South Australia: Resetting the geology and revitalising minerals exploration

Presentation Sydney Minerals Exploration Discussion Group Sydney 27th July 2017







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The information in this presentation relating to exploration results is based on information compiled by Mr. John Anderson who is a full time employee of the company. Mr. Anderson is a member of the Australasian Institute of Mining and Metallurgy. Mr. Anderson has sufficient experience of relevance to the styles of mineralisation and the types of deposits under consideration, and to the activities undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr. Anderson consents to the inclusion in this report of the matters based on information in the form and context in which it appears.

The information in this presentation that relates to Mineral Resources Estimates at the Paris Silver Project is extracted from the report entitled "Significant 26% upgrade for Paris Silver Resource to 42Moz contained silver" dated 19 April 2017 and is available to view on the Company website <u>www.investres.com.au</u>. The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.



SOUTH AUSTRALIAN FOCUS & ON-GOING SUCCESS

🛠 Prominent Hill





140°

SOUTH AUSTRALIAN FOCUS & ON-GOING SUCCESS





IVR is **innovative** in identifying & collaborating on research developments to create **first-mover** opportunities and **competitive advantage** in the data-rich & strong research environment of South Australia.

IVR participates in multiple university & Geological Survey research projects & national Uncover Initiative.

Breakthrough applications in SA

- A. Multi-element pathfinder geochem
- B. Micro-dating mineral systems
- C. Magneto-Telluric (MT) geophysical remapping of Olympic Dam metallogenic corridor

Key disruptive concept

That the Olympic Dam IOCG belt & emerging Paris-Nankivel epithermal/porphyry province are connected & the fluorine-rich deposits formed at the same time in an Olympic Dam Mega-event.

IVR has taken a strong ground position to pursue this concept & opportunity

IVR CORPORATE OVERVIEW: Well Positioned with a strong silver asset & copper-gold exploration upside

Capital Structure as at 24 th April 2017				
ASX listed since 2007	IVR			
Shares (ordinary)	584.4M			
Options (Unlisted)	11.7M			
Share Price (19 May 2017)	3.6 c			
Market Cap (A\$m)	\$21.0M			
Cash (31 March 2017)	\$3.1M			

Share Register as at 24 April 2017	
CITIC Australia	11.5%
Old Mutual Global Investors	5.5%
Board & Management	2.5%
Тор 20	33.9%
Total shareholders	3,480

IVR – Market performance last 12 months



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Chairman – Dr. David Ransom.

Upgraded Paris silver resource to significant 42Moz contained silver with robust 139g/t grade (open-pit).

- Paris is considered by IVR to be the **best undeveloped silver project in Australia**.
- Enables **Pre-feasibility study** on Paris Silver Project to proceed.

Nankivel porphyry copper-gold-silver Recent drilling changed the target model for the better Transitional spectrum in space and time with Olympic Dam IOCG belt Refining characterisation of different mineralising intrusives

R&D Tax & PACE drill rebates totalling \$1.0million

IVR has a strong foundation silver project and is primed for transformation through innovative first-mover copper-gold discovery opportunities.

Southern Margin of GRV ("Uno Province")



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OUTLINE:



Paris silver project

Breakthrough developments for IVR & South Australian discovery potential

- 1990 Nankivel advanced argillic outcrop mapping is interpretive & dates
- 1993 Menninnie Dam conversion new styles & tactics incl. spectral/soil geochem
- 2003 Initial Hiltaba granite characterisation "Moonta" corridor of special granites
- 2011 Paris IS epithermal deposit in Olympic Dam aged volcanics
- 2014 Paris-Nankivel mineral system epithermals & porphyries
- 2015 Remapping of the OD metallogenic corridor *magneto-tellurics (AusLamp)*
- 2015 OD mega-event, mid-GRV marker & transitional tectonics *micro-dating*
- 2016 Nankivel alunite date also OD aged plus more coming
- 2016 Multiple & transitional intrusive phases *multi-element pathfinder geochem*

Nankivel porphyry copper target

Strategic Ramifications – throwing out the dogma

Paris: A new silver deposit style for South Australia



Summary geological section through the centre of the Paris silver deposit



Silver mineralised polymict breccia

Period States St

Altered dolomite "clast"

Rhyolite dyke breccia

Main silver mineralisation zones

Acanthite & native silver in pyrite

Main host is polymict breccia host (orange) interfingered with unmineralised ignimbrite (pink)

Associated dykes with pepertic textures.

Dolomite surface is embayed & filleted at base of Gawler Range Volcanics (GRV)

Very high-grade zones of sulphide clasts (dark red)

Pervasive clay alteration & fine argentiferous pyrite mineralisation including framboids Intermediate sulphidation epithermal



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INFILL DRILLING: Paris drill plan

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Drilling largely with RCP holes but also with control core holes raised confidence & sample quality of the shallow clay rich breccias and corroded carbonate in the deposit.







CROSS SECTION: Shallow, open-pittable



Silver mineralisation is flat-lying with coherent high-grade blocks close to surface.



Section 51275mN looking north showing MIK resource blocks (average grade) overlaying the generalised resource geology. Blocks are 25m x 25m x 5m.

UPGRADED 2017 PARIS MINERAL RESOURCE ESTIMATE



Category	Tonnage	Silver Grade	Contained silver	Lead Grade	Contained lead
	(Mt)	(g/t)	(Moz)	(%)	(kt)
Indicated	4.3	163	23	0.6	26
Inferred	5.0	119	19	0.6	29
Total	9.3	139	42	0.6	55

Note: Based on 50g/t silver cut-off grade

Densities: Indicated - 2.20t/m³, Inferred - 2.22t/m³ and Average - 2.21t/m³

Compared with 2015 resource (by the same consultants & method with same cut-off) of **8.8Mt @ 116g/t Ag for 33Moz** contained silver:

- 5% increase in tonnes; 20% increase in grade; 26% increase in ounces
- 55% of ounces converted to Indicated with a 41% increase in grade

SHAPE: 55% of Silver Ounces converted to Indicated



Oblique view (looking north) of the MIK resource blocks that contributed to the plus 50g/t silver Inferred & Indicated classification.



With the 41% grade increase for the better drilled Indicated (red) component, it is reasonable to presume further infill drill may further improve grades and confidence in the current Inferred areas.





Graphical comparison of the Paris Silver Project resource grade and contained ounces with other silver deposits (as at April 2017 - No credits are added for other metals in multielement deposits).

Paris is arguably the best undeveloped pure silver deposit in Australia.

Investigator offers one of the few advanced silver projects in the country.

GOOD GRADE / TONNAGE PROFILE: Offers operational flexibility



Flexibility to raise or lower grades according to silver prices

Higher grade cut-off retains much of the ounces

30g/t cut-off

50g/t cut-off

70g/t cut-off



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Standard silver minerals (silver sulphide & native silver in pyrite). Good silver recoveries in laboratory leach trials*:

Ore Type	Estimated % of resource	Sample weight kg	Silver grade g/t Ag	% Leach recovery
Polymict breccia	85	610	109	65 (75 ¹)
Massive sulphide	Subset of above	135	1,440	69
Shallow oxidised	Subset of above	135	974	97
Shallow clay-host	Subset of above- Minor	160	119	45
Dolomite rind	15	115	379	83
Dolomite-host	Minor	110	408	69

Opportunities to improve silver recoveries with finer grind & longer leach times. Flotation trials were also positive for producing a silver-lead concentrate.

Advanced metallurgical laboratory tests about to start looking at the processing options of leach versus flotation.

* Standard cyanide leach bottle roll tests; All P₈₀ 106micron grind size except ¹ was P₈₀ 53micron; IVR ASX Release 21/10/13

Where it all began in 1990: Nankivel Hill - Advanced argillic alteration



Silica alunite dickite haematite altered rhyolite breccia with surrounding pyrophyllite (MIM – 1995) & topaz (GSSA- 2015) as well



Menninnie Dam: BHT to sub-GRV volcanic breccia (1993)



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FIRST EPITHERMAL EXPLORATION: MIM 1995/6



2003 granite data – IVR interpretation & exploration based on alternative Moonta Corridor prospectivity model





PARIS DISCOVERY: With soil geochemistry (2011)





Initially targeted by empirical soil geochemistry (e.g. silver): Limited by variable transported cover e.g. talus & alluvium subdue soil response



PARIS MODEL: I-S epithermal breccia (2013) *Ticks all the boxes*







Paris is an intermediate-sulphidation epithermal deposit often near porphyry systems







Paris-Nankivel Field Upgraded target plan

Numerous targets along connecting structures integrating inputs including airborne EM anomalies (green dots) & multi-element drill data

Five shallow epithermal silver-gold-copper targets (yellow) to build on Paris

At least **four interpreted porphyry centres** (pink) with potential for large coppergold deposits

Warrants aggressive geophysical program

The Next Big Ones: Where to explore?





Olympic Dam template: Magneto-telluric (MT) setting





Magnetotelluric Section through Olympic Dam

Modified after Hayward, 2004; Magnetotelluric section provided R. Gill, Uni. Adel; "hotter" colours are more conductive

Source: McCuaig 2013 WA Centre for Exploration Targeting

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Olympic Dam template: Seismic setting





Source: Neumann et al. 2010 SA Seismic & MT Workshop Geoscience Australia Record 2010/10

National roll-out of AusLamp MT survey: Breakthrough mapping of interpreted metal source & transport corridors e.g. Olympic Dam belt



MT Inversion conductivity maps (Base MT inversion plans with IOCG deposits are from Thiel & Heinson, GSSA/U of Adelaide presentation: *The electrical lithospheric structure of southern Australia*; 26th IUGG Assembly, Prague 27/6/2015)



Re-invigorating discovery of the next generation & spectrum of IOCG deposits by increasing confidence in the selection of target areas; *e.g. Maslins*

Maslins IOCG target:now with MT support



MT encouraged IVR's pegging of the Maslins tenement package & delineation of the Maslins IOCG gravity target





Gravity plan - Filtered Bouguer gravity



3-D model of Maslins gravity target Viewed from the southern end.

Maslins IOCG Target

- Gravity anomaly (9mgal) good density (3.2g/cc) contrast
- Modelled as 6km long x 1km diameter horizontal body
- 600m 700m depth to top at prospective IOCG geological position
- Underlain by magnetic zone (modelled top in blue). Possibly a deeper skarn zone as expected under the standard LOCC target model

Maslins IOCG copper-gold target: regional long section



Adding geology support to a large gravity target

At the preferred geological level and vector direction for IOCG deposits (review of past regional drilling). Size potential between Olympic Dam and Carrapateena & at depths suitable for modern bulk underground mining.



The Next Big Ones: Where to explore?





The next Big Question: What is the link between the Uno Province & Olympic Dam Belt?









MULTI-ELEMENT PATHFINDER GEOCHEMISTRY: Another IVR breakthrough - Distinguishing the Paris dykes


PARIS-NANKIVEL MINERAL SYSTEM: Therefore updated





NANKIVEL IP ANOMALY:





Large 2km by 500m chargeability anomaly (red zones on IP sections spaced at 400m intervals).

Adjacent to the outcrop on Nankivel Hill (Dyke on same orientation as the Paris mineralising dyke).

About 150m depth to top of IP target.

The combination of an IP anomaly with an advanced argillic cap is a desirable combination for porphyry targeting.

Oblique overhead view of the Induced Polarisation (IP) chargeability profiles over the TMI:RPT magnetic image.

1,000m

NANKIVEL PLAN





NANKIVEL SECTION: Copper







Supergene covellite CuS over-print on phyllic alteration (* Microscope images – field of view approx. 2mm)



Primary biotite replaced by secondary biotite (potassic alteration)*





NANKIVEL SECTION:





NANKIVEL: CROSS SECTION



MULTI-ELEMENT PATHFINDER GEOCHEMISTRY: Multiple intrusives at Nankivel



Nankivel diamond holes (IVR)

MULTI-ELEMENT PATHFINDER GEOCHEMISTRY: Regional characterisation of granites





Granite prospectivity model





New ground pegged with potential for further Paris-Nankivel style epithermal /porphyry centres; i.e. granites with Zr/Hf ratios around 20, showing multiple & late small intrusives in the magnetics and preferbaly south of the projected Uno Fault



- **Greenfields extensions to pedigree belts** (e.g. Olympic Dam megaevent) for best returns if you are any good
- Focus on emerging or revitalising belts and on your strengths
- Take on the next level of exploration difficulty & therefore opportunity (the hurdles are low e.g. Shallow covered extensions to pedigree belts)
- **Integrate and customise your exploration techniques** (mono-tactic campaigns will find a lot of false anomalies)
- Mapping is interpretive and becomes dated (Look at the rocks)
- **Scientific approach** (of sorts) Mineral systems approach means no dogmatic models of deposit types (*Look for the spectrum*)



- Have separate but do not separate data producers & administrators from users/abusers/arm-wavers/risk takers
- Look for opportunities to convert research ideas into exploration applications Pick winners in the research community, back their work, collaborate, be the first
- to hear their developments
- **Ask questions** (you will think about them in your sleep) so you will be ready when you see the answers from unexpected quarters e.g. *Is there a mid-GRV marker*?*
- Integrate, Iterate, Innovate especially using others' ideas & data (learn more than they do)
- Peg your ideas with urgency & drill early
- Share ideas and data (as long as you have squeezed it first)
- There is no shame with persistence (as long as you believe, keep refreshing the opportunity & recognise when you are wrong)

THANK YOU