



# **GEOPHYSICS & DRILLING COLLABORATIONS PROGRAMME REPORT**

## **U40 PROJECT EL10176**

**Tenement holder: G E Resources Pty Ltd**

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**3<sup>rd</sup> October 2019**

**Mapsheet: Oenpelli (1:100,000), Alligator River (1:250,000)**

**Datum: GDA94 Zone 53**

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## 1. Summary

G E Resources Pty Ltd, a wholly owned subsidiary of DevEx Resource Limited, collectively the Company, is exploring for primary, basement hosted, high-grade uranium copper gold mineralisation within the Alligator Rivers Uranium Province of West Arnhem Land. At the U40 Prospect, the Company proposed to drill a deep diamond drill hole targeting a new Induced Polarisation anomaly that lies well below previous drilling intercepts which define an isolated pod of high-grade uranium copper gold mineralisation and adjacent to a regional basement fault zone (Quarry Fault).

Reassessment of exploration models within the Company's granted exploration licences surrounding the historical high-grade Nabarlek Uranium Mine (Production 24Mlbs  $U_3O_8$  @ 1.84%  $U_3O_8$ ) recognised that the traditional unconformity-related uranium mineralisation model (the contact between the Kombolgie Subgroup and the Cahill Formation) was open for reinterpretation and potential for structural hosted uranium mineralisation to depths well below the unconformity was credible. Support for an alternative exploration model is best highlighted by the recent discovery of the massive Arrow Uranium Deposit (256.6Mlbs  $U_3O_8$  @ 4.03%  $U_3O_8$  Indicated Resource) within the Athabasca Basin of Northern Saskatchewan, Canada which is classed as a basement hosted deposit within a brittle fault zone and continues at depth to over 800 metres below the unconformity. Brittle ductile relationships within a reactivated brittle fault zone play an important role in the genesis of this deposit.

Within the West Arnhem-Nabarlek Projects, geological investigations during 2017 and 2018 by the Company were able to establish a strong relationship between fault bounded high grade uranium and copper sulphide mineralisation at both the historical Nabarlek Uranium Mine and the adjacent U40 Prospect. Recognition of this sulphide association with the high-grade uranium mineralisation saw the *first-time* application of ground Induced Polarisation (IP) geophysical surveys for the region, focussing on the U40 Prospect in 2017 and 2018. The IP Survey defined a clear chargeable anomaly at a greater depth beneath an isolated pod of high-grade uranium, copper-gold and platinum group elements at U40. The Company was granted funding to test this IP Anomaly with a deep diamond drill hole.

In addition to testing the source of IP anomaly, the diamond drill hole was designed to test the dip and structure of the lower basement stratigraphy of the Cahill Formation, then cross through the regional Quarry Fault into basement gneiss rocks.

The intention was to demonstrate an association between the IP Anomaly and uranium mineralisation and in turn dramatically enhance the prospectivity of the entire Alligator Rivers Uranium Province by:

- Confirming depth extents well below the unconformity between the Kombolgie Subgroup and the Cahill Formation: and a relationship between regional structure
- Introduce IP Geophysics as a credible tool to explore for uranium mineralisation
- Advance the genetic model for how uranium, copper, gold and platinum group elements are associated and their migration path.
- *Attracting a wider mineral investment community to the Alligator Rivers Uranium Province by providing confidence in the credibility behind a wider Polymetallic Exploration Model (U, Cu, Au, Pt Pd) - no longer solely restricted to uranium promoters or sceptics*

Drilling intersected anomalous uranium mineralisation on the western side of the IP anomaly returning **0.7m @ 1059ppm  $U_3O_8$  from 179.5m** within a fault zone comprising deformed

schists and breccias as well as several other zones of disseminated and fracture-controlled low-grade uranium mineralisation (ranging between 100 and 500ppm  $U_3O_8$ ). No significant gold or copper values were encountered. Numerous faults and fracture zones were observed in the diamond holes, with increasing green mica alteration and thin irregular pyrite occurring in the lower half of the hole possibly explaining the IP anomaly.

## 2. Introduction

The U40 Prospect is located within tenement EL10176, and forms part of the West Arnhem Nabarlek Project. The Project is located in West Arnhem Land to the east of Oenpelli and is wholly within Aboriginal Land. Energy Resources Australia's Ranger uranium mine is situated approximately 40km to the southwest and the tenement surrounds the rehabilitated Nabarlek mine site. Access from Darwin is via the Arnhem Highway to Jabiru, northeast to Oenpelli then east towards along the Maningrida Road to the historical Nabarlek Mine. The U40 Prospect is accessible 4WD tracks which branch off the Maningrida Road.

The Company maintains a permanent camp at the Nabarlek Mine Site which include office and accommodation facilities.

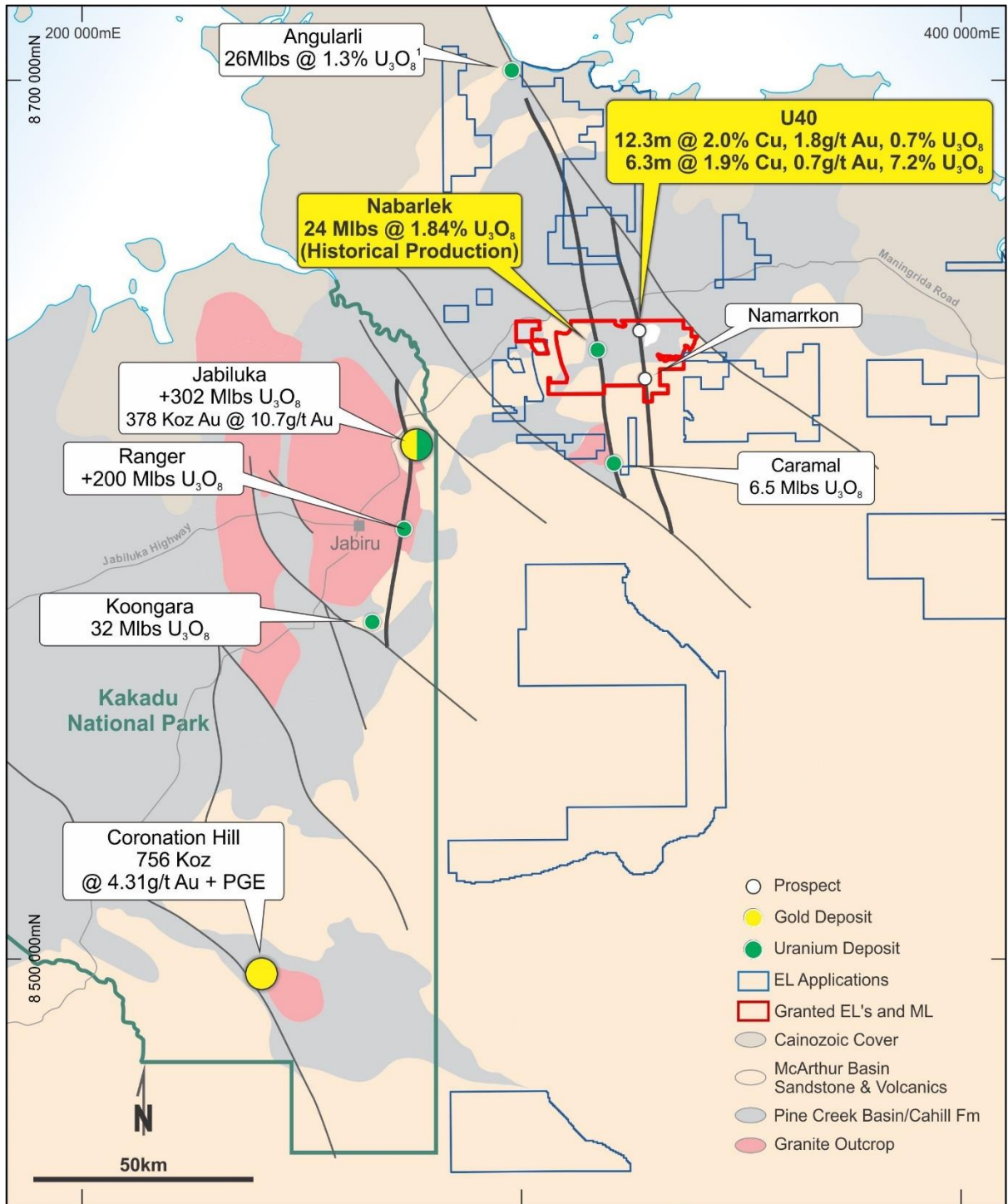


Figure 1: Alligator Rivers Uranium Province – Project Locations

### 3. Regional Context

#### Regional Geology

The Alligator Rivers Uranium Province in the Northern Territory is a world-class Proterozoic uranium province hosting numerous large-scale uranium deposits. The Nabarlek project area is located within the eastern margin of the Pine Creek Inlier and lies on the eastern boundary of the East Alligator structural domain with the Nimbuwah structural domains to the east (Needham, 1988; Needham and Stuart-Smith, 1980).

The Nabarlek project tenements are approximately 40% covered by the basal Mamadawerre Sandstone of the Katherine River Group, and forms outcropping sandstone escarpments and dissected pavements of the Spencer Range. In the far west of the tenement, these escarpments form part of the Oenpelli Massif; most of the remaining 60% area is lateritic with sandy colluvium overlying metamorphic basement rock and intrusive Oenpelli Dolerite.

The oldest rocks are a sequence of Early-Proterozoic metamorphosed sediments (semi-pelites), schists and amphibolites termed the Myra Falls Metamorphics. This unit is considered to be stratigraphically equivalent to the Cahill Formation in the western part of the Alligator Rivers Uranium Field and forms the host lithologies of the Nabarlek Deposit.

The Kombolgie Subgroup is the basal unit of the late Palaeo – Mesoproterozoic Katherine River Group of the McArthur Basin. The subgroup consists of sandstone units called the Mamadawerre Sandstone, Gumarrirrbang Sandstone, and Marlgowa Sandstone, which are divided by thin basaltic units called the Nungbalgarri Volcanics, and Gilruth Volcanics. Mamadawerre Sandstone unconformably overlies the basement sequences described above, forming an extensive inaccessible plateau.

The Oenpelli Dolerite is the most pervasive mafic intrusive suite to affect the Alligator Rivers region and is the youngest Proterozoic rock unit exposed. It intrudes various units Neoproterozoic and Palaeoproterozoic units, and the Kombolgie Subgroup, forming magnetic sills, dykes, lopoliths, and laccoliths.

These intrusive events had a pronounced thermal effect within the Kombolgie Subgroup, with the promotion of fluid flow and aquifer or aquitard modification. Localised effects in the sandstone include silicification, desilicification, chloritisation, sericitisation, and pyrophyllite alteration. A characteristic mineral assemblage of prehnite-pumpellyite-epidote has formed in the quartzofeldspathic basement rocks adjacent to the intrusions.

Mineralisation in the Namarrkon region is believed to be at least partially controlled by the structural regime through the area. Deformation since deposition of the Katherine River Group includes transpressional movement along steep regional-scale strike-slip faults and possibly some shallow thrusting. These regional faults follow a pattern of predominantly north – northwest trends.

#### Project Geology

U40 Prospect is situated on a regional north south fault zone - the Quarry Fault. The Fault zone appears to have offset both the basement Myra Falls Metamorphics (Cahill Formation equivalent) and overlying lower portions of the Kombolgie Supergroup Anomalous. Basement gneiss rocks have been logged in shallow reverse circulation drilling on the eastern side of the Quarry Fault. The dip of the Quarry Fault is not known.

In addition to the U40 Prospect, several other uranium and copper occurrences have been identified along the Quarry Fault extending from Black Bream and Namarrkon in the South to U40 Prospects. In addition to uranium, significant copper, gold, platinum and palladium mineralisation is present at the U40 Prospect, suggesting that the hydrothermal fluids could potentially host economic, uranium, base metal and precious metals.

#### **4. Previous exploration**

The Nabarlek-West Arnhem area was held previously by Queensland Mines Proprietary Limited (QML) during the 1970's. Work consisted of airborne radiometric and magnetic surveys, regional stream sediment geochemistry, regional geochemical soil sampling, regolith geochemistry, ground total count radiometrics, reconnaissance exploration and mapping with some facilitated by surveyed grids. The Nabarlek deposit was discovered by radiometric survey and ground follow-up in June 1970.

The dominant exploration focus concentrated on drilling the Nabarlek Shear Zone, known to hosting the Nabarlek Uranium Deposit. Nabarlek was operated by Queensland Mines Limited from 1978 until 1988. A total of 606,700t of ore was milled to produce 11,084t of U<sub>3</sub>O<sub>8</sub>. During this process 2.3Mt of waste rock material was temporarily stockpiled and 595,900t of tailings material was deposited in the mined-out pit.

No further exploration work was conducted on EL10176 until 1988 when regional exploration resumed through QML and U40 was identified by an airborne radiometric survey. Drilling in 1991 outlined weak uranium mineralisation in graphitic schists and amphibolites beneath an unconformity with values up to 1m @ 280ppm U from 52m depth. The weak mineralisation was considered laterally discontinuous, and the prospect abandoned after 2 more RC holes in 1993.

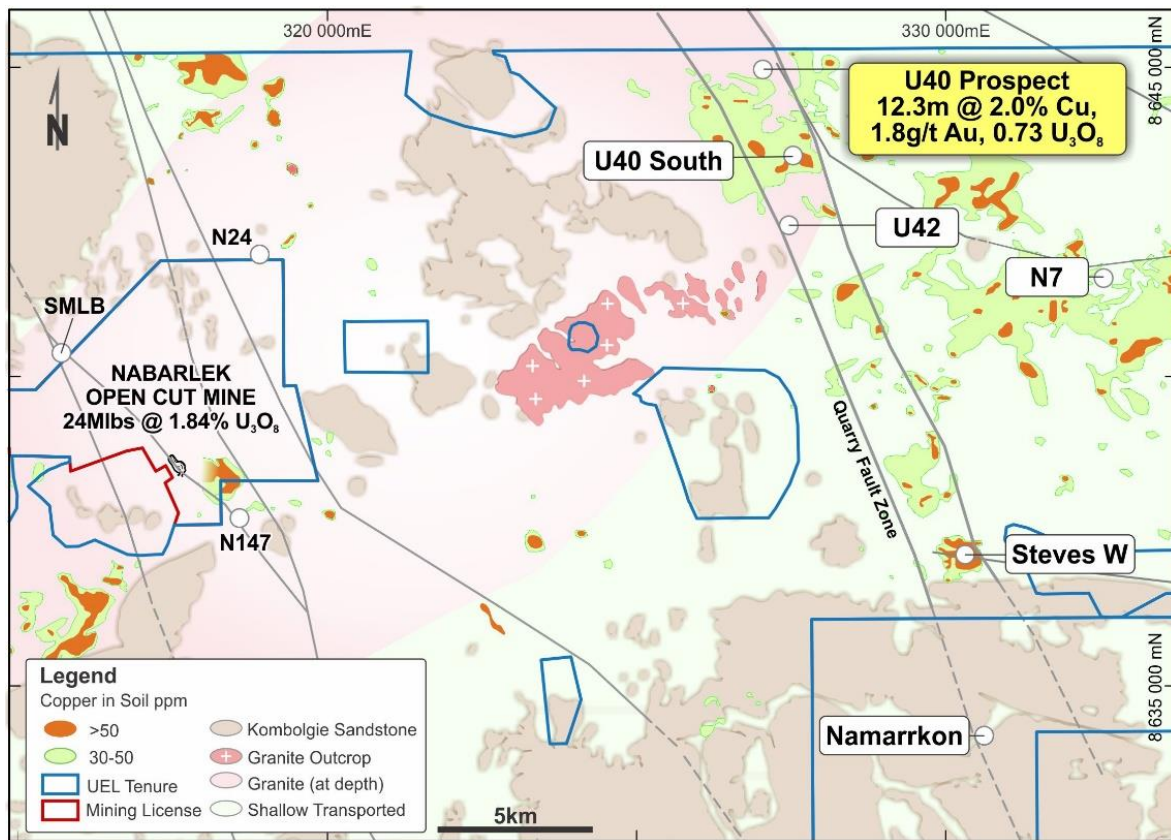


Figure 2: Local geology within the West Arnhem Project. Copper-in-soil geochemistry is noticeably lacking on the western side of the Quarry Fault Zone. Over 12km of the QFZ is considered prospective for copper, gold, base metals and uranium mineralisation from



In 2009 Cameco flew a radiometric and magnetic survey and followed this up in 2010 with Reverse Circulation and Diamond drilling alongside regional Aircore drilling. A significant pod of high-grade uranium, together with copper, gold, platinum and palladium was intersected at the U40 Prospect (see Table 1).

	From	To	Interval	Cu %	Au g/t	U <sub>3</sub> O <sub>8</sub> %	Pb%
<b>NAD7492</b>	75.5	81.8	6.3	1.9	0.66	7.23	1.41
	<b>including 3.0m @ 1.25g/t Au from 77m</b>						
<b>NAD7493</b>	78.9	91.2	12.3	2.03	1.77	0.73	0.16
	<b>including 2.6m @ 8.13g/t Au, 1.57g/t Pd, 0.96g/t Pt from 82.6m</b>						
<b>NAR7389</b>	76	81	5	1.09	0.4	1.14	0.36

*Table 1: 2010 U40 drilling results using 0.5% Cu lower cut-off, mineralisation is clearly polymetallic and the present of +1g/t platinum and palladium with gold draws interest with the historical Coronation Hill deposit to the south*

Follow-up drilling surrounding these intercepts between 2011 and 2014 restricted the size potential of this mineralisation and no further work took place at U40 until 2017 when management of the project was handed back to the Company.

Year	Company	Type of Work	Details	Comment	Report
1988	QML	Airborne magnetics/radiometrics			CR1989-0423
1990	QML	Trenching			CR1990-0450
1990	QML	Soil geochemistry			
1991	QML	RC&DH drilling	6 RC holes for 391m. One diamond tail for 84m	high of 1m@220ppm U in RC139 from 17-18m. 1m@280ppm U in RC141D from 52m	CR1992-0322
1993	QML	RC drilling	2 RC holes for 184m	No sig min	CR1994-0502
2008	Cameco	Airborne magnetics/radiometrics	321 line km		EL10176_EL24371_Annual_Report_NA09-02
2009	Cameco	AC drilling	189 holes for 4,069m covering U40-U42 (3.5km of strike)	high of 1m@328ppm U3O8	EL10176_EL24371_Annual_Report_NA10-02
2010	Cameco	RC drilling	6 holes for 888m	high of 4m@1.5% U3O8 from 78m in NAR7389	EL10176_EL24371_Annual_Report_NA11-02
2010	Cameco	Diamond drilling	4 holes for 486.7m	high of 6.8m@6.5% U3O8 from 75m in NAD7492 and 4.8m@2.05% U3O8 from 80.4m in NAD7493	EL10176_EL24371_Annual_Report_NA11-02

2011	Cameco	Diamond drilling	11 holes for 1675.9m	high of 1m@1.56% U3O8 in from 58.2m in NAD7501	Annual Report GR062-09_2012_GA_01
2011	Cameco	SWIR/ASD/PIMA analysis	on drill core samples	identified white clay alteration in association with QFZ and U mineralisation	Annual Report GR062-09_2012_GA_01
2011	Cameco	Ground gravity survey	13.3km2 at 100m line x 50m station spacing	designed to map QFZ from U40 to U40 South - identified wide shear zone with dissected lineaments	Annual Report GR062-09_2012_GA_01
2014	UEQ (DEV)	RC drilling	10 holes for 2500m	high of 7m@0.27% U3O8 from 46m in NAD7520	GR062_09_2014_A_Report

Table 2: Summary of exploration at U40

### Exploration Activity 2017 and 2018 – Changing Exploration Concepts

Reassessment of the geology and alteration from existing drill core at the U40 and the Nabarlek Uranium Deposit identified a strong relationship between fault bounded high grade uranium and copper sulphide mineralisation. Petrology of the U40 core confirmed that the dominant copper mineral is chalcopyrite and XRF Analysis of the Nabarlek Core at the NT Geological Core Library also shows up to 1% Copper within the uranium rich intervals. At U40, a broad alteration zone is observed in the drill core (Figure 3), associated with the high-grade intercepts, comprising an outer intense sericite pyrite alteration and an inner intense chlorite and chalcopyrite zone. The alteration zone is 15-25m wide, with a sharp eastern boundary indicating a major fault contact with basement units. A north-south trend is interpreted with a steep dip.



Figure 3: Core photographs showing the high grade mineralised zone in NAD4792 (6.3m at 7.23% U<sub>3</sub>O<sub>8</sub>, 1.9% Cu, and 0.66g/t Au from 75.5m – highlighted by the yellow outline) in contact with intensely sericite-pyrite altered schist (top). The chargeability anomaly.

Recognition of this sulphide association with the high-grade uranium mineralisation resulted in *first time* application of ground Induced Polarisation (IP) geophysical surveys for the region, focussing on the U40 Prospect and south along the Quarry Fault to the U40 South Copper

Prospect. Gradient Array IP identified a discrete chargeable anomaly underlying the U40 Prospect (Figure 4)

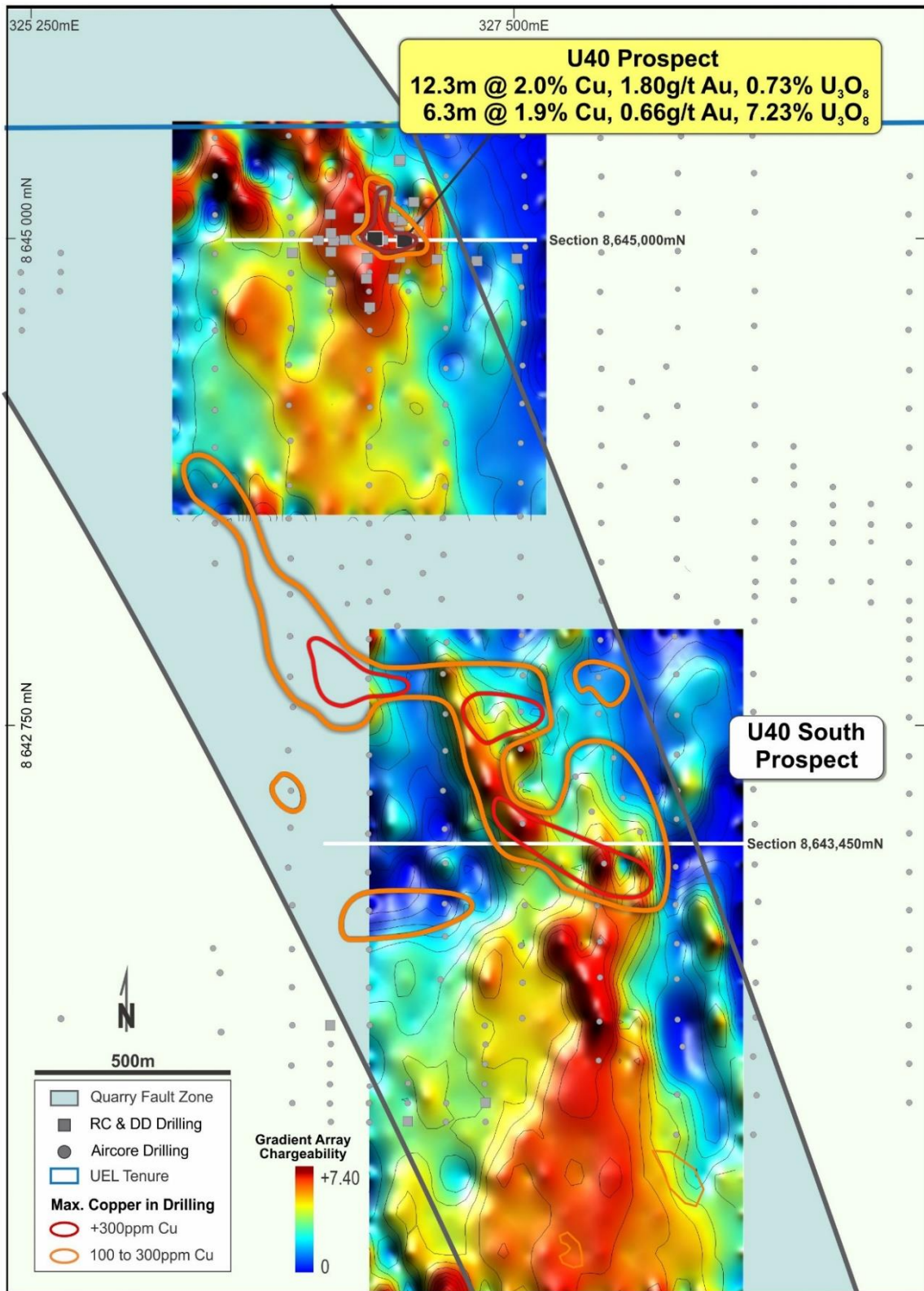


Figure 4: The November 2017 and 2018 extension Gradient Array IP Survey and with chargeable anomalies (red on the background image) displayed beneath maximum copper in bedrock mineralisation defined by drilling. At U40, high grade uranium, gold and platinum group elements are associated with the copper mineralisation seen in drilling.

Following on from the 2017 Gradient Array Survey, the Company completed several lines of Pole Dipole IP at U40 and U40 South. At U40 the Pole Dipole IP survey identified a clear chargeable anomaly located down-dip from the isolated pod of high-grade uranium-copper-gold mineralisation previously drilled by Cameco in 2010 (Table 1).

The IP anomalism (Figure 5) is interpreted to represent alteration associated with a larger body of mineralisation, with the high-grade historical intercepts in previous drilling interpreted to represent an isolated pod separated from the main body by faulting.

Alteration and mineralisation have not been intersected to date below the high-grade intercepts, due to interpreted fault dislocation. The IP anomalism demonstrates the potential for discovery of a large body of high-grade uranium-copper-gold mineralisation.

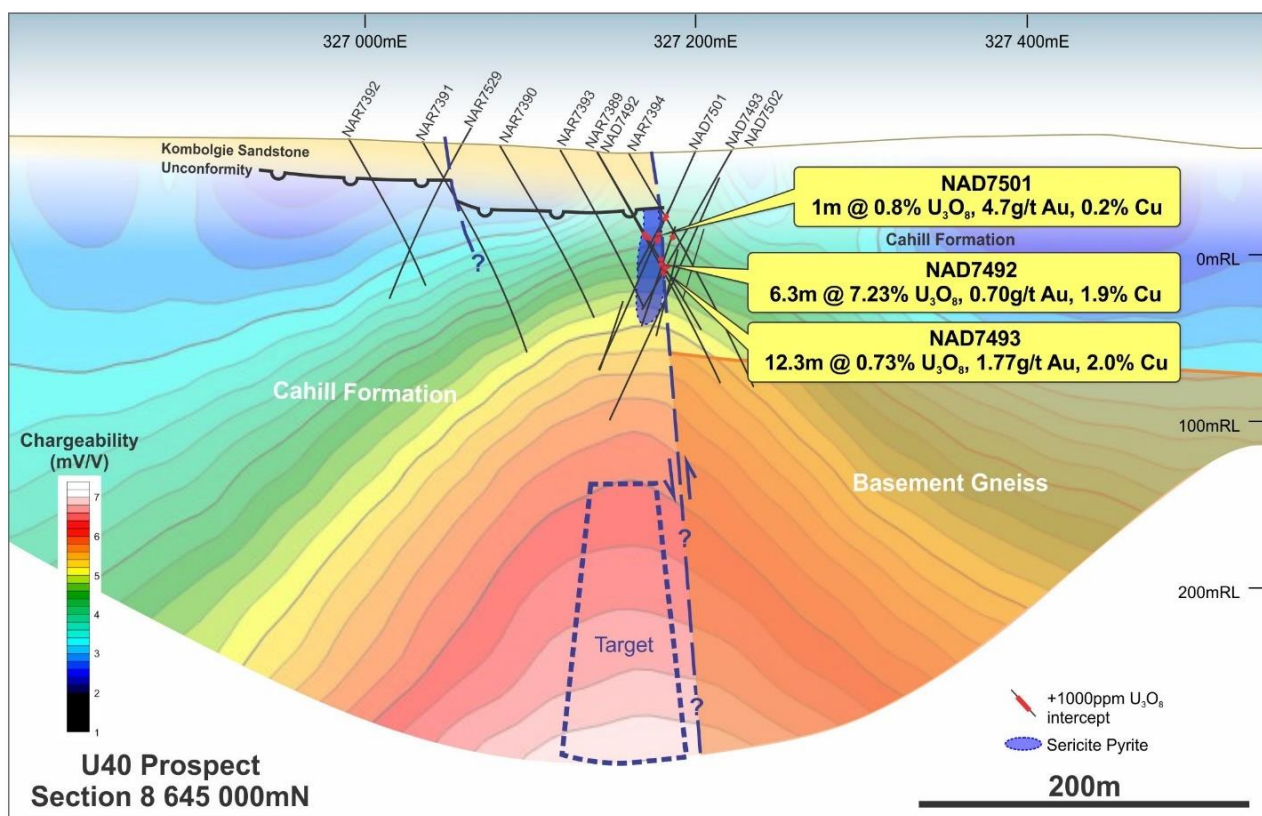


Figure 5: August 2018 Pole-Dipole Chargeability Anomaly at U40 Prospect where previous drilling has encountered and isolated pod of high-grade uranium copper gold mineralisation within a broad sericite-pyrite alteration zone.

## 5. Exploration Concept

Reassessment of exploration models within the Company's granted exploration licences surrounding the historical high-grade Nabarlek Uranium Mine (Production 24Mlbs  $U_3O_8$  @ 1.84%  $U_3O_8$ ) recognised that the traditional unconformity-related uranium mineralisation model (the contact between the Kombolgie Subgroup and the Cahill Formation) is open for reinterpretation and potential for structural hosted uranium mineralisation to depths well below the unconformity has merit. Support for an alternative exploration model is best highlighted by both:

1. the recent discovery of the massive Arrow Uranium Deposit (256.6Mlbs  $U_3O_8$  @ 4.03%  $U_3O_8$  Indicated Resource) within the Athabasca Basin of Northern Saskatchewan, Canada which is classed as a basement hosted deposit within a brittle fault zone and continues at depth to over 800 metres below the unconformity. Importantly brittle ductile relationships within a reactivated brittle fault zone play an important role in the genesis of this deposit (Browne, 2017), and;
2. the Coronation Hill Uranium, Gold and Platinum Group Element deposit (6.69Mt @ 6.42g/t Au, 0.3 g/t Pt and 1.01g/t Pd (Ahmad et al, 2009) and 344,170t @ 0.54%  $U_3O_8$  in South Alligator Valley field (see Figure 6) is classed by Orth et al (2014) as a polymetallic 'egress'-style deposit associated with ores formed by fluids rising through basement hosted fault networks and enhanced by brittle fault reactivation. Including the common metal association of uranium, gold, platinum and palladium at U40 and Coronation Hill, Orth et al (2014) age dating of the uranium mineralisation at Coronation Hill places uranium formation at 1607Ma, consistent with published Nd-Sm (Mass 1989) and U-Pb (Polito et al, 2004,2005) ages of uranium mineralisation at Nabarlek and Jabiluka Deposit.

As seen throughout the West Arnhem Project Area, exploration drilling at U40 has focussed on targeting the horizontal unconformity between the upper Kombolgie Subgroup and the basement Myra Falls Metamorphics (Cahill Formation equivalent). This is a tried and proven targeting strategy for uranium mineralization within the Alligator Rivers Uranium Field and also the Athabasca Basin of Northern Saskatchewan, Canada. However, this has also limited drill hole coverage within the Myra Falls Metamorphics as once through the unconformity, drilling is typically terminated. This is also evident at U40 with drilling restricted to both the unconformity and the immediate vicinity surrounding the isolated (fault bound) high-grade pod of uranium, copper, gold PGE mineralization. Considering the alternative models seen at Arrow and Coronation Hill Deposits (discussed above), egress style, brittle reactivated fault hosted mineralization provides significant potential for depth extent, whilst also introducing fault reactivation and discontinuity to mineralization in which it is hosted.

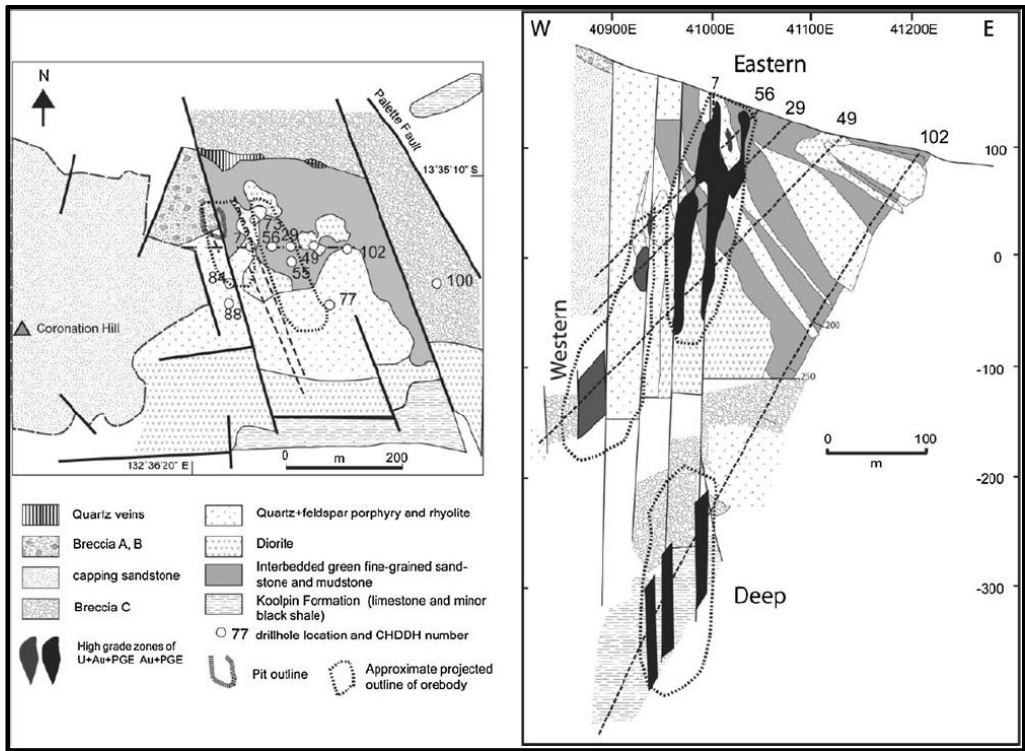


Figure 6: Local geology and cross section at Coronation Hill (after Carville et al, 1990 and Mernagh et al, 1994) - depicting an association between high-grade zones of uranium + gold + platinum group element mineralization and vertical faulting at depths well below any unconformity.

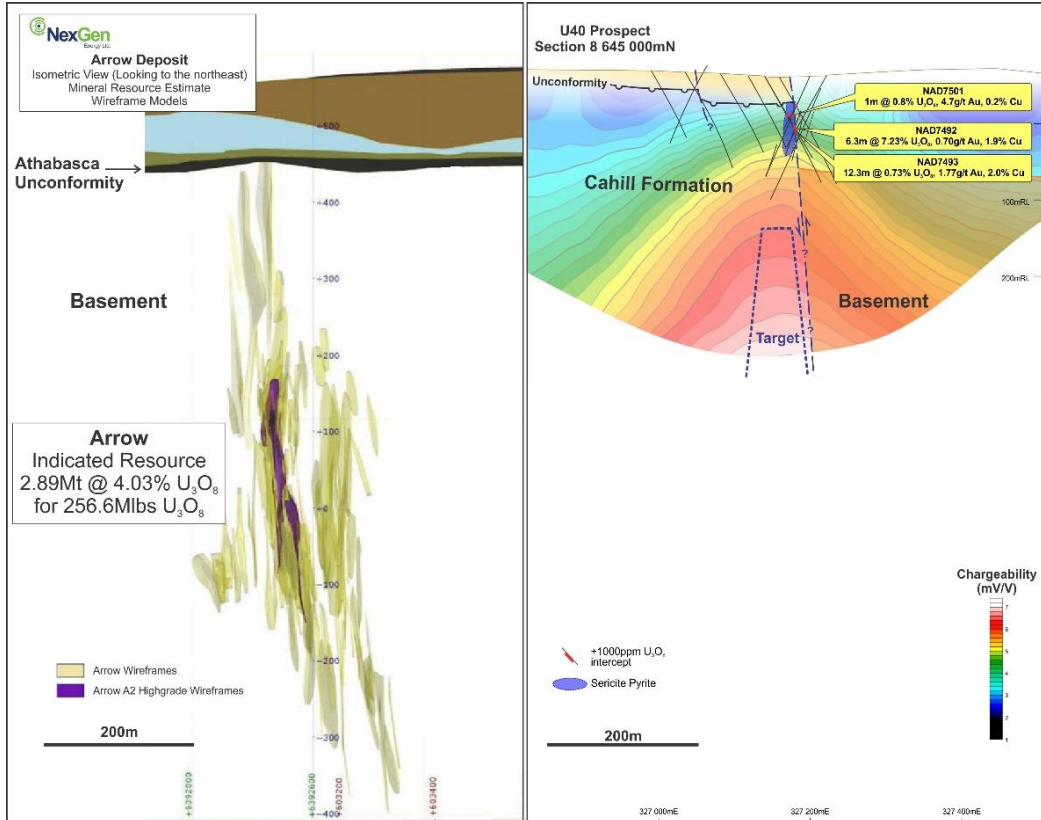


Figure 7: Cross Section of the Arrow Uranium Resource (Athabasca Basin of Northern Saskatchewan, Canada) with the U40 Section Provided for scale. The Resource wireframe model depicts numerous slithers of mineralisation associated with the regional faulting.



Drilling at U40 has not sufficiently tested for significant depth extent to the uranium, copper, gold, platinum and palladium mineralization encountered thus far. Considering the association of sulphide mineralization and alteration with this high-grade mineralization, the recent pole-dipole IP anomaly beneath this isolated pod of mineralization provides a credible deep exploration target.

Alteration and mineralisation have not been intersected to date below the high-grade intercepts due to interpreted fault dislocation. The IP anomalism demonstrates the potential for discovery of a body of high-grade uranium-copper-gold mineralisation beneath the mineralisation already defined. U40 has similar geological and mineralisation characteristics to the Nabarlek Uranium Mine, located 11km to the south-west. Both have chlorite alteration and copper sulphides directly associated with the higher uranium grades and are structurally controlled. The anomaly is an attractive target and it is greatly enhanced by the high-grade mineralisation encountered in the isolated pod, and by the strong faulting observed in the drilling.

## 6. Programme

A single diamond hole was drilled to test the IP chargeable feature on Section 8645000 (Table 3 and Figures 5 and 8). It was drilled HQ down to 71.8m and NQ down to the end of hole depth of 549.5m.

North_GDA	East_GDA	RL	Dip	Az	Depth
8645000	326954	73.7	-55	85	550

*Table 3: Drill Hole Collar and Details*

As well as the primary aim, which was to intersect the chargeability anomaly at depth, the diamond hole was planned to test the vertical dip interpretation for the basement fault contact (Quarry Fault) which defines the Myra Fall Metamorphics (Cahill Formation equivalent) to the west and the eastern Mount Howship Gneiss. This is interpreted to be part of a network of faults and conduit for the uranium, copper, gold, and PGE mineralisation.

Core recovery was good and the majority was competent enough for orientation marking and structural measurements. Samples were submitted to Intel Laboratory in Darwin based on scintillometer readings and geological observations in the core. Assaying included U using 4-acid digest and analyses via ICP-MS and Au, which was analysed via 50g fire assay.

QAQC entailed placing a blank every 20 samples and one standard per 50. No duplicates could be taken due to half of the core going to the Geological Survey. 243 samples of half core were taken through the hole.

## 7. Results and Interpretations

At the U40 Prospect 19U4DD002 targeted the main IP anomaly intersecting anomalous uranium mineralisation on the western side of the IP anomaly returning **0.7m @ 1059ppm  $U_3O_8$  from 179.5m** (see Figure 10). Uranium mineralisation is hosted within a fault zone comprising deformed schists and breccias and remains open to the north and south.

Several other zones of disseminated and fracture-controlled low-grade uranium mineralisation (ranging between 100 and 500ppm  $U_3O_8$ ) were seen within the main IP anomaly. These were confirmed with downhole gamma being conducted on the hole which showed an erratic gamma signature down to around 290m and a significant drop-off for the rest of the hole. Although not immediately obvious in the drill core this likely marks a lithological boundary and requires further investigation.

Uraninite observed in drill core, occurs as both irregular blebs and within thin fault fractures. No significant gold or copper values were encountered. Numerous faults and fracture zones were observed in the diamond holes, with increasing green mica alteration and thin irregular pyrite occurring in the lower half of the hole 19U4DD002 possibly explaining the IP anomaly.

Although drilling was unable to identify a continuation of the isolated pod of high-grade mineralisation previously encountered at U40, the new zone of uranium mineralisation seen in hole 19U4DD002 requires further investigation along strike and closer to surface.

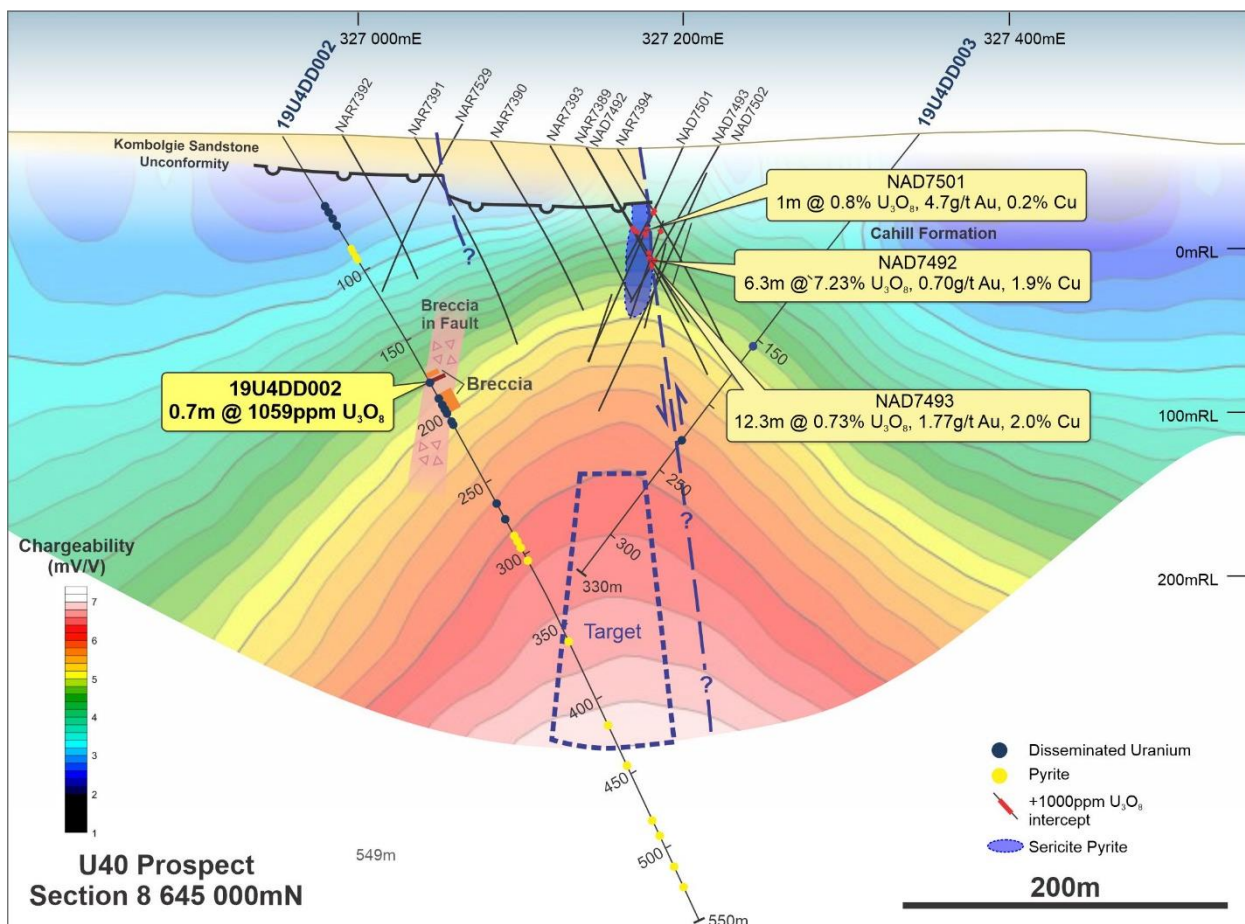


Figure 8: 2019 Drilling at the U40 Prospect, diamond drill holes 19U4DD002 and 19U4DD003 testing IP Pole-Dipole Chargeability Anomaly. Low-level disseminated uranium mineralisation was seen in both holes with 19U4DD002 intersecting anomalous uranium mineralisation on the western side of the IP anomaly returning 0.7m @ 1059ppm  $U_3O_8$  from 179.5m

## 8. Conclusion

The use of IP Geophysics as a tool for drill hole target generation at U40 requires further work. Encouragingly, the presence of stacked silica breccia zones with multiple uranium bearing horizons up to 200m away from the previously defined pod of mineralisation at U40 is a clear indication that mineralising fluids have passed through a broad package of the rocks in this area. This may be due to an extensive fault system related to the Quarry Fault. However, there is a structural complication present at U40 which requires further detailed interpretation in tandem with a study of the stratigraphy. This work may highlight the relevance of the IP anomalism but at this stage the cause of the anomaly is not clear.

Although the grades fall below previous high grades seen at U40, the presence of uranium on the west flank of the IP anomaly is encouraging, particularly as graphite was intersected from 180.5-183m – directly beneath the uranium intersection. It is known that graphitic zones are an excellent reduction medium for oxidised uranium bearing fluids to deposit uranium. The objective now is to locate a target which is large enough to host economic quantities of uranium. Down hole EM is planned to test for off-hole conductors such as broad graphitic horizons.

## 9. References

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## 10. Appendix 1

### **Downhole Gamma Survey**

