# Rockface Copper Discovery at Jervois

Keith Mayes, KGL Resources

AUSTRALIA'S NORTHERN TERRITORY

NORTHERN TERRITORY GEOLOGICAL SURVEY
AGES2017
ANNUAL GEOSCIENCE EXPLORATION SEMINAR
Alice Springs, 28–29 March 2017, Northern Territory

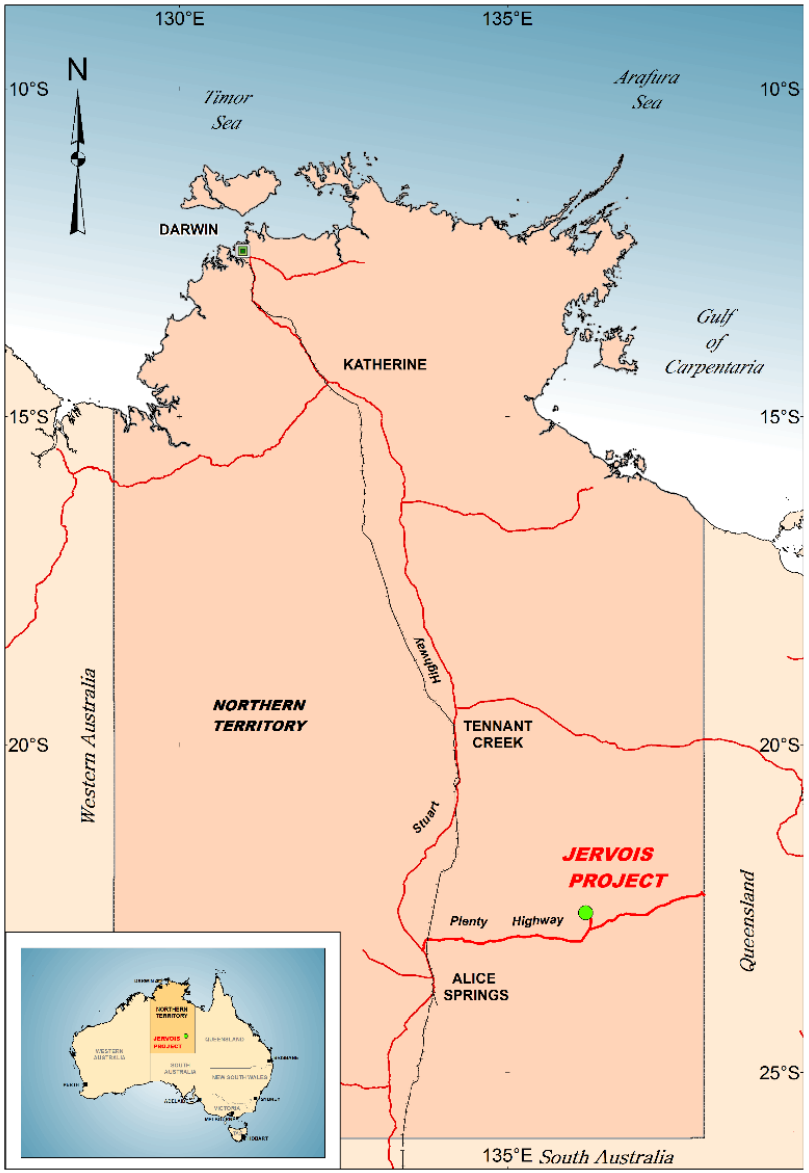
# Rockface Copper Discovery at Jervois

*March 2017*

KGL RESOURCES

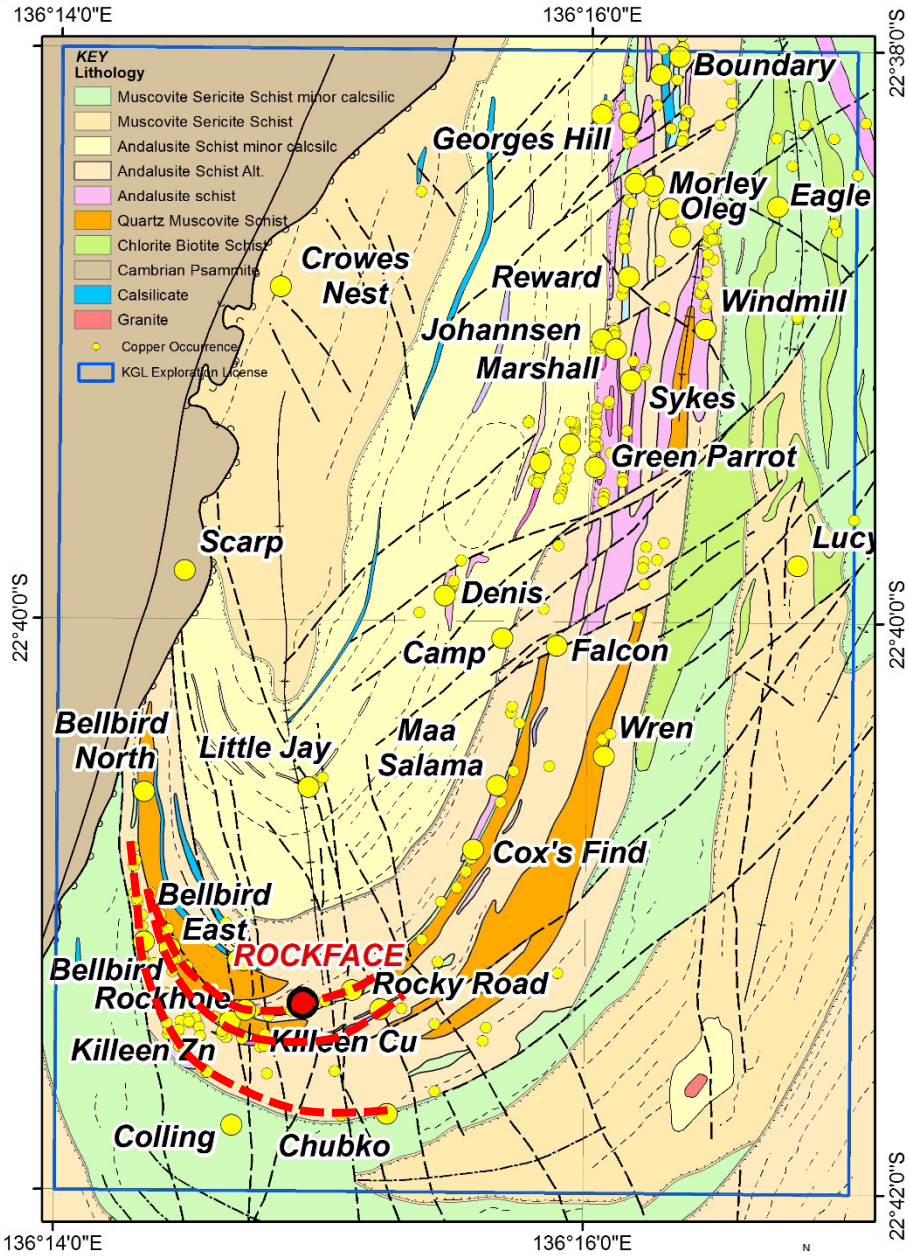
# Location

- 380 km  by road east north east of Alice Springs
- Jervois Pastoral Lease
- Access via Stuart and Plenty Highway
- Bonya Community 17 km south west of project



# Geological Setting

- Hosted by Bonya Metamorphics in Eastern Arunta
- High T - Low P metamorphism
- Dominated by Qtz Muscovite Schist
- Stratabound mineralisation
- Hybrid SEDEX-VMS  IOCG?



# Deformation

D0

- Basin Formation

D1

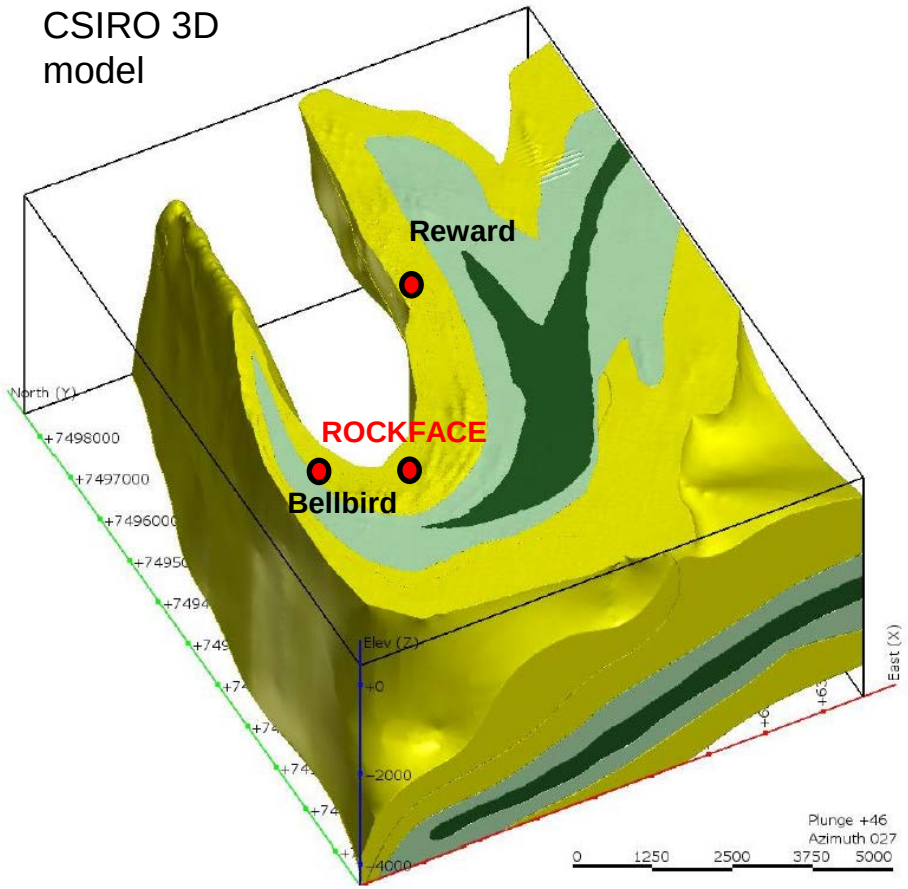
- large westward closing recumbent folds

D2

- Dominant fabric.
- East-west possibly transpressional regime
- Isoclinal folding repetitions

D3

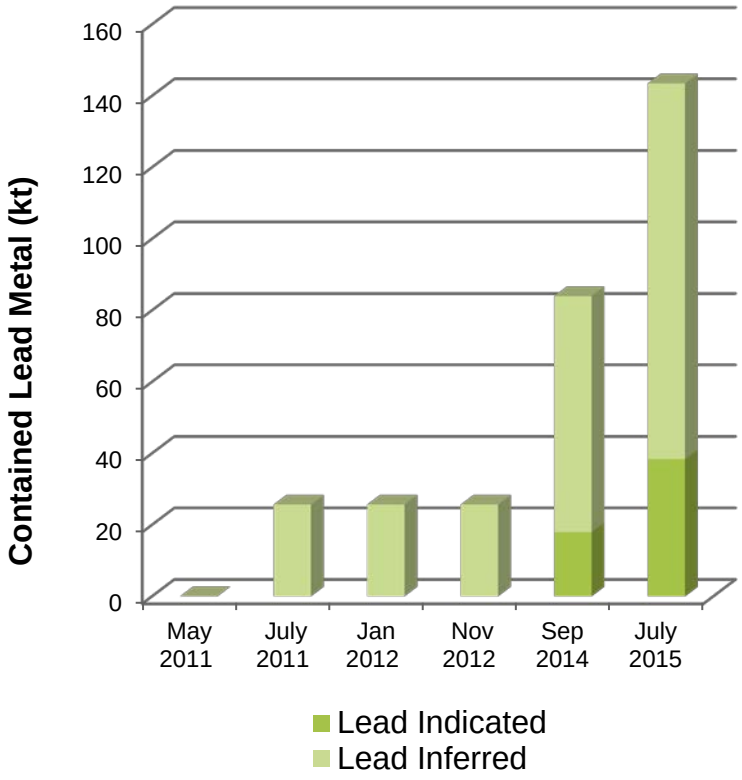
- Refolding of D2 forming the “J”shape

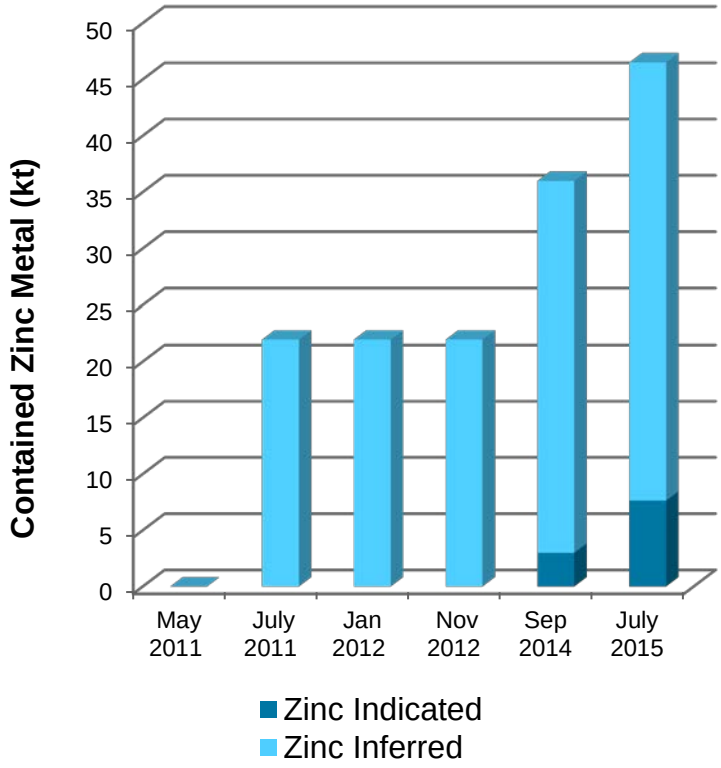


# Jervois Exploration

- Jervois discovered in 1929
- Numerous small scale prospecting and mining ventures
- **New Consolidated Goldfields** (Australasia) Pty Ltd 1961-1965;
- **Petrocarb Mineral Exploration** (SA) Pty Ltd (1969-1973)
- JV **Petrocarb** and **Union Corporation** (Australia) Pty Ltd (1973-1974)
- **Plenty River Mining** (1980-1983)
- JV **Plenty River Mining** and **Anaconda** (1983-1984)
- JV **Plenty River Mining** and **Normandy Poseidon** (1991-1996);
- **Britannia Gold NL** (1997-1999)
- JV **Britannia Gold NL** and **MIM Exploration** Pty Ltd (1999-2001)
- **Reward Minerals (**2004-2009) > **Jinka Minerals** (2010-2011)
- **KGL Resources** (2011 – Present)

# Lead and Zinc Resources

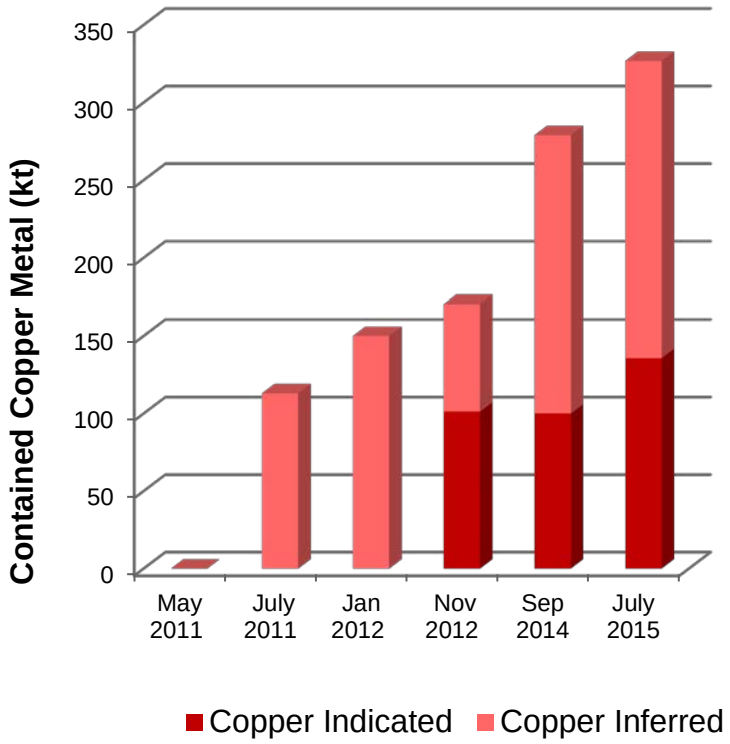


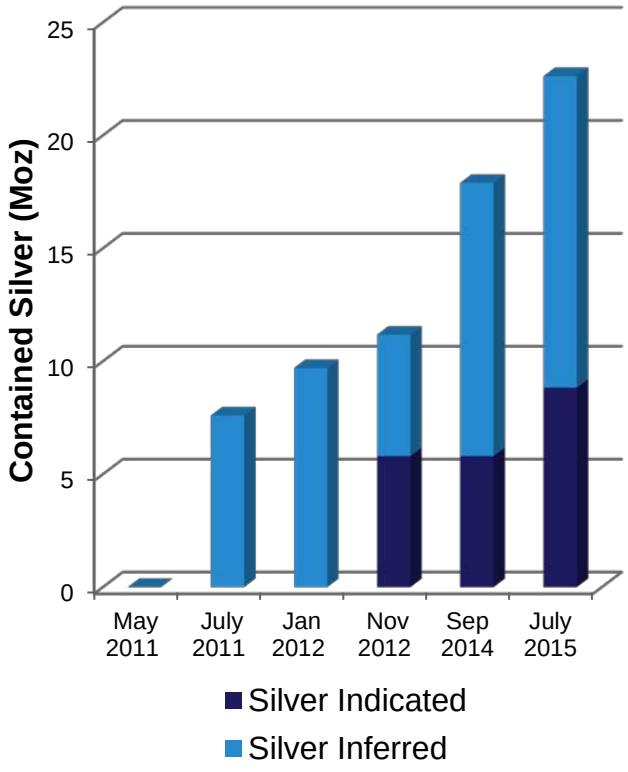

Total contained lead-zinc 190,000 tonnes

# Copper and Silver Resources

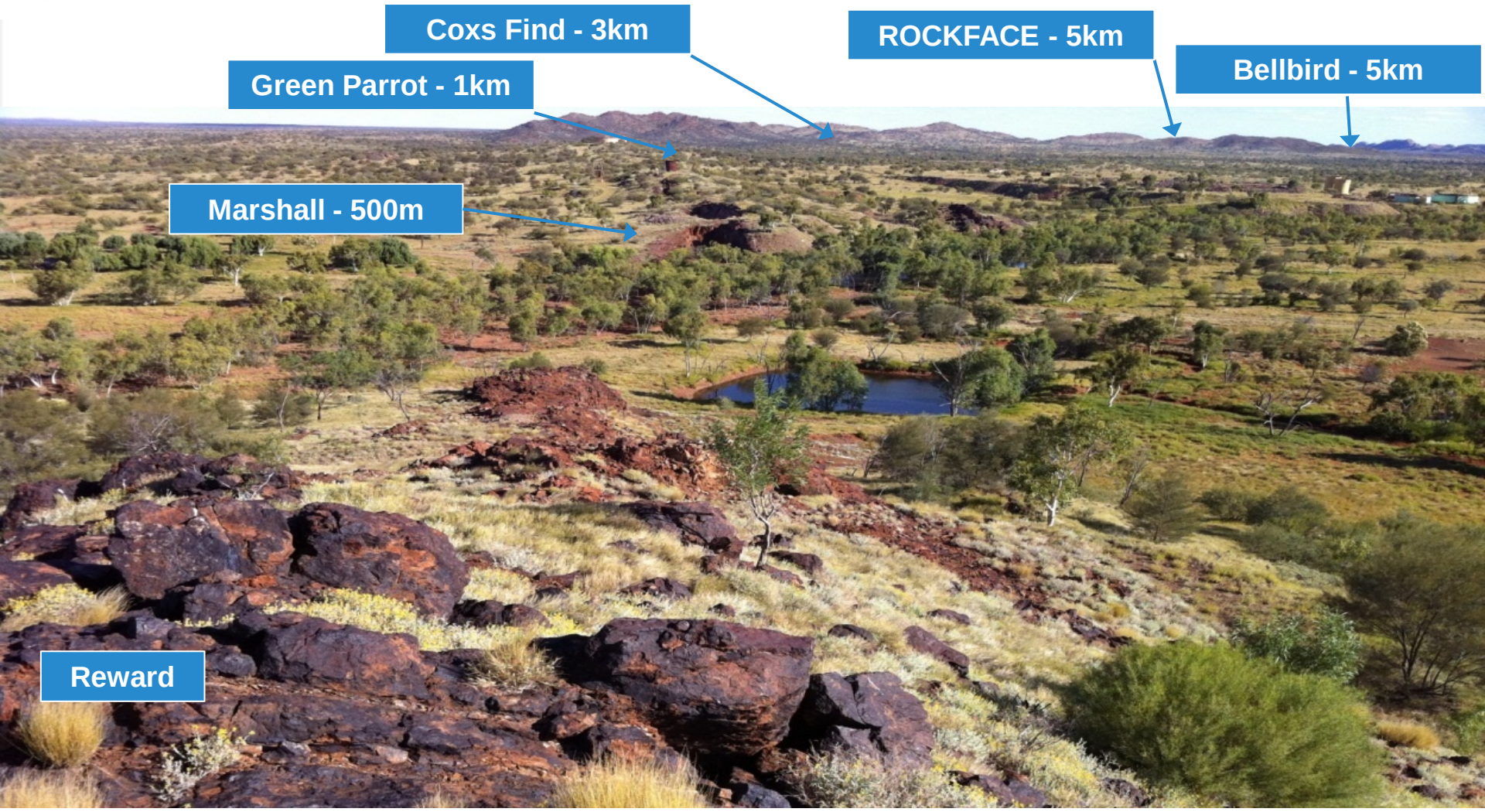
30.5 Mt @ 1.07% Cu for 327,000 t Cu




30.5 Mt @ 23 g/t Ag for 22.6 M oz Ag



# Jervois


Coxs Find - 3km
ROCKFACE - 5km
Bellbird - 5km
Green Parrot - 1km
Marshall - 500m
Reward

# Rockface

# Rockface Exploration

## Rockface

**Petrocarb** > Nicron > Normandy Poseidon Group

- 5 RC holes (PF1-5) – early 1970s

**MIM Exploration**

- 2 RC holes (J8,J9) - 2000

**Reward Minerals**

- 5 RC holes (RJ series) – mid 2000s

**KGL Resources**

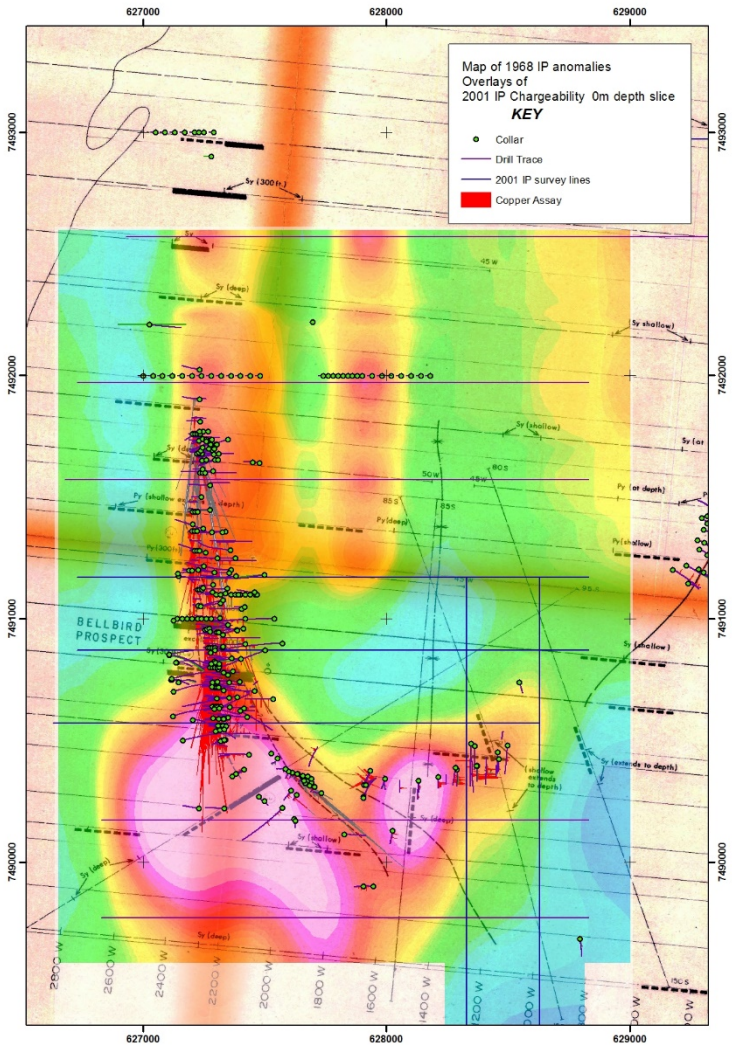
- 4 diamond (KJD series)
- 10 hand held diamond (KJD series) * Post 2014 resource estimate
- 5 RC holes(KJC & JOC series)
- 12 RC holes with Diamond tail (KJCD series) * Post 2014 resource estimate

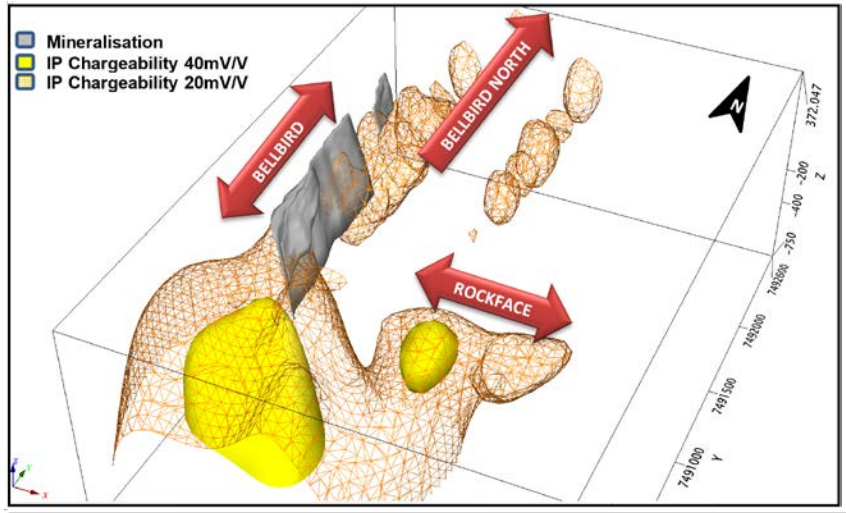
## Rockhole

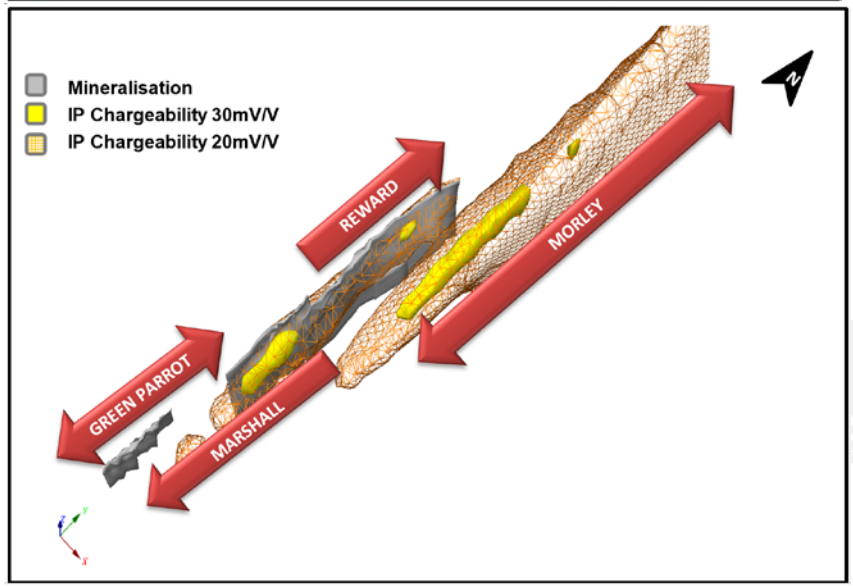
**KGL Resources**

- 3 diamond (KJD series)
- 5 RC holes(KJC series)

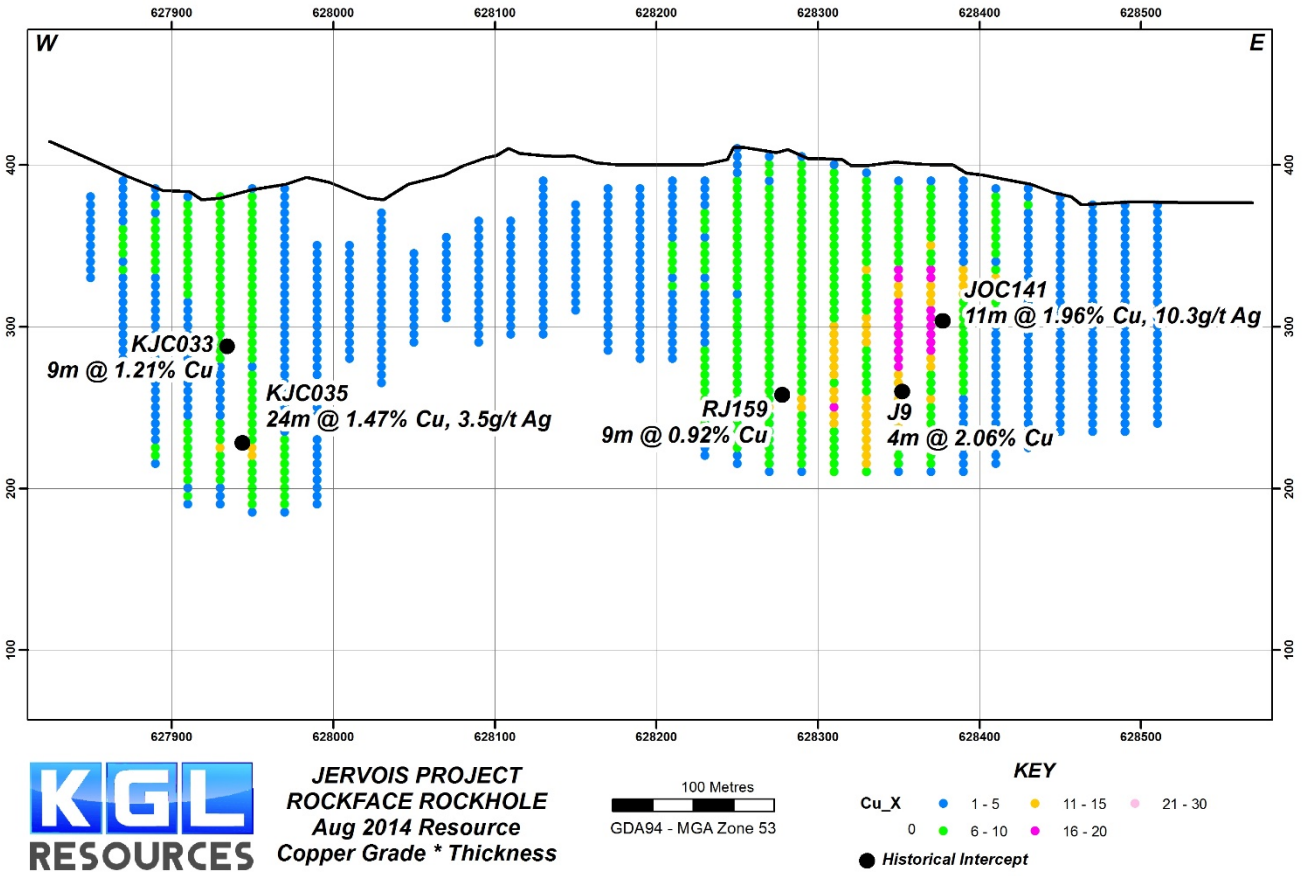
# IP Chargeability



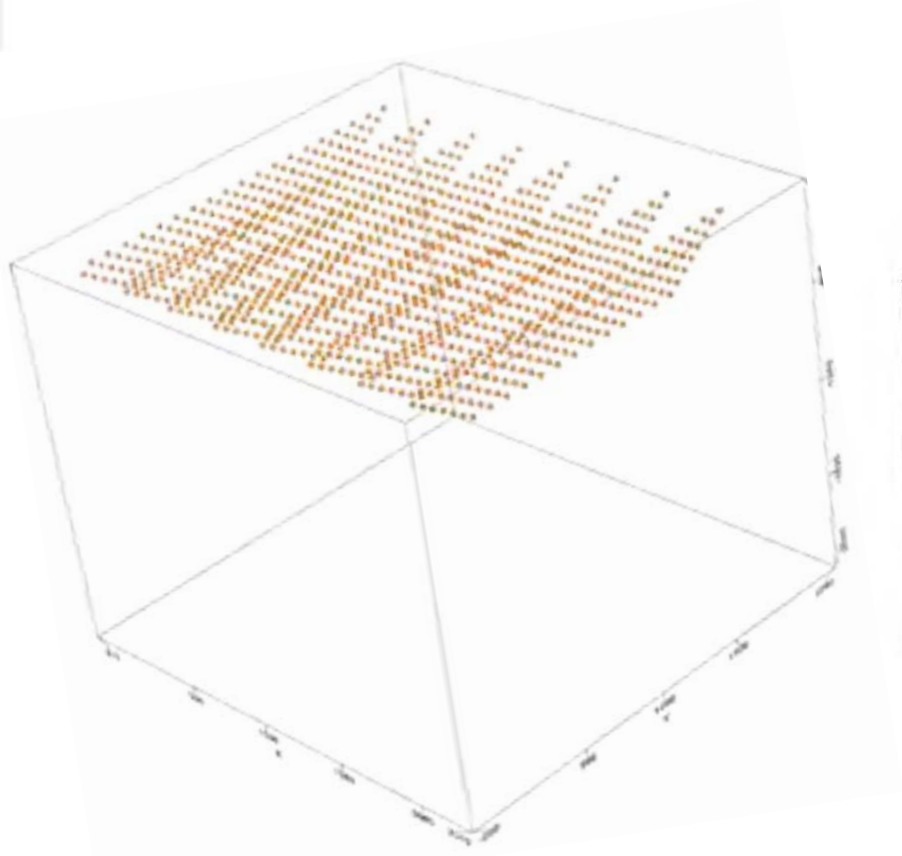



# Rockface 2014 Resource




Inferred Resource 0.7Mt @ 0.82% Cu, 3.1g/t Ag

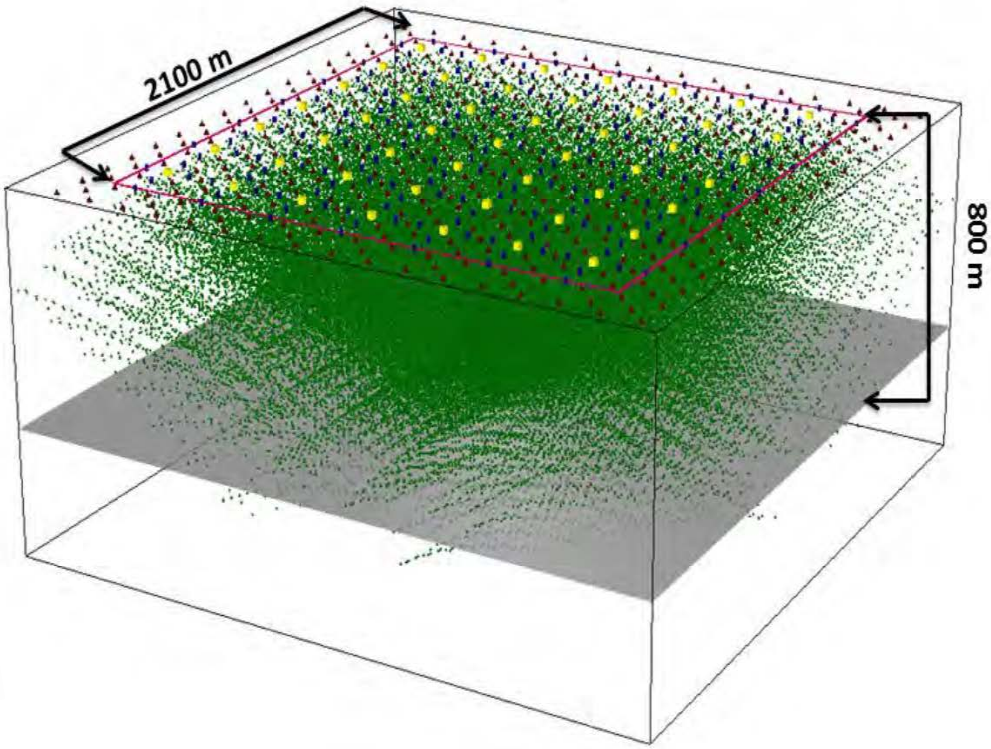
# Induced Polarisation



QUANTEC GEOSCIENCE

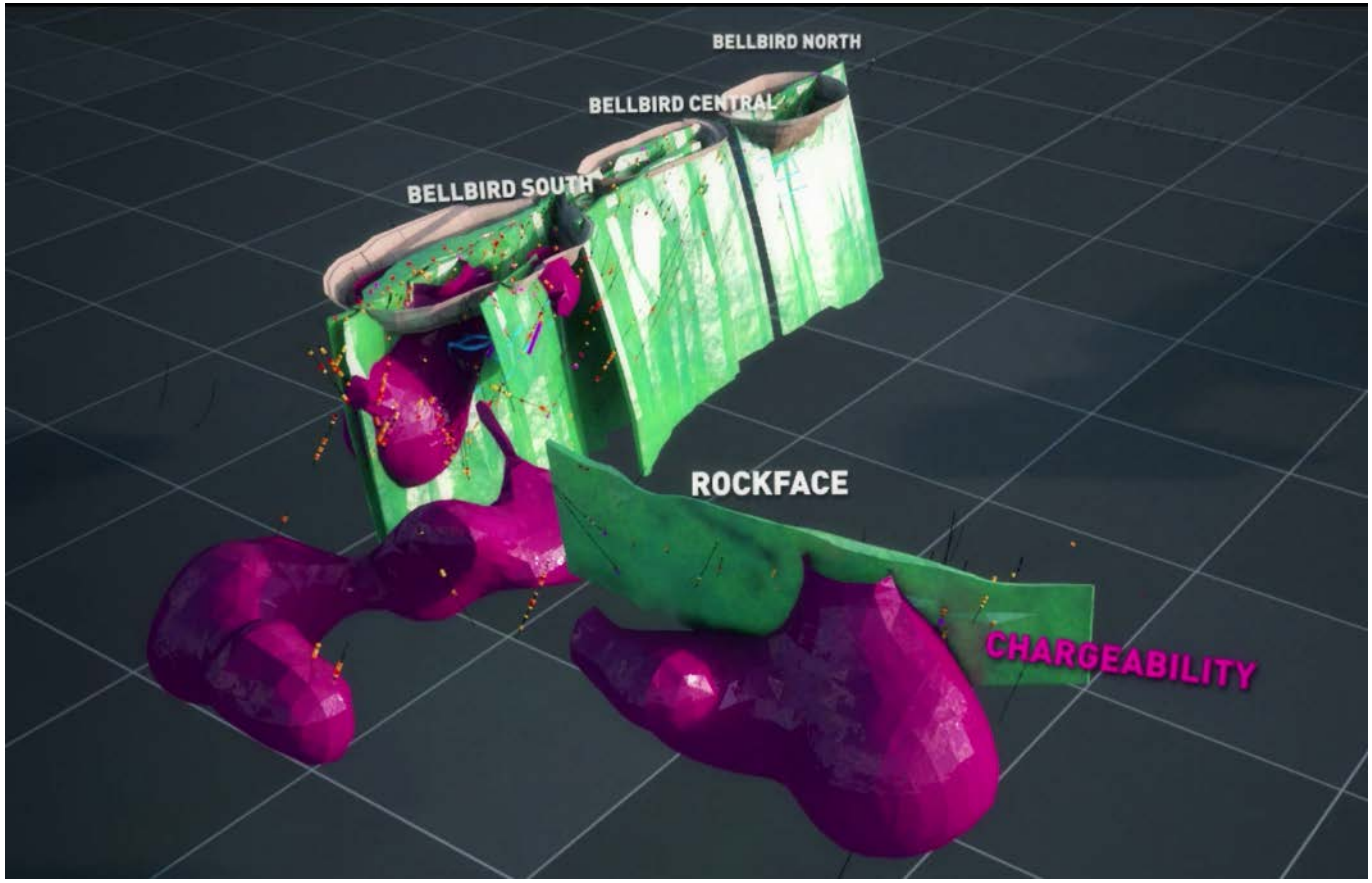
ORION 3D

Data Density

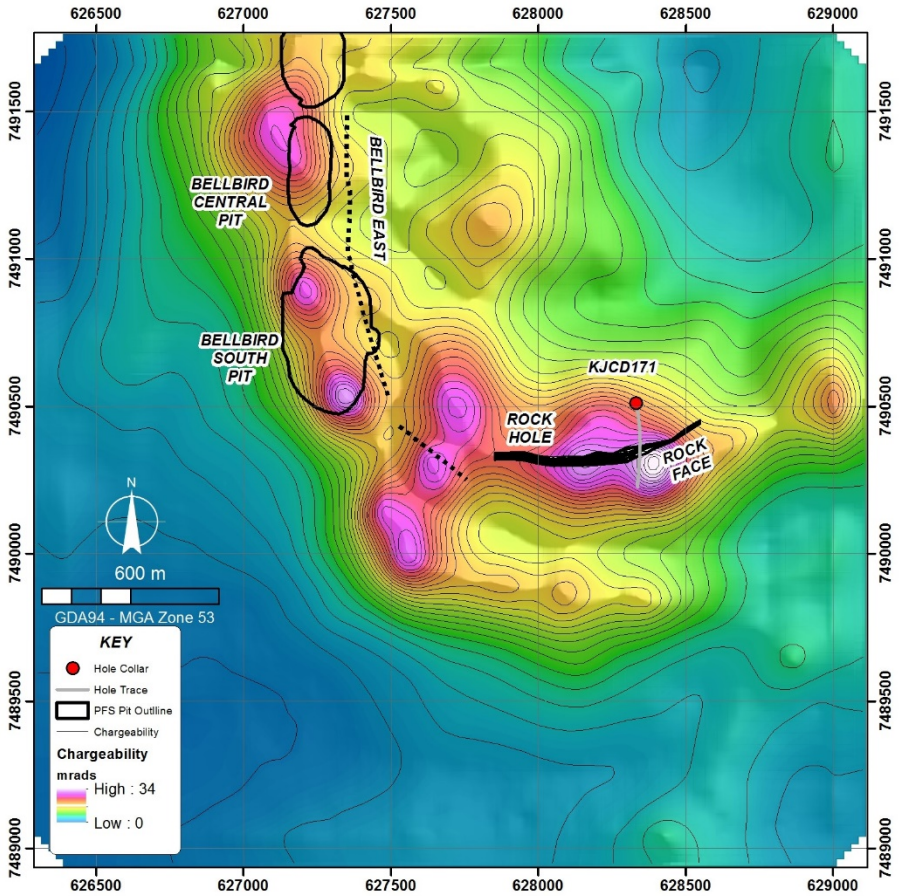


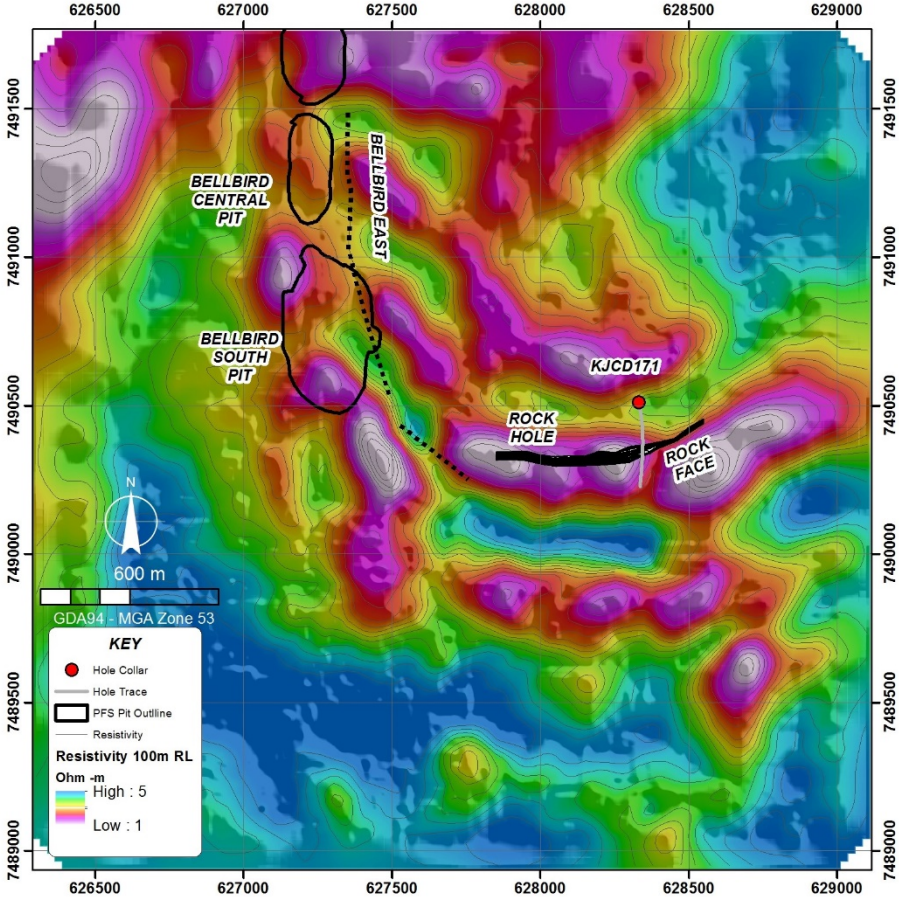

- **Conventional dipole-dipole array**

# Orion 3DIP


BELLBIRD NORTH
BELLBIRD CENTRAL
BELLBIRD SOUTH
ROCKFACE
CHARGEABILITY

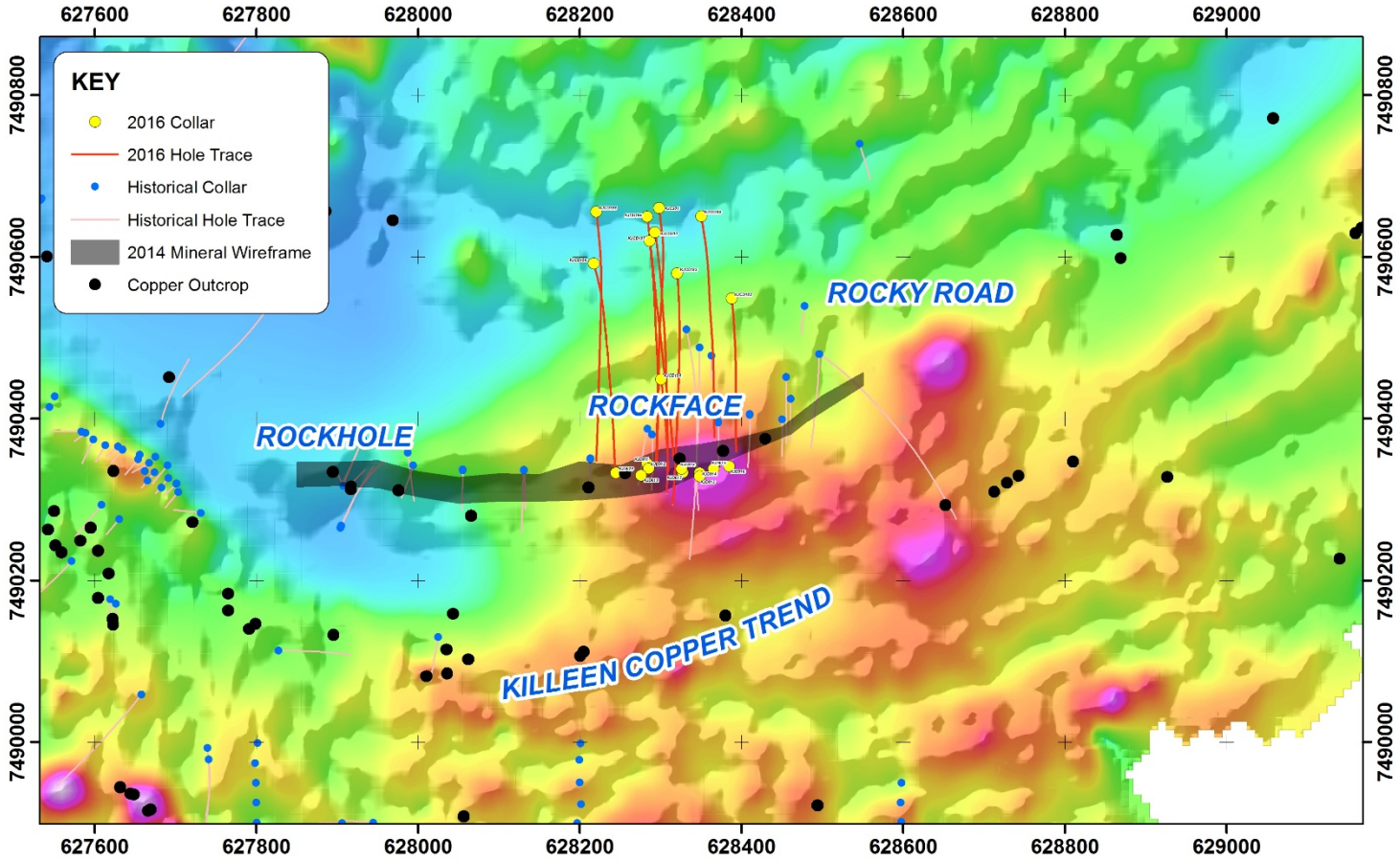
# Orion 3DIP




Orion 3DIP 100mRL: Coincident resistivity and conductivity anomaly

# Ground Magnetics

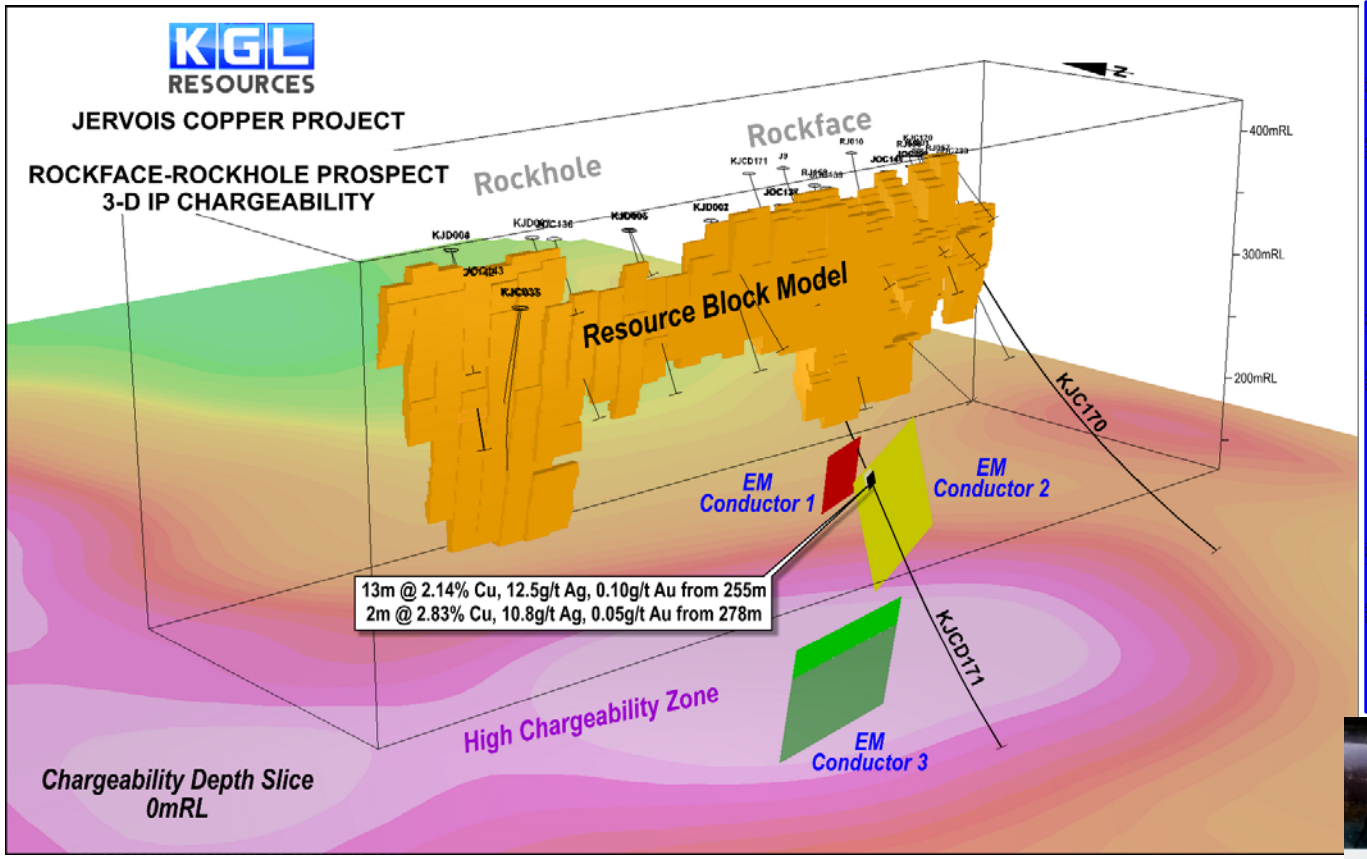


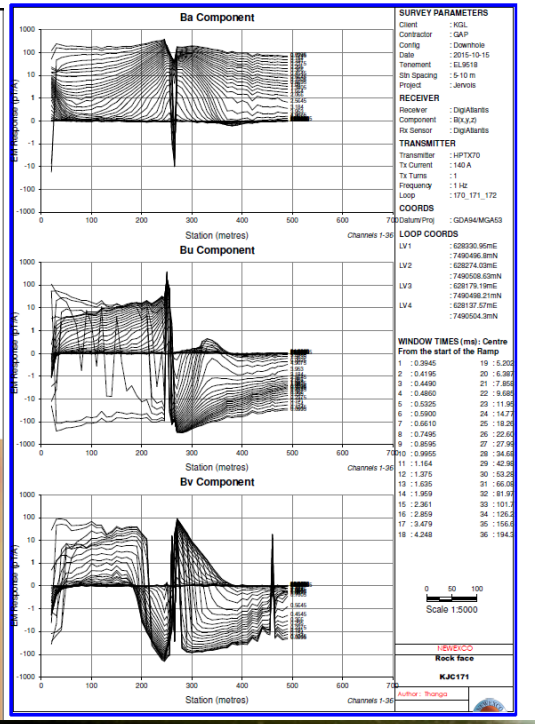

JERVOIS PROJECT
ROCKFACE PROSPECT
SAM TMI RTP

260 m

GDA94 - MGA Zone 53

# Rockface HG Discovery





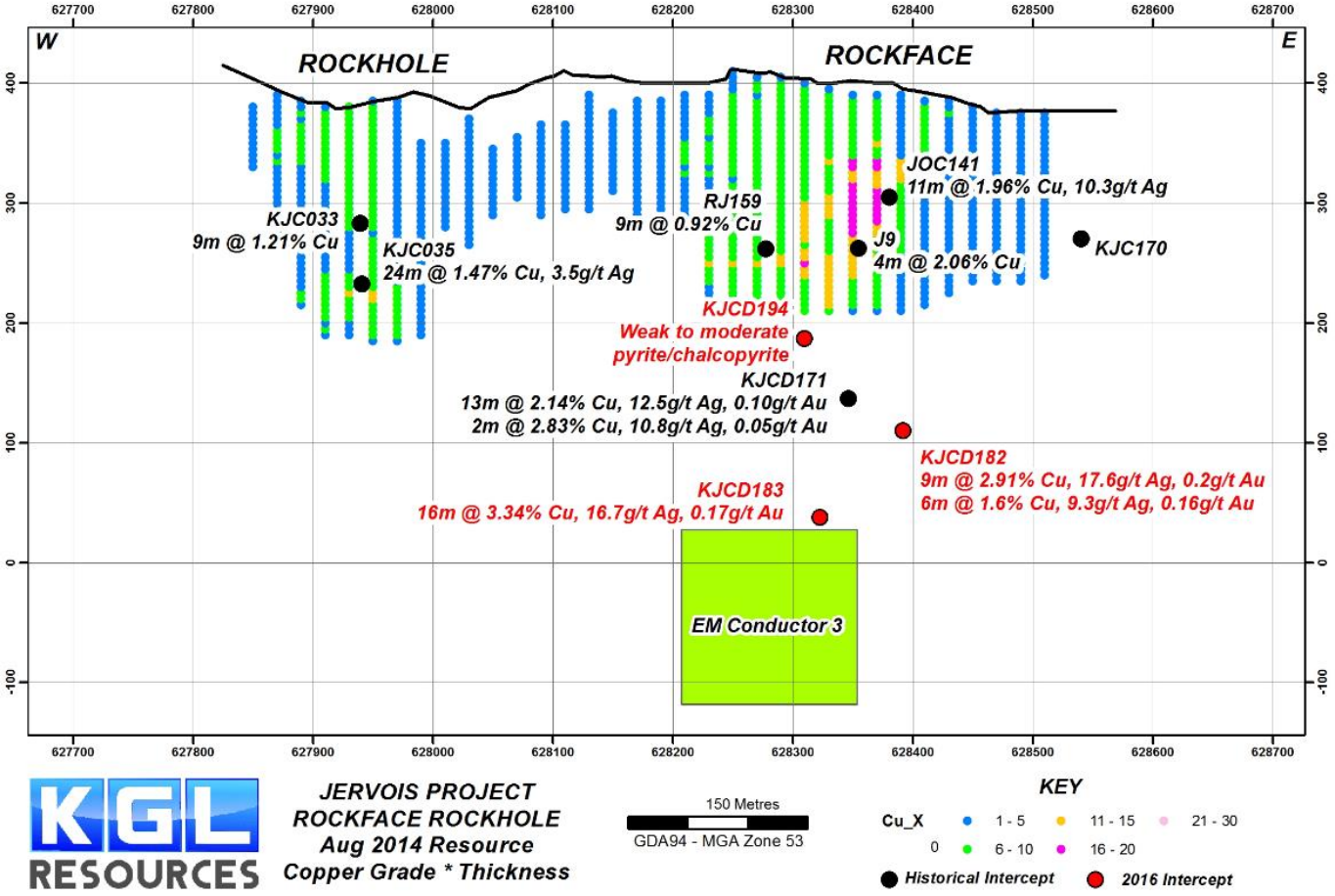
## KJCD171

**13m @ 2.14% Cu, 12.5g/t Ag, 0.10g/t Au from 255m**

**2m @ 2.83% Cu, 10.8g/t Ag, 0.05g/t Au from 278 m**

Hole KJCD182 successfully intersected EM Conductor 2

Hole KJCD183 lifted and did not intersect EM Conductor 3



# Drilling Priorities

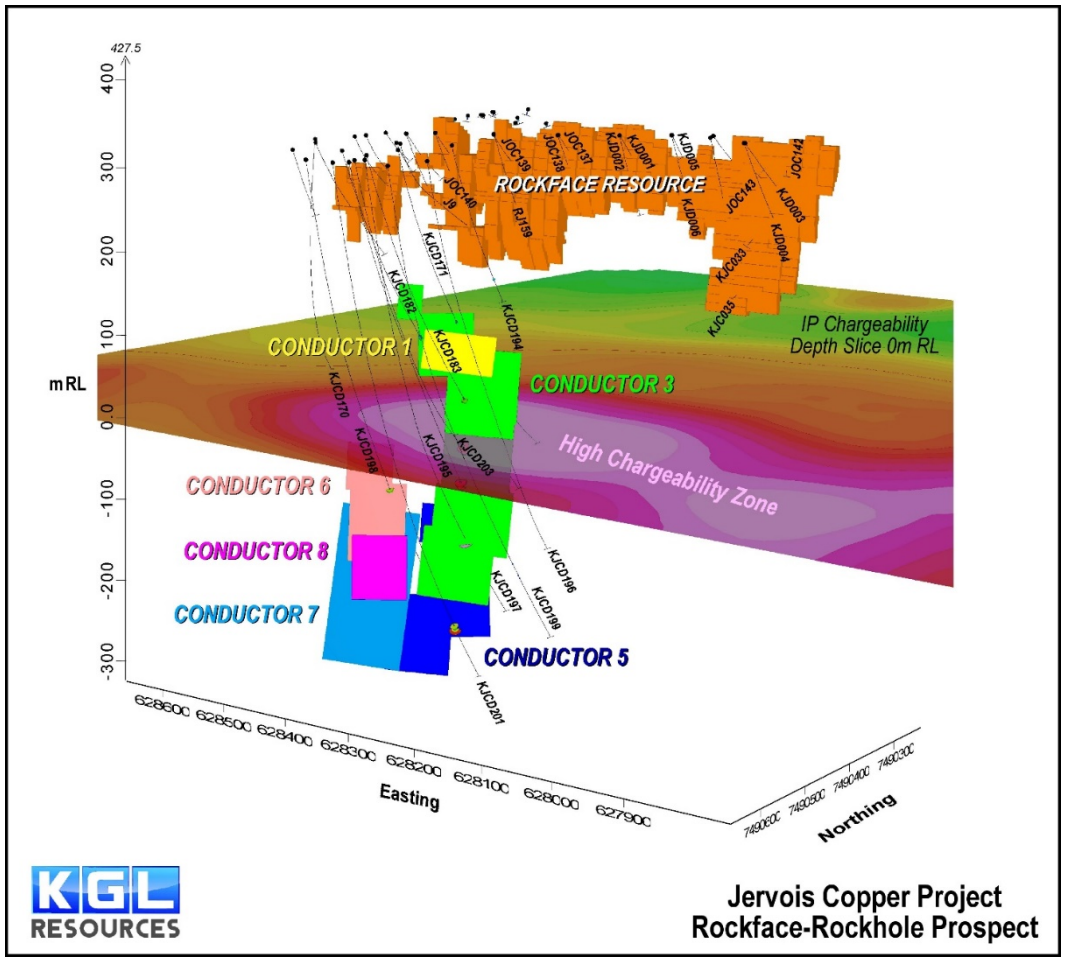
**Eastern zone (C6,7,8)**

**Shallower areas of C3 are target for infill drilling**

**Infill drilling on remainder of C3 & C5 in advance of resource update**

**IP Chargeability suggesting potential to the west**

**Rockhole extension drilling**



# Alteration

## Alteration Assemblage

Distal — Intermediate — Proximal

Magnetite-sericite

andalusite alteration to sericite and/or chlorite

*localised to high-strain zones* garnet-biotite *pervasively disseminated*

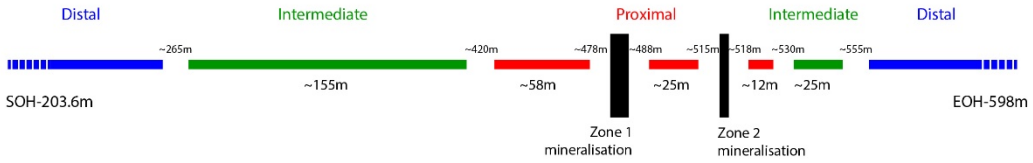
chlorite-magnetite-biotite

massive magnetite±biotite

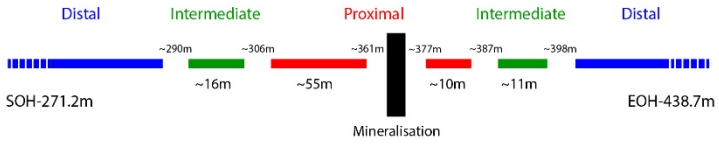
post mineralisation carbonate fracture veins

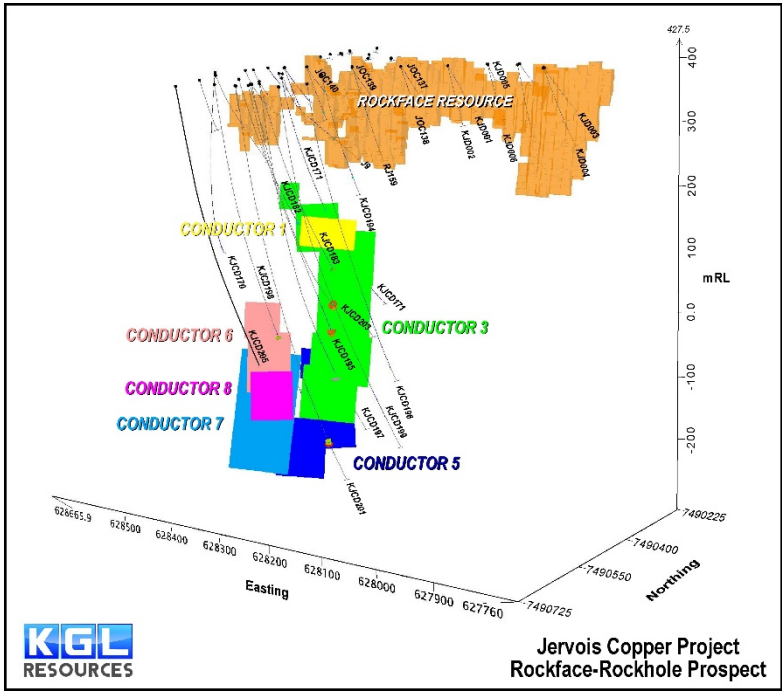
## Alteration Symmetry

**KJCD 195**




**KJCD 183**



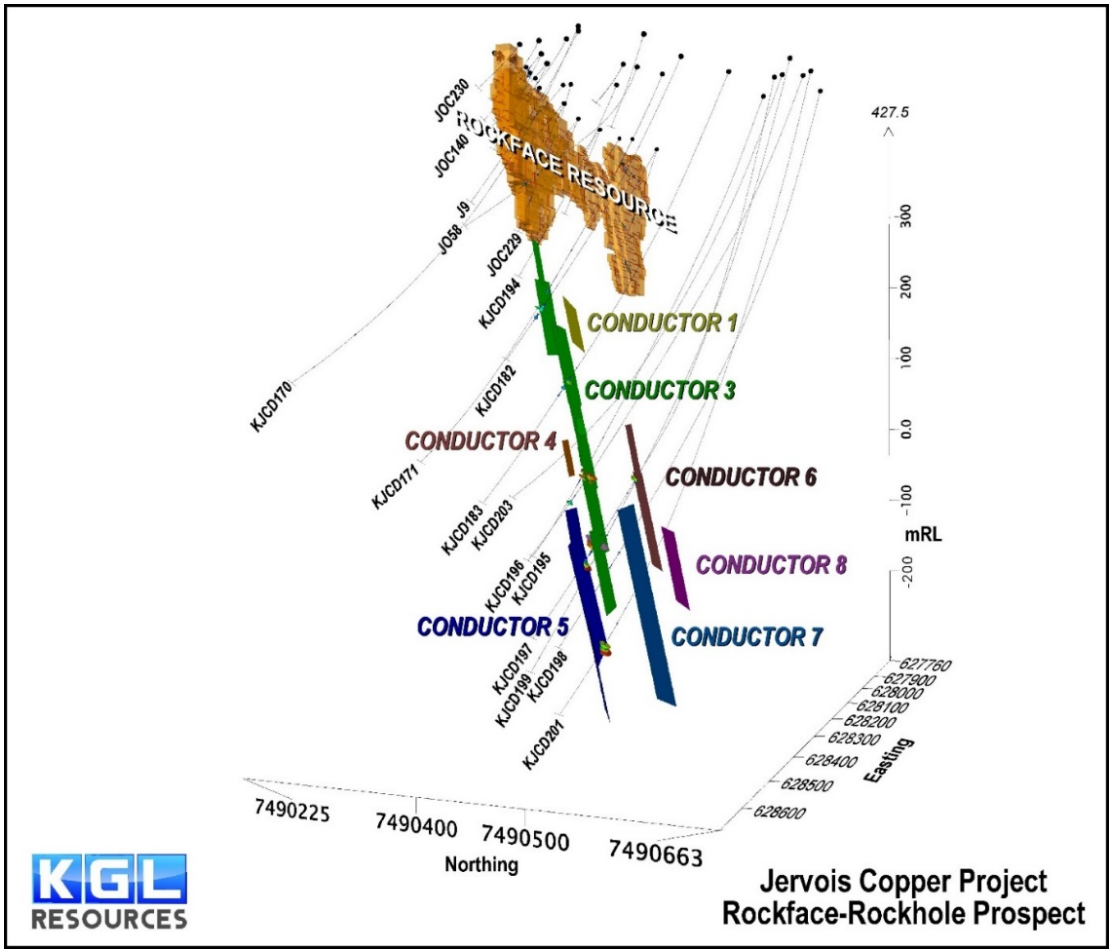
# Rockface

Multiple parallel lenses

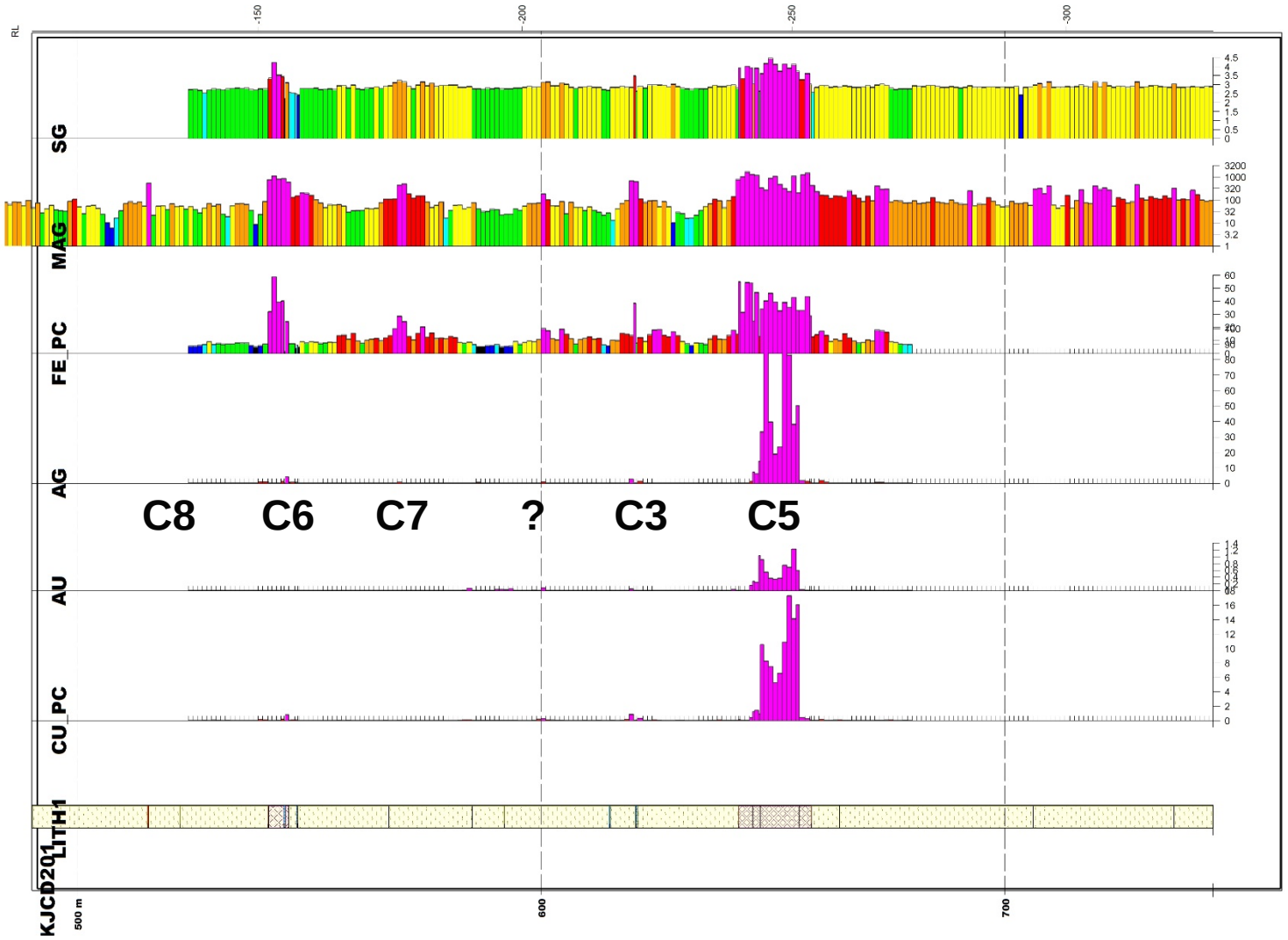
Dipping north at -80deg

C5 appears to be flattening to -75deg in KJCD201

Strike for C6,7,8 swinging to the north



# KJCD201 Log

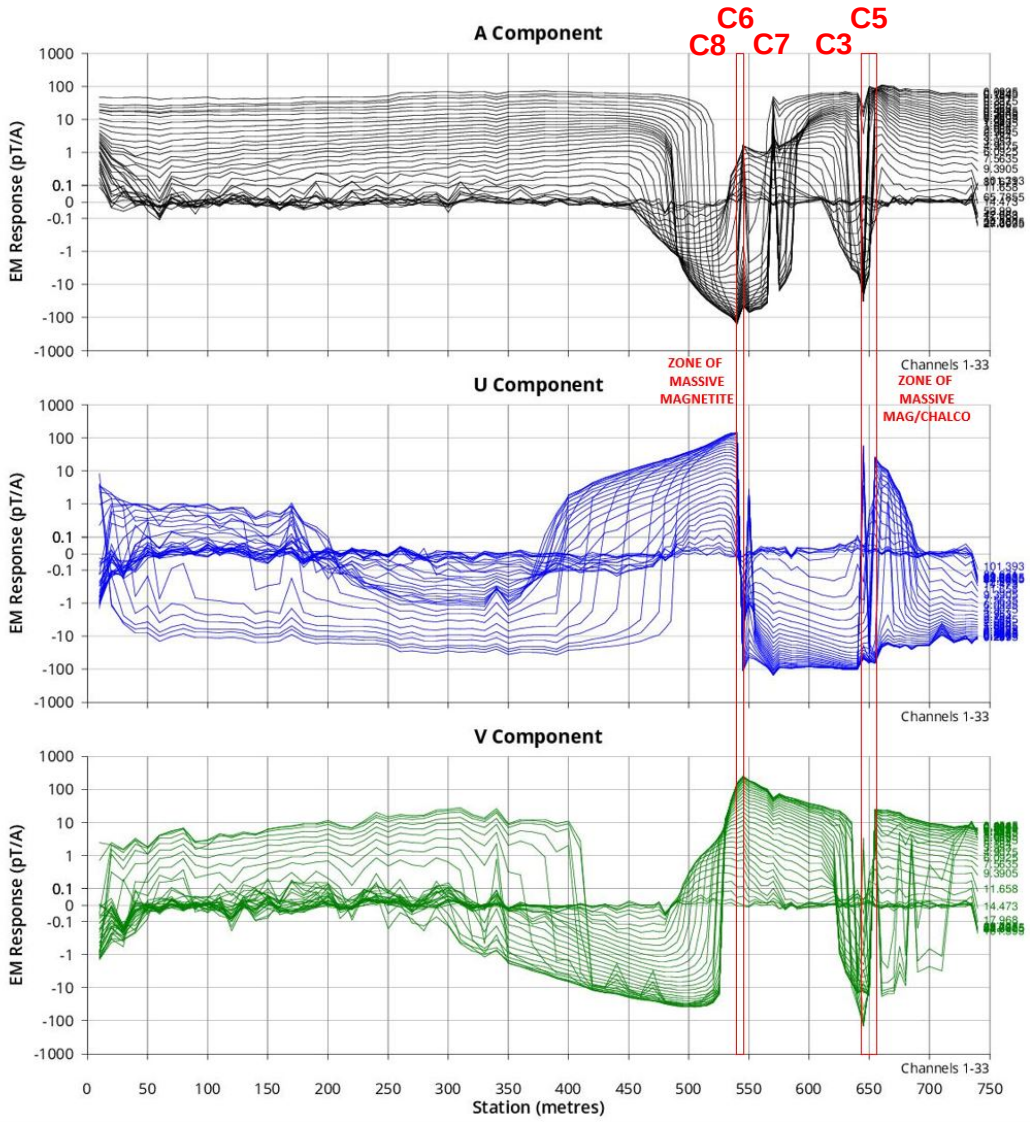



Magnetite Alteration Halo can be observed in Iron assay, magnetic susceptibility and SG

C6,7,8 off-hole to east

C3 off-hole above

# KJCD201 DHEM




- C5 coincided with a zone of massive magnetite/chalcopyrite
  - 10.05m @ 8.99% Cu, 45.5g/t Ag, 0.6g/t Au
- Strong EM response observed from the eastern zone

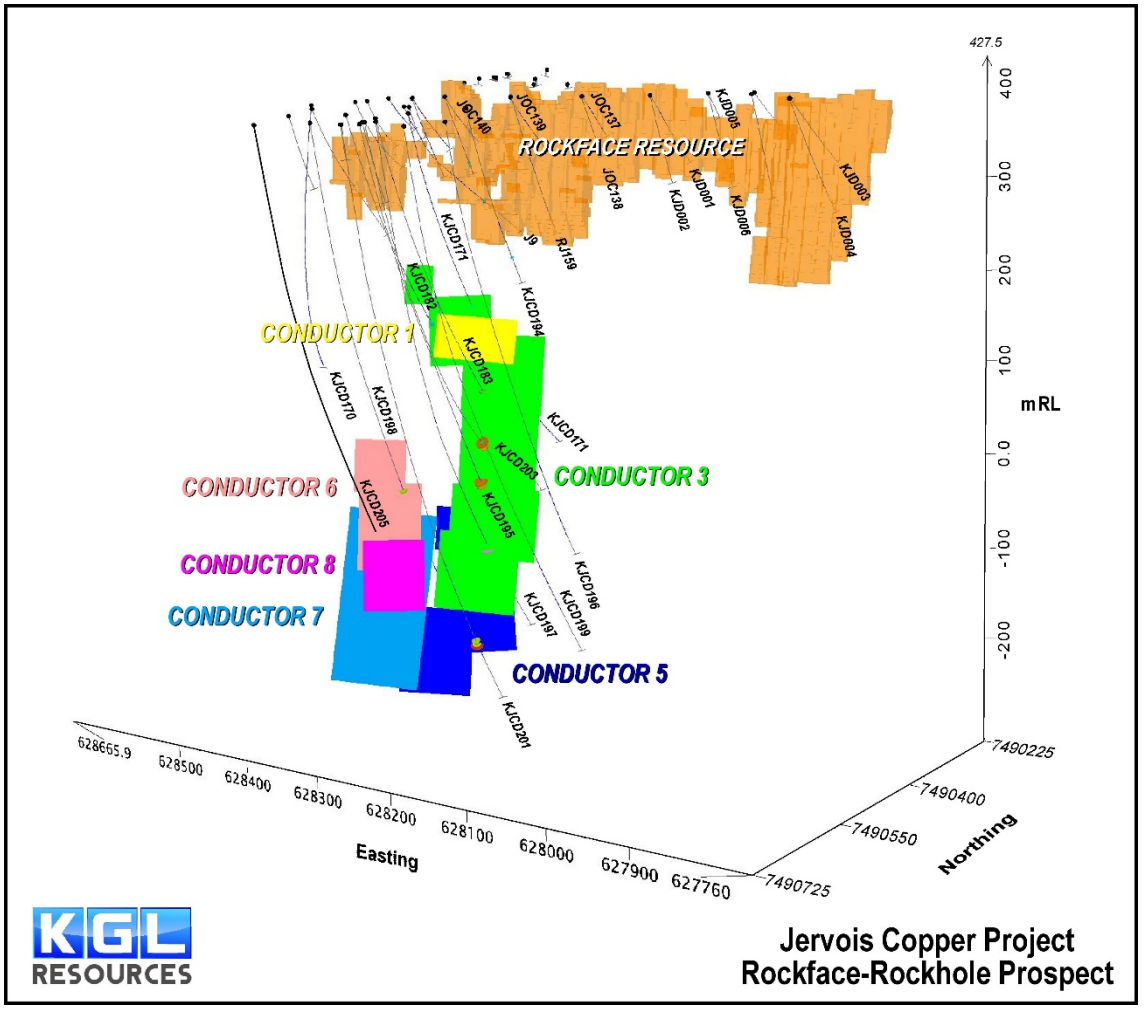
# Significant Intersections

| HoleID | Interval | ETW (m) | RL (m) | SG (t/m³) |
|---|---|---|---|---|
| KJD016 | 7.35m @ 1.22% Cu, 2.1g/t Ag, 0.06g/t Au from 0m | 4.3 | 389.7 | 2.71 |
| KJCD171 | 13m @ 2.14% Cu, 12.5g/t Ag, 0.10g/t Au from 255m<br>2m @ 2.83% Cu, 10.8g/t Ag, 0.05g/t Au from 278 m | 10.0<br>1.5 | 140.6<br>121.5 | 4.33<br>2.95 |
| KJCD182 | 9m @ 2.91% Cu, 17.6g/t Ag, 0.2g/t Au from 284m<br>6m @ 1.6% Cu, 9.3g/t Ag, 0.16g/t Au from 296 m | 6.6<br>4.4 | 118.3<br>108.7 | 3.65<br>4.46 |
| KJCD183 | 16m @ 3.34% Cu, 16.7g/t Ag, 0.17g/t Au from 362m | 11.7 | 46.6 | 3.84 |
| KJCD203 | 28m @ 5.08% Cu, 22.4g/t Ag, 0.22g/t Au from 435m<br>Incl. 14m @ 8.89% Cu, 38.5g/t Ag, 0.38g/t Au from 436m | 23.2<br>11.6 | -13.5<br>-14.2 | 4.02<br>4.28 |
| KJCD195 | 10.5m @ 8.76% Cu, 42.9g/t Ag, 0.51g/t Au from 478.4m<br>5.1m @ 2.66% Cu, 13.8g/t Ag, 0.27g/t Au from 513.6 m | 7.5<br>3.7 | -58.6<br>-87.0 | 4.42<br>3.38 |
| KJCD198 | 5.95m @ 4.94% Cu, 25.9g/t Ag, 0.45g/t Au from 449.85m | 4.0 | -61.4 | 3.90 |
| KJCD197 | 9.4m @ 11.53% Cu, 56.6g/t Ag, 0.87g/t Au from 535.4m<br>8.9m @ 1.00% Cu, 7.3g/t Ag, 0.09g/t Au from 544.8 m<br>15m @ 7.11% Cu, 29.4g/t Ag, 0.89g/t Au from 558 m | 6.6<br>6.2<br>10.5 | -133.2<br>-141.3<br>-152.2 | 4.03<br>3.94<br>3.59 |
| KJCD201 | 10.05m @ 8.99% Cu, 45.5g/t Ag, 0.6g/t Au from 645.65m | 7.5 | -243 | 3.90 |

*ETW – Estimated True Width RL – Height above MSL at the start of the interval*
*SG – Specific Gravity (density)*

# Eastern Zone

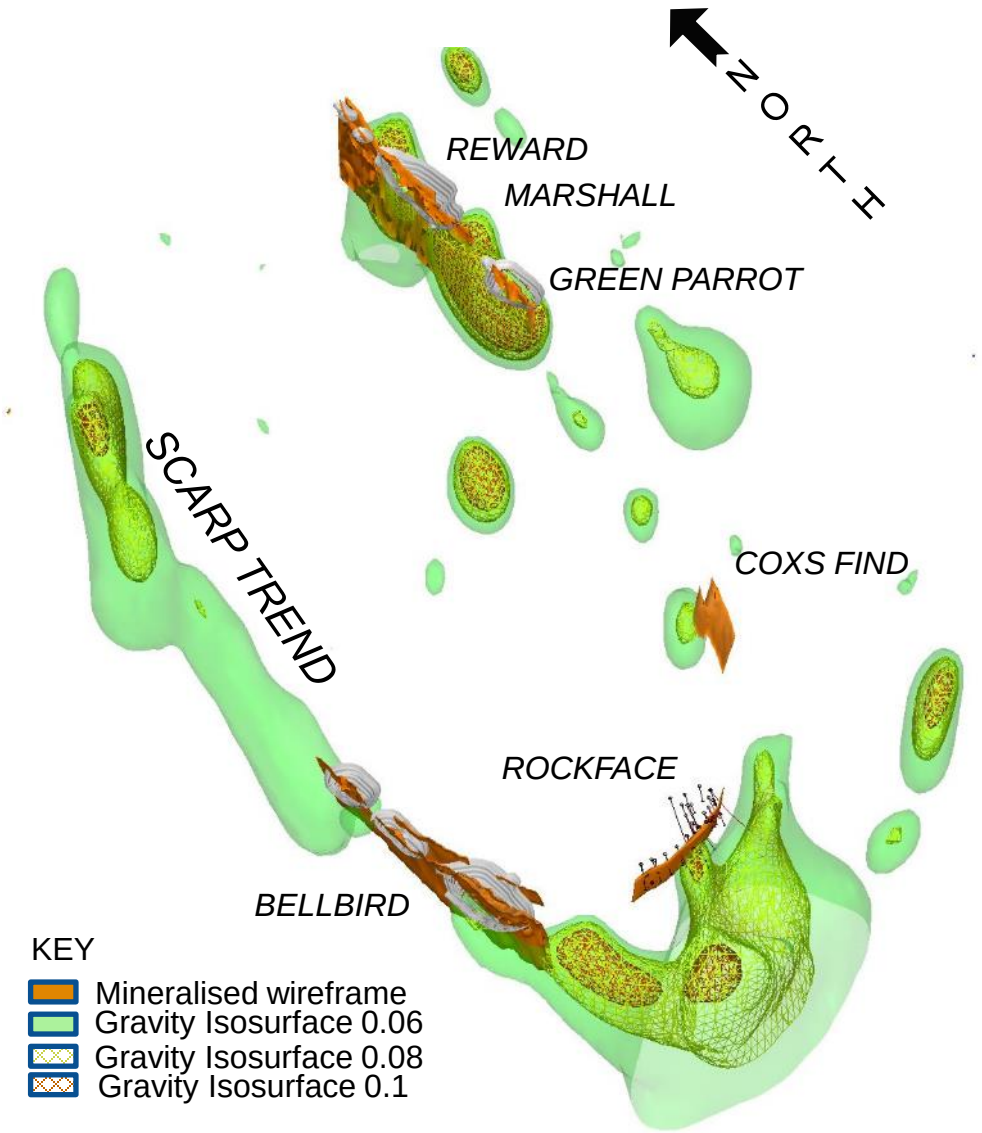
- KJCD198 -5.95m @ 4.94% Cu, 25.9g/t Ag, 0.45g/t Au
- KJCD205 - 30m zone of mineralisation C6 & C7



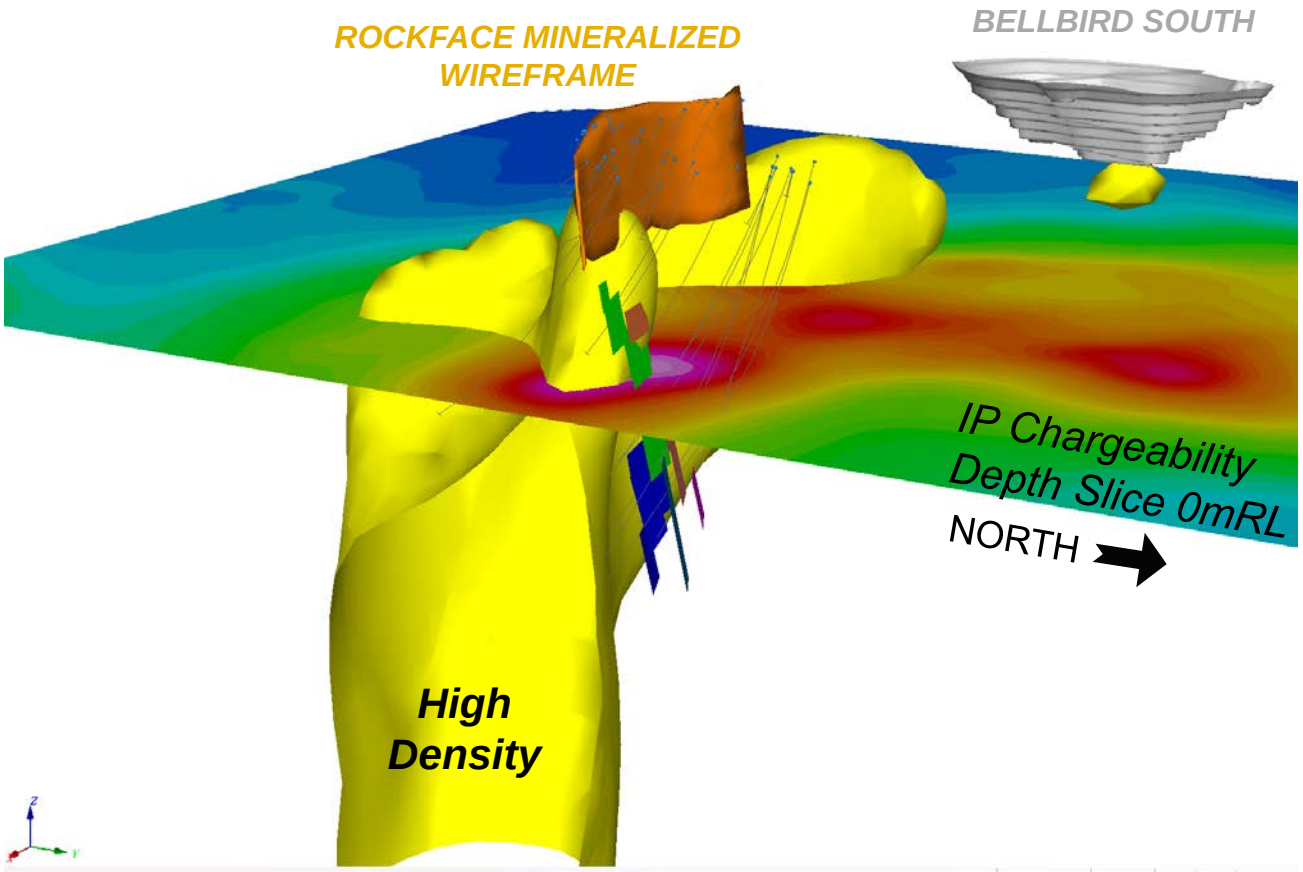
# Gravity Inversion

| Location | Rock Type | SG |
|---|---|---|
| Rockface | Massive Magnetite/Chalcopyrite | 4.3 |
| Bellbird | Disseminated Chalcopyrite | 3.1 |
| Reward | High-grade chalcopyrite/garnet magnetite | 3.4 |
| Jervois | Metasediments | 2.8 - 2.9 |

- Garnet-Magnetite alteration halo
- Direct detection of magnetite + massive/semi-massive sulphides

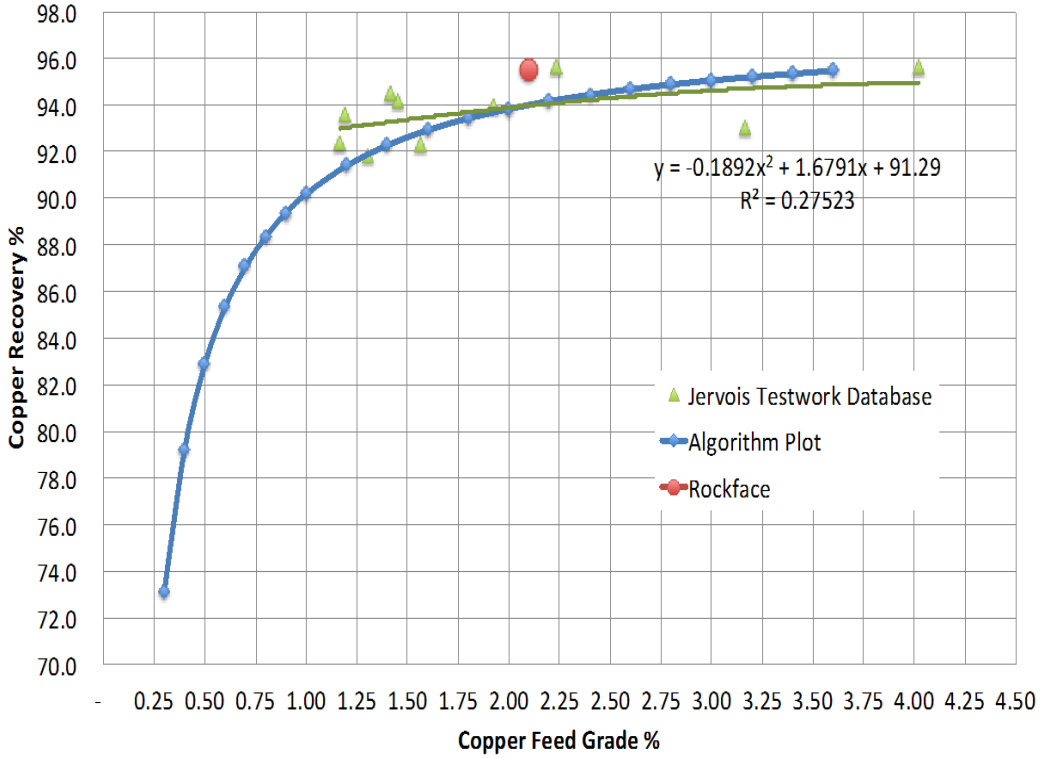


# Gravity

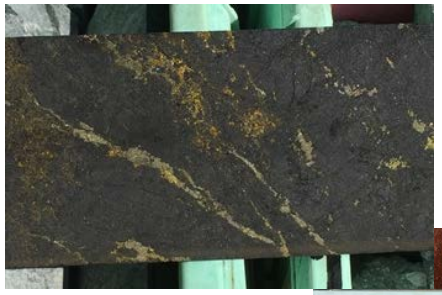

ROCKFACE MINERALIZED WIREFRAME
BELLBIRD SOUTH
IP Chargeability Depth Slice 0mRL
NORTH
High Density

# Rockface Metallurgy

- Composite sample from KJCD 171,182,183
- Composite head grade 2.05% Cu
- PFS flow sheet
- The grade and recovery for copper were better than expected
- >95% recovery at 25% Cu concentrate grade.



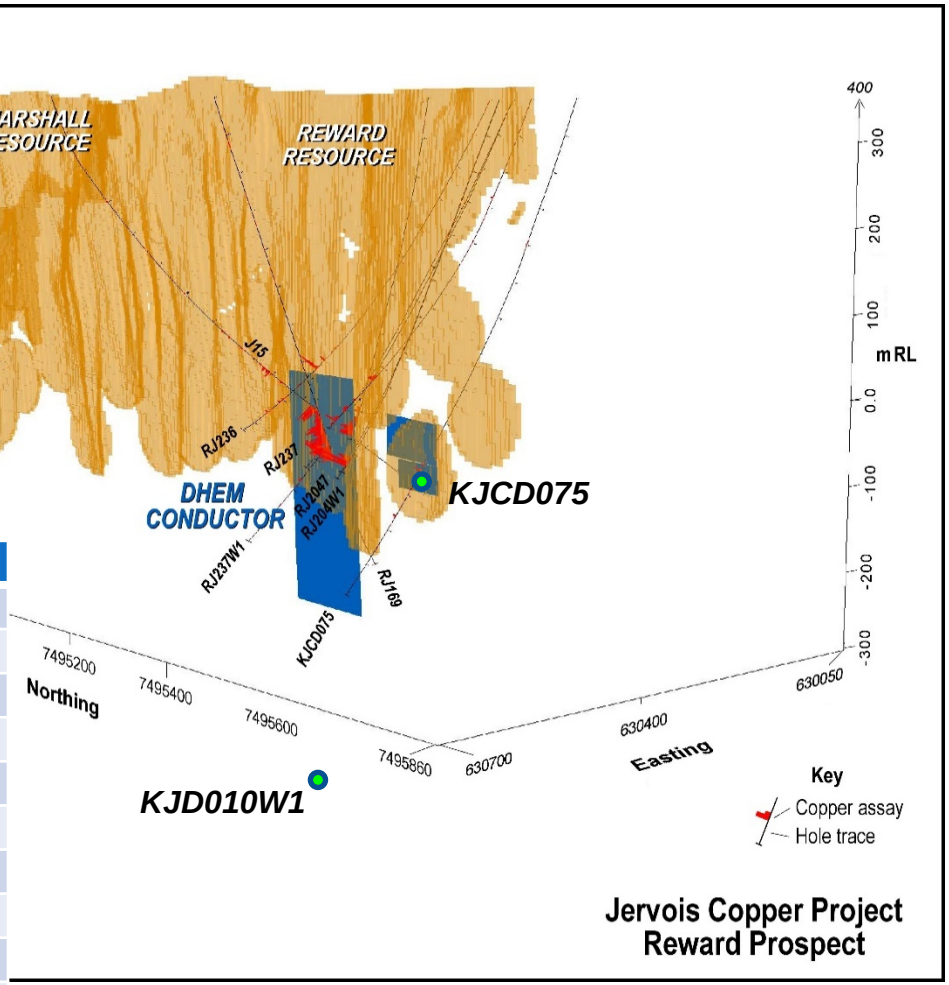
# The next Rockface?



Copper Mineralisation in KJCD075

Copper Mineralisation in KJD010W1

| Hole ID | Interval |
|---|---|
| J15 | 11m @ 4.73% Cu, 1.84g/t Au from 512 |
| RJ236 | 3.7m @ 4.68% Cu, 54g/t Ag, 1.96g/t Au from 433 m |
| KJCD043 | 7m @ 1.36% Cu, 25g/t Ag, 0.5g/t Au from 413 |
| | 7m @1.28%Cu, 20.1g/t Ag, 0.06g/t Au from 483m |
| RJ061 | 22.4m @ 2.84% Cu from 408 m |
| KJCD075 | 7m @ 5.07% Pb, 0.29% Zn, 106.6g/t Ag from 498m |
| RJ169 | 72m @ 3.27% Cu, 51.3g/t Ag, 1.16g/t Au from 414m |
| RJ237 | 23.6m @1.82% Cu, 23.9g/t Ag. 0.27g/t Au from 521.7 |
| RJ237W1 | 25m @ 1.74%Cu, 35.9g/t Ag, 0.82g/t Au from 518m |
| RJ204 | 8m @ 4.8% Cu, 62.1g/t Ag, 0.35g/t Au from 502m |
| RJ204W1 | 9.05m @ 4.9%Cu, 66.2g/t Ag, 1.22g/t Au from 509m |

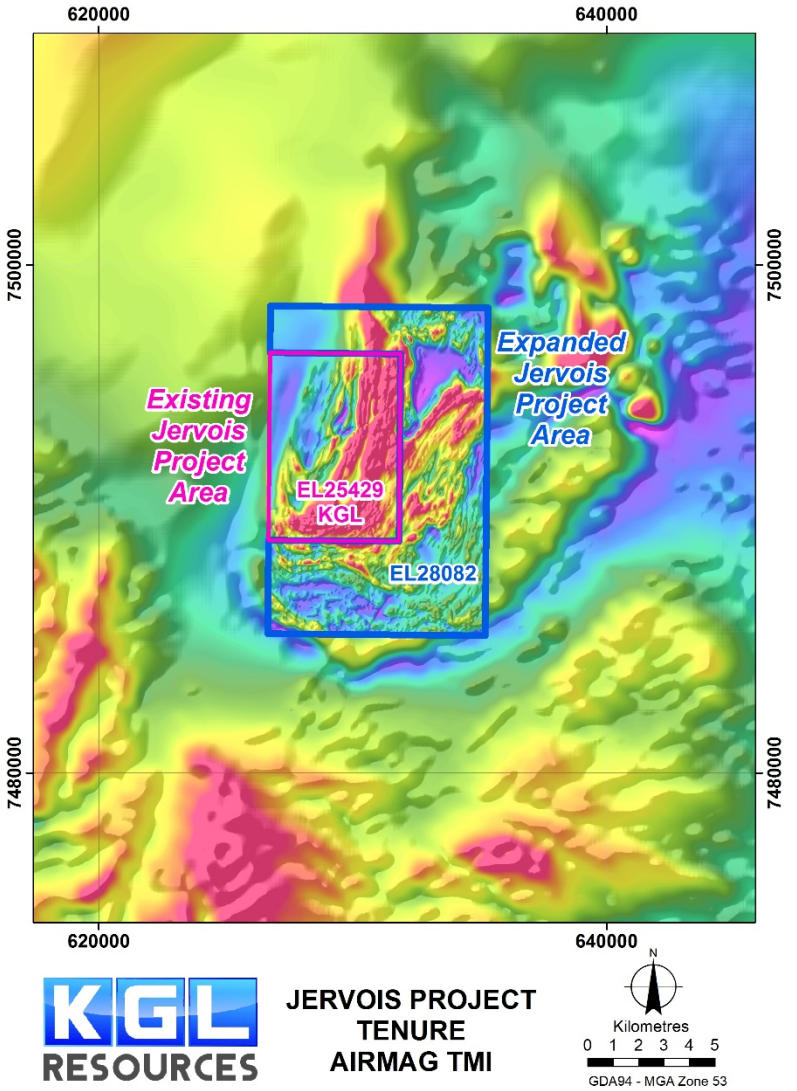


# The Greater Jervois Project

- Jervois Project Area increased from 37.9km$^2$ to 110.8km$^2$
- Within the Bonya Metamorphics
- Already surveyed with SAM
- Soils geochemistry survey completed

Multiple walk-up drill targets

- Marshall-Reward-Morley trend
  - Becana
  - Yohoho
- North-east of Reward
  - Hamburger Hill



KGL RESOURCES

# Thankyou

15 March 2015

**Competent Person Statement**

The Jervois Exploration data in this report is based on information evaluated by Martin Bennett, who is a member of the Australian Institute of Geoscientists and a full time employee of KGL Resources Limited. Mr. Bennett has sufficient experience which is relevant to the style of the mineralisation and the type of deposit under consideration and to the activity to which he is undertaking, to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr. Bennett has consented to the inclusion of this information in the form and context in which it appears in this report.

The data in this report that relates to Mineral Resource Estimates is based on information evaluated by Mr Simon Tear who is a Member of The Australasian Institute of Mining and Metallurgy (MAusIMM) and who has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"). Mr Tear is a Director of H&S Consultants Pty Ltd and he consents to the inclusion in the report of the Mineral Resource in the form and context in which they appear.

The data in this report that relates to cut off grades and mining assumptions is based on information evaluated by Mr Simon Milroy who is a member of The Australasian Institute of Mining and Metallurgy (MAusIMM) and who has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "JORC Code"). Mr Milroy is a full-time employee of KGL Resources Limited and he consents to the inclusion in the report of the cut off grades and mining assumptions in the form and context in which they appear.