

Low level gold by pXRF: R&D overview + why and how to get involved

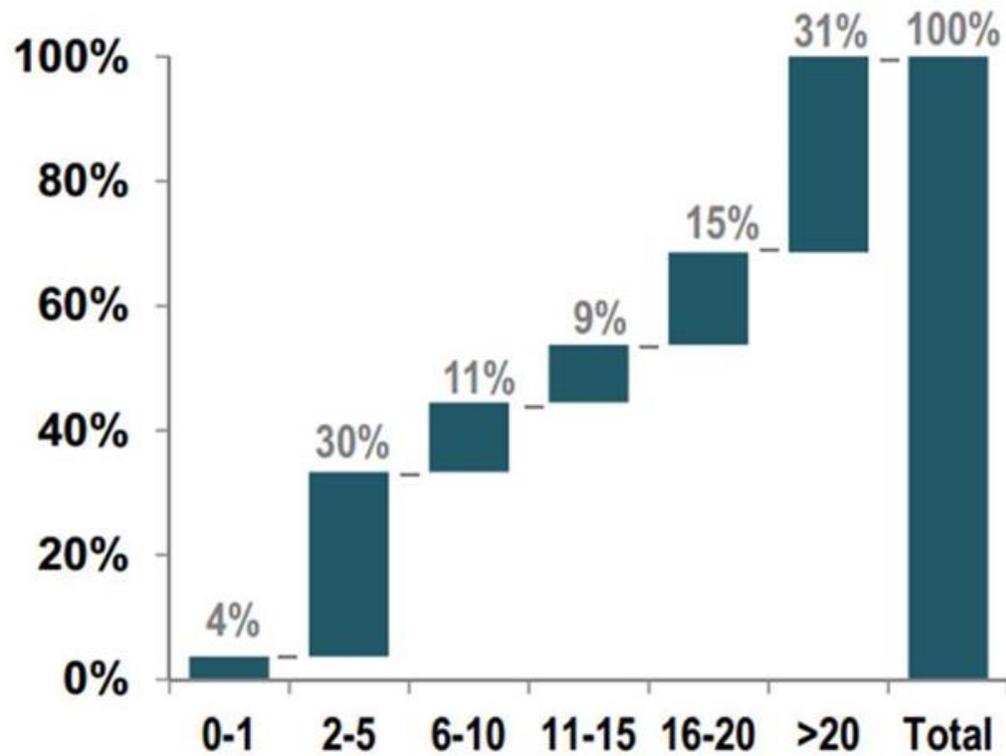
25 April 2021

Gold exploration can be very slow..

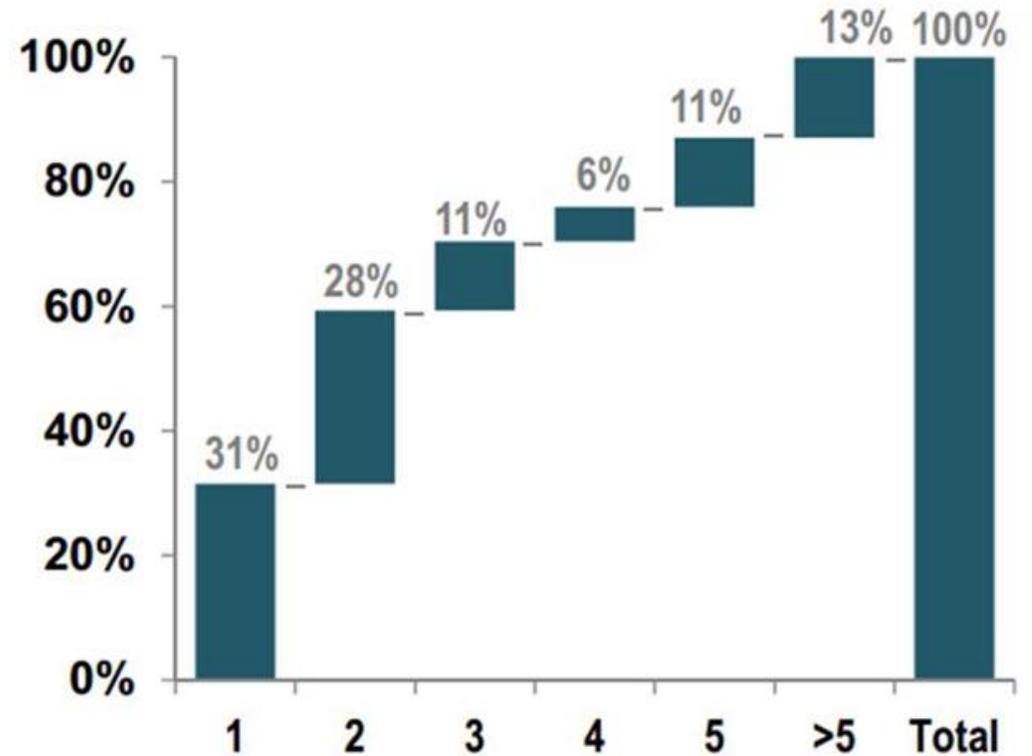
19 years is the average discovery time

2.8 companies on average explore property before discovery is made

Discoveries



Time (Years)

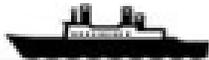


Exploration companies (n)

Battleships Game – similar to gold exploration?

My Ships

A									
B									
C									
D									
E									
F									
G									
H									
	1	2	3	4	5	6	7	8	



Aircraft Carrier **A A A A A**

Battleship **B B B B**



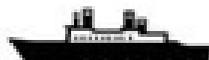
Cruiser **C C C**

Destroyers **D D** **D D**

Submarines **S** **S**

Their Ships

A									
B									
C									
D									
E									
F									
G									
H									
	1	2	3	4	5	6	7	8	



Aircraft Carrier **A A A A A**

Battleship **B B B B**



Cruiser **C C C**

Destroyers **D D** **D D**

Submarines **S** **S**

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
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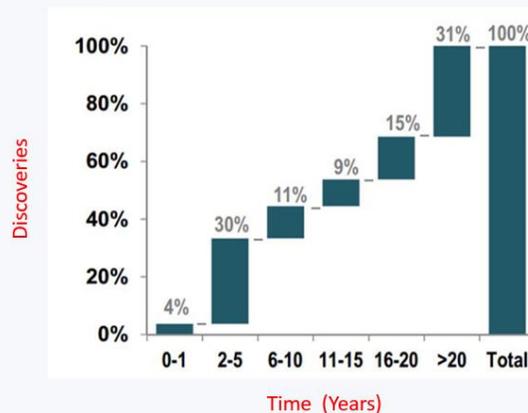
Waiting for assays is expensive – do the maths!

Junior stock exchange listed exploration company often cost a minimum A\$1,000,000 / year or more to maintain and operate

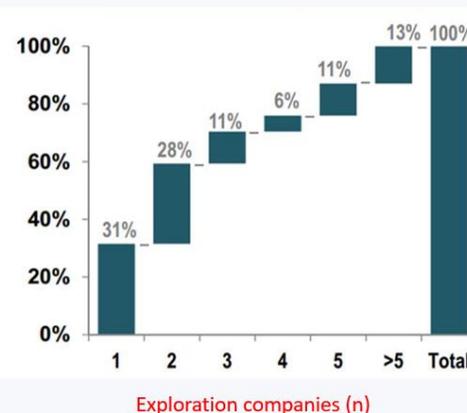
- i.e >\$3000/ day, each and every day
- Assays are needed to direct exploration
- Provide stock market updates
 - maintain / grow investor confidence and company valuations

What is YOUR true costs of waiting for assays? It is probably much higher than \$3000 / day!

19 years is the average discovery time



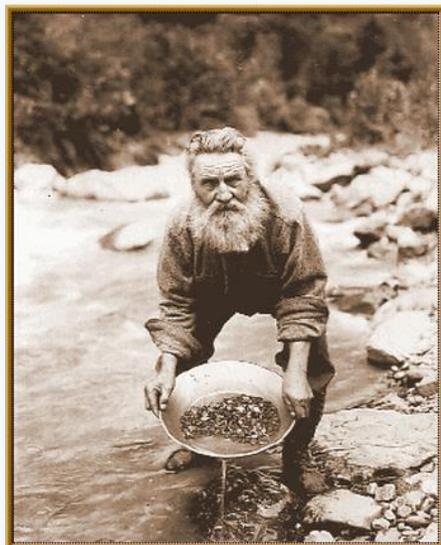
2.8 companies on average explore property before discovery is made



Many companies walk away from good properties too soon

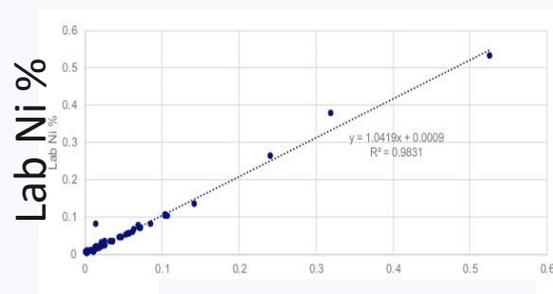
- Inadequate sampling
- Relinquish untested areas
- Management / Board / Investor Project fatigue

In field assaying has been possible for high grade gold (~10 gpt) and base metal deposits for sometime

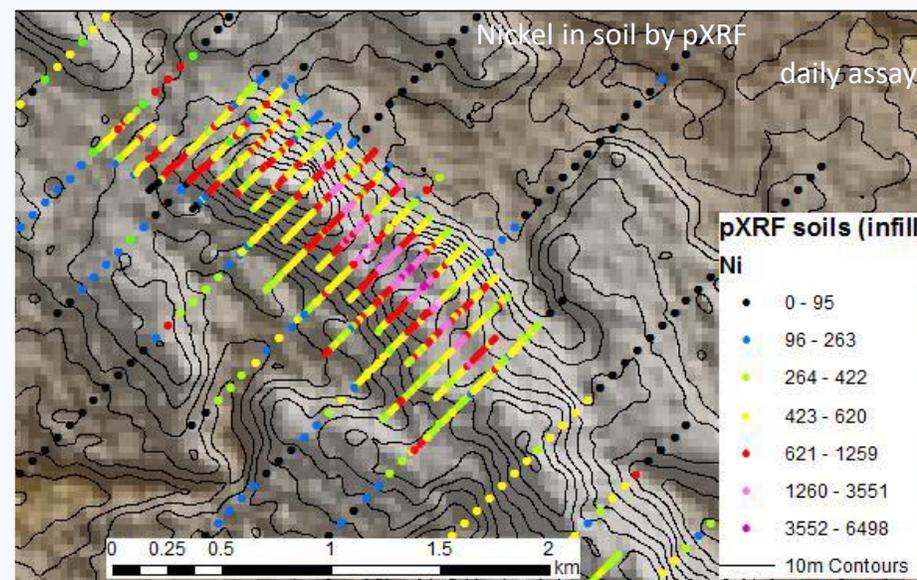


Many pXRF owned by gold explorers

- BUT not used for gold analyses, YET gold is what explorers and miners seek!
- PRESENTLY pathfinder elements and lithochemical applications
- work well for in-field analyses of Ni, Cu, As etc



Olympus Vanta pXRF Ni %



Field portable XRF (pXRF) for gold

pXRF has been unreliable for gold explorers

- Gold concentrations often too low to detect
- Gold is too dispersed
- Interfering elements (W, As, Zn)



Low level gold by pXRF has been a “Holy Grail”

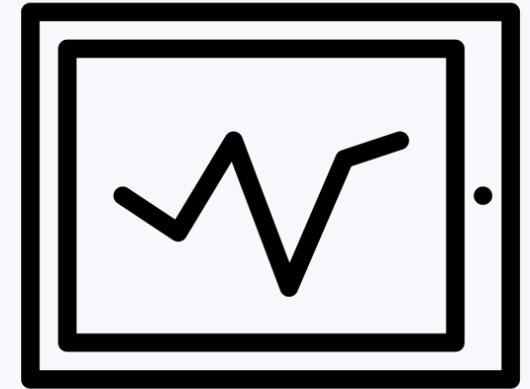
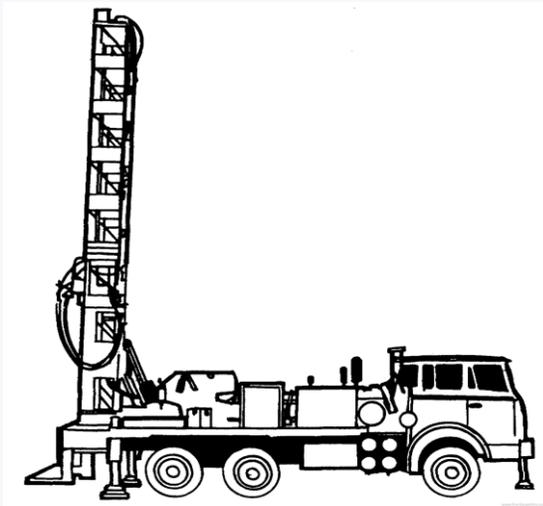
What is detectORE™?

- detectORE™ is patented technology invented by the CSIRO in Australia
- **Gold results to <20 ppb Au using pXRF, within 8 HOURS....GAME CHANGING**
- Portable ppb Pty Ltd (Pppb) has the exclusive global Licencing Rights
- Uses a consumable (“widget”) plus an App (specialised software)
- Works on most kinds of exploration samples
- Can be applied from a field / remote location **using off-the-shelf pXRF plus our “widget”**
- Enables continuous, fast adaptive and more effective gold exploration
- Trims many months off normal timelines to discovery – saves \$\$\$
- Greatest impact in remote locations away from efficient laboratories
- Working towards full commercialisation by end of 2021
- **Sponsors are able to access detectORE™ now to test / use on their projects**
- It is disruptive technology with clear commercial benefits for the users



Waiting for gold assays is expensive and reduces discovery rates

Drill samples
Soils
Auger
Drainage

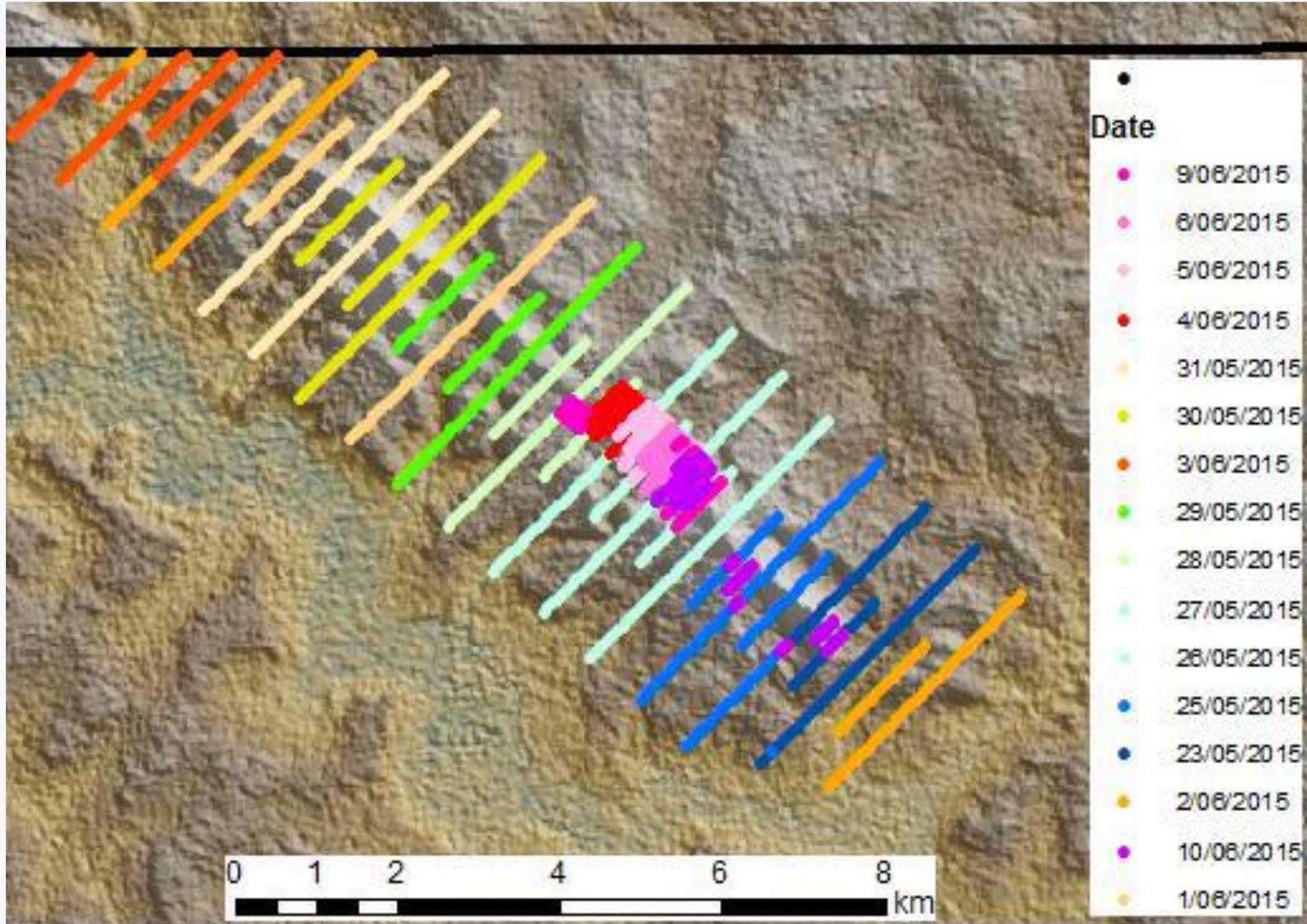


Weeks to
Months



**Fast, field based, adaptive sampling
>>> increase effectiveness, increased
probability of discovery**

Reactive sampling – reduces discovery timelines



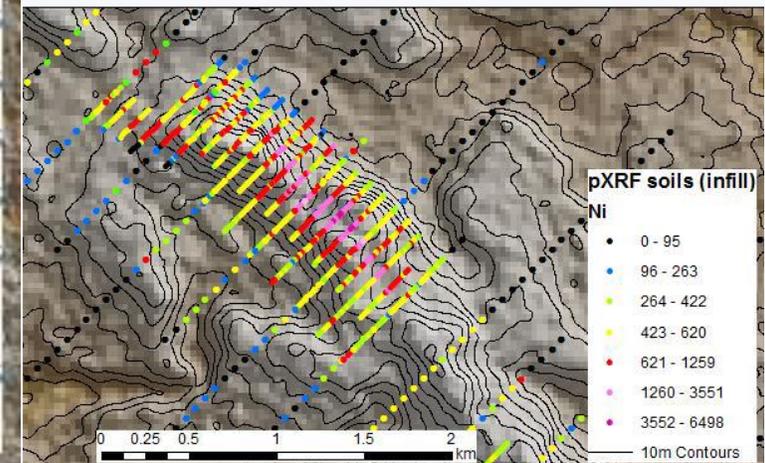
Soil sampling following up on Ni & Cu in drainage anomalies.

Soil sampling – 2020 samples collected in 16 days.

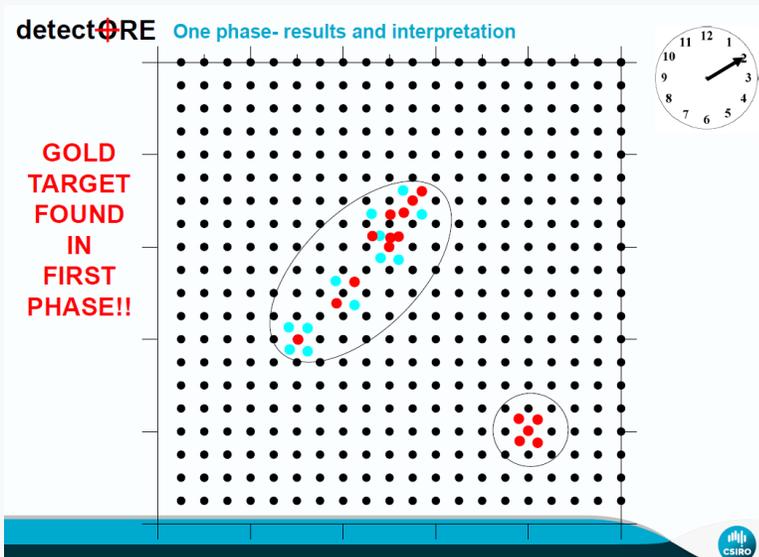
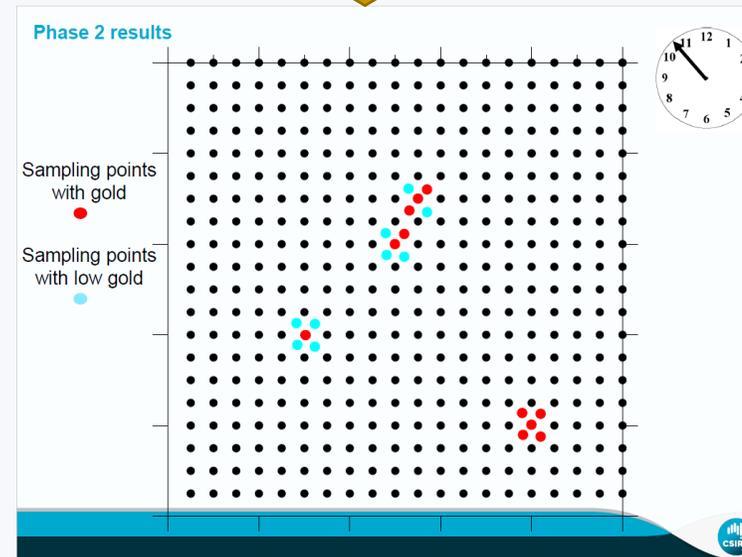
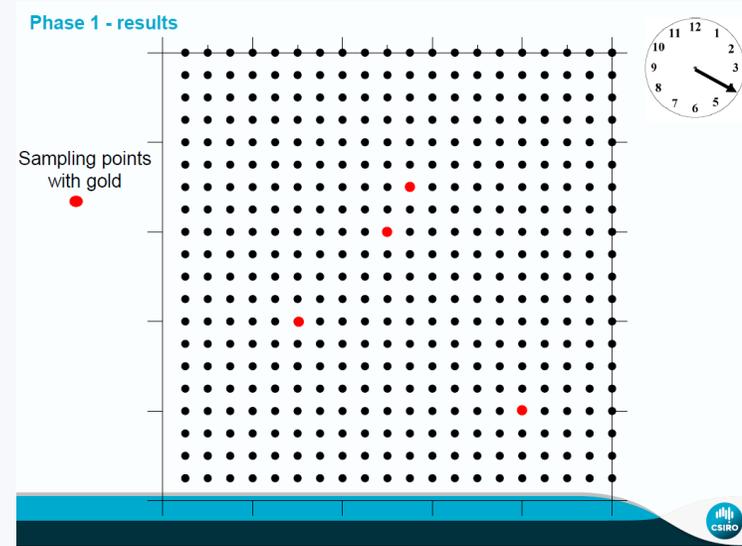
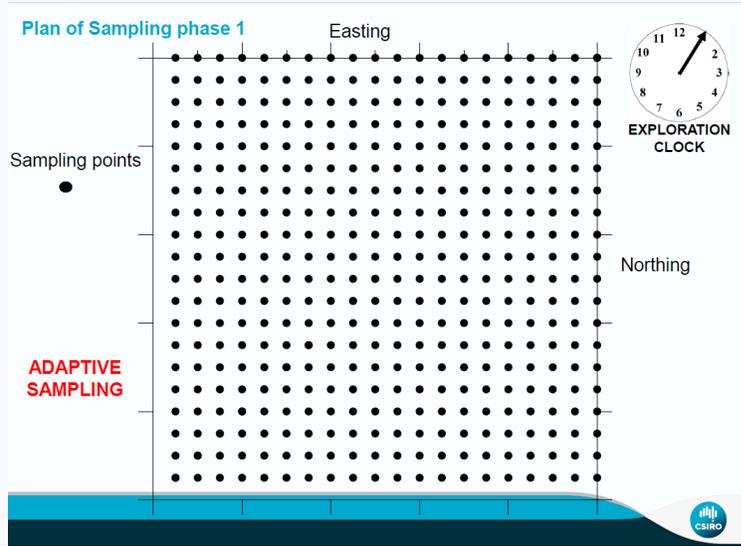
Final pXRF result received 17th day

Defined 1.6km + 0.6% Ni anomaly

Now repeating for Au exploration..



Reactive sampling – Theoretical (After ML – CSIRO)



PORTABLE
ppb

detect**ORE**™

250g sample



+



“Any” pXRF

+



detectORE™
software

=

Container with
“widget”



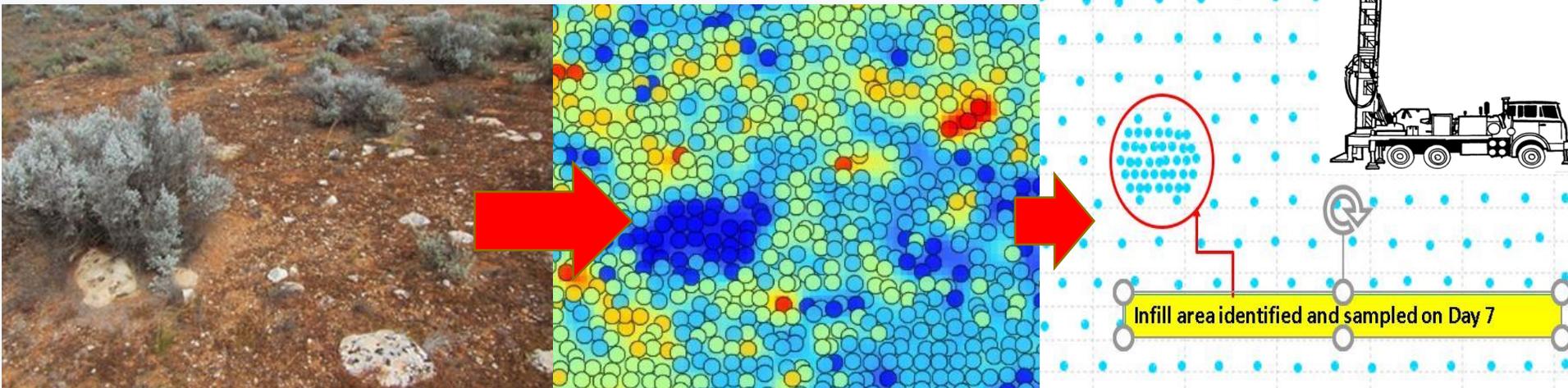
Many gold companies use pXRF, but CANNOT for gold analysis!

CSIRO set out to resolve the problem

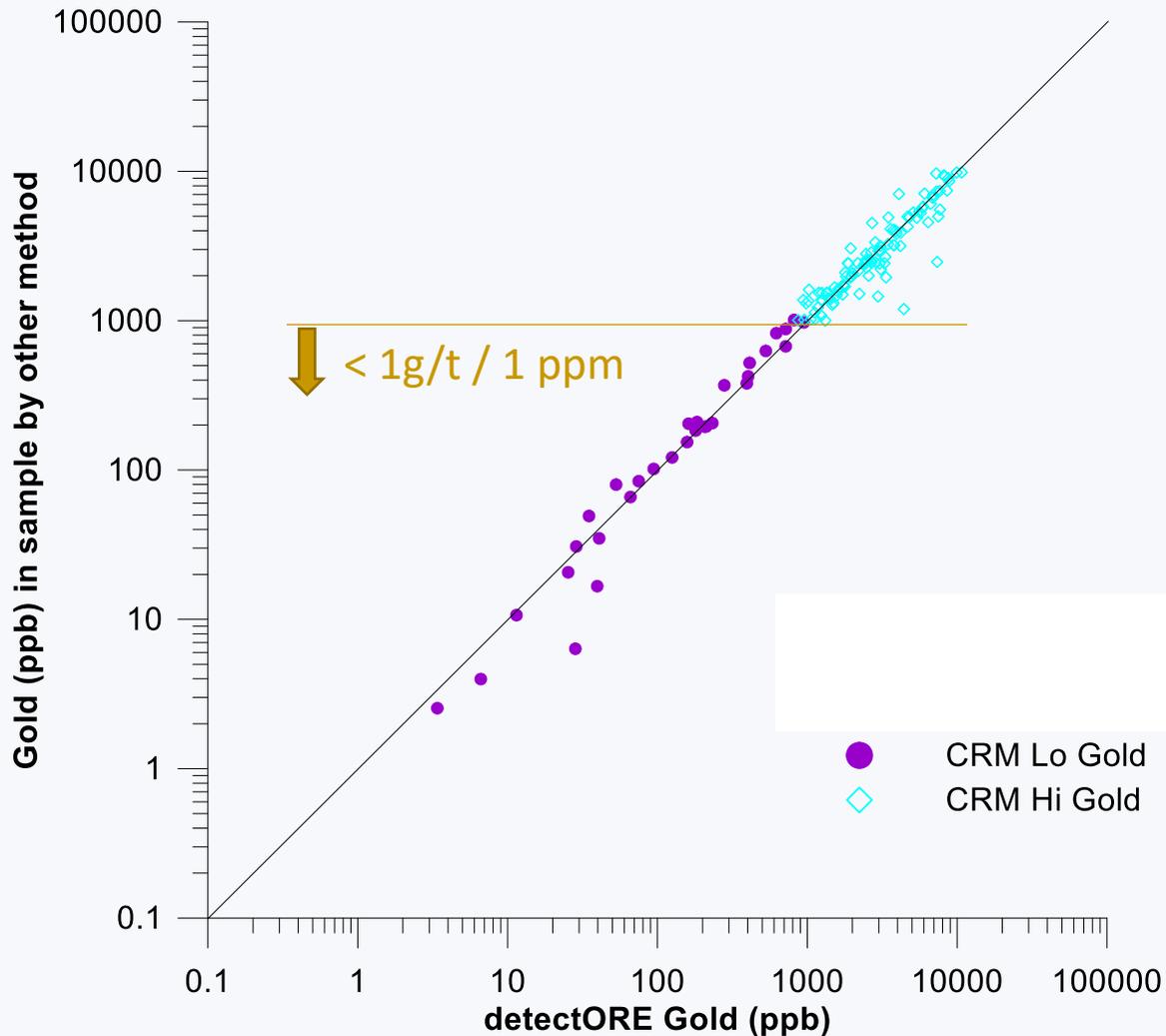
- Invented the patented detectORE™ technique
- Highly encouraging field trials and test work completed

CSIRO completed an EOI process with Portable PPB (PPPB) selected to continue the R&D

- <500 samples evaluated by CSIRO
- Mel Lintern left CSIRO in 2018 to join PPPB as CTO to continue work on his invention
- PPPB management has over 100 years of industry experience



detectORE™ vs. total gold CRMs (1-10,000 ppb) – pre 2018 data



139 certified reference materials (CRMs) run through the detectORE™ process

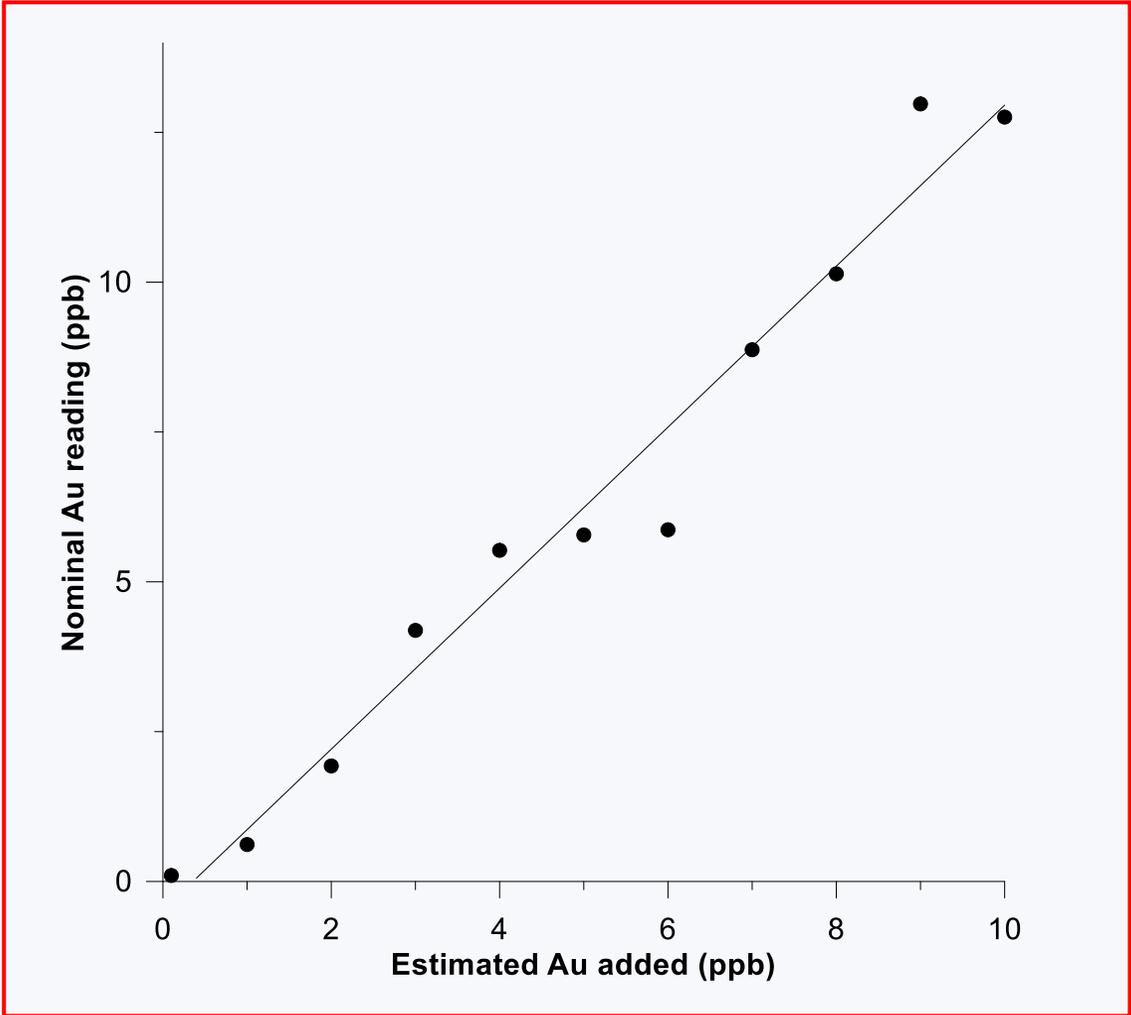
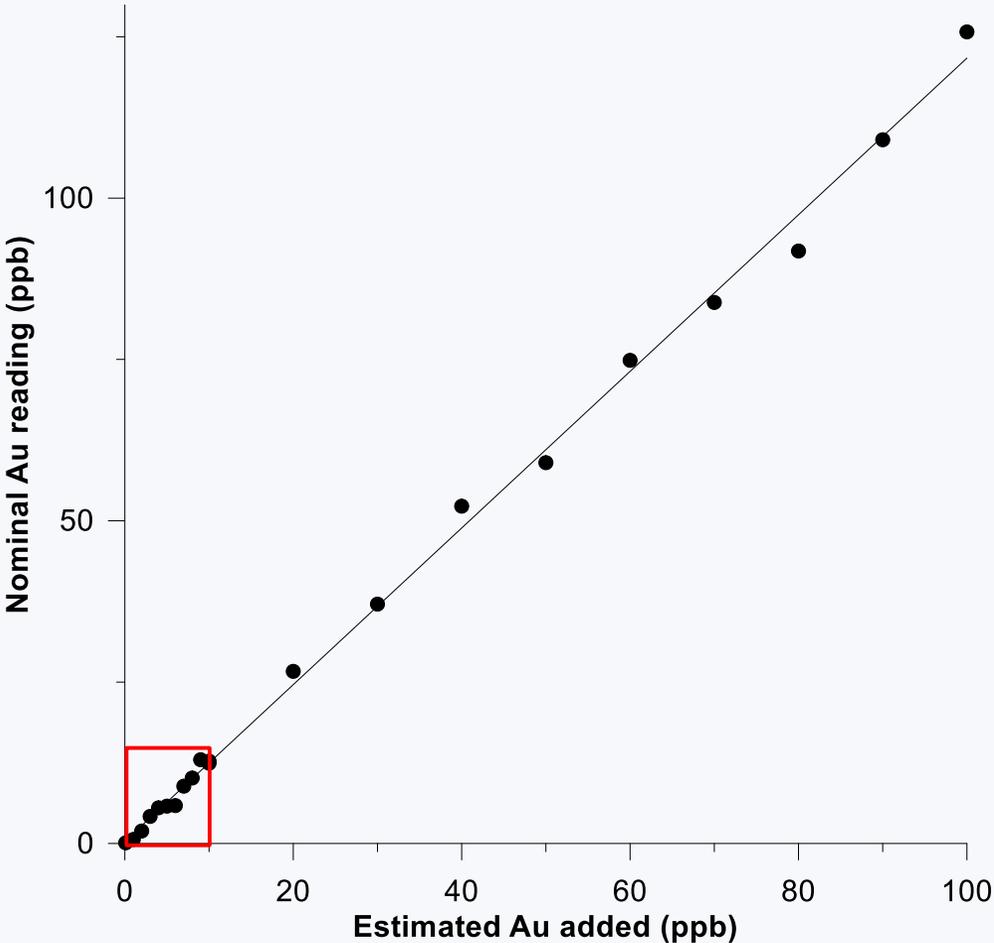
Cover a range from ppb to ppm gold

Results highly encouraging

Note that many CRMs certified for Fire Assay and may include deleterious metals

Much work completed to determine what affects gold determinations using the detectORE™ process

Calibration curves 1-100 ppb gold standards read with pXRF (using detectORE™ procedure) – pre 2018 data



Field trial by CSIRO – Western Australia – pre 2018 data



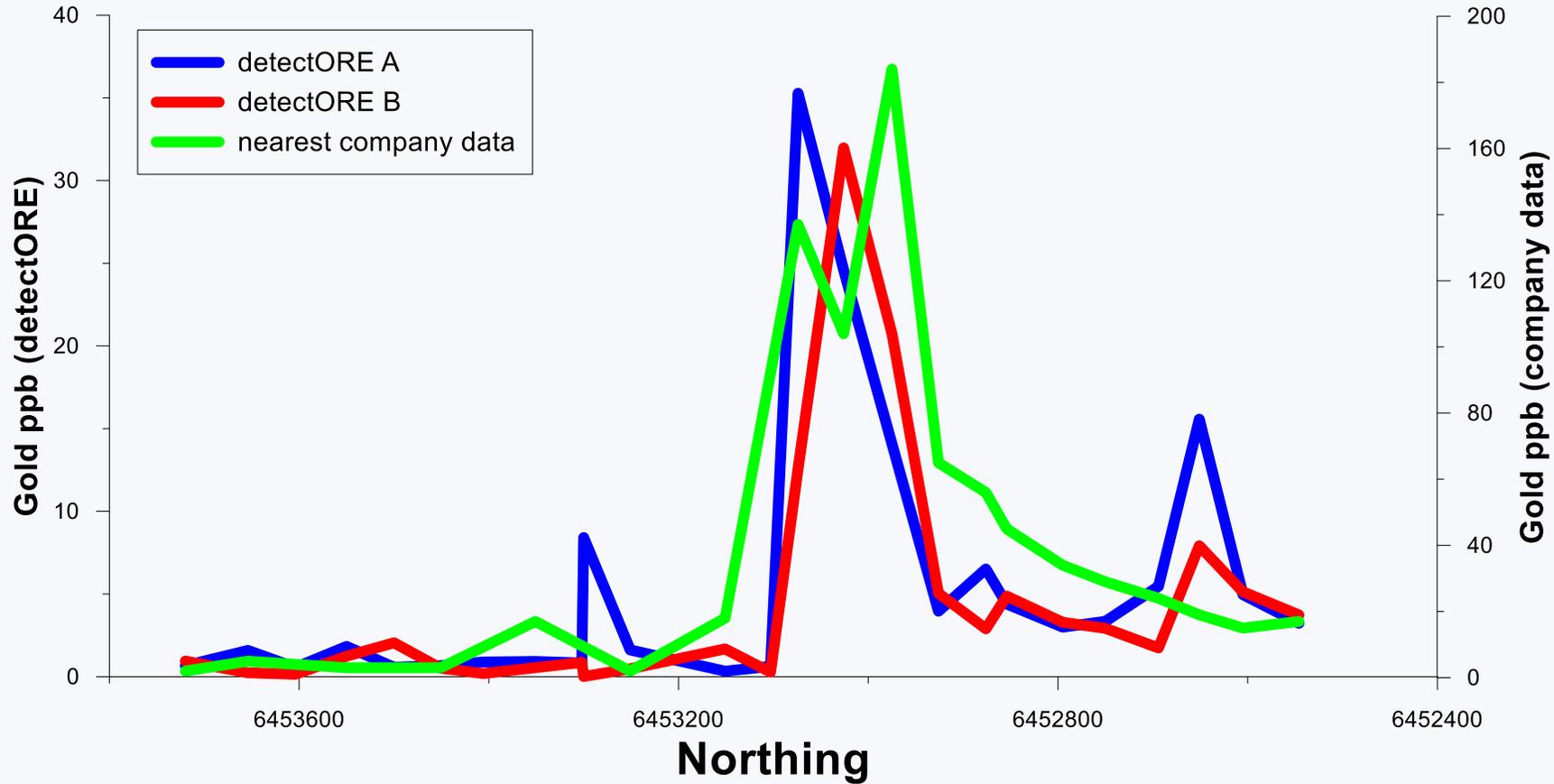
Soil sampling directly over auger GOLD anomaly and out into background to collect high level to background suite of samples.

Soils sieved in field to <math><2\text{mm}</math>



detectORE™ bottles with “widgets” loaded in the field for on-site gold concentration determinations with pXRF after 24 hours

Field Trial Results – pre 2018 data



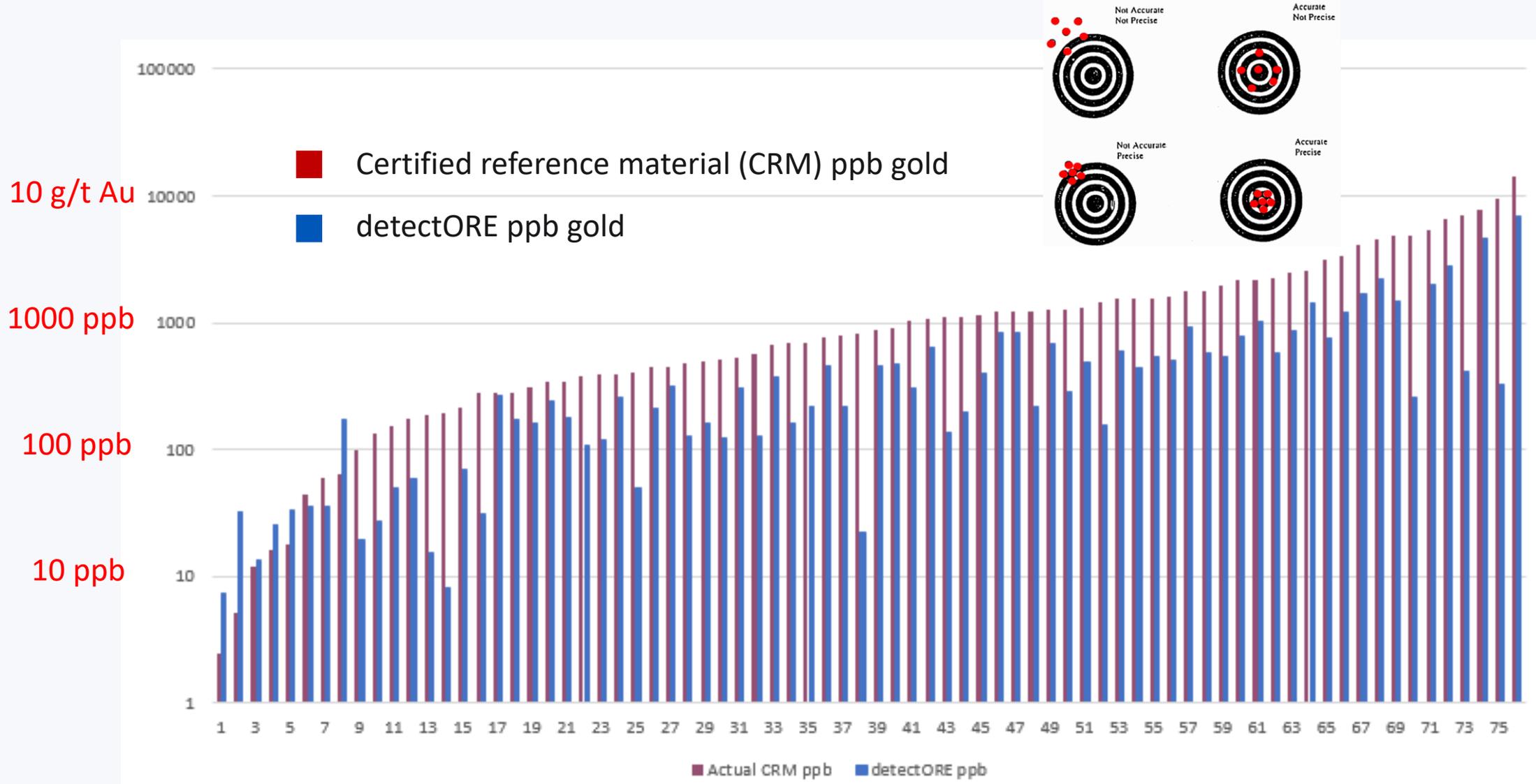
Green = auger

Red & blue = detectORE soil

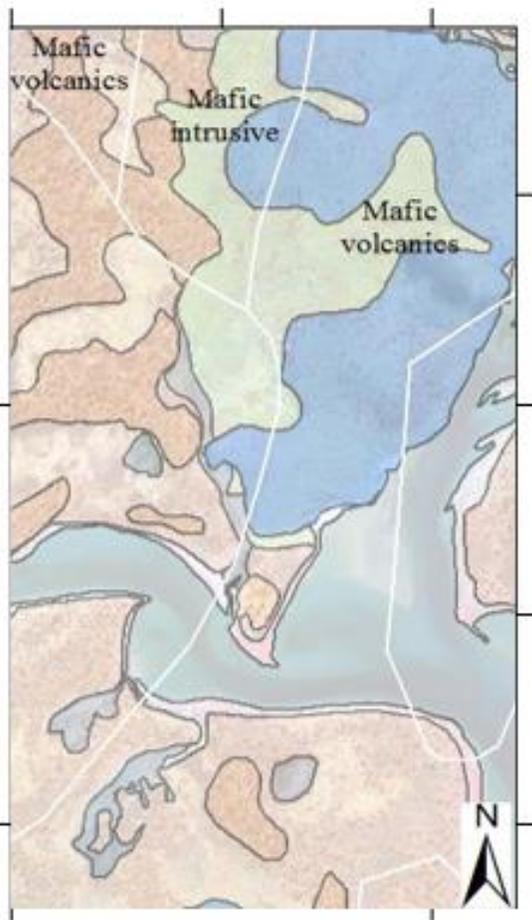
Green – transport samples & possibly wait weeks, sometimes months, for results

Red / blue – results achieved within 24hrs from field camp using pXRF (operating detectORE process)

detectORE™ testing with Certified reference material-CRMs

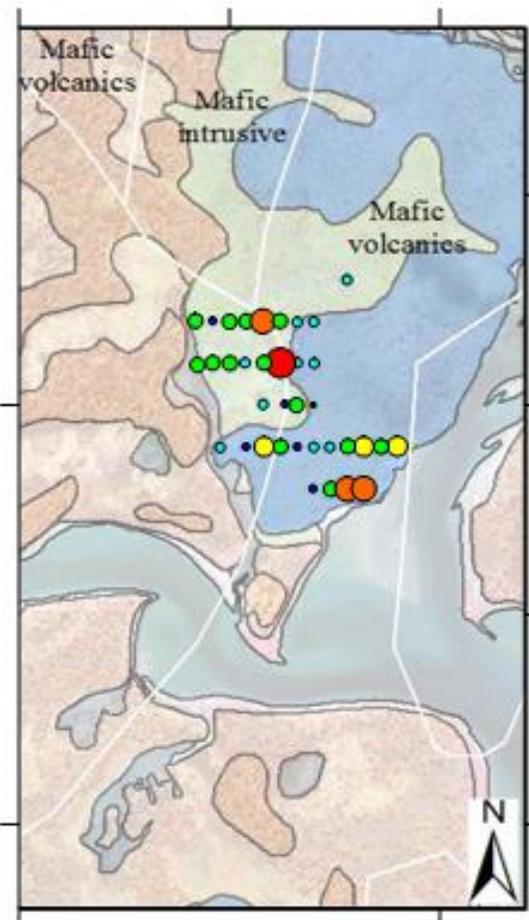


Tuesday



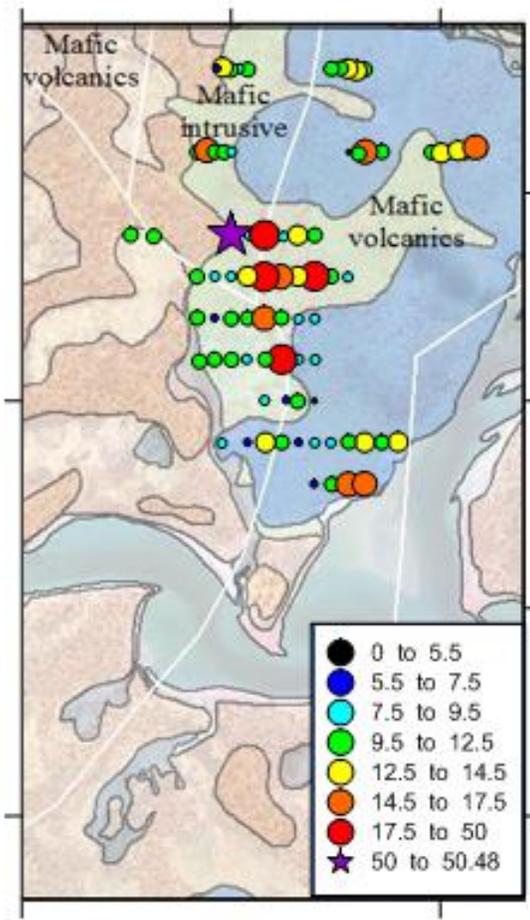
Site Arrival

Wednesday



First Glimpses

Thursday



Discovery position
& dimensions



Done



Patented
MVP

On-going

Global Test Work
Traction
Validation
Engagement

Advancing



Productisation/SOP
GLOBAL Scaling up

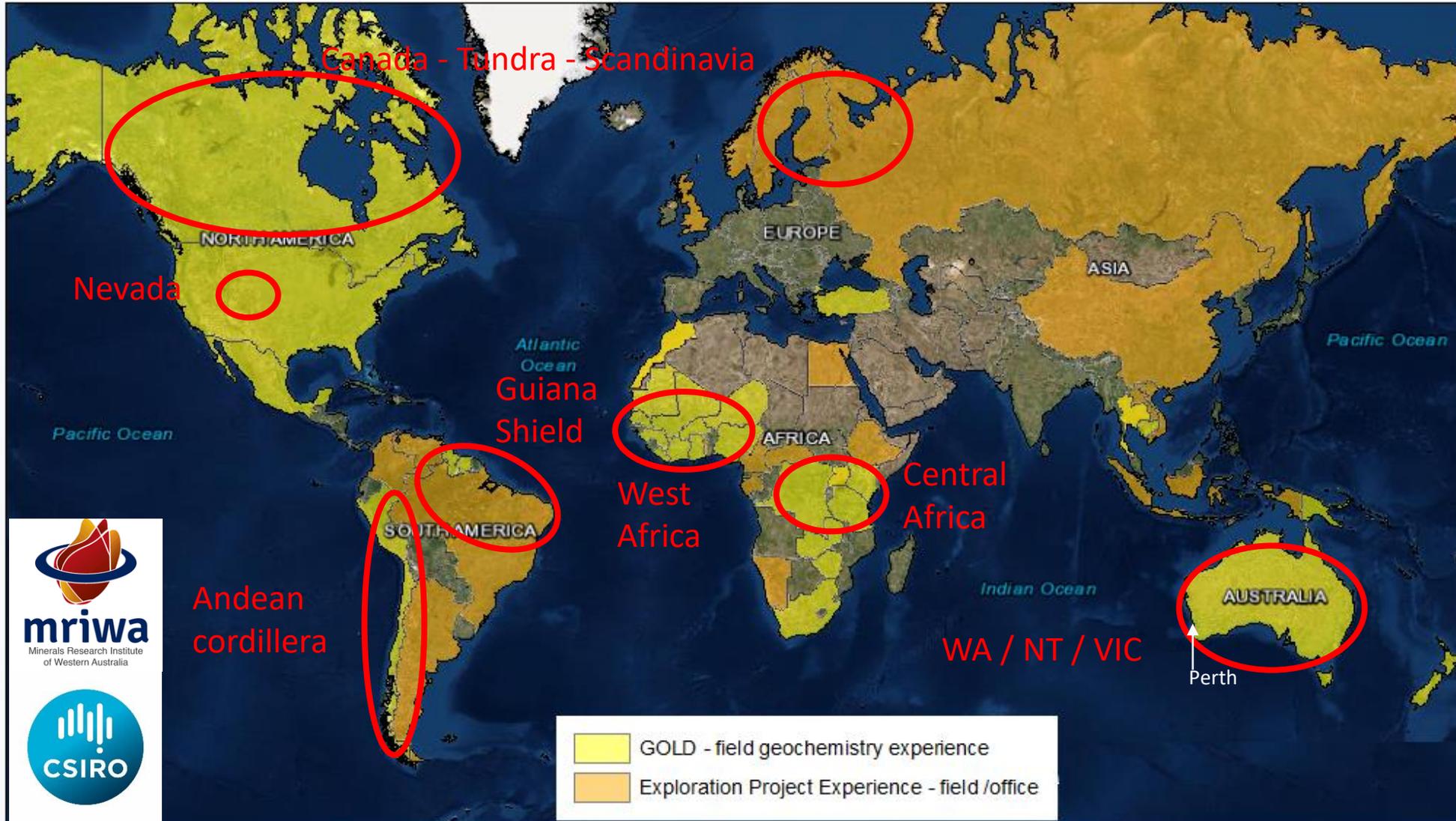
Continuing Research ahead of Commercialisation

- Principals of Pppb have:
 - Extensive global gold industry experience
 - History of successful commercial developments (ERMapper, Intierra, HiSeis)
- Pppb to further develop and take out to the global gold industry
 - Field orientation trials continue, covering the full range of
 - Sample media (drainage, soils, trench, drill samples)
 - Mineralisation styles
 - Regolith terrain types globally
- Signed up a limited number of Industry partners through tiered sponsorship in return for a range of immediate and longer term benefits. **Only a few spots remain. Closing the sponsorship scheme soon.**

Management Team	Experience
<p>Peter Williams Chairman B.Sc (Hons), M.Sc AICD, SGA, AIG, AusIMM</p> 	<ul style="list-style-type: none"> ▪ Over 30 years executive experience in major and mid tier companies and successful junior company start-ups ▪ Co-founder of the technology companies, HiSeis (3d Seismic), Intierra (Internet financial/minerals) and EMIT (electromagnetic imaging) ▪ Founding partner in companies currently worth \$2.7b and significant role founding companies that later sold for >\$1b
<p>Simon Bolster Managing Director B.Sc (Hons)</p> 	<ul style="list-style-type: none"> • Over 30 years experience in the gold exploration industry, specializing in regolith geochemistry and remote sensing ▪ Former Consulting Geochemist – Newmont (Global role), regolith specialist Normandy Exploration and Anglo American (Africa) ▪ Worked in 30 countries – 5 continents ▪ Founded and operated successful regolith geochemistry consulting company ▪ Undertaken numerous geochemical orientation surveys and lead regolith geochemistry training seminars / courses ▪ Former Head of Exploration (Gryphon Minerals, West Africa)
<p>Dr Mel Lintern Chief Technical Officer Geochemist, PhD</p> 	<ul style="list-style-type: none"> • Inventor of detectORE™ ▪ > 35 year career with CSIRO focused on exploration / regolith geochemistry ▪ Principal researcher resulting in industry adoption of calcrete sampling for gold exploration ▪ Lead research resulting in significant advances in biogeochemical sampling for gold explorers ▪ Long history of experimenting with field portable techniques for the analysis of gold in remote locations

Global experience coupled with global test work

Proudly supported by:



Track record in commercialisation, mission critical know how.

- Research lead by CSIRO veteran supported by highly experienced gold industry explorers
- Former company geochemistry specialist fully aware of the uptake resistors and what will likely remove these
- In-depth QA/QC knowledge - field and laboratory
- Exploration management experience - understand operational pressures, pricing and exploration challenges
- Disruptive technology – passionate about getting this out to industry

R&D plan involves:

- SMART Testing in mission critical areas, of the technique – including field and laboratory trials
- Simultaneously work on scaling up supplies and systems ahead of release – The “D” part – including cloud / App based processing and QA/QC
- Staged roll-out – **R&D partners able to use now**
- On-going R&D / improvements
 - Reduced pXRF detection limits for other commodity & pathfinder elements
 - Alternative “widgets”
 - Development of other complimentary applications

Established R&D capacity



Oct 2018



Oct 2020



Oct 2020

Established R&D facility and now expanding *production / distribution capacity*





Australia field trials –
tent, trailer and field
van options

Some initial detectORE™ known unknowns...

What is precision like for various sample media?

- Our R&D has largely answered this, but tests continue with our Sponsors

How accurate is the technique for different sample media?

- Substantially known after 1000s of tests

What are the absolute lower detection limits?

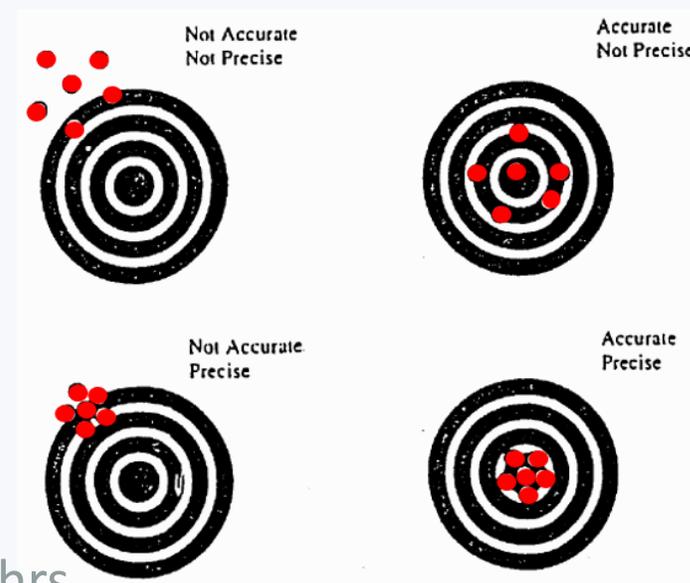
- Largely established for W2 and W1, but continuing the R&D

The “widget” initially stayed in the bottle for 24 hours

- The R&D has resulted in times being reduced from 24 hrs to 6 hrs

Which pXRF instruments are best suited / less well suitable?

- Now known by PPPB. Several pXRF manufacturers continue to improve and refine their instruments to use detectORE™, working in collaboration and consultation with PPPB



R&D focused on 4 key aspects....



R&D is testing a variety of sample media...

Extensive work undertaken on various exploration sample media

- **Rock & Drill samples** – **RC** / RAB / **AC** / **AUGER** (+/- **DD**)
 - Sample processing requirements for detectORE – developing pragmatic field methods
 - **Weathered and fresh bedrock + overburden**
 - **Orogenic / Porphyry / Epithermal / Carlin** / IOCG / **IRG style deposits**
- **Surficial regolith: Soil / Laterite / Lag / Calcrete**
- **Transported regolith: Drainage**, Lacustrine, Till



Cross checking detectORE™ values with traditional laboratory assays

Green text = samples obtained / currently undergoing test work



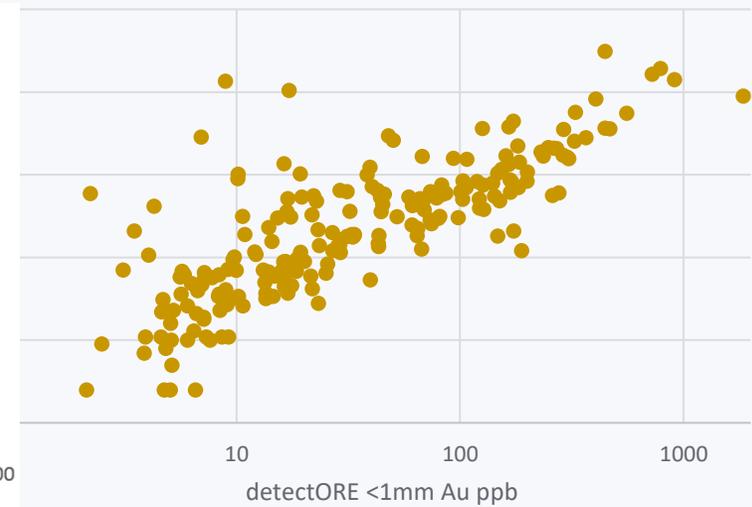
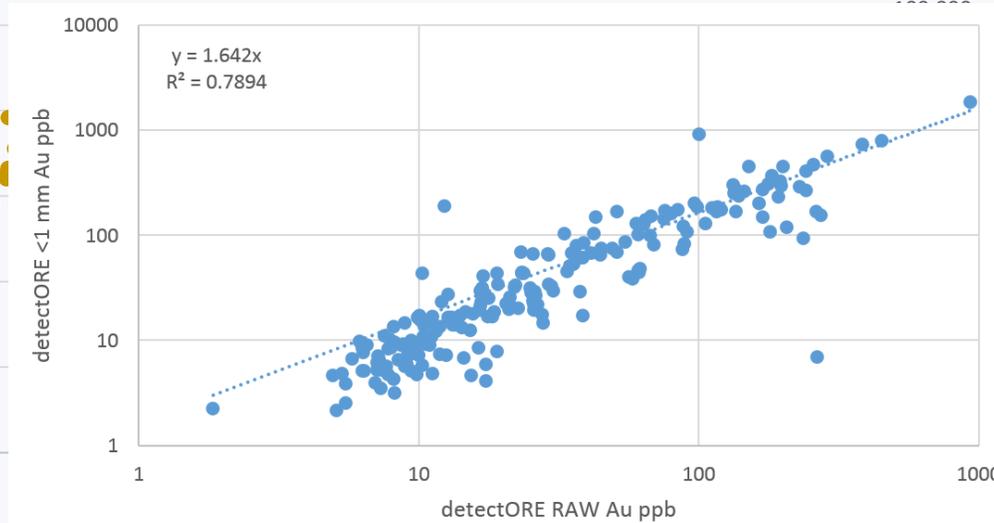
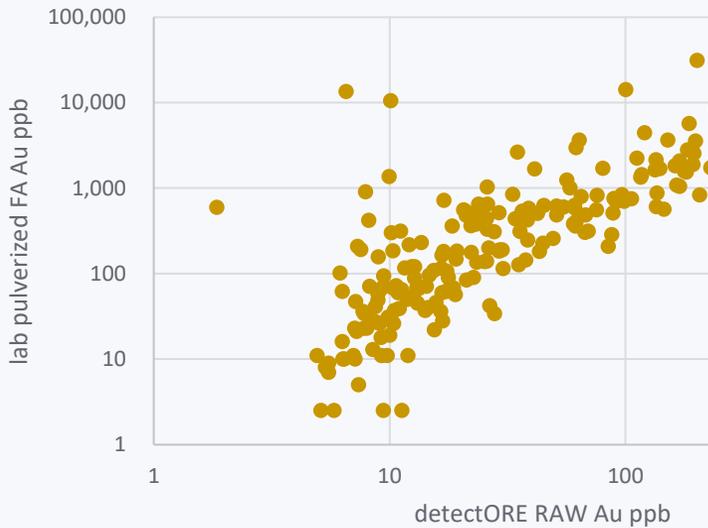
Practical drill sample preparation ...



“raw” RC

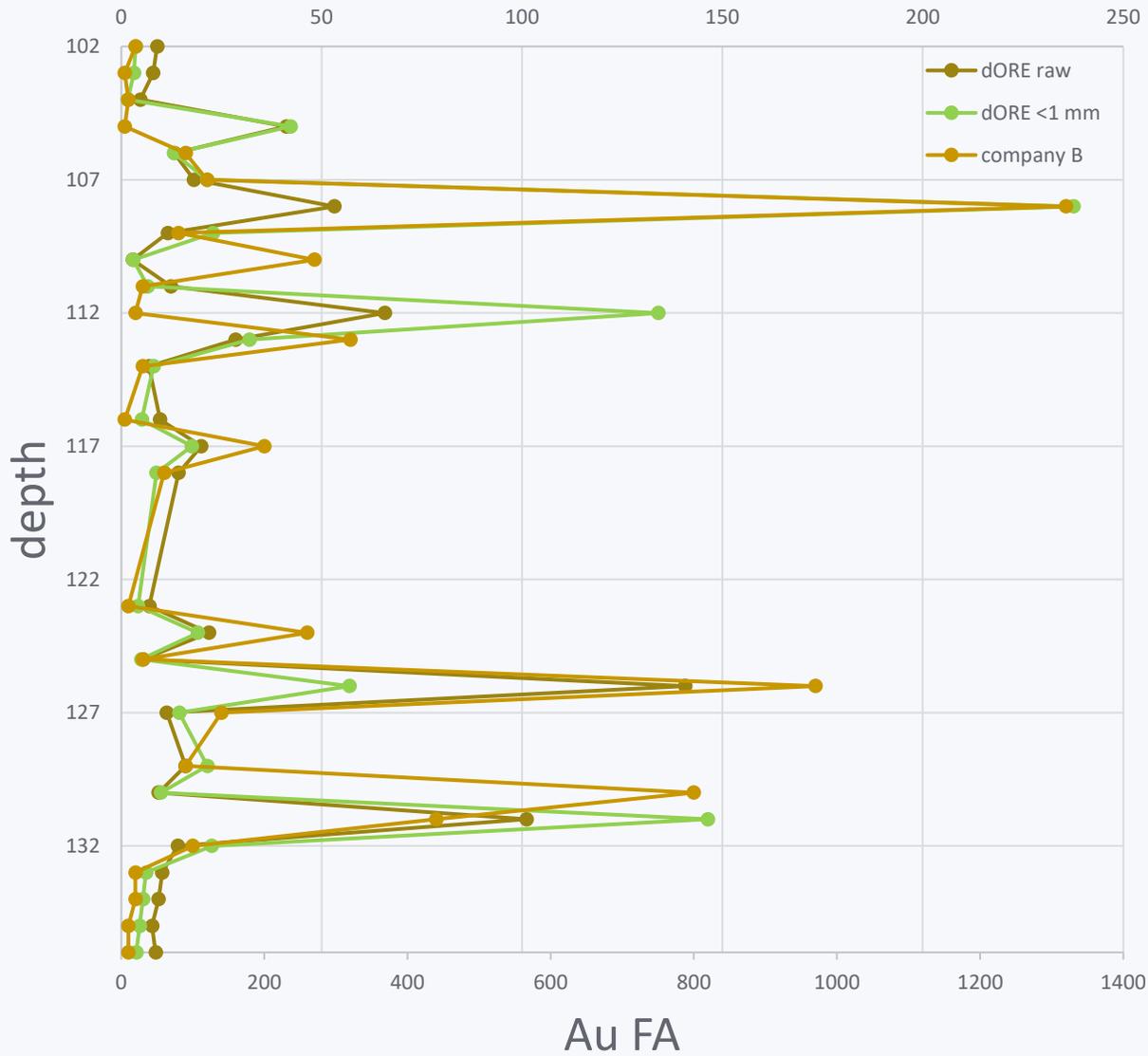


“<1mm” RC



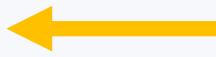
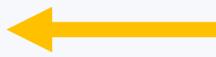
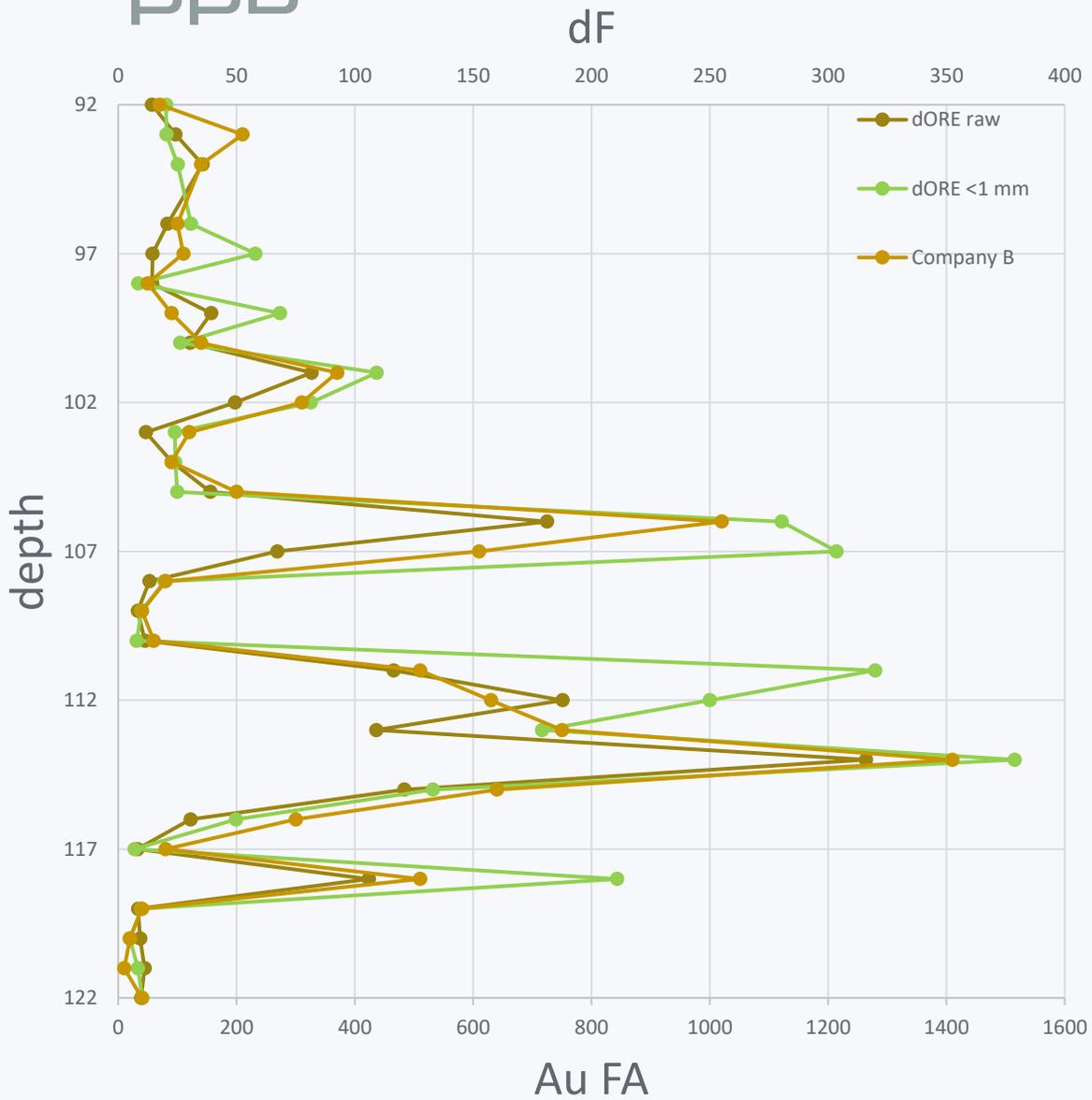
Note: These RC samples were sourced from an orogenic gold deposit containing abundant coarse gold

dF



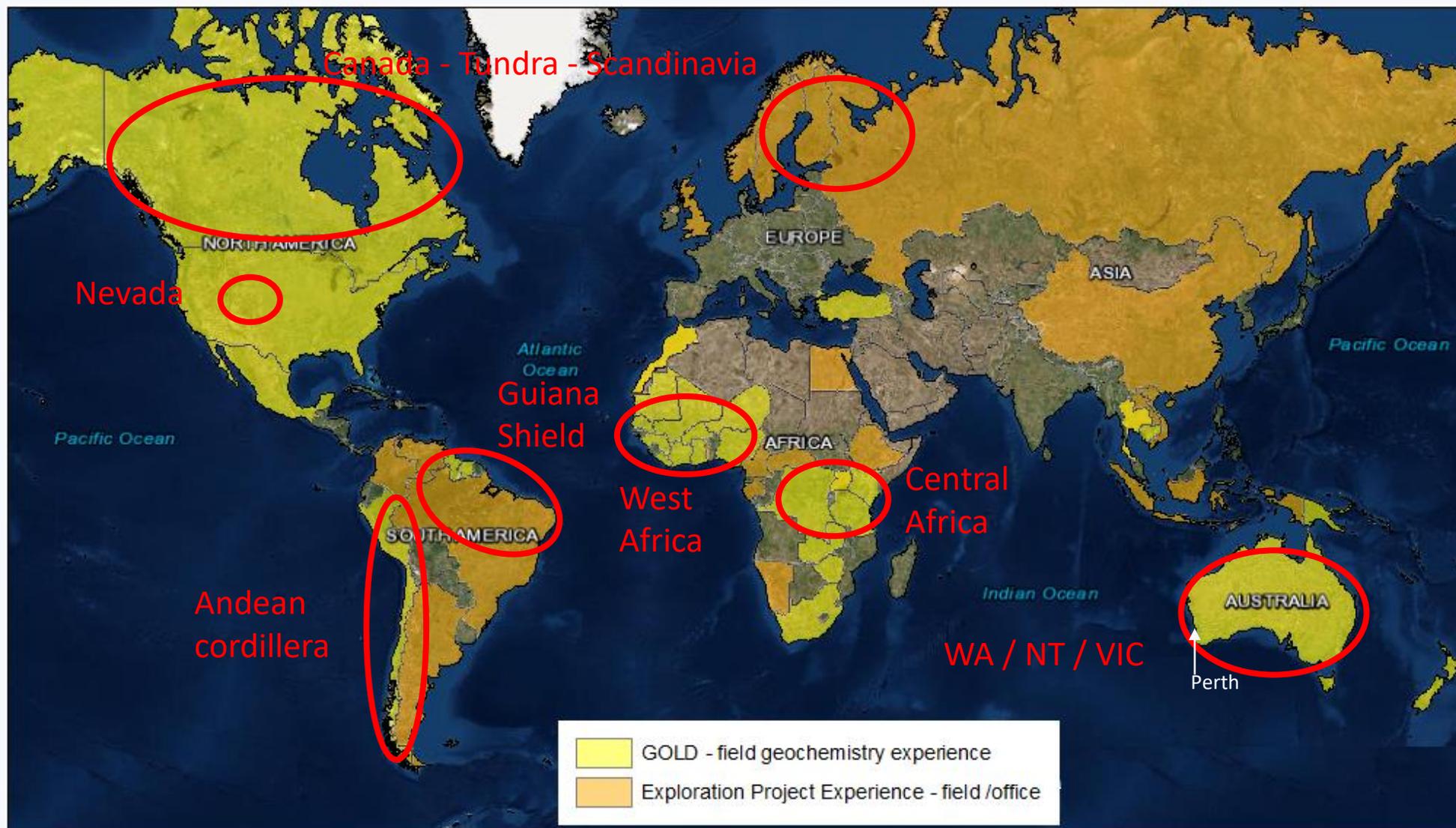
Q. Are we able to identify anomalous intervals of the **drill hole**? **YES!**

RC drill results



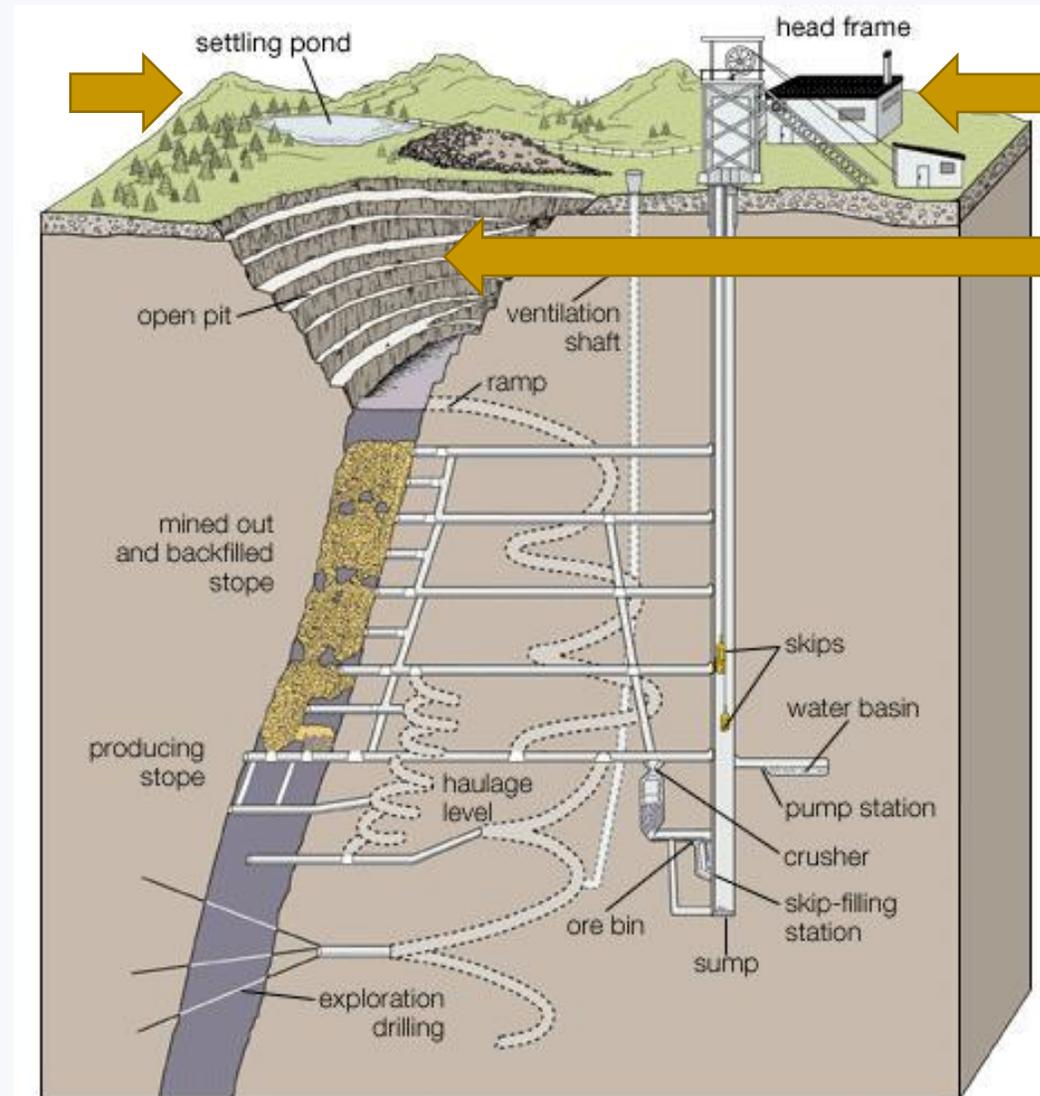
Q. Are we able to identify anomalous intervals of the drill hole? **YES!**

Global trial areas



Brownfields & greenfields Exploration

- Drill samples
- Soils
- Auger
- Trench
- Drainage



Process plant monitoring

- CIL Au grade?
- Tailings grade?

Grade control drilling

detectORE™ benefits, compared with conventional gold analyses:

- **Low capital and operating costs** compared with traditional assay methods
 - Fire Assays require very skilled staff and has high running costs
 - ICPMS uses expensive equipment & skilled operators
- **Larger sample** (250g) – more representative
- **Easier to scale up** and be run by technicians

detectORE™ R&D Sponsor program

- **Opportunity for companies to work with us** to steer the R&D & to access the **technology now!**
- Sponsors **receive immediate and longer-term benefits** for doing this
- **Limited number** of companies can get involved
- **Rewarding “Early Movers” (original and Enhanced scheme)**
- **Possibility to upgrade** sponsor status by contributing more funds, provided that there is an opening at the higher level
- **Five sponsor levels**
 - **Bronze** – \$30,000 (limited to 6) 2/6
 - **Silver** – \$50,000 (limited to 8) 7/8
 - **Gold** – \$100,000 (limited to 5) 5/5 places taken up by industry
 -
 - **Gold Plus** - \$100,000 + in-kind support of \$50K and \$150K (limited to 5) 1/5
 - **Platinum** - \$200,000 (limited to 2) 0/2

Original scheme (Sept 2018)

Enhanced scheme (since Oct 2020)

CUSTOMER REQUEST

detectORE™ exploration R&D Sponsor program

	Bronze	Silver	Gold	Gold Plus ¹⁴	Platinum
Advanced access to technology	✓	✓	✓	✓	✓
Direct access to detectORE principals to discuss product development and priorities	✓	✓	✓	✓	✓
Notification of new case studies and product releases	✓	✓	✓	✓	✓
Priority Access before full commercial release	✓	✓	✓	✓	✓
Orientation surveys – advice & design	✓	✓	✓	✓	✓
Express supply of detectORE CRMs	✓	✓	✓	✓	✓
Guaranteed supply of consumables for 12 months after release ¹	✓	✓	✓	✓	✓
Advanced access to any new elements or techniques (Assistors if assisted with the newest product)	✓	✓	✓	✓	✓
Earliest supply of SOPS in French / Spanish	✓	✓	✓	✓	✓
Orientation surveys – advice, design, interpretation ²		✓	✓	✓	✓
In-house train-the-trainer workshop training ³		✓	✓	✓	✓
Guaranteed supply of consumables after commercial release for 24 months ⁴		✓	✓	✓	✓
Highest priority product support (<4hrs during normal business hours)		✓	✓	✓	✓
Guaranteed places (up to 10 days before) for 3 people at detectORE industry training sessions ⁵		✓	✓	✓	✓
Highest Priority access to product after commercial release		✓	✓	✓	✓
Orientation surveys –free field supervision of up to 10 days / year ⁶			✓	✓	✓
SOPS – specify one other language required at no charge			✓	✓	✓
Earliest access to any enhanced technology			✓	✓	✓
Highest priority analysis turnaround ⁸			✓	✓	✓
On declared commercialisation receive FREE widgets ⁹	✓	✓	✓	✓	✓
Early mover sign-on commitment rewards ¹⁰		✓	✓	✓	✓
Ability to move to a higher tier (*or negotiate further benefits) by contributing additional funds ¹¹	✓	✓	✓	✓	✓
On commercialisation receive a 10% discount on widget purchase costs for the next 10 years. ¹²	✓	✓	✓	✓	✓
Right to purchase additional widgets at the Introductory pricing (TBD) for a further 18 months after the Introductory Pricing ends for all other Sponsors and Customers ¹³				✓	✓
Field support and supervision worth up to \$50K at predetermined fees (personnel, camp, equipment, field vehicle etc) ¹⁵					✓

Sponsor Level	Cost (A\$ + GST)	Sponsor Widgets	Early Mover	Plus - Tier 3 (\$50K)	Plus - Tier 2 (\$150K)	Total Widgets	Total widgets - early movers
Bronze (x6)	30,000	1000	0			1000	
Silver (x 8)	50,000	2500	2500			2500	5000
Gold (x 5)	100,000	5000	5000			5000	10000
Gold Plus (x 5)	100,000	5000	2500	2500	5000	12500	15000
Platinum (x 2)	200,000	15000	5000			15000	20000

red = unavailable currently (full)

Plus Tier 3 = \$50K in kind support
Plus Tier 2 = \$150K in kind support

detectORE™ R&D Partner Company Sponsor Levels

- Limited to 5,000 units / year with dispatch from central supplies within 5 business days for 2 years
- Planning and Interpretation time charges covered but limited to 7 man days/ year.
- Train-the-trainer course costs limited to out of pocket expenses
- Limited to 5000 units / year dispatched from central warehouse within 3 business days of urgent order receipt for a period of 24 months after declared commercial release date (to be posted on website)
- Expenses associated with training to be at client charge
- Supervision time charges covered, limited to 10-man days/ year during R&D phase, but travel / expenses at sponsor costs. Additional days at prescribed day rates.
- Limited to 30 months after product release, there after based on client volume
- Gold sponsor XRF spectral will be assigned highest priority for post processing and checking through company software and manual routines for a period of 18 months on start-up and thereafter based on on-going product volume
- Free “widgets” will be made available to sponsors ex-Perth for a period of 3 years (Freight and any import duty at sponsors own cost) after commercialisation as described in Table1. These may be drawn down ahead of commercialisation by mutual agreement, and applied to field trials ahead of declared commercialisation
- Be among the first sponsors and besides assisting with the early trials, receive further widgets upon declared commercialisation, or applied to field trials, over and above standard tier level rewards.
- Enter at one level and like what you see and want more of it? Then contribute more R&D funds and provided that there is a vacant slot in our limited Sponsor Program, you receive all the benefits of the higher tier. For the avoidance of doubt, the free units are not cumulative, i.e. move from Bronze to Silver you receive 2500 units, not 1000+2500.
- The 10% discount will be over and above any other promotions or discounts on at any one time – i.e. pricing that would be available to non R&D Sponsors. The 10% discount is capped to a total discount value of 2x Sponsorship money provided to PPPB, i.e. a total cash saving of \$60,000, \$100,000 or \$200,000 for Bronze, Silver and Gold sponsors respectively.
- An option to purchase additional widgets at Introductory prices for a period of 18 months after Introductory Pricing ceases to be available, limited to Gold Plus, whose Option is for 10,000 widgets and Platinum 20,000 widgets.
- To Gain Plus Level status the company must have first joined as a Gold Sponsor and paid the Sponsorship Fees and committed to provide up to initially \$50,000 of in-kind support, detectORE products or contributions towards field trials over 3 years. The in-kind support can include staff such as a field Technician (capped at \$650/ day) or Geoscientist (capped at \$800/day), field equipment, accommodation / messing, freight, airfares and comparative assays or other costs as agreed in advance between the Company and Sponsor.
- The Diamond Sponsor field support and supervision applies to the testing and early stage application of detectORE™ using the Portable PPB's staff and field equipment, and as such is restricted to Australia during COVID times. A list of predetermined fees will be discussed early on with prospective Diamond Sponsors and agreed prior to sign-up.

Cost of not getting involved as a sponsor

- Potential 12 month delay with using the technology, compared with sponsors who can access this technology now!
- Any testing by your company post commercialization will be at your company's expense (widget purchases / personnel / field = time and \$\$\$)
- Unable to access our extensive R&D results for a considerable period of time
- Inability to direct the R&D in ways that can directly benefit your company
- No free widgets (equivalent in value to ~half the R&D sponsor fees)
- No on-going discount for the “widgets” and other PPPB products (worth up to double the value of the R&D sponsorship payment)
- Not able to access pre-commercialization introductory pricing

- pXRF low level gold, in the field, near real time, is now possible!
- detectORE™ expected to be of greatest benefit to explorers in remote areas with poor access to labs, where field seasons are short, or traditional laboratories are overloaded with long turnaround times
- Expected to transform the way gold explorers go about their business
- PPPB working with Industry Sponsors will lead the industry change increasing efficiency and effectiveness of gold exploration
- R&D Sponsor Scheme delivers win-win opportunity for those who can see the future and want to be exploration leaders
- Consider / calculate what it truly cost your company to wait for gold assays
- Why continue to wait to know if your samples contain gold, when you can now take control of your analytical timelines?!

For more details contact...

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