

INTERTEK MINERALS PRESENTATION

Africa House – Mining Focus Group Webinar

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INTERTEK ATIC SERVICES



01

INTRODUCTION



YOUR GLOBAL PARTNER FOR TOTAL QUALITY ASSURANCE



Systemic approach to Quality and Safety with ATIC Solutions



43,000+
employees

Global Market
Leader in
Assurance

1,000+
Labs and offices

100+
countries

Global Market
Leader in TIC

80+
languages



Our Sectors



Products



Trade



Resources

DELIVERING TOTAL QUALITY SOLUTIONS



OUR SECTORS

Products	
Trade	
Resources	



OUR SERVICES

Assurance 	Testing
Inspection 	Certification

...THROUGH A DEPTH AND BREADTH OF ATIC SERVICES

WHAT IS ATIC?

A

Enabling our customers to identify and mitigate the intrinsic risk in their operations, supply chain and business processes

T

Evaluating how our customers' products and services meet and exceed quality, safety, sustainability and performance standards

I

Validating the specifications, value and safety of our customers' raw materials, products and assets

C

Formally confirming that our customers' products and services meet all trusted external and internal standards

* ATIC = Assurance, Testing, Inspection & Certification

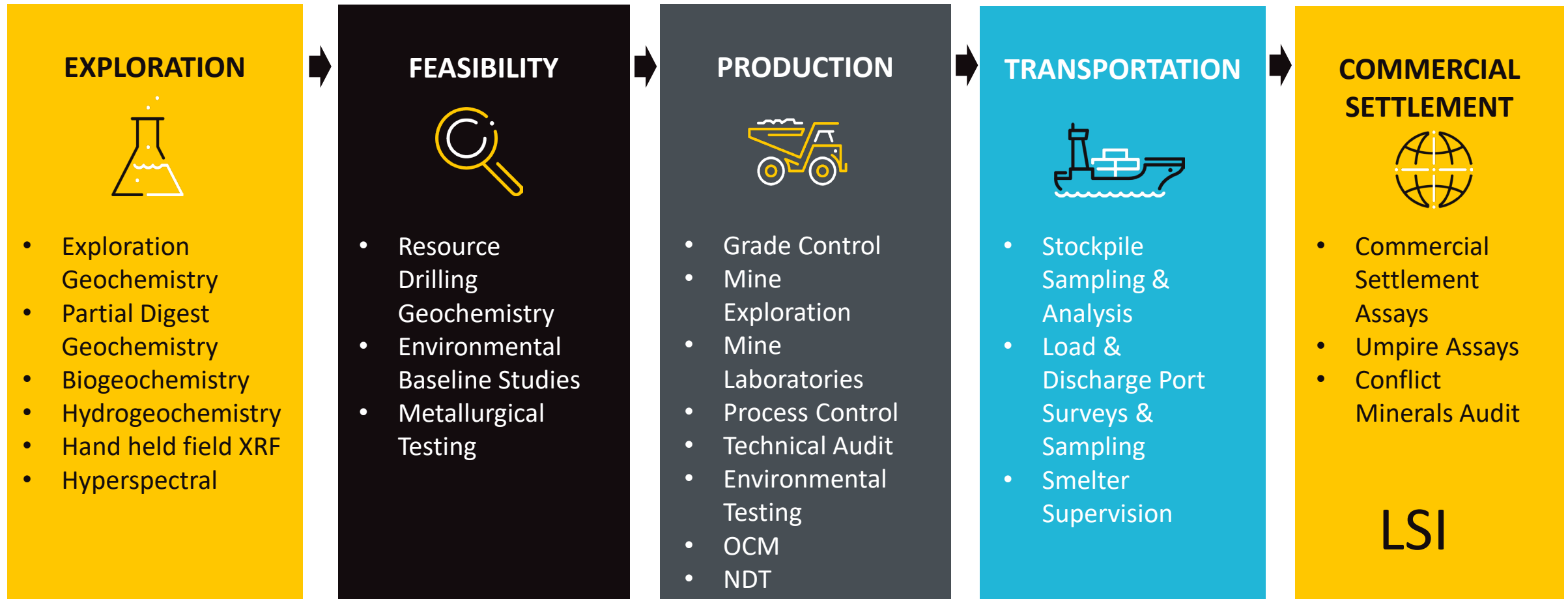


02

INTERTEK MINERALS



MINING AND RESOURCES LIFE CYCLE IN THE MINERALS SUPPLY CHAIN





MINERALS



From grassroots exploration to final product shipment, Intertek provides minerals testing, inspection and certification services to support mining activities around the world

Minerals Geochemistry

- Sample Preparation
- Precious Metals Analysis
- Exploration Geochemistry
- Ore Grade Analysis
- Mineralogy

Mine Site Laboratory Services

- Mine and Port sample preparation and laboratories
- Specialists in robotic & automated laboratory systems

Minerals Inspection, Sampling and Analysis

- Independent quality and quantity verifications
- Commercial settlement and umpire analysis
- Coal testing/inspection



INTERTEK MINERALS TRADE



- Cargo control by an experienced Inspection Company reduces the risk of unexpected complications and gives assurance to the counterparties that the **Quantity** and **Quality** of the material transacted correspond to the contractual specifications.
- We provide sampling, sample preparation, analysis and weighting of material, reporting of the results for commercial settlement purposes (Letter of credit, payments, insurance, pre-payments etc.)

Trade and Transport

- Quality analysis on stockpiles, train, truck, shipment samples
- Port site sample preparation facilities and laboratories
- Shipment umpire analysis

03

**INTERTEK MINERALS
AFRICA - CAPABILITIES**





INTERTEK MINERALS AFRICA LOCATION MAP





GEOCHEMISTRY & METALLURGICAL LABORATORY SERVICES IN WEST AFRICA



- Intertek Tarkwa laboratory expanded its capabilities to include a metallurgical laboratory within the accredited Minerals facility.
- The metallurgical laboratory supports existing and new clients within the sub-region who seek to understand the metallurgy and geometallurgy of their ores and related deductions needed in mineral processing.
- The laboratory covers all metallurgical facets of the mining value chain, ranging from testing, investigations, field support and consulting.
- The lab also provides Services Gold Analysis (Fire Assay, Aqua Regia, BLEG, Carbons, Bullion via AAS) , Manganese
- Clients Mix – Exploration (Regional, Resource Definition, Near Mine, Pit) , Grade Control , and Plant ; Open and UG Operations.





INTERTEK SOUTH AFRICA – MINERAL INSPECTION & TESTING

Intertek Minerals South Africa expanded its capabilities to include

- Inspection
- Sampling
- Sample preparation
- Analysis of ore grade material at an accredited laboratory
- Weighing of material
- Reporting of the results that will be used for commercial settlement purposes (Letter of credit, payments, insurance, pre-payments etc.)

Cargo control by an experienced Inspection Company reduces the risk of unexpected complications and gives assurance to the counterparties that the **Quantity** and **Quality** of the material transacted correspond to the contractual specifications.

Intertek LSI – An LME accredited laboratory based in the Netherlands supports Intertek Minerals globally, performs the following services:

- Commercial Settlement Assays
- Umpire Assays
- Conflict Minerals Audit

Intertek LSI – bring in trust to commercial/contractual mineral transactions and minimise risk and exposure



INTERTEK SOUTH AFRICA – GEOCHEMISTRY AND MINERAL SERVICES CAPABILITIES

Our Geochemistry analysis establishes underlying chemical patterns, identify geochemical anomalies and accurately quantify the chemical content of precious metals, base metals, REE and associated commodity ores.

The geochemistry services include:

- Sample preparation
- Pulp Density by pycnometer
- Precious metals analysis
- Exploration geochemistry
- Partial digest geochemistry
- Biogeochemistry
- Ore and commodities
- Litho-geochemistry & Whole-rock analyses

Mineralogy services include:

- Davis Tube Recovery (DTR)
- X-Ray Diffraction (XRD)
- Infra-red Spectroscopy – NIR, FTIR
- Micro Mineralogy by QEMSCAN



MINE SITE LABORATORIES



Intertek Minerals designs, commissions and operates dedicated port and mine site laboratories in remote locations and key mining regions across the globe and supports a range of mineral commodities.

Mine Site Laboratory Services

- Mine site sample preparation and assay services
- Portable sample preparation and laboratories
- Laboratory consultancy, design and audits
- Mineral trade onsite lab services
- Laboratory outsourcing (build, supply and operate options)

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**INTERTEK ATIC
SERVICES**



SOLUTIONS FOR TOTAL QUALITY ASSURANCE



	ASSURANCE	TESTING	INSPECTION	CERTIFICATION
EXPLORATION	<ul style="list-style-type: none"> • Technical Staffing Services 	<ul style="list-style-type: none"> • Resource drilling geochemistry • Metallurgical Test work • Environmental baseline studies 		
PRODUCTION	<ul style="list-style-type: none"> • Management system audits • Supply chain audits/ mgt • Vendor qualification • Social responsibility audits • Energy & environmental audit & review • Custom training solutions • Asset integrity management 	<ul style="list-style-type: none"> • Grade Control • Resource definition • Mine site laboratories • Process control • Environmental testing • Industrial Hygiene Testing • NDT, OCM • Pressure vessel testing • Corrosion testing 	<ul style="list-style-type: none"> • Product survey & inspection • Stockpile surveying • Pipeline inspection & testing • Fuel tank inspection & testing • Tank and Pump inspection and Calibration 	<ul style="list-style-type: none"> • Management systems: <ul style="list-style-type: none"> • Quality • Environment • Safety • BCM • EnMS • ISMS • Pressure vessel certification
TRADE AND TRANSPORT	<ul style="list-style-type: none"> • Management system audits • Vendor qualification & approval • Social responsibility audits • Custom training solutions • Traceability & Sustainability Services • Charters Liability Cover • Packaging verification 	Quality analysis on <ul style="list-style-type: none"> • shipments, stockpiles • Port site laboratories 	<ul style="list-style-type: none"> • Load & discharge port services • Tank and Hold Cleanliness • Inspection/Calibration • Sampling • Survey & inspection 	<ul style="list-style-type: none"> • Management systems: <ul style="list-style-type: none"> • Quality • Environment • Safety • BCM • EnMS • ISMS

intertek
Total Quality. Assured.



INTERTEK

INNOVATIONS IN MINING AND MINERAL PROCESSING – PHOTON ASSAY TECHNOLOGY



INNOVATION – CHRYSOS PHOTON ASSAY TECHNOLOGY



- Chrysos Photon Assay detects and counts atoms of gold, silver and complementary elements in as little as two minutes. using much higher energies than traditional X-ray methods
- Photon Assay allows large samples to be measured and provides a true bulk reading independent of the chemical or physical form of the sample. Using uniquely-numbered sample jars, the process is completely non-destructive, and all samples can be retained for further analysis or testing if required.
- The technology is also measurably safer and more environmentally friendly than previous assay processes, something that aligns with Intertek’s stated purpose of bringing quality, safety, and sustainability to life.
- For gold producers Chrysos Photon Assay delivers faster, more accurate gold analysis on larger samples with lower costs.

CHRYSOS PHOTON ASSAY TECHNOLOGY



Performance Specifications

Assayed elements	Gold, silver and copper.
Sample size	Containers hold 330 mL of sample (typically 400-650 g depending on material density).
Analysis time	Less than 2 minutes Standard throughput up to 1,400 samples per day.
Detection limits	Gold: 0.02 ppm (3-sigma) *Detection limit is larger for samples containing elevated levels of U, Th or Ba.
Disposal	Samples are retained inside unit for 2 hours post-analysis, after which time they can be safely handled or discarded.
Re-analysis	Photon Assay is completely nondestructive, so materials may be sent for additional measurements if required.
ESG improvement	Every sample analyzed with Photon Assay means reduced CO2 emissions and less hazardous waste.



INNOVATION – CHRYSOS PHOTON ASSAY TECHNOLOGY



- Chemical-free
- Non - destructive technology that supersedes the traditional fire assay method for measuring gold concentrations in samples.
- Photon is non-hazardous whiles fire assay is a complex and hazardous process
- Photon Assay is a faster, safer and more accurate gold analysis.
- ChrysoS Photon Assay is an environmentally-friendly replacement for fire assay on-site and in the laboratory.





CHRYSOS PHOTON ASSAY QA/QC



Monitoring of low-level data quality

- Photon Assay unit monitors quality of raw data every cycle
- If a 'single-cycle' anomaly is detected, the sample is automatically rerun
- Any fault persisting for more than a few cycles; triggers alert via Slack to engineer's mobile and shuts down PA unit

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Total Quality. Assured.