MAXIMIZING THE **VALUE** OF YOUR OPERATION –
TECHNICAL SOLUTIONS TO HELP REACH YOUR GOALS EFFICIENTLY AND EFFECTIVELY

MineAfrica Investing Seminar
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Global Head, Mine and Plant Services
AT A GLANCE

Nº1 WORLD LEADER

85,000 EMPLOYEES

1,800 OFFICES AND LABORATORIES

14 GLOBAL INDUSTRIES

GLOBAL SERVICE LOCAL EXPERTISE
MINERALS
FULL SUPPORT ALONG THE VALUE CHAIN

- Transportation & Cargo Services
- Engineering & Technical Operational Support
- Mineralogical & Metallurgical Testing
- Trade Services

Chemical & Environmental Analysis

Explore → Develop Reserves → Pre-feas Feas → Construct → Mine or Produce → Transport → Industrial Use → Close

- Iron Ore
- Precious Metals
- Biofuels
- Base & Ind Metals
- Fertilizer
- Coal
MINERALS ON A GLOBAL SCALE
INTEGRATED SERVICES UNLOCK VALUE

SGS is uniquely positioned in the mining industry to unlock value and maximize performance at your exploration project, operating mine, or government agency.
UNLOCKING VALUE IN AFRICA
OPERATIONS IN AFRICA
Orebody modeling, resource and reserve estimation, classification, modeling and auditing

Database review, verification and validation

Geostatistical data handling and grade variability studies

Identification of fatal metallurgical flaws

Metallurgical scoping studies

Conceptual overview of metallurgical flowsheets and recoveries

Geometallurgical domain definition and sampling guidance
GEOLOGY, GROUND SURVEYS AND DRILL PROGRAMS

- Geochemical sampling and interpretation
- Regional, local and detailed mapping, core logging and sampling
- Exploration mineralogy integrated with geochemical analysis
- Diamond selection, classification and evaluation
- Geological interpretations including structural, tectonic and exploration model delineation and 3D ore deposit models
- NI 43-101 and JORC Technical Report writing, review and audits
- Mining code consulting
The torch has been passed… I know that SGS Geostat will reap the benefits of winning the Gold Rush Challenge. Mark my words, this is not the last time we hear from the SGS Geostat team.

- Rob McEwen
The generation of consistent and objective data for core and chip samples can give exploration and mining professionals an increased level of confidence in the data used in the modelling of resources and mining activities.

Core/Sample and Data Preservation

Specific advantages of applying automated core scanning include:

- Providing additional, consistent mineralogical and textural information to improve the depth and confidence of information in resource block models.
- An in-field technique that facilitates active program monitoring and management for cost effective drilling and a reduced time-to-data.
- Assisting with the refinement of geometallurgical models for ore processing and mine planning purposes.
HYPERSPECTRAL CORE IMAGER – 3: HCI-3
ANALYTICAL AND TRADE SOLUTIONS

- Exploration Geochemistry
- Import/Export Inspection and Surveys
- Settlement and Umpire Services
- Mobile Sample Preparation Facilities
- On-site Analytical Laboratories
- Process Automation and Robotics
- Major, minor, trace, rare earth element and precious metals analyses
- Laboratory quality management
  - Chain of custody
  - Intra-laboratory proficiency testing
- ISO/IEC 17025 and other Accreditations
Full Suite Metallurgical and Mineralogical Testing and Characterisation
  - On continent
  - Supported by global SGS network

Flowsheet development for the recovery and purification of metals

Bench Scale Testing & Bankable Pilot Plants

Production of Market Samples

Metals Accounting/Sampling System Audits

Plant Audits and Optimisation

Process Commissioning and Debottlenecking

Advanced Process Control
PROCESS ENGINEERING AND TRADE-OFF STUDIES

- Bankable pilot plant testing
- Geometallurgical process and mine planning, simulation and design
- Power consumption studies
- Production of market samples
- Design engineering
- Cost estimates for capex and opex
- Joint mining and metallurgical optimization, production and mine planning
- Scoping, Pre-feasibility and Feasibility level studies
Acquisition of Time Mining and Performance Labs in 2012 provided an African Footprint for new Service
- Focused Engineering Services fills a gap in our client’s value chain

EPCM and Lump Sum Turn Key (LSTK) project execution for Plant Upgrades and Retrofits

Process engineering and material balancing for the recovery and purification of metals

Joint mining and metallurgical optimization, production and mine planning

Plant layout

Operational simulations and sensitivity analysis

Procurement and construction supervision
ROLE OF SGS

As a key **partner**, we help mining **companies** and **governments** extract maximum value from their deposits and resources across the mining life cycle by providing:

- Clearer understanding
- Testing and piloting
- Diagnostics and characterisation
- Design and optimisation
- **Solutions** to difficult problems
WE ARE SGS

HOW CAN WE HELP?

WHEN YOU NEED TO BE SURE
### WHAT DO WE DO?

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<th>EXPLORATION</th>
<th>RESOURCE DEVELOPMENT</th>
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<th>FEASIBILITY</th>
<th>PRE-PRODUCTION</th>
<th>PRODUCTION</th>
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<td>On-Site Lab &amp; Mill Support</td>
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Expanded engineering services is the natural complement to our existing TIC service offerings

Bateman’s focus on niche-application, advanced technology solutions is consistent with SGS’ value proposition in the Minerals industry