SGS STATEMENT OF CAPABILITIES FOR LITHIUM

2021

SGS

AN OVERVIEW OF SGS

An Overview of our Expertise for the Mining Industry

1. WHO IS SGS?

SGS is the world's leading inspection, verification, testing and certification company. SGS is recognized as the global benchmark for quality and integrity. With more than 89,000 employees, we operate a network of more than 2,600 offices and laboratories around the world and provides an extensive portfolio of testing services to the oil and gas, environmental, agricultural, industrial, life sciences, consumer products and minerals sectors. Held by SGS SA, a Swiss traded public company, the SGS group celebrated 140 years of business in 2018.

SGS is proud to be a carbon neutral company and draws attention to its achievements in this area and our approach to Corporate Sustainability in general in Section 13. SGS is also pleased to announce that our Australian business unit has had its Reconciliation Action Plan (RAP) formally endorsed by Reconciliation Australia. SGS' Reconciliation Action Plan (RAP) program aims to develop and strengthen relationships with Aboriginal and Torres Strait Islander peoples and communities in which we operate.

SGS' Minerals business group provides a wide range of services to its clients including the following:

- Ultra trace geochemical exploration analytical services;
- Geochemical exploration analytical services; Onsite analytical services. We have extensive experience with the design, commissioning and operation of commercial and onsite mine laboratories around the world;
- Geological Services; Ore body modeling and resource estimation 43-101 reports, AI for exploration targeting;
- Extractive metallurgical testing, process design and proof of concept;

- Process mineralogy;
- Geometallurgical process modeling, production forecasting and metals accounting;
- Mine and plant optimization services and audits;
- Expert control and process simulation systems;
- Mechanical sampling system design, manufacture, installation and operation;
- Engineering services and modular plants through SGS Bateman;
- Inspection and verification; and
- Commercial analytical services.

2. WHAT DIFFERENTIATES SGS FROM ITS COMPETITORS?

SGS differentiates itself from the competiton on the following points:

- Financial strength demonstrated by 2019 annual turnover of CHF 6.6 billion;
- Current global staff of over 89,000 people; greater than 2,600 offices and over 700 laboratories in 140 countries (all business lines);
- The largest geochemical analytical group in the world with greater than 175 labs, including over 95 mine support laboratories. SGS operates more than 10 times the number of hard rock and energy minerals mine laboratories compared to our closest competitor;
- An integrated network of minerals-related services providing expertise and coordinated solutions for all your geological, analytical, metallurgical and plant engineering needs; and
- SGS was the first inspection company to implement a global integrity training program for its employees. Our SGS Group Compliance program, based on the

SGS Code of Integrity, exists to ensure that the highest standards of integrity are applied to all our business activities worldwide, in accordance with international best practice. SGS is committed to a culture where issues of integrity and professional ethics can be raised and discussed openly. Guidance and support is available to help employees and other stakeholders acting on behalf of, or representing, our organization to understand SGS' Code of Integrity and to help them make the right decision when faced with an ethical dilemma.

3. THE SGS ADVANTAGE

Using SGS for your exploration and metallurgical programs will provide the following benefits as highlighted below:

a) SGS has extensive experience with the analysis of exploration samples globally and can provide/adjust methodology, preparation and analysis to best suit the sample types, exploration targets and geology being explored;

b) SGS has a strong geochemistry presence all continents except Antarctica. Local presence will help decrease transport costs of delivering samples to the nearest SGS laboratory. Currently SGS operates greater than 300 mining-related laboratories in over 60 countries for the energy materials, geochemical, metallurgical, mineralogical and minerals trade testing sectors.

c) Ability to mobilize and site mobile preparation laboratories (MSPUs) at your project sites where ever they may be;

d) SGS commercialized the MMI soil geochemistry technology and has been providing this ultratrace exploration service to clients for >20 years;

e) SGS' prices for sample preparation are transparent with easy to understand prices for upfront batch/job creation and escalators based on sample weight. This makes it easy to accurately calculate the monthly preparation costs per sample;

f) SGS uses Rocklabs Boyd Elite crushers with online rotary sample dividers (RSDs) and Rocklabs RM2000 and RM1000 pulverizers. The Rocklabs equipment is the best quality equipment

in the world. Rocklabs' equipment has a proven track record of high up-time and a high-quality prepared product with the highest level of safety interlocks and operator protection systems compared to competing products. SGS' has moved globally to Rocklabs' inline Rotary Sample Dividers (RSDs) or the inline Linear Sample Dividers (LSD) in order to improve the quality of the sample splitting step in sample preparation. Manual riffle splitting is prone to significant operator error and provides an inferior quality analytical sample compared to RSD or LSD sample dividing;

g) SGS' laboratories incorporate the latest in building designs and equipment to ensure the health and safety of workers and respect for the environment;

h) SGS has accredited its commercial laboratories globally and many of its onsite mine laboratories to the ISO/IEC 17025 standard;

i) SGS FAST hrelps projects during exploration, resource definition and production, getting analytical data quickly is vital for making accurate and timely decisions. SGS FAST solutions provide you with essential analytical data within 24- to 48-hours from the sampling event using new portable analytical technologies. This dedicated field-based preparation and analytical testing gets you the data you need to make quick, but accurate decisions around exploration, mining and plant production.

Depending on your requirements, the SGS FAST package includes:

- SGS FAST Fourier Transform IR (FTIR)
- SGS FAST Portable XRF (pXRF)
- SGS FAST Mobile Sample Preparation (MSPU)
- SGS FAST Minalyze XRF Core Scanning
- SGS FAST Machine Learning

SGS FAST enables you to:

- Make faster decisions during active exploration programs
- Stand-out from peers by demonstrating an optimized exploration spend
- Realize an earlier return on exploration investment and development activities

- Ensure rapid project development through the lifecycle
- Maintain consistent plant performance and minimize unexpected production downtime
- Achieve a more attractive company profile to investors by demonstrating project progress in a shorter timeframe

j) For an early indication of a metal recovery and the potential flowsheet considerations SGS can support a project with its new Early Stage Metallurgical Evaluation package (ESME) which can be carried out on critical metals.

k) SGS a provides mineralogical support to our exploration clients through our automated mineralogy services (using QEMSCAN and the latest technology on the market TIMA-X) which can provide information on the mineralogy of deposits to quality control core logging, for resource models and metal deportment through our Explomin™package.

l) Modern mineral deportment studies at SGS include physical, chemical and mineralogical assessments to obtain a full understanding of the nature and variability of rare earths (and other critical metals) in a resource. Provided data is applied to resource evaluation, practical processing and extraction process optimization. Speciation of the chemical forms of the rare earths includes: XRD, Automated Scanning Electron Microscopic Techniques (QEMSCAN / Tescan SEM / TIMA-X) with resolution to <0.5 µm provide data for the mineralogical attributes of the host rock and microscopic particles. Electron microprobe analyses (EMPA), Dynamic Secondary Ion Mass Spectrometry (D-SIMS), Time of Flight Secondary Ion Mass Spectrometry (ToF-SIMS), Laser Ablation by ICP-MS and non linear Raman spectroscopy can evaluate and semi-quantify other attributes.

m) The implementation of advanced microbeam analytical techniques has greatly improved and expanded our capabilities to accurately characterize and quantify light elements (e.g., Li), quanitify trace elements (1 pm detection limits), or characterize the surface chemistry to evaluate process related attributes (e.g., reagents, depressants, in flotation of REE

minerals) and other individual carriers in a variety of deposits, and process stream products;

n) SGS experience encompasses projects from around the globe and a variety of geological settings and plants (e.g., Avalon, Search Minerals and others, see experience list);

o) High depth of knowledge and understanding of rare earth, Li, Nb mineralogy associated with physical and chemical extraction of rare earths;

p) On-site interaction with metallurgists to implement mineralogical results;

q) Advanced analytical methodology analysis (e.g., AI) for large projects to identify geological or metallurgical patterns to characterize the gangue components; with special emphasis on deleterious characteristics of the ore. Predictions based on the mineralogical observations are confirmed by physical and chemical testwork. These include grading analyses, gravity separation, flotation and hydrometallurgical products,

r) SGS Bateman Engineering Services for the mining industry can fill in gaps and deliver competitive advantage to you:

By utilizing the SGS team across Canada, that has the depth and wealth of experience with nearly every commodity to provide advisory, effective, safe and sustainable resolution to any processing challenge. Our team in Canada is backed by a global network allowing us to provide the trusted metallurgical expertise needed for project success no matter where your project is located globally. SGS Canada fit-for-purpose solutions encompass the skills of qualified geologists, geostaticians, analytical chemists, mineralogists, metallurgists, process engineers and mining engineers brought together to provide accurate and timely mineral and process evaluation services across the entire mining life cycle. For decades, the mining industry has turned to SGS Lakefield for trusted metallurgical testing solutions. SGS Lakefield demonstrated success in metallurgical testing has provided thousands of companies and mines with effective flowsheets and practical technical solutions to processing problems. Delivering a mining project to the market has become increasingly more difficult and requires seamless integration of all aspects, from exploration all the way to final commissioning of the Process Plant.

SGS

The addition of SGS engineering services to the extensive SGS portfolio of mining services aims to help you meet these challenges not only throughout the project life-cycle, but from pit-to-port. At the centre („The Hub") of the engineering services is SGS Bateman, an integrated solutions provider to the global mining industry. Being part of the global SGS Minerals network allows us to take projects from geological modelling and resource estimation (SGS Geological-Blainville), in-house metallurgical test work, through life-of-mine metallurgical modelling to design, engineering, procurement and construction.

Production optimisation, plant efficiency studies and in-plant support are offered through our Mine & Plant Services and our Advanced Control Systems Division. Our hub location is in South Africa, but we are also able to utilise our engineering presence in USA (SGS KD Engineering in Tucson) and Chile (SGS SIGA Engineering in Chile) to provide some of the services locally with the support of the hub group in South Africa.

In summary, the Engineering Services provided by SGS Bateman include:

- Test work at any of SGS's 10 metallurgical facilities and 4 mineralogy facilities;
- Full NI 43-101 studies including mining, resource and reserve definition, and environmental studies;
- Conceptual, prefeasibility and definitive feasibility studies;
- Due diligence studies and audits;
- Design and detailed engineering;
- Project and construction management;

Modular and Plant Design:

SGS Bateman's comprehensive services for new process plants and brownfield upgrades cover a wide range of commodities and can be tailored for small or large projects. SGS Bateman are a leading supplier of cost effective, robust and easy to erect plants for the rare earth industries. We have provided engineering, procurement, construction and management (EPCM) services for some of the most exacting mineral resource projects in the most difficult terrains. We offer flexible contracting

arrangements covering price, project management consulting (PMC) or owner's representative, and joint venture (JV).

SGS Bateman's full suite of project execution EPCM services includes: Process plant detailed design and engineering, materials and equipment procurement and supply, subcontractor management, construction management and hot and cold commissioning, Successful Project Delivery in Difficult Terrains. SGS Bateman has extensive experience successfully delivering projects in Africa. As a global company with local expertise, we ensure that our clients receive cost effective and efficient solutions tailored to their specific needs. We employ people from local communities to support local industries and local development.

LITHIUM EXPERTISE ACROSS THE MINING LIFE CYCLE

To help meet the increased mining and exploration expenditure in Quebec seen in recent years, we've been strategically locating ourselves across the province and expanding existing operations to help meet the growing needs of the mining industry within the province. With facilities across the province, we are uniquely positioned to offer the Quebec mining industry localized expertise throughout the mining life cycle for lithium projects. Backed by a network across Canadian and global operations and laboratories, we deliver a broad spectrum of independent quality and quantification services including geochemical analysis, resource calculation, mineralogy, metallurgy, engineering services, advanced systems, water treatment and trade services to the lithium industry.

SELECT SGS LITHIUM EXPERTS

With a global network, our techncial expertise is able to pull technical insight from around the world. Below is a selection of lithium experts based within North America.

Marc-Antoine Laporte

Global Business Manager, Geological Services

- Years in industry: 14
- Specialization: Geological exploration models and targeting with lithium, Ni-Cu-PGE, porphyry Cu-Au-Mo, iron ore, coal and VMS.

Maxime Dupéré

Project Geologist

- Years in industry: 18
- Specialization: Geostatistics and resource estimation of lithium, gold, iron, titanium-vanadium, economic evaluations and audits of resources.

Bill Van Breugel

Profesional Engineer

- Years in industry: 30
- Specialization: underground and open pit mining construction, development, mine planning and scheduling, exploration, feasibility studies, mine permitting and infrastructure construction across mining sectors.

Tassos Grammatikopoulos

Senior Geoscientist

- Years in industry:23
- Specialization: Automated mineralogy with extensive QEMSCAN and TIMA-X expertise with lithium projects.

Jame Brown

Extractive Metallurgy Manager

- Years in industry: 20
- Specialization: Testwork program execution and project management. Experience in lithium, rare earth elements, rare metals, base and precious metals, and uranium.

Hugh de Souza

Director, Minerals Technical Services

- Years in industry: 35
- Specialization: SGS geochemical and mineralogical labs and the development of new mineralogical and geochemical methods for mineral exploration with an emphasis of lithium.

Dominique Lascelles

Quebec City Metallurgy Manager

- Years in industry: 20
- Specialization: Extensive experience in managing flotation testwork programs and on-site operations. Expertise in developing flowsheets for any commodities including lithium, base metals, gold, silver, iron ore and molybdenum.

Massoud Aghamirian

Senior Metallurgist

- Years in industry: 20
- Specialization: Project management for lithium projects with a focus on beneficiation processing including dense media separation, froth flotation and magnetic separation.

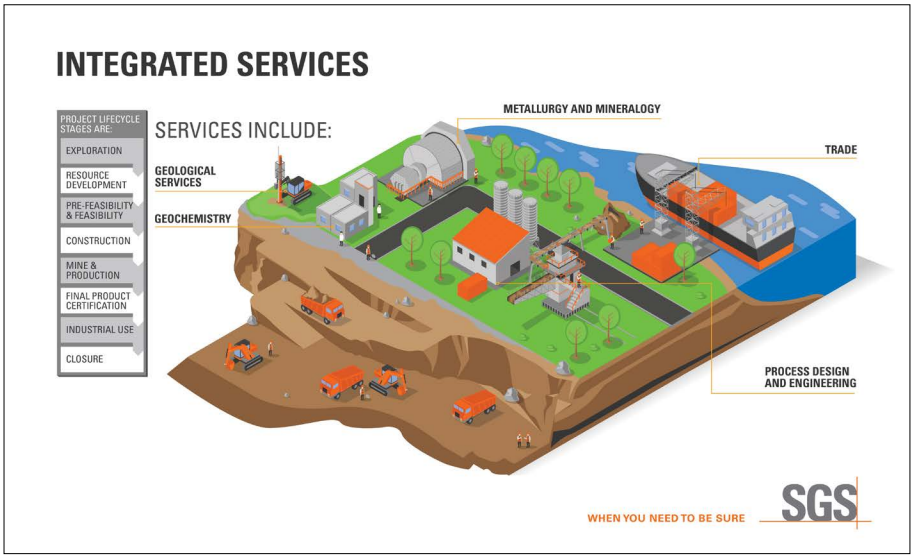
SGS

SGS MINERALS EXPERTISE ACROSS NORTH AMERICA

Delivering Quality Expertise throughout the Mining Life Cycle in North America

Across Canada, our integrated approach delivers testing and expertise through out the entire mining life cycle leading you to project success. Our techncial expertise for processing remains unmatched around the world. Our services encompass the skills of qualified geologists, geostaticians, analytical chemists, mineralogists, metallurgists, process engineers and mining engineers are brought together to provide accurate and timely mineral and process evaluation and consulting services.

Backed by 14,000 employees globally, our integrated approach provides the mining industry with:



GEOLOGICAL SERVICES

Our geological services bring the disciplines of geology, geostatistics, and mining engineering together to provide customers with accurate and timely mineral project evaluation solutions. Our machine learning technologies are focussed on finding new ore bodies, evaluate risk, and determining potential for mineral resource expansion, rather than just optimizing operations.

GEOCHEMISTRY

Our network of commercial laboratories, sample preparation facilities and mine-site and mobile labs link together creating a market leading network of geochemistry labs providing an unparalleled suite of target elements. Our geochemical team across Canada provides you the quality, consistency and ethical compliance needed for geochemical analysis.

METALLURGY & MINERALOGY

For nearly 80 years, we have been providing bankable metallurgical expertise across Canada. With locations in Lakefield, Ontario, Vancouver, British Columbia and Quebec City, Quebec, our bankable expertise has been providing mining companies with a comprehensive understanding of their deposit and ore variability while optimizing flowsheet design for processing.

PROCESS DESIGN & ENGINEERING

We offer a range of integrated services for the global mining, bulk materials handling, and mineral beneficiation and processing sectors. Our state-of-the-art process engineering and design, and leading-edge project execution systems help you to ensure the success of your project throughout its lifecycle – from concept to commissioning.

ENERGY MINERALS

With over 40 years of experience in Canada our energy minerals team provides the Canadian coal market with quality coal results. We have issued certificates of analysis for over 500 million tonnes of coal shipped across Canada.

TRADE SUPPORT

Across Canada and around the globe our trade team reduces commercial risk by ensuring that your shipments meeting contractual specifications and international standards in respect to quality and quantity. Our globally trusted inspectors and samplers are well-trained who represent your best interest at ports, warehouses and facilities around the world.

ENVIRONMENTAL SUSTAINABILITY

Our environmental sustainability for the mining industry focus on helping you develop a truly sustainable environmental mitigation strategy. We have the technical expertise to provide effective mitigating strategies and innovative, practical solutions that reduces the environmental impact of your operations by looking at water related issues from the early stage of metallurgical process development.

SGS

SGS GEOLOGICAL SERVICES

Orebody Modelling and Resource and Reserve Evaluation Expertise for the Metals and Mining Industry

With over 35 years of experience providing the mining industry with mineral resource estimation services using cutting edge geostatistical techniques; SGS Geological Services is known globally as the expert in ore body modelling and reserve evaluation.

We bring the disciplines of geology, geostatistics, and mining engineering together to provide you with accurate and timely mineral project evaluation solutions. We also offer a broad range of services to the mining and exploration industries to reduce risk and enhance value. We have the expertise to assist you in the following areas:

- Exploration services including customizable software solutions
- Ore body modelling and resource estimation within our own GENESIS software
- Mine engineering including optimization, design and scheduling
- Mine audits including resources, reserves, mine to plant reconciliation and technical due diligence
- Technical Reports (NI 43-101, JORC and SAMREC) and Desktop Studies
- Sample selection for metallurgical tests to ensure representativity
- Training and education on themes discussed above

With over 1,000 consulting projects completed worldwide, SGS Geological Services is well equipped to minimize your operational and financial risks. You can depend on SGS Geological Services's global technical leadership to ensure effective solutions to your exploration and mining challenges.

We have provided modelling and resource estimation solutions for a wide array of commodities including:

- Gold and precious metals
- Base metals
- Iron ore
- Rare earth elements, niobium, tantalum
- Uranium
- Coal
- Industrial minerals (bauxite, barite, limestone for cement and lime, salt, sands with titanium bearing minerals etc.)

As part of the larger SGS Minerals group, we can draw upon our network of laboratories, metallurgists, process engineers and other professionals to help optimize your mineral project.

GEOLOGICAL MODELLING

With SGS Geological Services, an ore body modelling project starts with a critical review of geological interpretation using existing drill hole and surface, or underground data and maps. Drill hole and/or sample databases are constructed along with all the quantitative and qualitative information available to build a resource model. Many tools have been developed in our specialized software (GENESIS) including implicit modelling, variable ellipsoids and "fast-mode" modelling. These features provide rapid and flexible modelling solutions providing the SGS Geological Services team with an edge.

GEOSTATISTICS AND RESOURCE ESTIMATION

Accurate resource estimation by a Qualified Person (QP) is an essential part of due diligence, and is the corner stone of international reporting standards such as National Instrument 43-101, JORC and SAMREC. SGS Geological Services is an experienced leader in geostatistical techniques and will ensure your resource estimations are completed with accuracy and integrity.

Geostatistics involves the analysis and prediction of the spatial distribution of materials within the earth based on the concept that variability is predictable within a specific ore domain. One of the most important tools utilized to establish these relationships are variograms. The raw data is compiled, validated and imported into our proprietary software to calculate variograms; these enable the characterization of the nugget effect and the inherent variability of data in specific directions within the ore domain. Careful construction of the variogram also enables various types of sophisticated algorithms to estimate grades into block models; including kriging (simple, ordinary, lognormal or indicator) and conditional simulations. There are several advantages to using these advanced methods of interpolation:

- Retention of high-nugget samples during interpolation to minimise metal loss due to smoothing or capping
- Reduce the overall error in resource and reserve estimation
- Quantification of error including the probability that a given stope or open pit blast is below the cut-off grade

MACHINE LEARNING SERVICES

Machine learning is defined as using powerful statistical algorithms to large sets of geoscientific data to help identify correlations and trends. This eliminates risk of missing data used to identify new prospective areas of mineralization within a property for drill testing. Machine learning adds value to existing data and justifies managing and maintaining extensive databases. Since winning the 2016 Integra Gold Challenge, SGS Geological Services has integrated machine learning in its toolbox for key services offered to clients for the creation of 3D geological modelling and domaining, exploration, and prospectivity targeting services.

MINING ENGINEERING

SGS has a team of mining engineers with an array of experience which can ensure that your mining project is fully optimized including a production schedule to maximize your returns. We have completed a multitude of pit optimizations using external and internal software to help evaluate the limits of economic extraction and to maximize revenues for a given time period. Detailed and practical mine design for underground and open pit mines can also be developed either for a producing company, or for detailed technical studies such as PEA, pre-feasibility or feasibility studies. A dedicated software toolset has been established to provide scheduling solutions to ensure that target ore blends are respected, or that metal production is maximized.

REPORTS

SGS Geological Services can provide reports that meet the specific needs of the client. We can complete a Desktop Study which provides a conceptual resource estimate and estimates economic viability based on a series of clearly stated assumptions, along with recommendations for work that will enhance the value and reduce the risk for that project. This type of report can be used as a basis for decision making or the first step in a due diligence.

We can also provide Technical Reports according to international standards such as NI 43-101 (Canada), JORC (Australia) or SAMREC (South Africa). These reports are recognized in the international investment community and are a requirement for public companies operating in those countries. We have completed all levels of study from exploration reports, resource reports, Preliminary Economic Assessments, pre-feasibility and feasibility Studies. Each supplementary level of study effectively reduces the technical and financial risk associated with the project.

At SGS Geological Services we have earned our leading position in the industry with our blend of professionals with practical mining and geological experience, world-renowned geostatistical knowledge, and by pioneering software technology. Partner with SGS and let us reduce your financial risks and optimize your mineral projects.

SGS GEOCHEMISTRY CAPABILITIES ACROSS NORTH AMERICA

An Overview of Quality Geochemistry in North America

Across North America, SGS provides quality geochemical analysis across the minerals sectors. Our network of commercial laboratories, sample preparation facilities and mine-site and mobile labs link to create a network across North America which is backed by an unparalleled global network. Our geochemical team across North Americaprovides you the quality, consistency and ethical compliance needed for geochemical analysis.

Our scope of geochemical support in North America includes:

EXPLORATION SUPPORT

Complete range of analytical testing and check analyses from ppb- to percent level

- Geochemical analysis of a vast array of matrices
- Mobile Metal Ion (MMI™) soil geochemistry
- Precious metals analyses
- Surface water and soil analyses
- Check assays
- Ultra-trace analysis
- Handheld XRF analysis
- On-site sample prep facilities
- Mobile laboratories

OPERATIONAL SUPPORT

- Complete range of analytical testing and check analyses from ppb- to percent level
- Integrated on-site or mobile laboratory facilities to support grade control, plant operation and environmental programs
- Sample preparation facilities
- Wastewater and effluent treatment and monitoring
- Mine waste and acid rock characterization

COMMERCIAL TRANSACTION SUPPORT

- Complete range of analytical testing and check analyses from ppb- to percent level
- Party (settlement) and umpire analysis
- Arbitration expertise
- Metal and metal alloy analysis
- Scrap metal analyses
- Smelter support
- Precious metal analysis
- Catalyst testing services

AVAILABLE INSTRUMENTATION

- ICP-MS, ICP-AES, MP-AES, XRF, XRD
- AA, GFAA, hydride AA, cold vapor Hg
- HPLC, LC, IC
- S, N by IR combustion
- C by IR combustion and coulometry
- SIE
- Peroxide and LIM fusion
- Many classical methods including titration and gravimetry/ electrogravimetry
- Full decomposition techniques including weak and strong acid digestion and fusion
- Pb fire assay for Au, Ag and PGE

VALID AND SECURE DATA ACROSS NORTH AMERICA

Validity and security of data is critical. We ensure our operational practices underline these crucial requirements. To ensure this, we have:

- Standardized methods that are independently validated and peer viewed.
- Direct transfer of all instrument data directly into our Laboratory Information Management System (LIMS).
- Integration of standardized data acceptance and related quality control criteria into data handling procedures.
- Q-Mine, our secure internet data portal which allows worldwide authorized data access.
- Sophisticated data hosting services for the ultimate in data traceability.

INDUSTRY STANDARD PRACTICES AND QUALITY

- Geochemical reference materials preparation and characterization
- Due diligence reviews
- Impendent and secure data hosting
- Lab audits, consulting and technology transfer/licensing
- Accreditations and practices that support technical reports
- Laboratory design

OUR COMMITMENT TO QUALITY

Our quality management objectives at SGS allows us to provide you with excellent service by:

- Identifying and applying the most appropriate quality tools to measure our performance and the quality of our results.
- Continuously improving our performance to maximize our business success.
- Creating a work environment that encourages quality, customer service and individual and group excellence
- Continuously ensuring you trust us by adhering to strict confidentiality.

Our geochemical team across North America provides you the quality, consistency and ethical compliance needed for geochemical analysis across the entire mining life cycle.

FTIR FOR RAPID IN-PLANT QUANTIFICATION OF LITHIUM MINERALS

Direct Mineralogical Identification and Quantification for a Wide Range of Phases

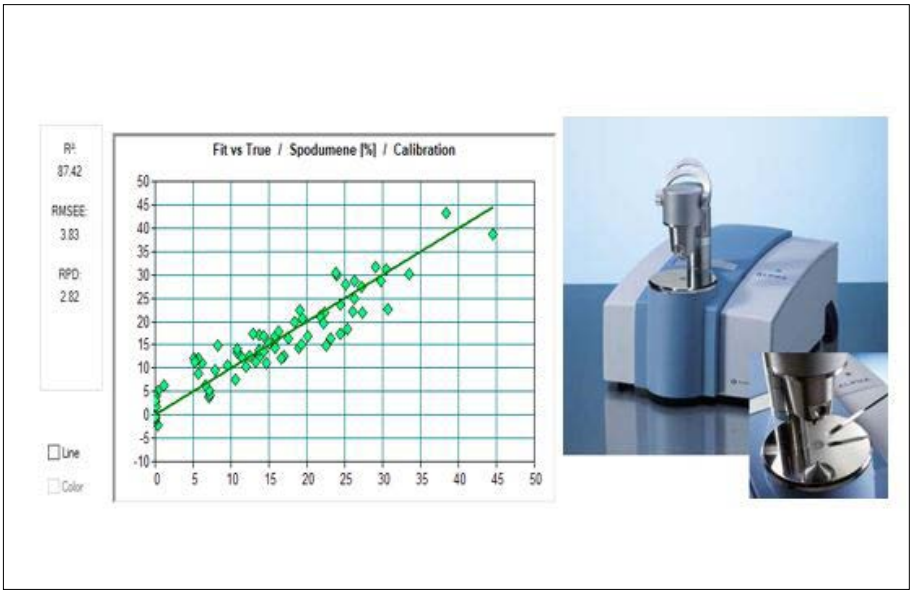
Fourier-transform infrared spectroscopy (FTIR) is a technique used to obtain an infrared spectrum of absorption or emission of a solid, liquid or gas. FTIR analysis has many advantages over other spectrometry tests.

OVERVIEW OF TECHNOLOGY

- Bruker Alpha II FTIR unit with Diamond ATR to develop Lithium mineral quantification methods matrix matched to the clients product.
- FTIR can analyse 230 samples per 8 hour shift per instrument. It can be used for routine process control.
- Data provided as csv or excel spreadsheet as required

METHODS FOR PREDICTIVE MODELLING

- FTIR can be used to quantitatively determine the mica content which is a major issue in both process control and product safety.
- Predictive modelling generated from FTIR data can be used to indicate not only lithium content but how much of the lithium is held in spodumene and how much is in micaceous phases.
- FTIR quantitative mineral data can be used to generate a grindability index.
- Quantitative mineralogical data can assist in flotation cell design and operation.
- Tantalum content can be predicted using FTIR in matrix matched systems.
- The mineralogical contents determined by FTIR can be used to define the pegmatite type and exploration potential.



PROCESS DEVELOPMET

- FTIR can be used to quantitatively determine the mica content which is major issue in both process control and product safety.
- Predictive modelling generated from FTIR data can be used to indicate not only lithium content but how much of the lithium is held in spodumene and how much in micacous phases.
- FTIR quantitative mineral data can be used to generate a grindability index.
- Quantitative mineralogical data can assist in floatation cell design and operation.
- Tantalum content can be predicted using FTIR in matrix matched systems.
- The mineralogical contents determined by FTIR can be used to define the pegmatite type and exploration potential.

METHODS

FTIR ATR Methods Quant

- Spodumene
- Petalite
- Muscovite
- Quartz
- K Feldspar
- Plagioclase
- Apatite

FTIR ATR Methods Predict

- Tantalum
- Lithium in pegmatite

SGS METALLURGICAL CAPABILITIES ACROSS NORTH AMERICA

An Overview of Metallurgy Expertise in North America

For nearly 80 years, SGS has been providing bankable metallurgical expertise across North America. With locations in Lakefield, Ontario, Vancouver, British Columbia and Quebec City, Quebec and Durango, Mexico, our network of metallurgical facilities across North America provides the global mining industry with effective flowsheets and practical technical solutions to processing issues.

Our metallurgical expertise covers a wide range of commodities including:

- Precious metals (gold, silver, platinum, palladium, etc.)
- Base metals (copper, cobalt, zinc, nickel, lead, molybdenum, manganese, etc.)
- Rare earth element minerals
- Uranium/ Naturally occurring radioactive material
- Industrial minerals (lithium, graphite, etc.)
- Iron Ore
- Hydrocarbons

Our scope of metallurgical capabilities in North America includes:

MINERAL PROCESSING

Flotation

The flotation process ultimately produces saleable concentrate grade from both simple and complex ores. Bench scale flotation test programs generate parameters including flowsheet design, flotation kinetics, reagent schemes and optimization and grind size. Our flotation capabilities include:

- Flotation Equipment
- Mineral Flotation Test (MFT)
- Column Flotation
- Oxide Flotation
- Mini Flotation Pilot Plant

Comminution

With grinding circuits typically being the largest or second largest capital investment for a mine, it is vitally important to be confident in your grinding circuit design, to ensure positive project economics. We offer several comminution tests that have been created to design grinding circuits or optimize existing operations including:

- SAG Power Index (SPI)
- Bond Ball (BWI)
- Bond Ball (RWI)
- Bond Low Energy Impact
- Abrasion Index
- Modified Bond
- HPGR
- JK Drop Weight
- SAG Mill Comminution (SMC)
- SAG Pilot Plant

Beneficiation

Beneficiation is the process where ore is reduced in size and gangue separated from the ore. Separation of certain minerals can be efficiently achieved by taking advantage of the physical, electrical and magnetic properties. Our beneficiation capabilities include:

Gravity Separation

- Gravity Recoverable Gold (GRG)
- Spirals
- Mozley Tables
- Falcon Separator
- Knelson Concentrator
- Wilfley Tables
- Dense Media Separation (DMS)/ Heavy Liquid Separation (HLS)

Magnetic Separation

- Davis Tube
- SATMAGAN
- Electrostatic
- High Intensity
- Perma Roll
- High Magnetic Intensity / Low Magnetic Intensity

Size Classification

- Screens / Sieves
- Cyclosizer
- Malvern (Laser PSA)

Ore Sorting

EXTRACTIVE METALLURGY

Our extractive metallurgy enables you to develop trusted flowsheets which will allow you to recover maximum recovery yields while meeting environmental and health and safety regulations. Our extractive metallurgy capabilities include:

Gold Extractive Metallurgy

- Cyanide Leaching
  - o Bottle Rolls
  - o Column Leaching
- Bioleaching
- Thiosulphate Leaching
- CIP/CIL Modelling
- SART Testing
- Cyanide Destruction/Recovery

Hydrometallurgy

- Atmospheric and Pressure Leaching
- PLATSOL™
- Product Purification
  - o Selective precipitation
  - o Solvent extraction
  - o Ion exchange
  - o High purity product production

Solid-Liquid Separation

- Static and dynamic thickening
- Pressure and vacuum filtration
- Rheological testing

MINERALOGY

Mineralogy is the expert quantitative study of minerals using manual and automated techniques. Our mineralogy experience spans a wide range of elements, commodities and deposit types. We provide testing for a multitude of applications – from exploration, through to production, industrial hygiene, environmental applications and mine closure.

Our mineralogy capabilities include:

- Optical Microscopy
- TIMA-X
- QEMSCAN
- XRD
- SEM
- Gold Deportment

GEOMETALLURGY

Geometallurgy is the integration of geological, mining, metallurgical, environmental and economic information to maximize the Net Present Value (NPV) of an orebody while minimizing technical and operational risk. Our geometallurgy capabilities include:

- EXPLOMIN™
- Plant Design, Production Optimization and IGS Simulations
- Geostatistics
- Domaining
- Production Forecasting

PILOT PLANT TESTING

Pilot plant testing is used to demonstrate and confirm that the flowsheet developed at the bench is viable. SGS pilot plants are unique in that they operate in an integrated fashion. Our main pilot plant facilities are fully supported by state of the art analytical laboratories. Our pilot plant capabilities include:

- Mini Flotation Pilot Plant Testing
- Mini and Large Scale Pilot Plant Testing
- SAG Mill Pilot Plant Testing
- Dense Media Separation Pilot Testing
- Continuous Pressure Oxidation (Autoclave)
- CIP/CIL Pilot Plant Testing
- Cyanide Destruction Pilot Plant Testing

ENVIRONMENTAL SERVICES

It is vital to minimize all environmental considerations to achieve a successful mining operation. Our environmental capabilities include:

- ARD Testing
  - o Static Testing
  - o Kinetic Testing
- Water Treatment Solutions

OTHER CAPABILTIES

- Engineering Design
  - o Rheology
  - o Paste Backfill
  - o Filtering
  - o Thickening
- Plant Operations and Audits
- Geotechnical Engineering and Hydrogeology
- Advanced Process Control Systems
- Flotation Equipment Supply (Spargers)

CHEMISTRY LAB

Our metallurgical capabilities are supported by an internal geochemical network designed to provide rapid turn around time on all metallurgical products.

For decades, the mining industry has turned to SGS for trusted metallurgical testing solutions. Our demonstrated success in metallurgical testing has provided thousands of companies and mines with effective flowsheets and practical technical solutions to processing problems.

Our team across Canada has the depth and wealth of experience with nearly every commodity to provide an effective, safe and sustainable resolution to any processing challenge.

SELECT LITHIUM EXPERIENCE

From early exploration to end-product certification and closure, our team provides quality fit-for-purpose solutions and testing capabilities for lithium projects.Our integrated approach delivers testing and expertise through out the entire mining life cycle leading you to project success. Our techncial expertise for battery metals remains unmatched around the world. The following table indicates recent lithium projects completed at SGS.

CLIENT	DEPOSIT	COUNTRY	YEAR	DESCRIPTION
MINERAL PROCESSING PROJECTS				
Rock Tech Lithium	Georgia Lake lithium property	Canada	2020	Flotation flowsheet develop and spodumene concentrate
Piedmont Lithium	Piedmont Lithium Project	North Carolina, USA	2019-2020	DMS and flotation flowsheet development and variability sample testing, DMS pilot plant, Concentrate production for hydromet testwork
Archer Cathro & Associates	Little Nahanni Pegmatite	Canada	2019	Scoping level metallurgical testing on the little nahanni pegmatite prospect
Neometals Ltd.	Li Ion Batteries	Australia	2019	Sample preparation for recycling of lithium ion batteries
Sigma Lithium Resources	Xuxa	Brazil	2018	DMS pilot plant
Sigma Lithium Resources	Xuxa	Brazil	2018	DMS processing of one tonne of material to generate Concentrate
Guo Ao Lithium Ltd	Moblan	Canada	2018	Variability testing for process design
Far Resources Ltd	NWT Lithium Pegmatite Project	Canada	2018	Evaluation on 4 pegmatite samples
Vision Lithium	Sirmac	Canada	2018	Lithium flowsheet development on a composite sample from Sirmac lithium project
92 Resources Corp	Hidden Lake Lithium Property	Canada	2017	To develop preliminary flowsheet
North American Lithium	Quebec Li	Canada	2017	Pilot plant operation to confirm flowsheet performance and to produce lithium concentrate
Sigma Lithium Resources	Xuxa Deposit	Brazil	2017	To develop preliminary flowsheet
North American Lithium	Quebec Li	Canada	2017	To improve plant performance and troubleshooting
Global Geoscience	Rhyolite Ridge Li-Boron Project	Nevada, USA	2017	Scoping level metallurgical testing to recover Li and Boron by scrubbing, classification, magnetic separation and flotation

CLIENT	DEPOSIT	COUNTRY	YEAR	DESCRIPTION
Hydrometallurgy Projects				
Galaxy Lithium (Ontario) Inc.	Sal de Vida	Argentina	2019	Processing of 10 cubic meters of lithium brine
Neometals Ltd.	Li Ion Batteries	Australia	2018	Pilot scale leaching of shredded Li Ion Batteries and sequential SX operation to recover Cu, Co, Ni and Li salts
Neometals Ltd.	Li Ion Batteries	Australia	2018	Pilot plant testing
Sayona Quebec Inc.	Authier	Canada	2018	Li hydromet bench testwork
St Georges Eco Mining Corp		USA	2018	Lithium recovery from Nevada lithium clay
Galaxy Resources Ltd	James Bay	Canada	2018	Process flowsheet optimization
Cypress Development	Clayton Valley	USA	2017	Process flowsheet development
North American Lithium	Val d'Or	Canada	2017	Process flowsheet optimization
Standard Lithium	Bristol Dry Lake	USA	2017	Process flowsheet development and piloting
Millennial Lithium	Pastos Grandes	Argentina	2017	Process flowsheet development
Minera Exar	Salar de Cauchari-Olaroz	Argentina	2017	Boron SX and impurity removal optimization
Minera Salar Blanco	Salar de Maricunga	Chile	2017	Boron IX and impurity removal optimization
Pure Energy Minerals	Clayton Valley	USA	2016	Process flowsheet development for impurity removal
Pure Energy Minerals	Clayton Valley	USA	2016	Process flowsheet development and piloting
Bacanora Minerals Ltd	Sonora	Mexico	2015	Flowsheet development for production of battery grade Li2CO3. On-site audit of the Bacanora Analytical Laboratory
Simbol Materials Inc.	California's Imperial Valley	USA	2014	Process development of purification methods for upgrading technical grade Li2CO3 to battery grade specifications
RB Energy Inc.	Val d'Or	Canada	2014	Plant audit and technical and operational support for Quebec Lithium commercial operation.
Critical Elements"	Rose Property	Canada	2013	Lithium purification and tantalum recovery
Orocobre Ltd.	Salar de Olaroz	Argentina	2011	Lithium carbonate purification testwork
Globestar Mining Corp	Moblan	Canada	2011	Laboratory program to test standard hard rock process for production of lithium carbonate

WWW.SGS.COM

WHEN YOU NEED TO BE SURE

SGS