



PhotonAssayTM

Overview

Welcome to PhotonAssay™

→ What is PhotonAssay™?

Delivering faster, safer, more accurate and environmentally-friendly gold analysis, PhotonAssay™ is a trusted replacement for fire assay across the industry.

→ How does it work?

Hitting samples with high-energy X-rays, the technology causes excitation of atomic nuclei allowing enhanced and non-destructive analysis of gold, silver, copper and other elements in as little as two minutes.

→ [Watch the videos](#)

→ Why it matters

Through rapid turnaround on high sample volumes, PhotonAssay™ provides timely quantitative data, drives optimisation through the value chain, and delivers the key operational and environmental outcomes that matter to miners.



PhotonAssay™ means value delivered



Broad Applicability ✓	Fit for commercial laboratories, exploration projects, and large or small-scale mining operations
Budget Efficient ✓	Multiple leasing and analysis options deliver reduced CAPEX and operating costs
Superior Results ✓	Enhanced accuracy and precision, and the analytical method of choice for complex mineralogy
Improved Productivity ✓	Reduced turnaround times for faster, more informed decision-making
Better OHS Outcomes ✓	A lead-free, automated and intuitive technology that minimises manual handling and operator error
Planet-Friendly ✓	Every sample analysed means lower CO ₂ emissions and less hazardous waste
Full-Service Maintenance ✓	Chrysos provides specialised and structured unit maintenance across the globe
24/7 Support ✓	Dedicated technical support wherever and whenever you need it

Reporting-ready analysis

PhotonAssay™ analysis integrates with numerous industry-standard reporting frameworks including:

- ✓ JORC
- ✓ NI 43-101
- ✓ SEC

ISO Accredited

PhotonAssay™ units are operational in multiple laboratories accredited to ISO/IEC 17025 standards.

➔ [Watch the video: PhotonAssay™ Code “Compliance” Explained](#)



The PhotonAssay™ process

STEP 1



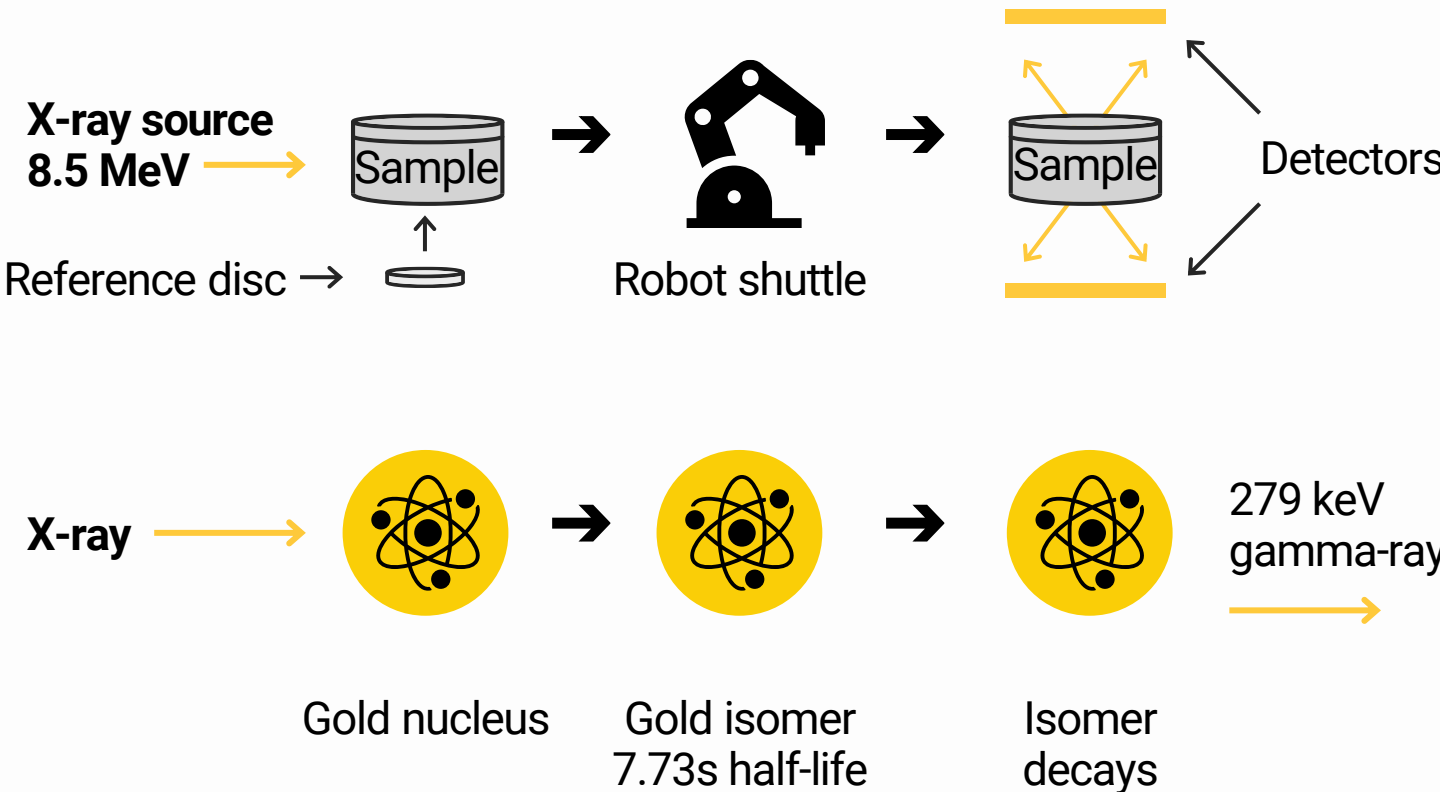
The crushed sample (2-3mm) is loaded into jars and scanned into unit by operator



STEP 2



Automated high-energy X-ray analysis: activates and detects gold atoms in as little as two minutes

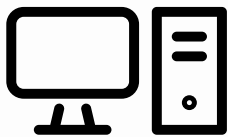


STEP 3

Automatic Reporting

Sample can be retained for future assaying or safely disposed of if no longer required

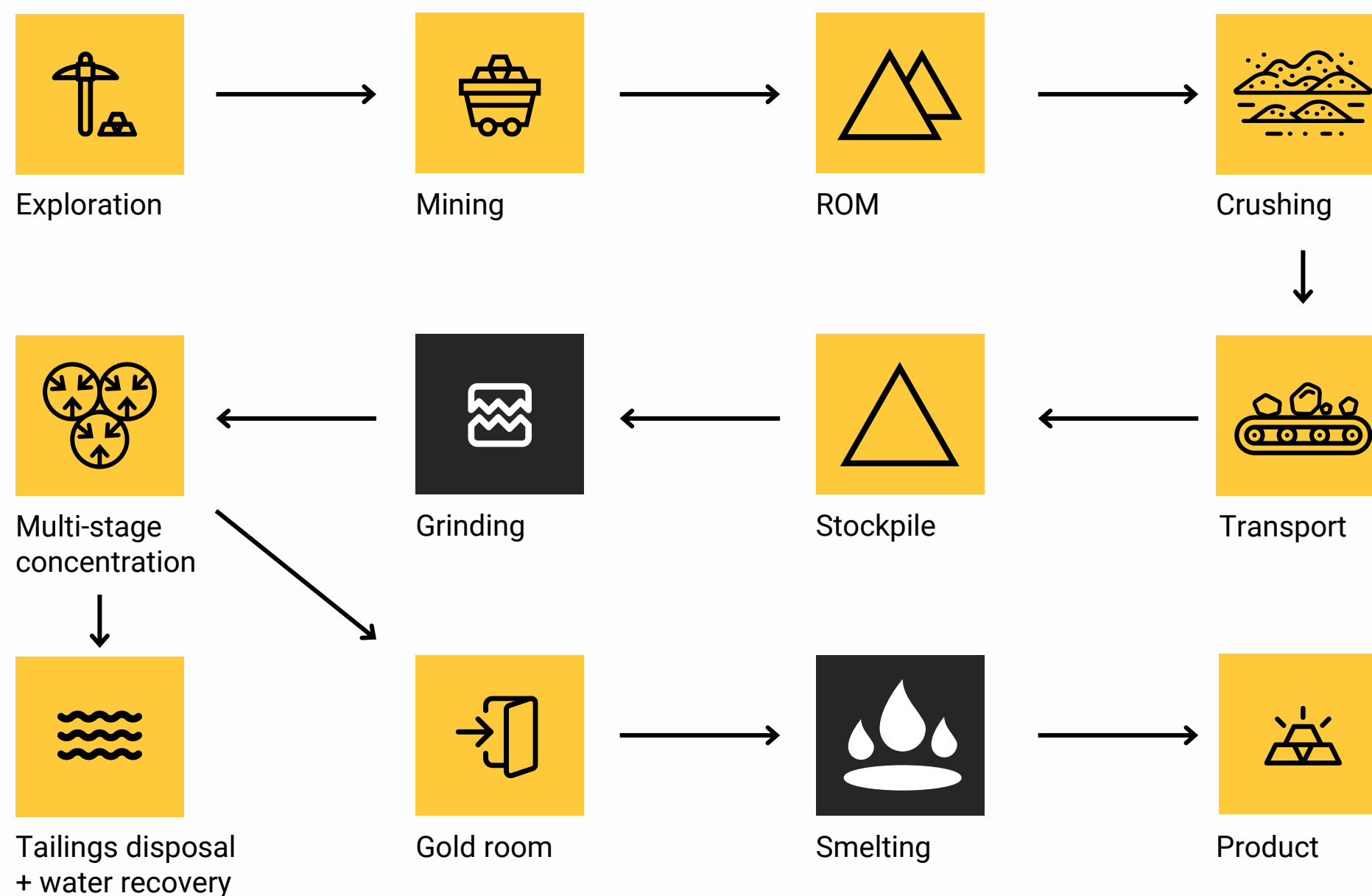
High sample throughput for improved productivity and decision-making



See PhotonAssay™
in Action →



Delivering value through the chain



PhotonAssay™ value-add

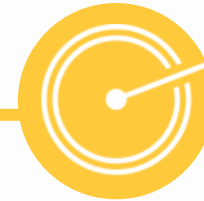
Exploration Mine	Fast turnaround for mine planning and scheduling in-pit
ROM Crushing	Assay-supported blending between pit and processing
Stockpile	Stockpile sampling & optimised gold recovery
Multi-stage Concentration	Reduction in process reagents and consumables
Tailings + Water Recovery	Tailings grade monitoring
Gold Room	All samples retained for QA/QC
Product	Buyer / seller assays

The PhotonAssay™ advantage



Lower Costs

- Simple to operate
- Minimal consumables
- Reduced sample preparation



Better Data

- Increased sample size and representativity
- 1 PhotonAssay™ equals ~7 fire assays
- Matrix agnostic accounts for challenging ore bodies



Faster Turnaround

- Results in two minutes
- Near real-time analysis
- Continuous quality assurance



ESG and Safety

- No hazardous waste
- Lower CO₂ emissions
- Improved OH&S



Process Optimisation

- Non-destructive assay
- Fully automated workflow
- Drives improved recovery rates

Better for people, for business and the planet

A 2025 GHD study at SGS Kalgoorlie identified **three key environmental advantages to PhotonAssay™**

Key Finding **1**

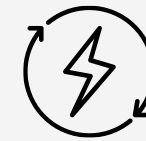


PhotonAssay™ produces Zero Scope 1 emissions

Compared to fire assay, PhotonAssay™ generates:

- 0 kg of Scope 1 CO₂ emissions
- ~3x lower emissions per sample overall

Key Finding **2**



Energy use is up to 90% lower

Compared to fire assay, PhotonAssay™ uses:

- ~10x less energy used during analysis
- ~5x less across the full assay process

Key Finding **3**



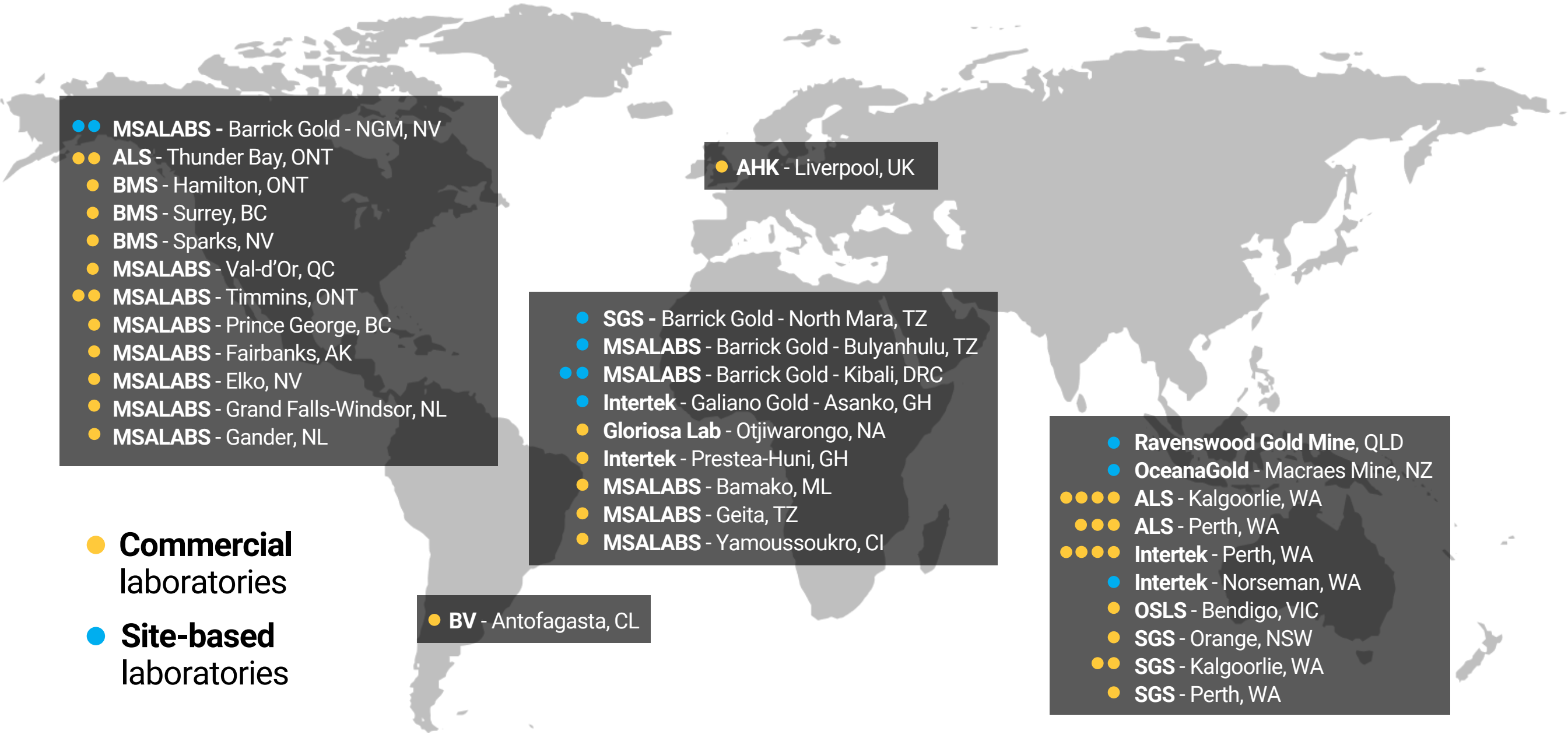
PhotonAssay™ fully eliminates lead-contaminated waste

- Every fire assay sample generates ~215g of lead-contaminated waste
- PhotonAssay™ generates **none**
- **Zero lead exposure** for operators

→ [Download the full study here](#)

Top-tier customers around the world

Chrysos is engaged with more than **80% of the world's top 20 gold producers** in key industry hubs



80%

Used by **80% of the world's Top 20** gold producers

1M+

1 million+ samples assayed per month across **five continents**

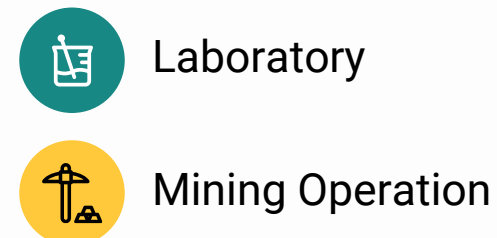
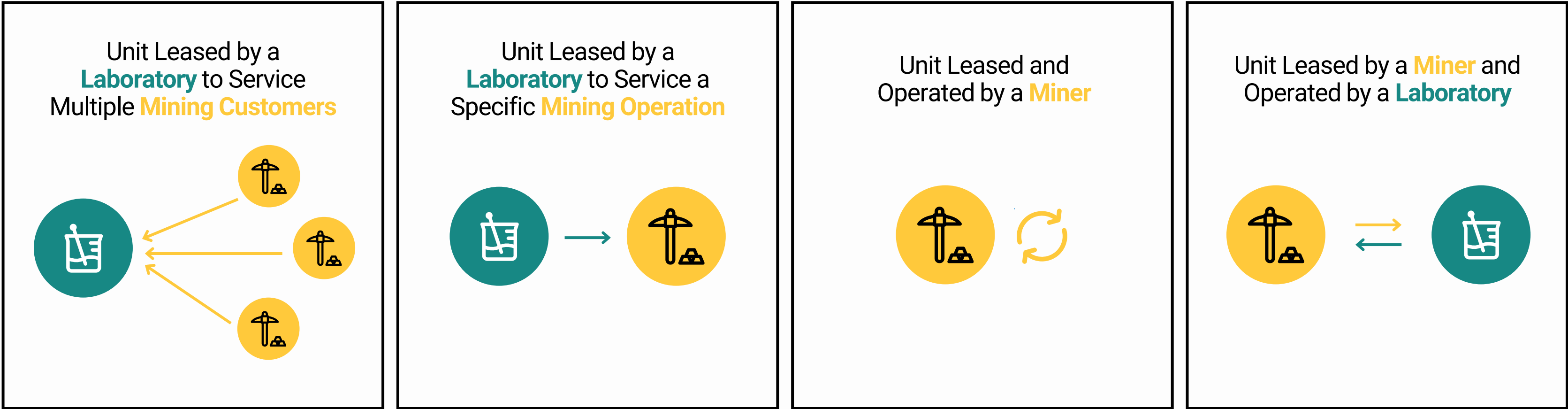
23M+

Over **23 million samples** processed globally to date

Trusted & Used By

Barrick Mining Corporation • **Newmont Corporation** • **Agnico Eagle Mines Gold Fields** • **Kinross Gold Corporation** • **Northern Star Resources** • **Evolution Mining** • **Alamos Gold** • **IAMGOLD** • **OceanaGold Corporation** • **Ramelius Resources** • **Westgold Resources** • **Prodigy Gold** • **Spartan Resources** • **Ravenswood Gold**

Multiple operating models in action



Unit deployed direct to the mine site

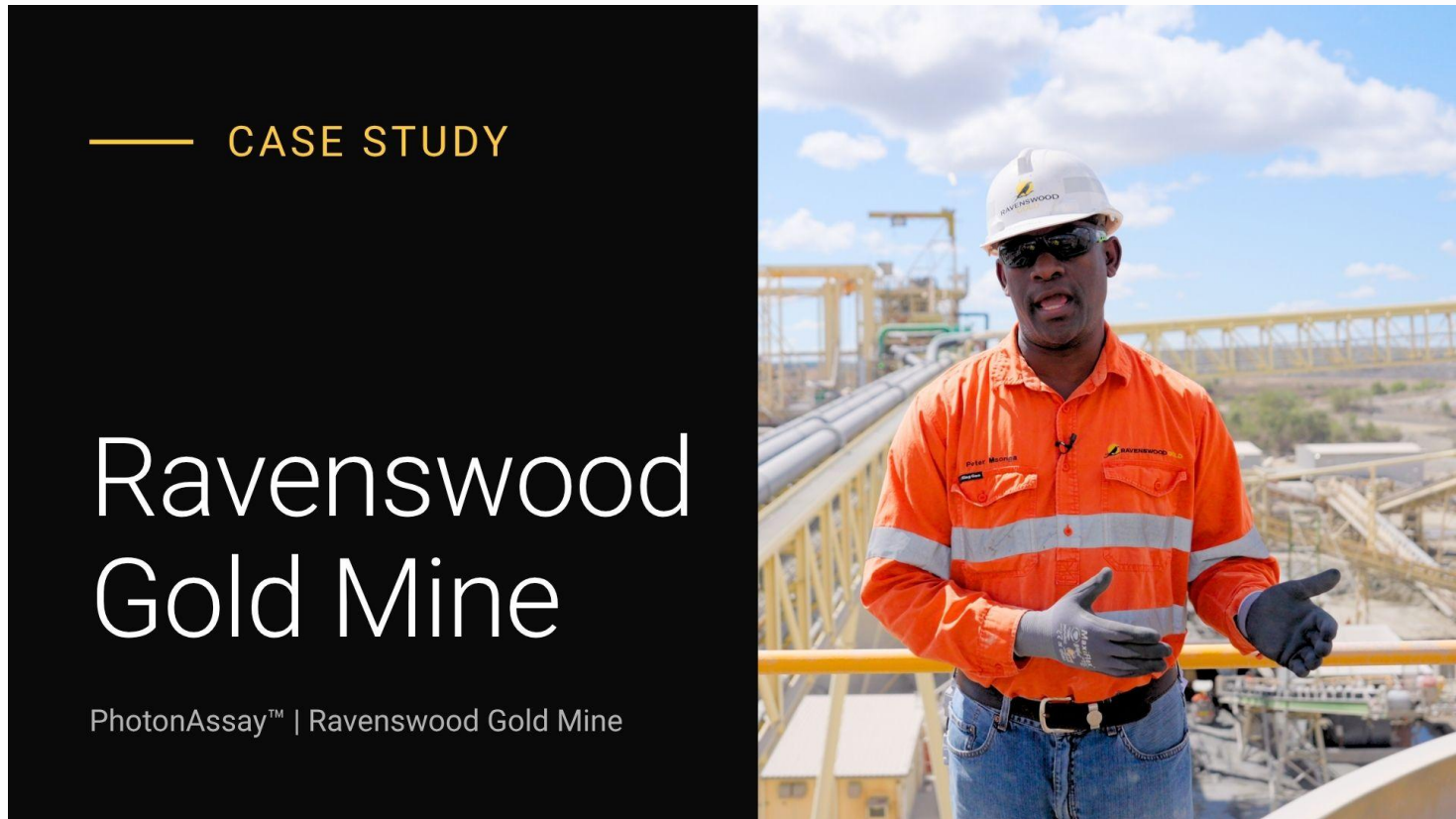
Customer case studies



- ✓ 50% faster grade control assay turnaround
- ✓ Fire assay **eliminated on site**
- ✓ 100% confidence in low-grade assays
- ✓ From rig to results in **24 hours**
- ✓ Faster data enables more **dynamic drilling**



Click above or scan the QR to watch



- ✓ Assay costs reduced by **5-10% per month**
- ✓ Assay backlog **eliminated**
- ✓ Grade control decisions **accelerated**
- ✓ Recovery rates and reconciliation accuracy **improved**
- ✓ More effective mine planning **enabled**



Click above or scan the QR to watch

PhotonAssay™ technical features

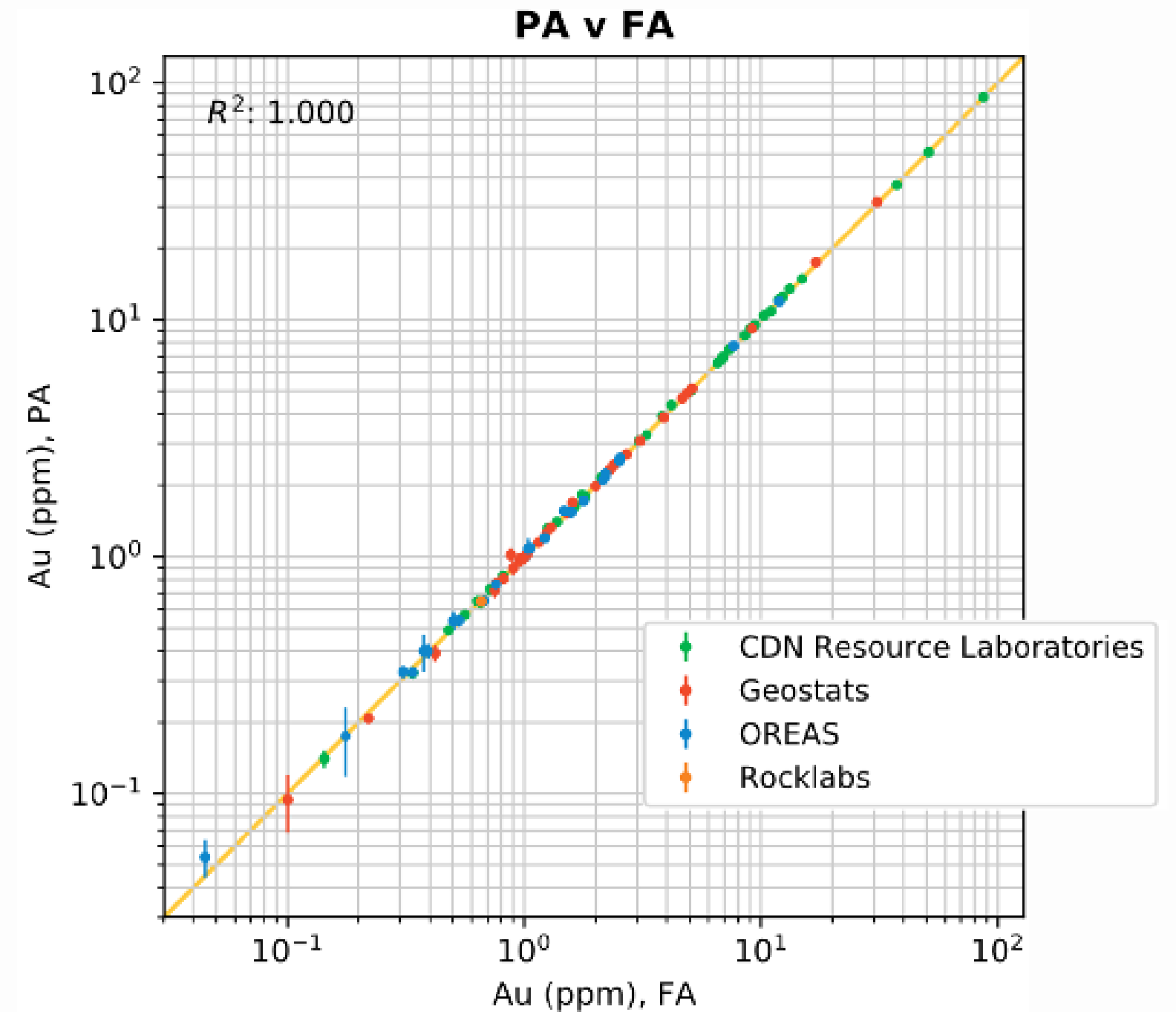
PhotonAssay™ vs. Fire assay ¹	Fire assay	PhotonAssay™
Time per Sample →	~3-4 Hours	~2 Minutes ✓
Sample Size →	10-50 g	400-650 g ✓
CO ₂ per Sample →	2.3 kg	0.9 kg ✓
Hazardous Waste →	0.31 kg	0 kg ✓
Energy Use →	~8.9 kWh	~1.7 kWh ✓
Automation →	No	Yes ✓

- ✓ True bulk measurement of large samples, typically 400-650 g
- ✓ Minimal sample preparation e.g. crush to 2-3 mm top-size
- ✓ Non-destructive; no chemical reagents required
- ✓ Quantitative results in as little as two minutes
- ✓ Excellent sensitivity: detection limit 0.01 ppm - 10,000 ppm
- ✓ Independent of sample matrix, chemistry or mineralogy

1. Based on findings from the 2025 GHD | SGS | Chrysos PhotonAssay™ – Emissions, Energy and Waste Assessment for Assay Technology report

Gold validation on CRMs

- Detection limit of 0.01 - 10,000 ppm*
- Excellent correlation 0.03 – 100 ppm ($R^2 = 0.99994$)
- Testing on carbon pulp CRMs validated up to ~8,000 ppm

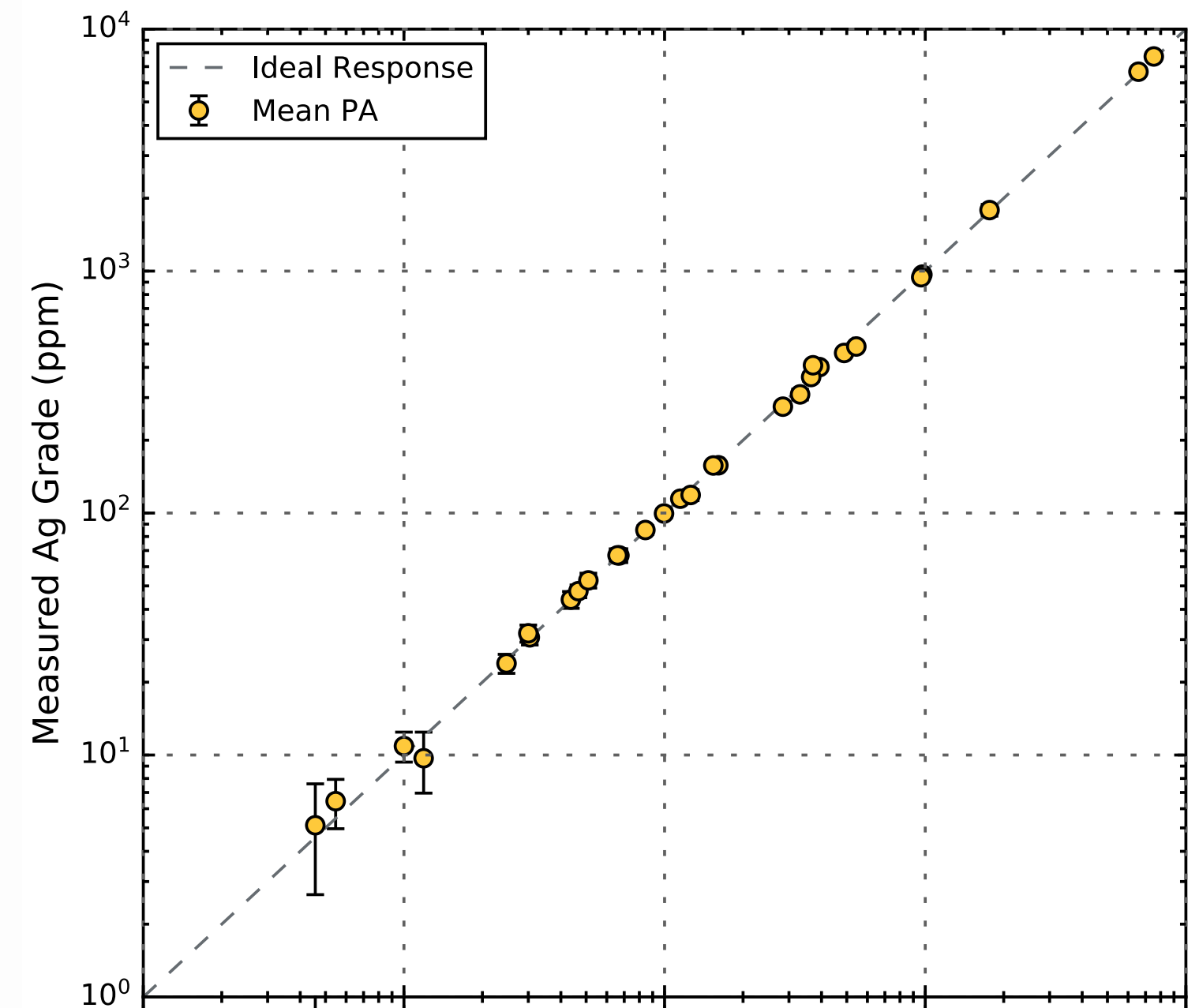


*Example CRM performance: test on 94 gold reference materials
from four commercial providers*

*On reagent blank materials

Ag Silver validation on CRMs

- Detection limit:
 - ✓ 3.7 ppm for standard 'gold-optimised' service*
 - ✓ 1.5 ppm for 'silver-optimised' service*
- Excellent correlation 5 – 8,000 ppm ($R^2 = 0.99994$)
- Can be measured simultaneously with gold



Example CRM performance: test on 38 reference materials from five commercial suppliers

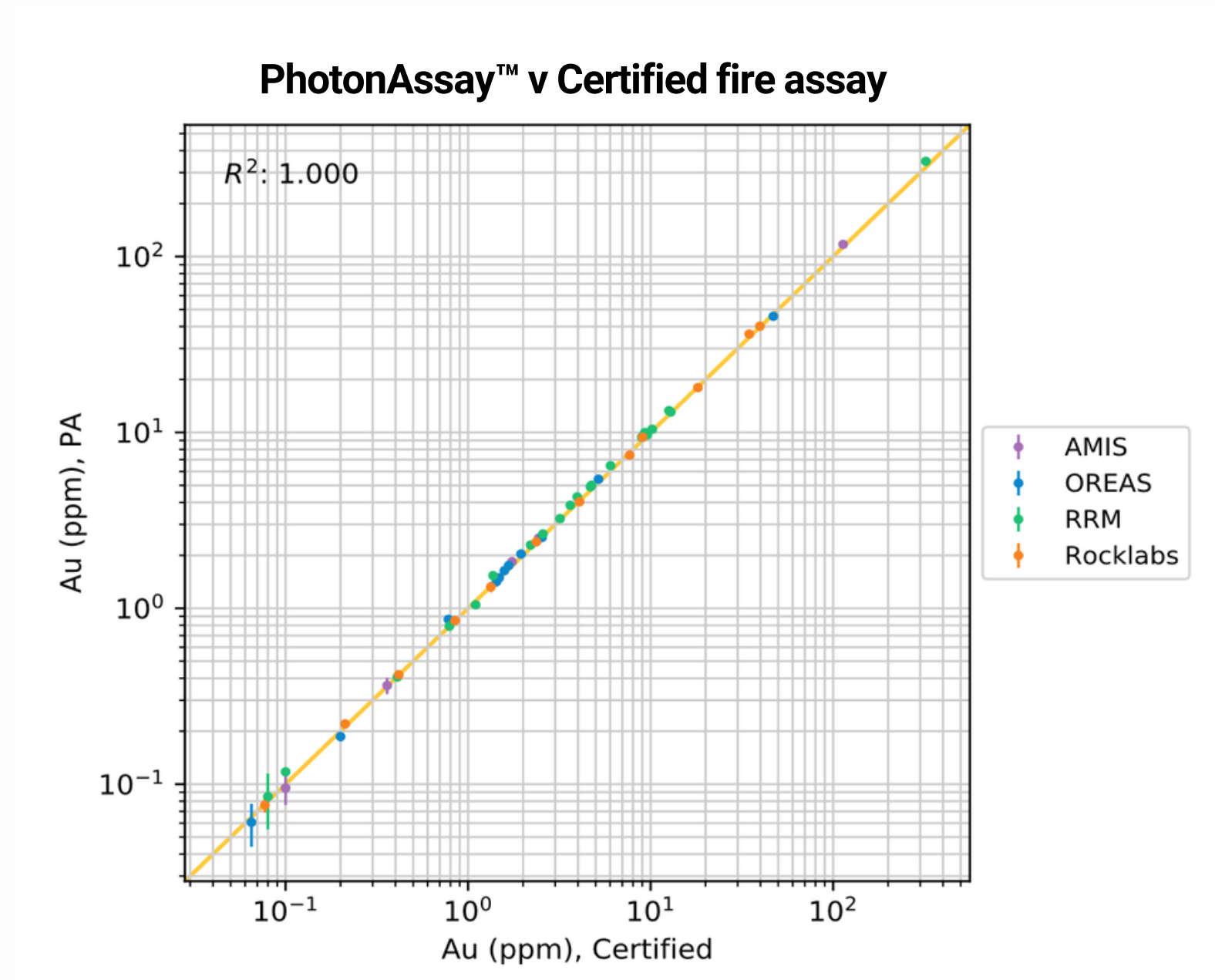
*On reagent blank materials

PhotonAssay™ certified CRMs

- More than 800,000 CRMs analysed in PhotonAssay™ units across the globe
- A growing number of CRM providers (OREAS, IMS etc.) now offer PhotonAssay™ certified materials
 - ✓ Crushed and pulverised materials available
 - ✓ Grade range 0.108 – 92 ppm
- Customers report savings in CRM costs via the non-destructive PhotonAssay™ technique and reusable CRM jars
- **Download the technical notes for more information**



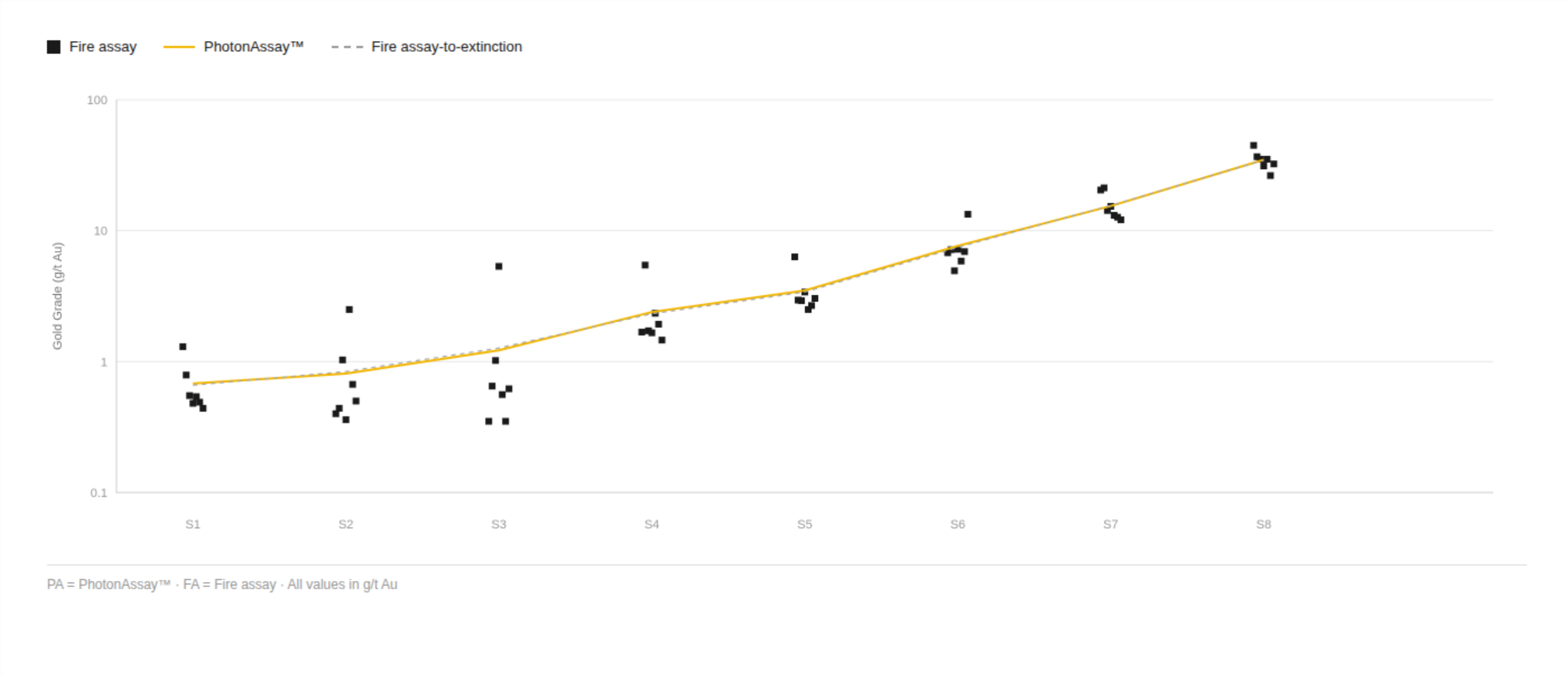
Accuracy is important...



...but how often is your
real-world material
homogeneous enough for
CRMs to provide a true
representation of your
deposit?

Real-world accuracy and precision

Results are from a PhotonAssay™ implementation study, conducted on a gold deposit with moderate heterogeneity. Eight samples were run seven times each with fire assay, then compared to a single PhotonAssay™ result.



Structured maintenance & support

Chrysos maintains the machine so you can make decisions with the data

WEEKLY & MONTHLY

Preventative Maintenance

- Scheduled, structured checks
- Planned downtime windows
- Localised spares

AUTOMATED & CONTINUOUS

Monitoring & Diagnostics

- Continuous system monitoring
- Built-in diagnostics
- Integrated with real-time QA/QC

24/7

Support & Response

- Local maintenance engineers
- QC Slack channel, email & portal
- Batch failure reviews by Chrysos team

✓ CONTRACTURAL GUARANTEE

- High availability you can plan around
- Predictable maintenance windows
- Fee reductions may apply if machine is unavailable
- Transparent reporting

! IF AN ISSUE OCCURS

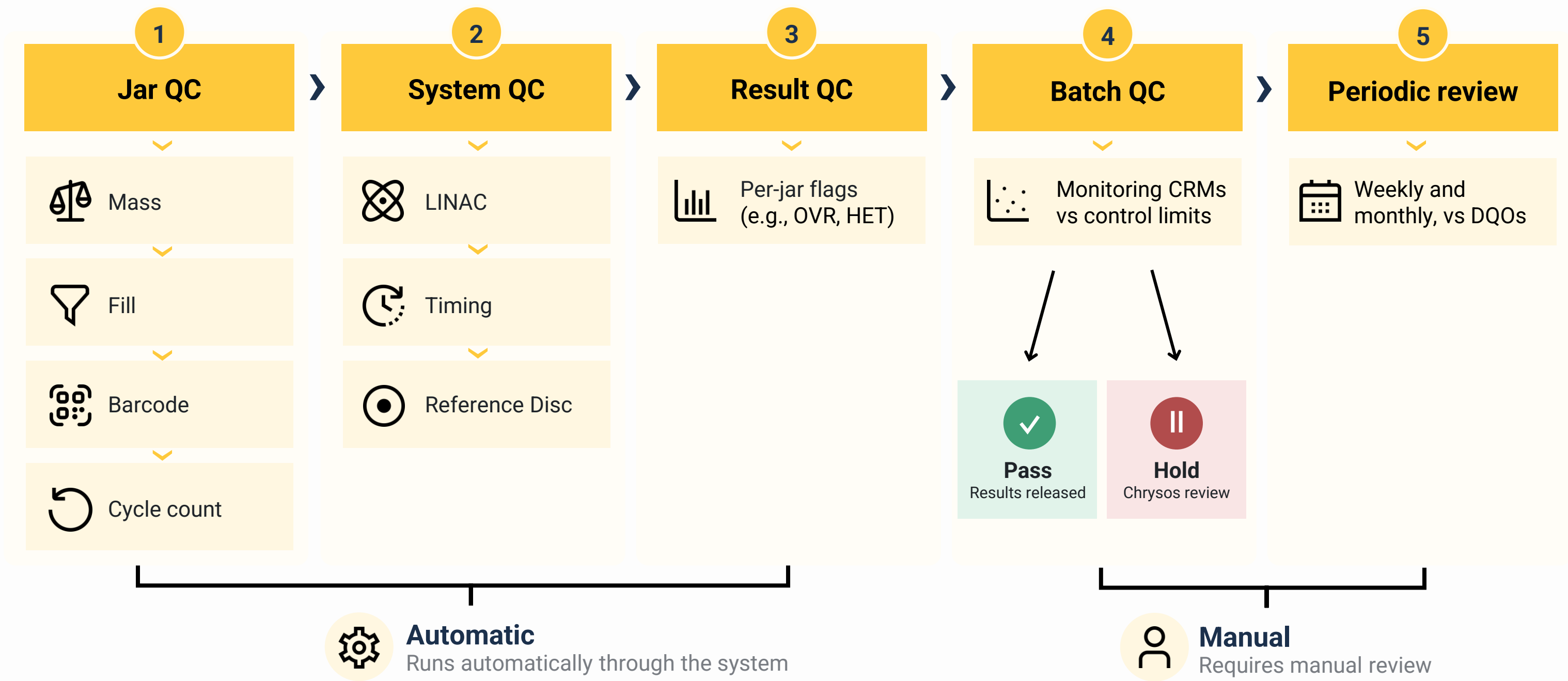
- Rapid diagnosis by 24/7 support teams
- Structured response to close loops
- Dedicated maintenance engineers on site
- Minimal downtime



PhotonAssay™ Unit & Chrysos Maintenance Engineer

PhotonAssay™ quality control

The benefits of automation, brought to your mine site with reports delivered automatically



Learn more about PhotonAssay™



POV: What It's Like to Be a Sample Inside a PhotonAssay™ Unit



A Sample's Journey Through PhotonAssay™



How PhotonAssay™ Works

Contact our team at info@chrysoscorp.com and get started on your path to faster, safer, more accurate and environmentally-friendly gold analysis today!

- ➔ Book a PhotonAssay™ demonstration or unit tour
- ➔ Start a PhotonAssay™ trial at one of our partner laboratories
- ➔ Collaborate with our team to customise an on-site deployment at your project



Explore more at
photonassay.com



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