molten metal transfer emissions control
- Process vessels secondary hooding
- Meet environmental compliance for visible emissions through building roof line
- Materials handling dust control

Computational Fluid Dynamic (CFD) Modeling

GCT utilizes proprietary and in-house mathematical models for process simulation to optimize system design of gas handling systems and secondary fume control systems in process plants. We use Computational Fluid Dynamic (CFD) models as an effective design tool to predict the performance of gas handling systems for process plants. CFD provides the means to compare the relative performance of several design scenarios. Specific benefits of our CFD modeling techniques include:

- Predicting heat and contaminant exposure levels
- Evaluating performance of ventilation systems in process plants
- Predicting airflow patterns and contaminant migration paths
- Optimizing primary and secondary capture hood performance
- Predicting and optimizing process gas mixing and combustion
- Evaluating burner configuration and selection
Energy Optimization & Greenhouse Gas (GHG) Emissions

GCT has extensive expertise in heat recovery and energy optimization, including process plant energy intensity assessments, and process unit energy optimization, which directly impact GHG emissions. GCT regularly performs energy assessments for process equipment and off-gas systems. GCT identifies practical approaches to recover heat from the off-gas in the form of steam, preheated air, or direct recycle that can be used in other processes to reduce fuel consumption. Specific capabilities include:

- Audit and assessment of existing process operations with respect to productivity, efficiency, and environmental considerations
- Benchmarking of energy consumption in process operations
- Evaluation of material inputs, equipment capabilities and operating practices aimed at improved operating efficiency and reduction of GHG generation
- Smart-Gas® technology - a proven low maintenance, user-friendly, and modular tool using proprietary software which enables melt shops to optimize their EAF’s total energy usage in real-time, while providing guaranteed minimum overall net savings of at least US$1.00/ton, plus safety and environmental benefits without the need to measure off-gas chemistry.

Bulk Material Handling

GCT offers complete engineering design, procurement, and project and construction management services for a wide variety of applications in material handling. With expertise in process, mechanical, electrical, instrumentation, and civil and structural engineering, we can support projects that includes the following:

- Mechanical and Pneumatic Conveying
- Storage Systems
- Reclaim Systems
- Ship, Truck, Railcar Loading / Unloading
- Bulk Solids Processing

Water and Wastewater Treatment

GCT has expertise in innovative water and wastewater treatment solutions specifically suited for metallurgical process operations and industrial plants. GCT can develop practical and customized engineering solutions for the following applications:

- SO2 Stripping Towers
- Heavy Metals Removal
- Dewatering – Thickening, Gravity Settler, Filter Press, Centrifuge
- Chemical Oxygen Demand (COD)
- Total Dissolved Solids (TDS) Removal
- pH Control / Neutralization
- Ion Exchange / RODI
Project Development services

GCT provides experienced, multi-disciplined project managers for all projects and is capable of providing full services necessary to properly develop a project from concept to execution and close out. GCT project development services include:

- Preliminary studies
- Technology selection
- Bankable Feasibility Studies
- Investment project analysis
- Project Plan Development
- Master planning and scheduling
- Execution & Change Management
- Resource Planning & Management
- Budget & Cost Control
- Quality Planning, Assurance & Management
- Risk Assessment & Management
- Operational and maintenance analysis
- Financing alternatives

GCT Construction LLC

GCT Construction LLC ensures a project's success by meeting expectations of quality, time and cost. By managing risks and controlling costs, our experienced construction team's focus on achieving the end result while monitoring the ongoing details. Our comprehensive management at every stage of the project includes pre-construction planning, complete construction oversight, and post-construction services. GCT Construction LLC is agile and flexible to offer a variety of contracting methods, depending on the client needs and project requirements. Project contract methods might include:

- Engineering, Procurement, Construction (EPC)
- Lump sum turnkey
- Fixed Fee
- Target price

Engineering, Procurement, Construction Management (EPCM)

GCT is flexible to offer construction support services on an as needed basis and is capable of offering the following services:

- Contractor Scope & Bid Review
- Field Supervision
- Subcontractor Negotiations
- Payment Requests Review
- Equipment & Material Testing
- Value Engineering
- Constructability Review
- LEED Registration / Certification
- Project Close-out
- Document Control
Key GCT Personnel

Paykan Safe, Ph.D., P.E. – President
Dr. Safe has nearly 40 years of experience in the evaluation and design of gas cleaning systems around the world for the steel and non-ferrous metals industries. He has extensive experience in process engineering, process simulation and modeling, and analysis and design of off-gas systems, including heat recovery and energy optimization, from initial concept and scoping studies through to detail engineering. He has also authored a textbook, several papers and conducted seminars and short courses on smelter gas handling, heat recovery, energy optimization, and industrial air pollution control systems.

Gord Engel, P.E., P.Eng. – VP Projects
Mr. Engel has more than 25 years of experience with project management, gas cleaning and material handling system design in the pyrometallurgical, hydrometallurgical and hydrocarbon industries. He has managed a wide variety of projects from front end development through to detail engineering, construction support and commissioning. He is skilled in the engineering design and layout of ferrous and non-ferrous metallurgical primary and secondary off-gas systems. He has also been involved in the design of complete hydrometallurgical process plants. Gord offers a wealth of experience in bulk material storage and handling systems including mass-flow or funnel flow storage silo and feeder systems, mechanical conveying, crushing and screening, and fluidized conveying.

Matt Russell, P.E. – VP Process Technology
Mr. Russell has over 20 years of experience in process and gas cleaning projects in numerous ferrous and non-ferrous metallurgical processes throughout the world, including steel mills, copper, nickel, ferronickel, lead, zinc, aluminum, and platinum smelters, as well as alumina refineries. He has extensive experience in process engineering, feasibility studies, process simulation and modeling, analysis and design of off-gas systems, and heat recovery and energy optimization projects.

Bobby Randhawa – VP Process Engineering
Mr. Randhawa has over 18 years of experience in management and execution of gas cleaning and energy optimization projects in ferrous and non-ferrous metallurgical processes around the world. Bobby has the experience to provide clients with technical direction, conceptual and detail engineering design of new and retrofit systems, and troubleshooting of air pollution control systems. His extensive experience includes process engineering, feasibility studies, process simulation and modeling, analysis and design of off-gas systems, including heat recovery and energy optimization, for ferrous and non-ferrous metallurgical processes.

Robert Albert – Ferrous Process Consultant
Mr. Albert has nearly 40 years of experience in varied environmental engineering and management positions that range from Design Engineer to Regional Director. Robert’s experience encompasses iron and steel, coal and coke, aluminum, power generation, paints and resins, foundry, and chemicals. He has participated or managed air pollution system upgrades, industrial water treatment systems and remediation projects and site assessments. Robert’s experience also includes the preparation of PSD permits, installation permits, operating permits, and Title V permits. He has extensive knowledge of the regulations, equipment, and processes necessary to consistently comply with them.
Daniel Brosig, P.Eng. – Senior Process Engineer

Mr. Brosig is a Professional Engineer with over 12 years of experience in the metals industry specialized in process engineering, process technology development and business development. His assignments have included the techno-economic evaluation of incumbent and emerging innovative extractive technologies for the recovery of nickel, zinc, lead, copper, PGMs and various minor specialty metals from both primary and secondary resources for international clients. He has significant experience in proof of concept process test work design and execution, and hands-on pilot plant and commercial plant troubleshooting. Daniel holds a Bachelor’s degree in Chemical Engineering, a Master’s degree in Chemical Engineering and a Master’s degree in Entrepreneurship and Innovation.

Gerson Duran, PMP – Project Engineer, Senior Mechanical Engineer

Mr. Durán is a senior mechanical engineer and project manager. Over the past 13 years he has gained expertise in the assessment, design, construction, commissioning, and management of projects involving mechanical design of industrial equipment, industrial furnace rebuilds, industrial off-gas ventilation, spare parts contract management, and contract management for both public and private-sector clients. Mr. Durán is also experienced in plant layout design, thermal and furnace integrity audits and simulations, primary and secondary hood design for converters and anode furnaces, as well as simulations for fan sizing. He has been responsible for the management of Design and Supply projects for Primary and Secondary Hoods, as well as all facets of business development, project planning, financial, fabrication quality control, construction and commissioning. Gerson is a certified Project Management Professional.

Chi Seng Tong, P.Eng. – Senior Structural Engineer

Mr. Chi Seng Tong is a Senior Civil Engineer (Foundations & Steel and Concrete Structures), with more than thirty-five years of experience in the design, engineering and construction of metallurgical, mining, petrochemical, chemical, aluminum, and power projects. His technical expertise includes: project management and quality control, developing conceptual, basic and detailed structural designs, preparing technical specifications, material take-offs, team coordination, scope of work definition and cost estimating. Chi Seng is also experienced with field construction/site management and support.

Larry Cull, P.Eng. – Senior Electrical Engineer

Mr. Cull has nearly 40 years experience in engineering, design, procurement, construction and commissioning of electric power and control systems for major industrial expansions in the Metallurgical and the Oil and Gas Industries. He has engineered and commissioned high, medium and low voltage power distribution systems up to 250 MVA capacities, DCS/PLC control systems with up to 1000 inputs/outputs and electrical power plants rated 18 MW.

Gary Rosas – Chief Designer

Mr. Rosas has more than 30 years of mechanical, structural and piping design and layout experience for ferrous and non-ferrous smelters, petrochemical and hydrocarbon processing plants, and environmental/air quality projects for greenfield and brown facilities. His experience is primarily focused on heavy industrial design for basic and detailed engineering projects for off-gas handling APC systems, water-cooled duct and equipment, dust handling and conveying, heat recovery, nuclear air and gas handling treatment for D.O.E. facilities and process piping systems.
Global Corporate Structure

GCT is organized into the following business units to best serve our global clients.

Gas Cleaning Technologies, LLC
4953 North O’Connor Road
Irving, Texas, 75062 USA

Gas Cleaning Technologies, LLC
Chicago, IL USA

GCT Engineering Inc.
Canada

Gas Cleaning Technologies (Asia) PTE. LTD
Singapore
GCT International Experience:

For further information about our global capability email: info@gcteng.com