

CHRYSOS
PhotonAssay™

Faster, more accurate gold analysis

PhotonAssay™

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.



The PhotonAssay™ process

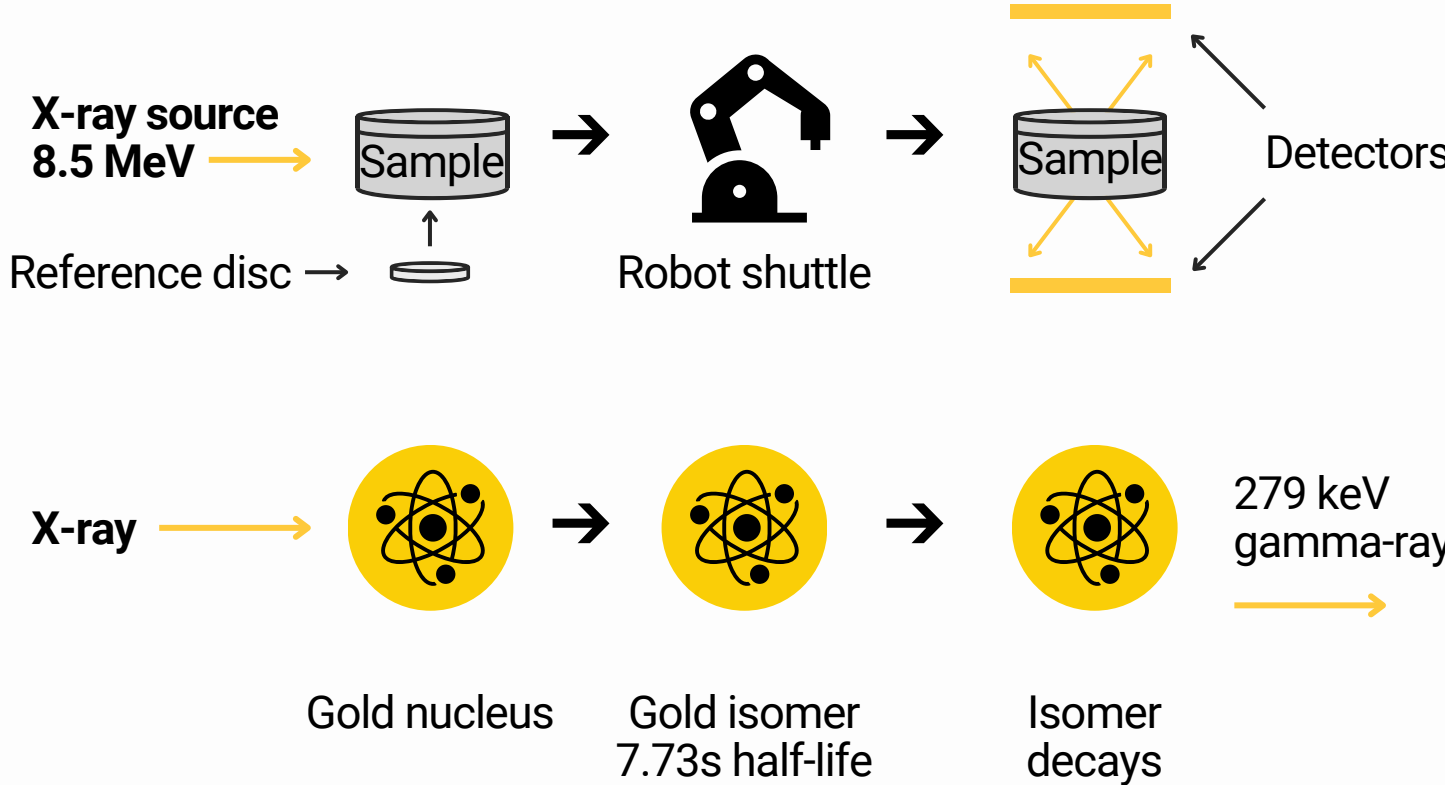
STEP 1 →

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

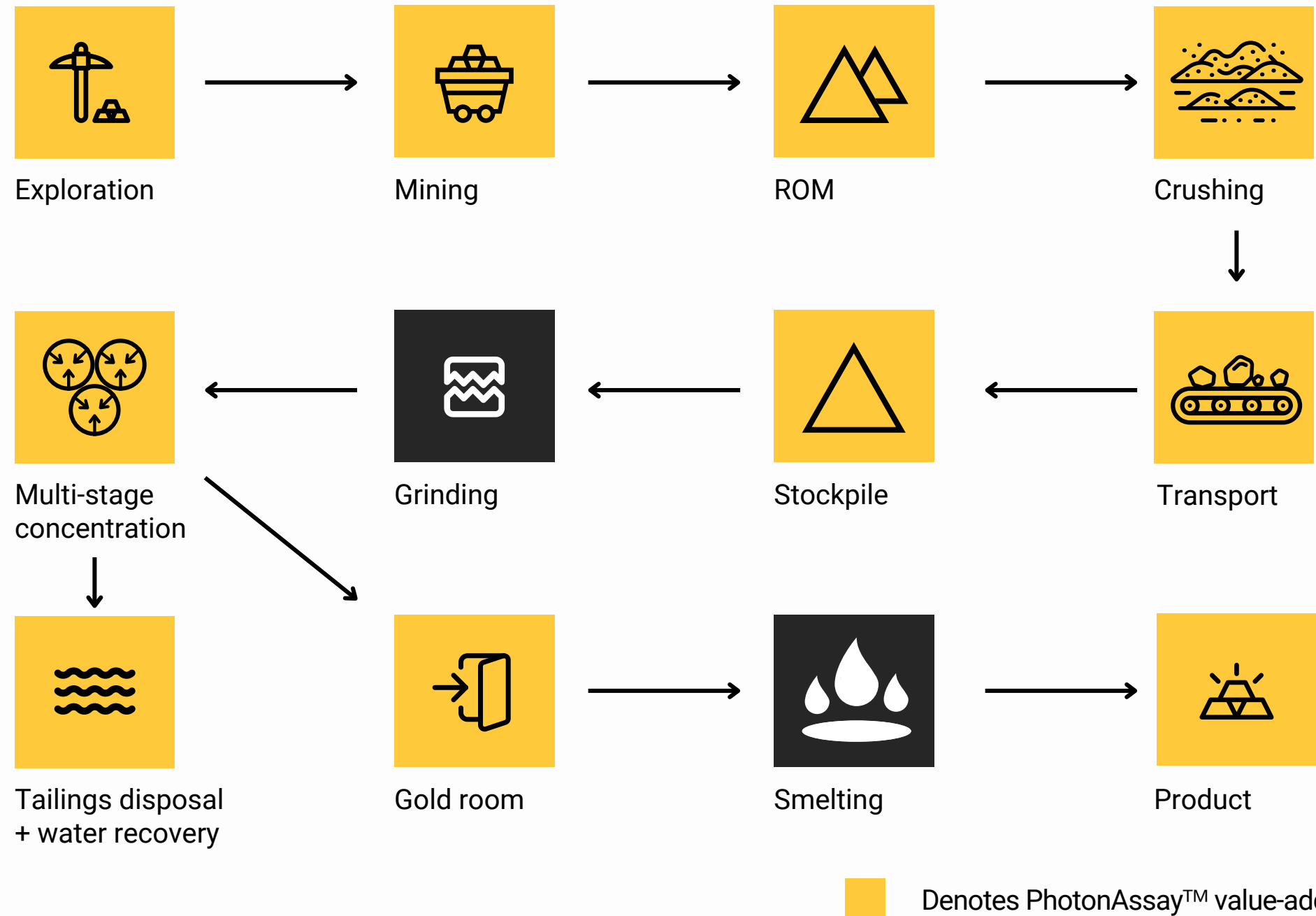
High sample throughput for improved productivity and decision-making



See PhotonAssay™ in Action →



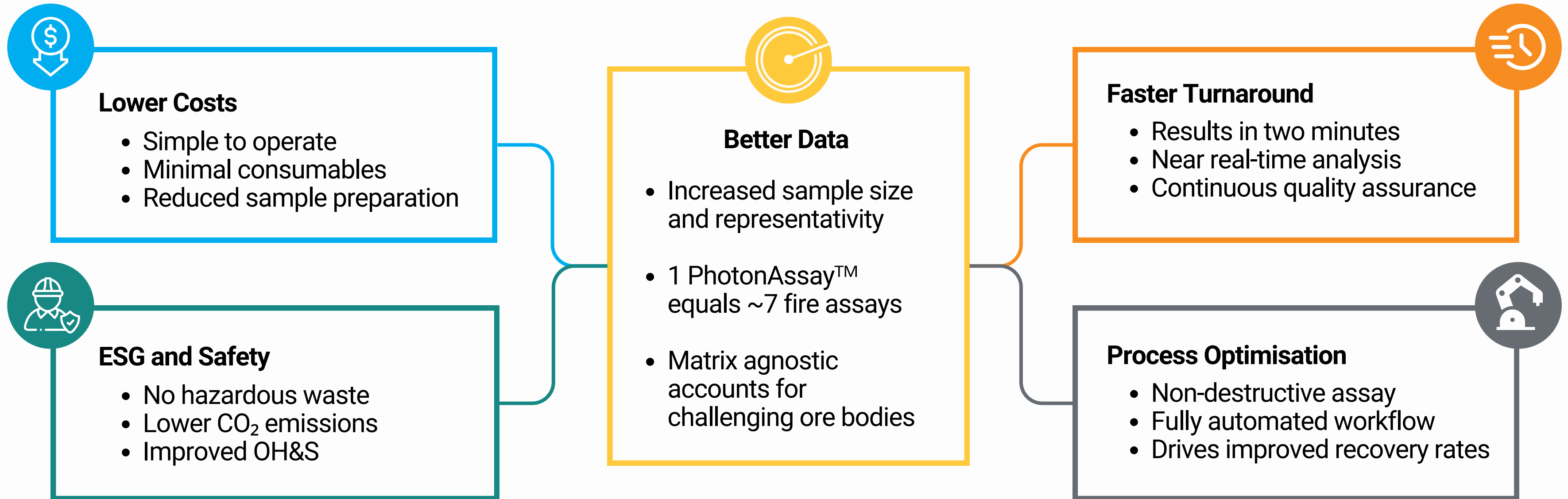
Delivering value through the chain



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



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**

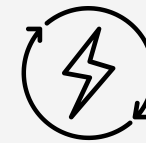


PhotonAssay™ produces Zero Scope 1 emissions

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**

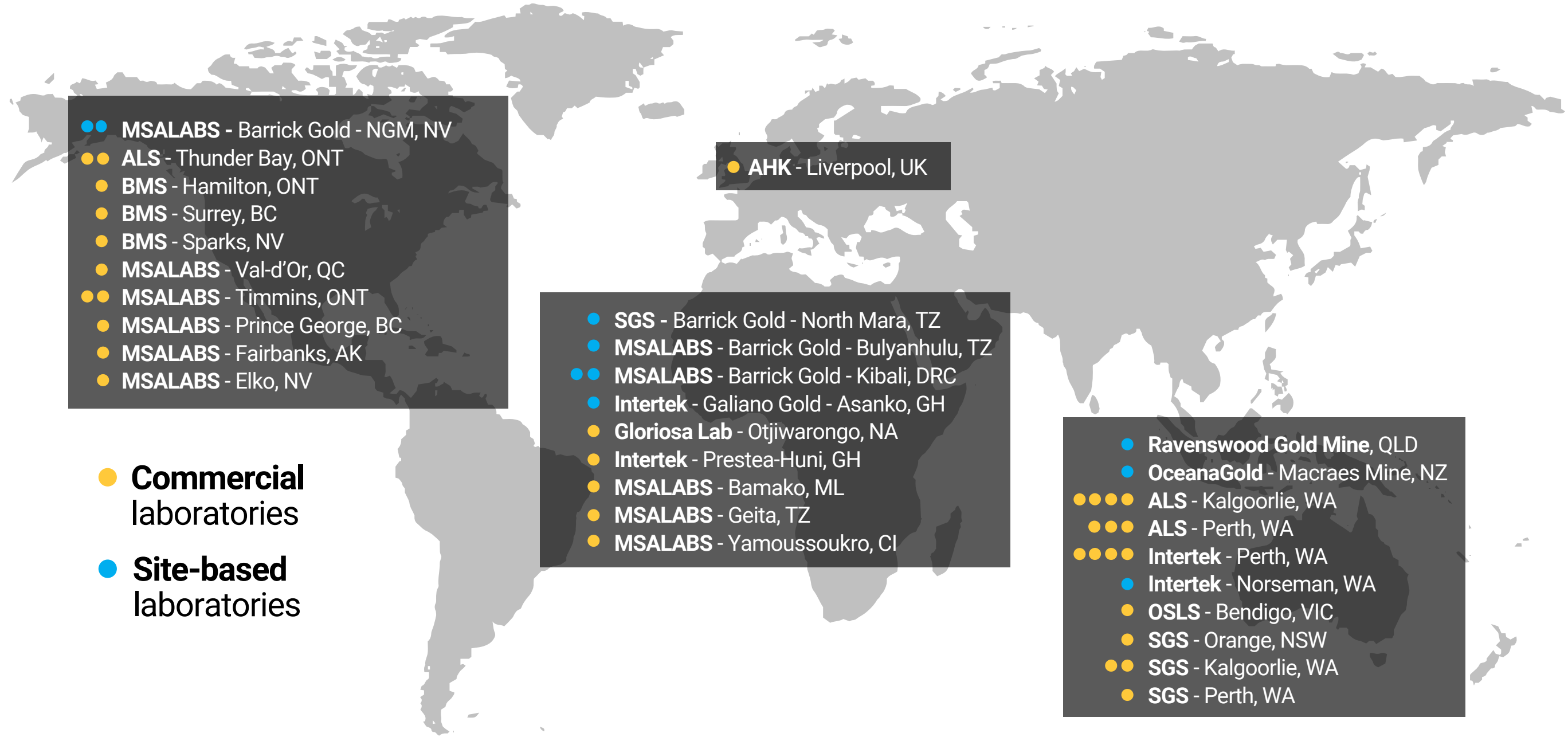


PhotonAssay™ fully eliminates lead-contaminated waste

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

Top-tier customers around the world

Chrysos is engaged with more than **70% of the world's top 20 gold producers** in key industry hubs



70%

Used by 70% of the world's Top 20 gold producers

950K+

950,000+ samples assayed per month across four continents

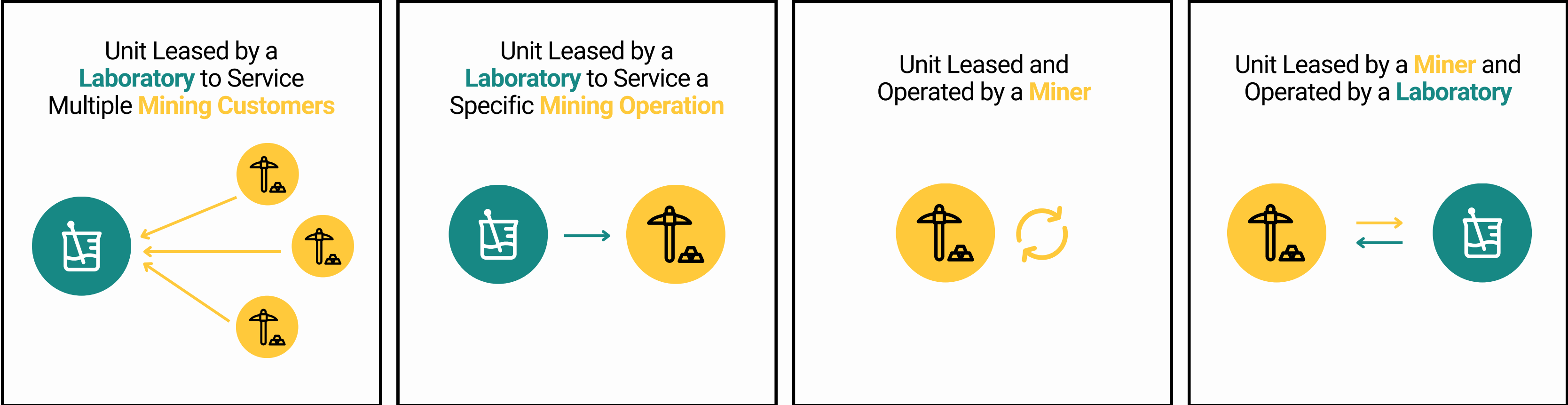
23M+



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



-  Laboratory
-  Mining Operation



Unit deployed direct to the mine site

Changing the game for Ravenswood Gold

The Challenge

Ravenswood required faster assay turnaround to support mine expansion and increased production. The existing PAL method was slow and had created a backlog, delaying grade control and reconciliation.

The Solution

PhotonAssay™ installed on-site and integrated seamlessly into operations to support mine growth and faster, more informed decision-making.

The Results

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

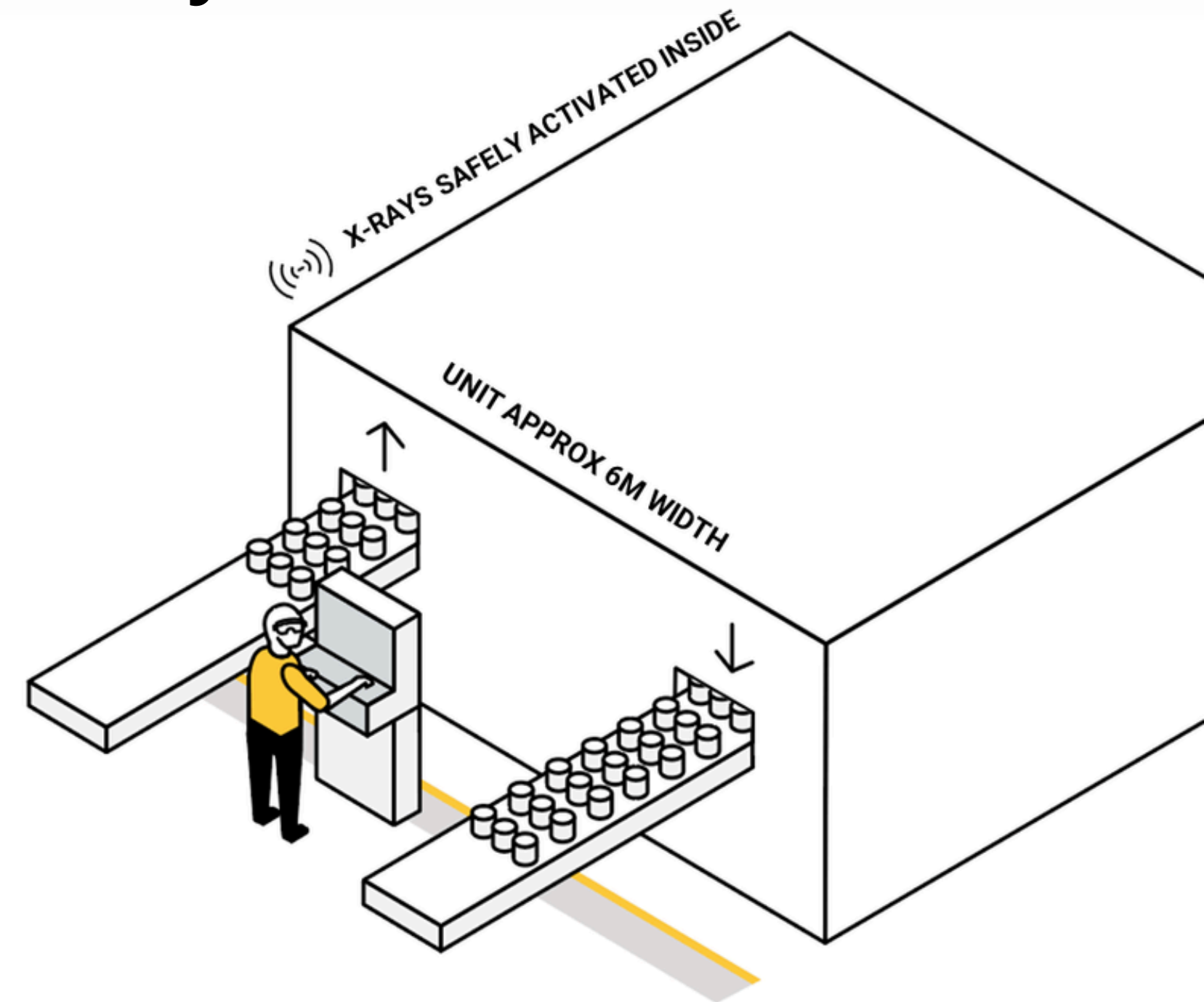


Click the image above or scan the QR code to see the whole story.



PhotonAssay™ - safe, efficient and easy to use

- Fully automated sample handling. Operator loads and unloads samples from outside the unit. Minimal opportunities for human error
- Radiation levels, interlocks etc. compliant with state and national regulations
- Electronic X-ray source: no power means no radiation
- Samples can be safely handled, stored or disposed of after analysis



PhotonAssay™ technical features

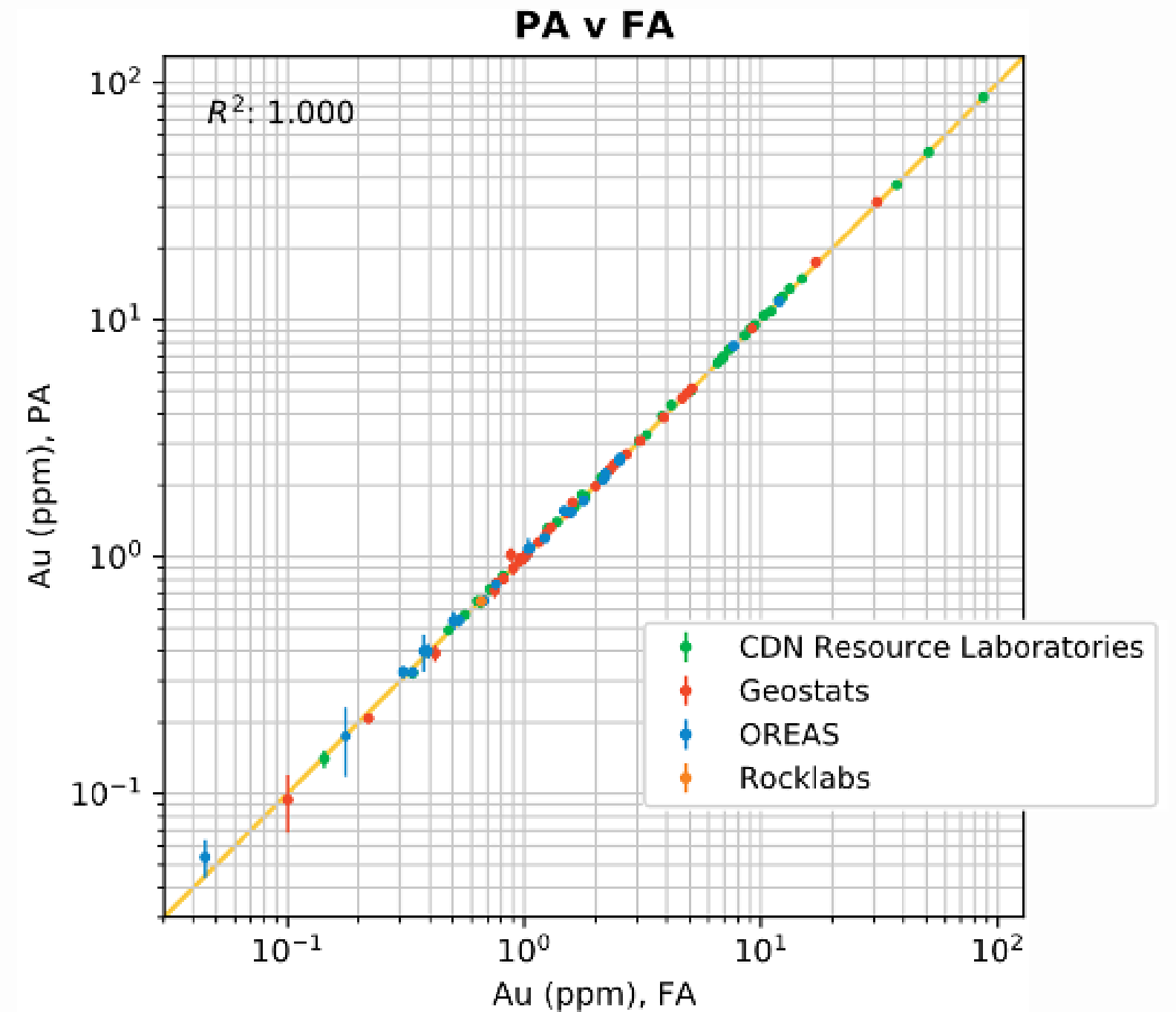
PhotonAssay™ vs. Fire Assay ¹	Fire Assay	PhotonAssay™
Time per Sample →	~3-4 Hours	~2 Minutes
Sample Size →	10-50 g	400-650 g
CO ₂ per Sample ² →	0.91 kg	0.455 kg
Hazardous Waste →	0.31 kg	0 kg
Energy Use →	~1.3 kWh	~0.65 kWh
Automation →	No	Yes

- ✓ 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. Comparison of PhotonAssay™ and Fire Assay per Frost & Sullivan industry report
 2. Assumes same energy/electricity source is used for both methods

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

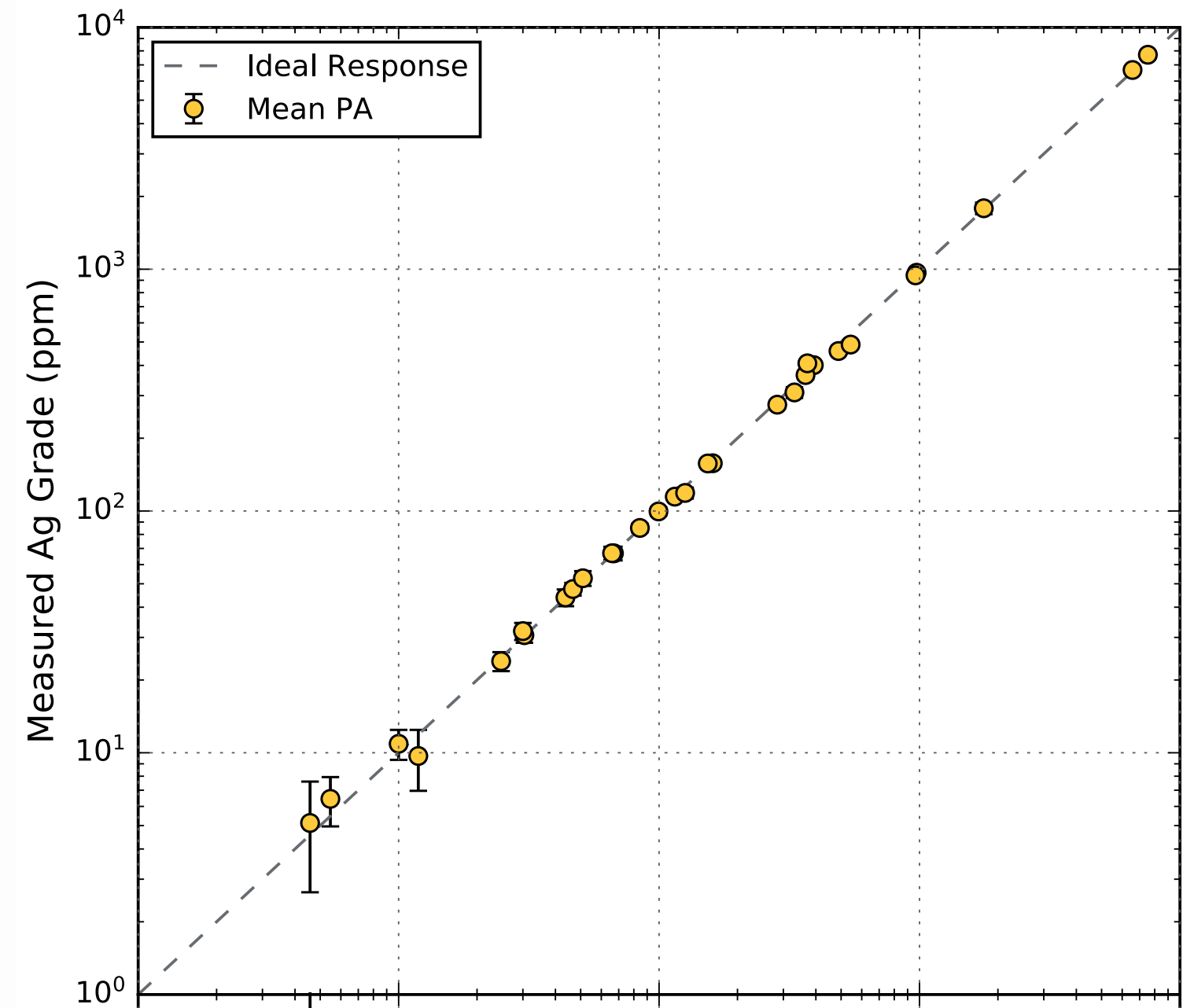


*Example CRM performance: test on 94 gold reference materials
from four commercial providers*

*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

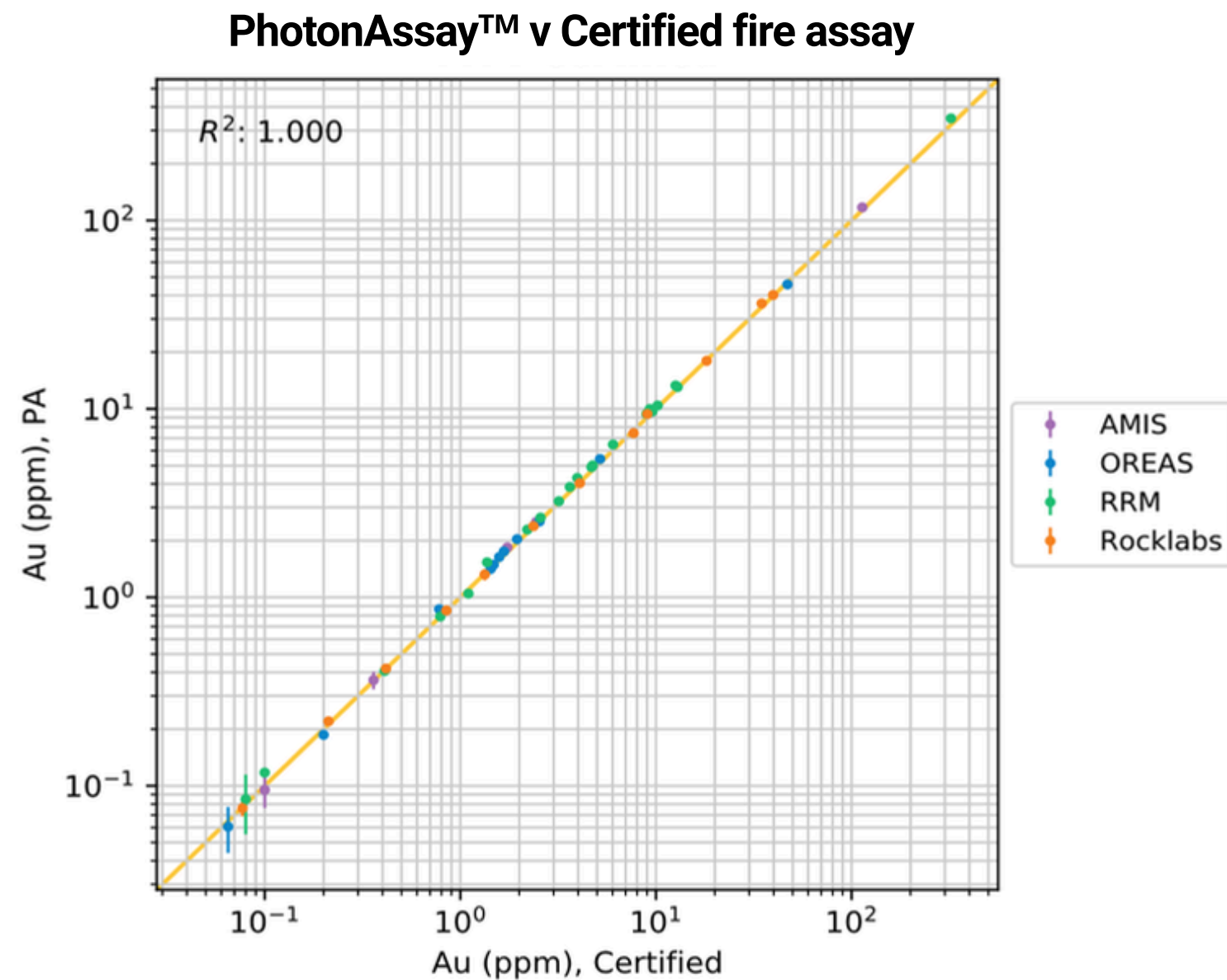
*On reagent blank materials

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 non-destructive PhotonAssay™ technique and reuseable CRM jars
- Request technical notes TN-001 and TN-003 to learn more!



Accuracy is important...



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

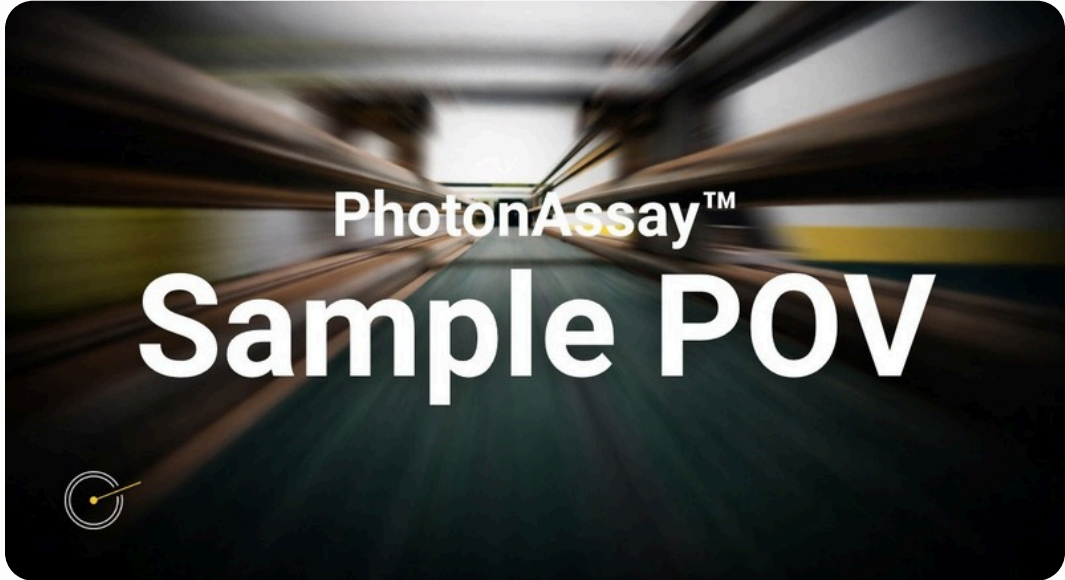
Real-world accuracy and precision

Results below are from a PhotonAssay™ implementation study, conducted on a gold deposit with moderate heterogeneity.

	FA 1	FA 2	FA 3	FA 4	FA 5	FA 6	FA 7	FA to Extinction	A single PhotonAssay™	PA vs FA Extinction Difference	FA 1 vs FA Extinction Difference
S 1	1.30	0.79	0.56	0.48	0.54	0.49	0.44	0.66	0.68	3%	65%
S 2	0.40	0.44	1.03	0.36	2.50	0.67	0.50	0.84	0.81	-4%	-72%
S 3	0.35	0.65	1.02	5.34	0.56	0.35	0.62	1.27	1.22	-4%	-114%
S 4	1.68	5.46	1.72	1.66	2.34	1.93	1.46	2.32	2.39	3%	-32%
S 5	6.31	2.95	2.92	3.40	2.50	2.68	3.04	3.40	3.49	3%	60%
S 6	6.78	7.16	4.94	7.21	5.86	6.92	13.35	7.46	7.65	3%	-10%
S 7	20.44	21.22	14.26	15.33	13.10	12.68	12.11	15.59	15.43	-1%	27%
S 8	44.82	36.72	35.14	31.19	35.14	26.36	32.34	34.53	34.80	1%	26%

PA = PhotonAssay™
FA = Fire Assay

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@chrysosecorp.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



Discover more at photonassay.com



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