Alkane, another overnight success?

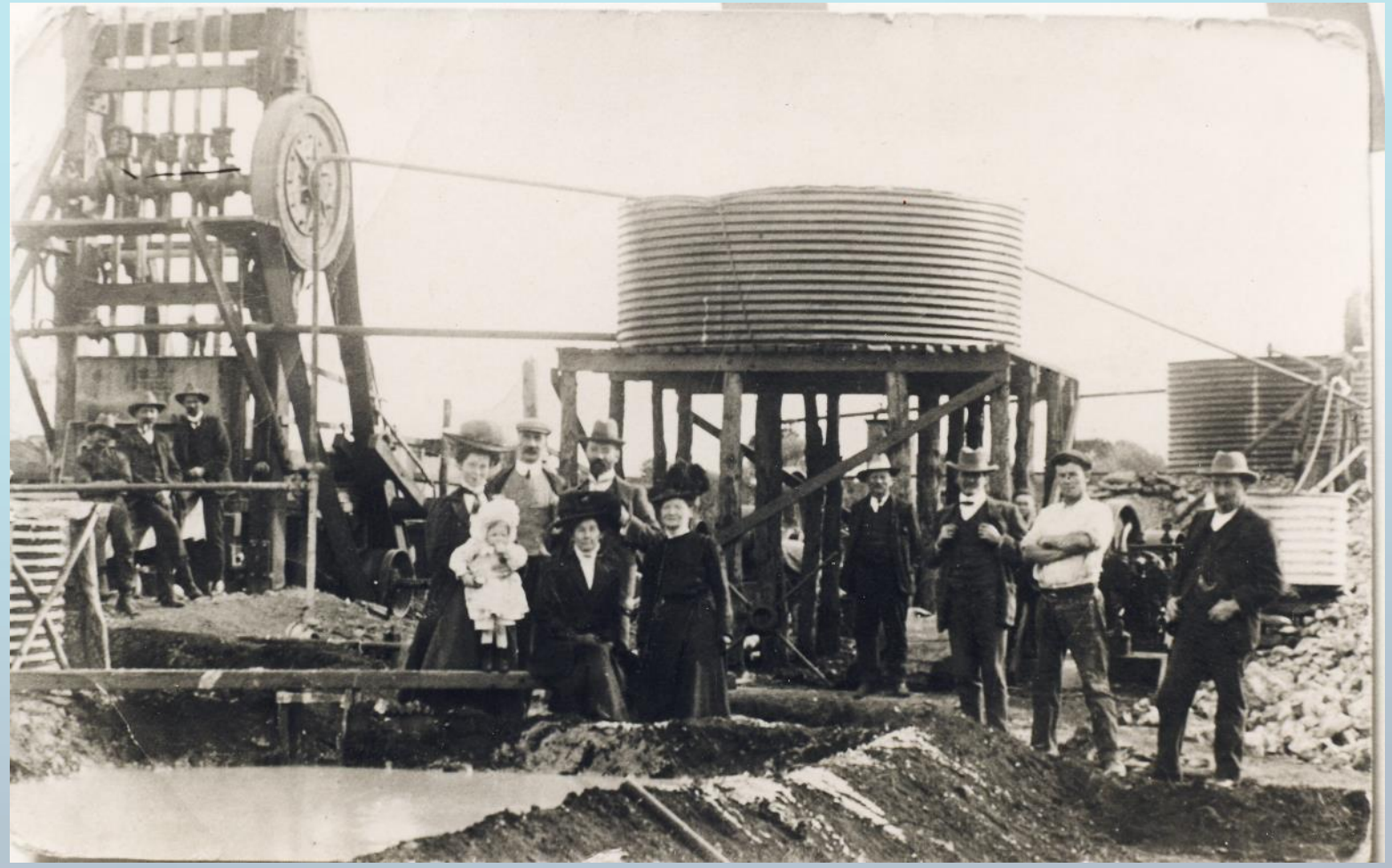
28 August 2025

Ian Chalmers

Alkane Resources Ltd

In the beginning

- *well perhaps not quite that far back!*



The Happy Jack Gold Mine, Menzies 1908, 130km north of Kalgoorlie

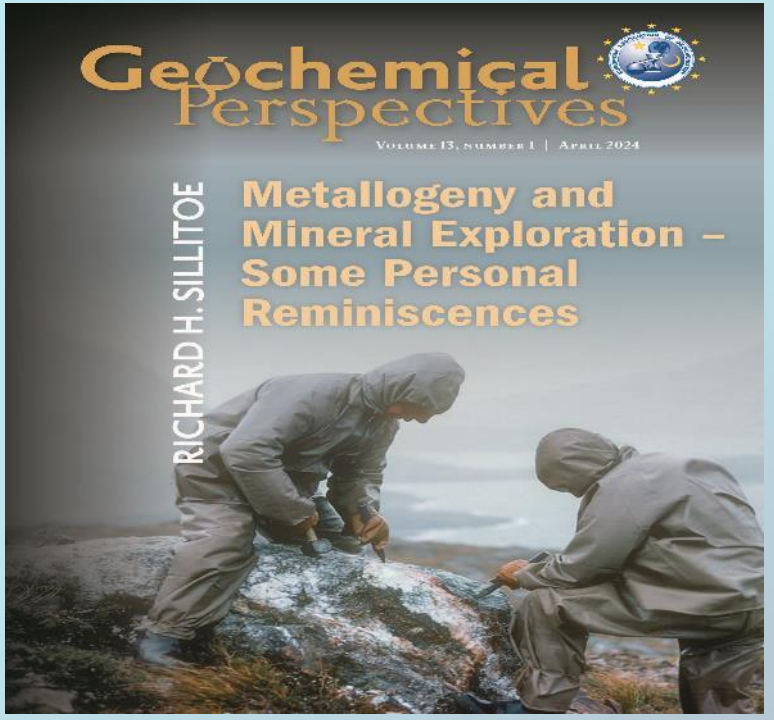
Before Alkane

- *setting the scene?*

A 200 page "Personal Reminiscences" like Richard Sillitoe's 2024 publication?

I'm not in the same league as Richard, so perhaps a self indulgent, old style "slide night" will have to suffice.

Bear with me.



Sillitoe and Chalmers in Alkane's Peak Hill Open Cut

Mineral Systems Exploration

- *we used to call them Geological Models / Concepts*

Kennecott 1970 -1974
Eastern Goldfields WA - Magmatic nickel
Eastern Goldfields; **Kimberley** WA - VHMS
Eastern Goldfields WA - Bulk Gold

Shell Metals 1976 -1980
Kimberley WA - MVT Zn-Pb
South West; Eastern Goldfields WA - Magmatic nickel
Eastern Goldfields; Kimberley WA - VHMS

WCH 1980 -1989
Eastern Goldfields; **Kimberley** WA - Orogenic gold
Kimberley; **Yilgarn** WA - Rare Metals/Rare Earths
[Pilot plant operated in UK]
Kimberley WA - Skarn – Base metals; gold; tungsten

They don't build them like this anymore
(notice PPE – floppy hat and thongs)

Mineral Systems

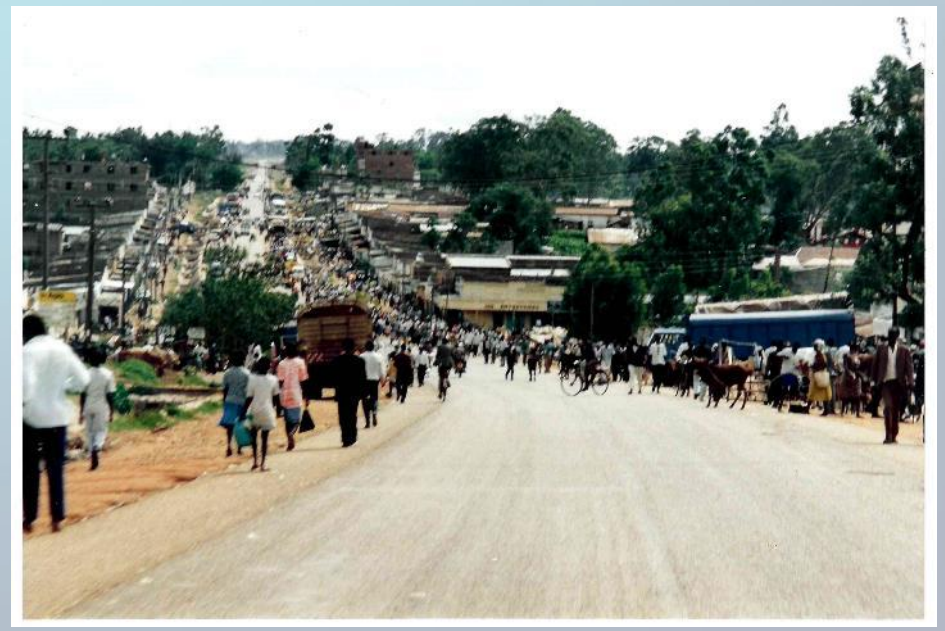
Multi Metal Consultants 1989 – 2007……..

Advising on exploration and development projects for major and junior mining companies. Floted **Panorama Resources** (1994 and **Northern Star Resources** (2003).

Panorama Resources 1992 -2000

Kimberley WA - Orogenic Gold
Kimberley WA - Nickel PGM
Kimberley WA - Skarn – Base metals; gold; tungsten
Kenya East Africa - Gold

Sheer luxury – field camp Kimberley



Morning peak hour – Migori SW Kenya

Mineral Systems

Northern Star Resources 2000 - 2007
Kimberley WA - Orogenic Gold / Epithermal Gold
Kimberley WA - Skarn – Base metals; gold
Kimberley WA - Magmatic Ni & PGMs

Halls Creek (Kimberley) HC Cup (horses)

Alkane Resources listed 1969
and demerged *entities:*

- ***BC Iron – listed 2006***
- ***Australian Strategic Materials – listed 2020***


Thompson Ni Mine, Central Manitoba – mid Feb @ minus 45c^{O}

Some Examples

Magmatic Nickel

Eastern Goldfields WA

Camelot (Kennecott) 1971-73

Serpentinised peridotite with interstitial violarite, pentlandite

Mined by BHP Nickel, Leinster Nickel Operations (2015?)

Some Examples

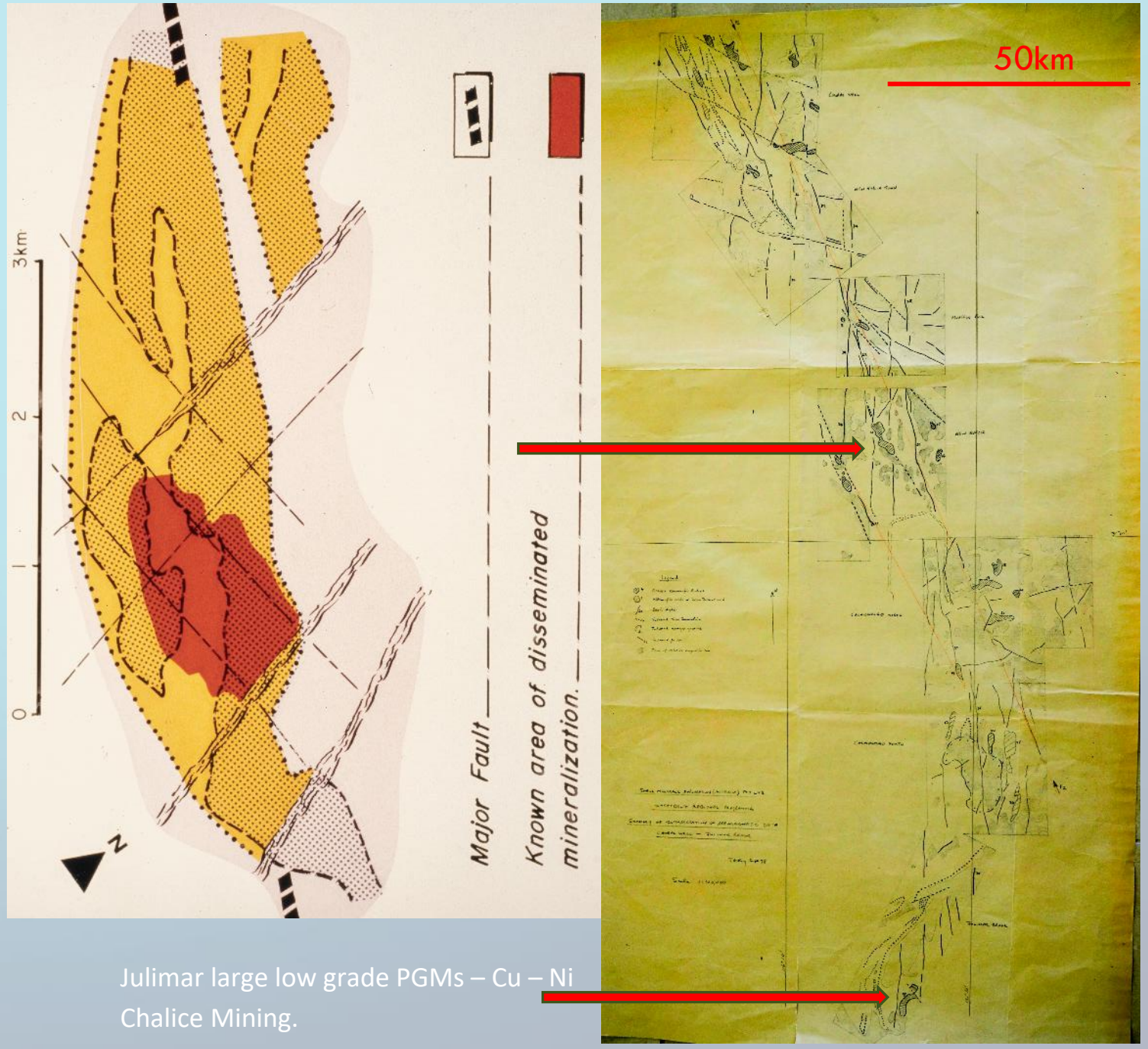
Magmatic Ni Cu PGMs

South West WA Yarrawindah (New Norcia - Shell Metals 1977-79)

Pyroxenite-peridotite-norite with interstitial sulphides.

Extensive low-grade Ni-Cu-PGM but complex metallurgy.

Regional targeting with extensive aeromagnetic survey (1978), highlighted numerous targets, including Julimar (Chalice 17Moz PGE-Au; 1Mt Ni; 0.5Mt Cu 2020).



Julimar large low grade PGMs – Cu – Ni
Chalice Mining.

Some Examples

VHMS Cu-Pb-Zn –(Ag-Co)

Kimberley WA (Kennecott)

Koongie Park, Sandiego Onedin – found by gossan o/c.

Total resource base ~ 12Mt @ 1% Cu and 4% Zn

Epithermal Au

Kimberley WA (Panorama and Northern Star)

1.8 Ga Whitewater Volcanics.

Best reported drill results 4m @ 113g/t Au (Trudi Vein**)**

Some Examples

Bulk Gold Targets

Eastern Goldfields WA (Kennecott)

Kennecott mineral economists decided that gold would break out from its fiscal restrictions in the late 1970's.

They felt they could apply their bulk mining techniques from Bingham Canyon (Utah), and embarked on an initial survey in the Kalgoorlie region.

Many targets were identified, included one we named "The Sting".

A prospector exposed, extensively fractured felsic intrusive, with an interesting gold content. Turned out to be a very clever ruse by the owner.

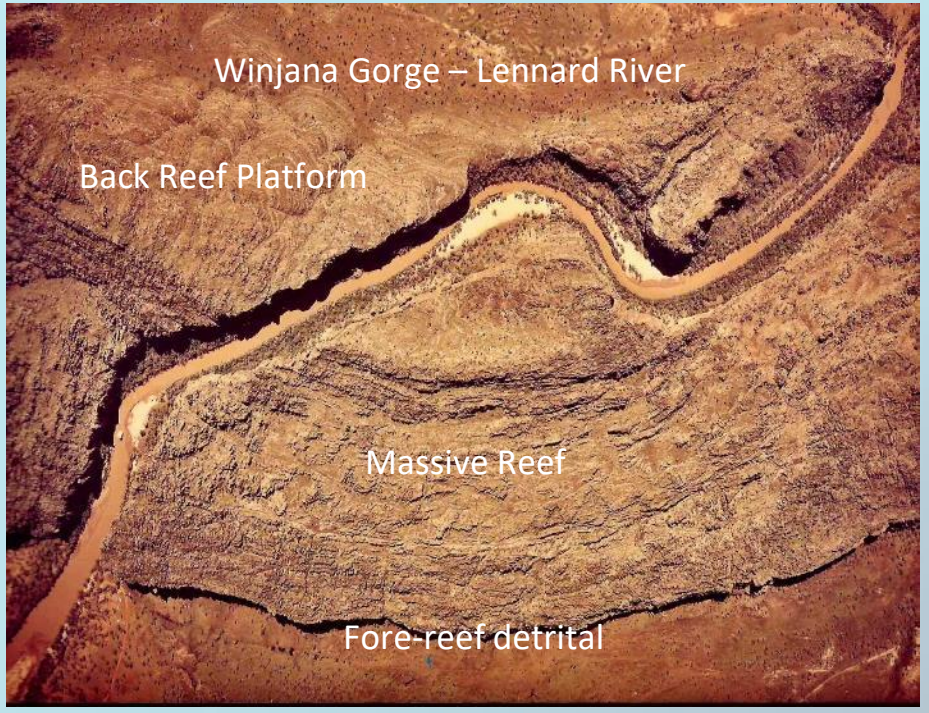
Some Examples

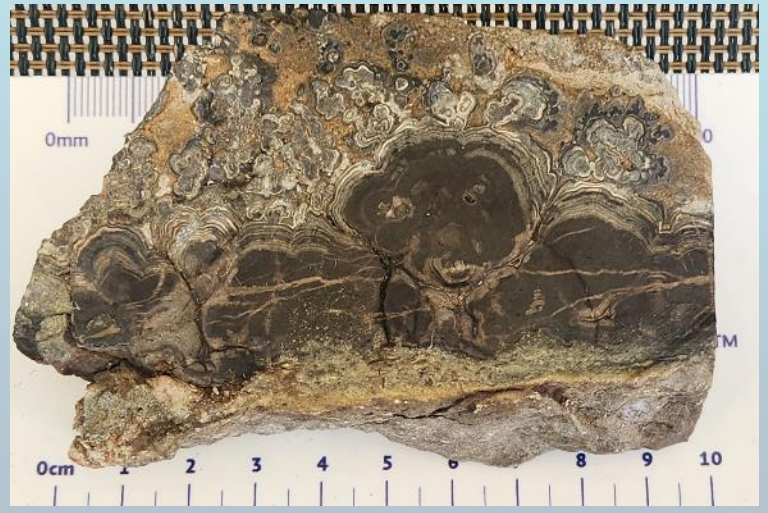
Carbonate hosted zinc-lead- +/- silver MVT

Kimberley WA (Shell Metals)

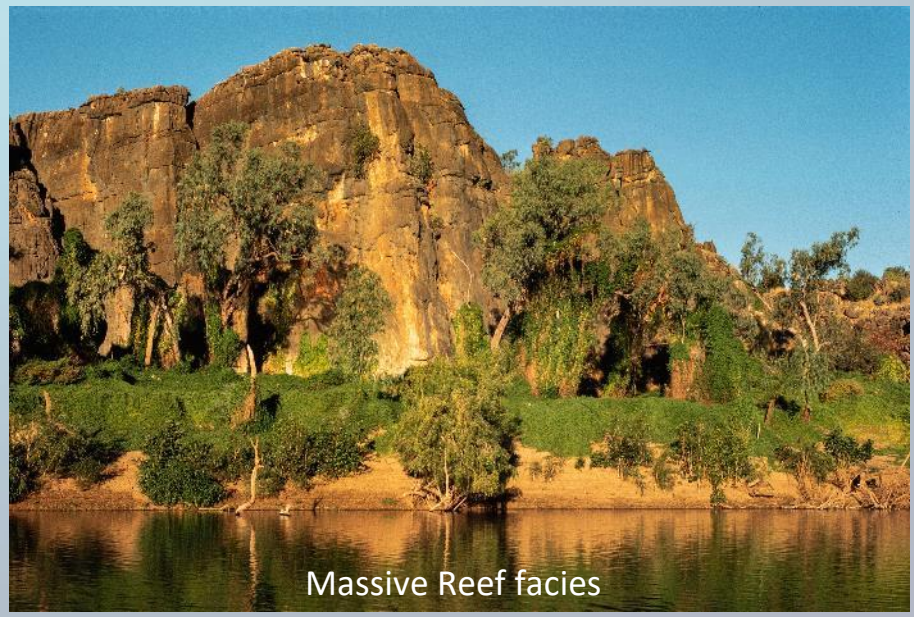
Structurally controlled, replacement massive sphalerite, galena in Devonian reef complexes on Lennard Shelf.

Deposits mined at Pillara (20Mt @ 8.3% Zn,2.5% Pb, 17g/t Ag) Cadjebut, Goongewa and the (unmined) Wagon Pass deposit.





Pillara massive sulphide



Some Examples

Specialty Metals (Rare earths; rare metals; exotics)

Kimberley; Yilgarn WA (WCH)

Various deposits of Ta, Sn, W, Rb, Cs, Ga and particularly Zr, Hf, Nb, REEs at Brockman in Kimberley.

Brockman Zr, Hf, Nb, LREEs and HREEs; 1.8 Ga aged alkaline volcanic province – mineralisation in trachytic ash flow tuff drilled over 3.5km and up to 30m thick.

Process flowsheet developed at Warren Springs Laboratory at Stevenage, UK (1988 – 89), and tested by pilot plant..

Sulphuric acid roast leach, SX separation and refining.

Pinjarra WA (Solvay) Gallium SX Plant.

Brockman ore zone – note fluorite filled pumice fragments

Alkane Resources *1986* →

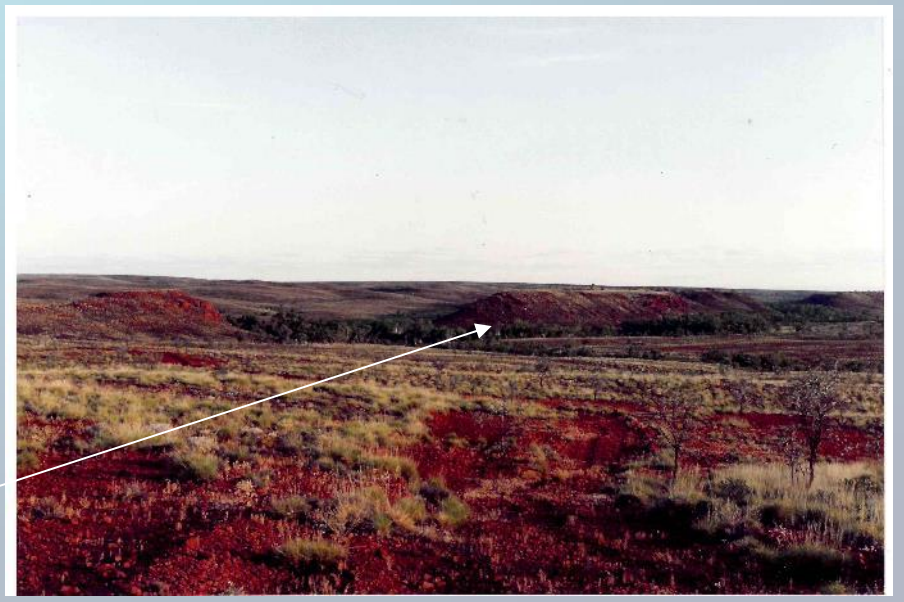
The WCH Group “inherited Alkane” through a majority equity swap with an entrepreneur who wanted Command Petroleum, which WCH controlled at that time.

ALK had an office in Sydney with a small team. Two major properties, London-Victoria near Parkes and half of the Peak Hill deposit. Our view was the regional exploration potential was very high but hampered by land access and lack of funds.

It was agreed that we should maximise the value of London-Victoria and Peak Hill. The Sydney office was closed and remaining people offered relocation to Perth, the headquarters of the Group.

The focus was to be the Central West of NSW

A residual diamond project in WA led to the discovery of a extensive channel iron deposit. This was floated as BC Iron. BCI produced for severall years but the company is now developing a salt project near Onslow in WA. ALK ultimately cleared $14M through sale of shares.



Bonnie Creek Channel Iron Deposits

Alkane Resources – The “Strategy”

London-Victoria was initially joint ventured to BHP Gold; later the remaining interest was sold to that group (pre the merge into Newcrest) for ~$2.1M. Effort was directed into amalgamating Peak Hill under the ALK banner and then joint ventured to GeoPeko (1986).

After significant drilling, resource estimation and process options, GeoPeko were not convinced of the viability at the then gold price of around A$350-400/oz (1988-89). The project was optioned to Ashton Mining in 1990 and they presented a heap leach concept but were concerned about proximity to the town and withdrew.

In 1992 Alkane decided to proceed with a low capex heap leach operation. The group had internal expertise on heap leaching and pushed forward on development and approval on an initial proven oxide reserve of 1.8Mt @ 2.0g/t Au.

State approval was finally achieved in 1995 and mining commenced in 1996. Capex and pre-production costs were ~A$6m secured by a loan $7.5M from Macquarie.

Alkane Resources – Peak Hill

The “Restart”

Peak Hill is a high sulphidation epithermal Au (Cu) deposit located within Ordovician aged Mingelo (Goonumbla) Volcanics.

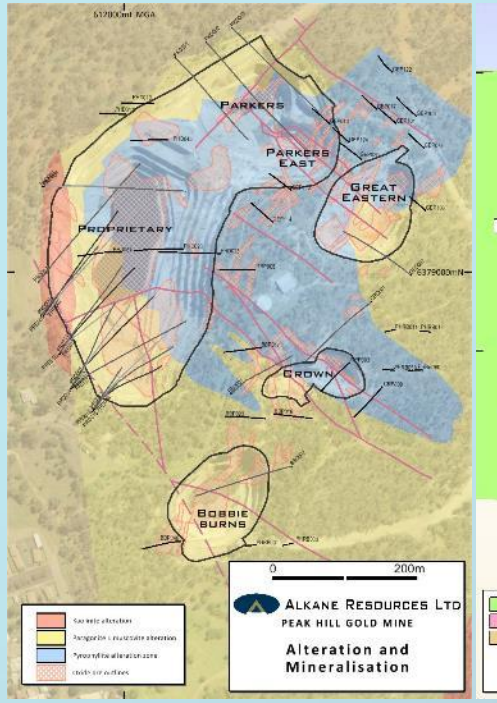
Marked by an extensive (3km by 500m) phyllic -advanced argillic alteration zone.

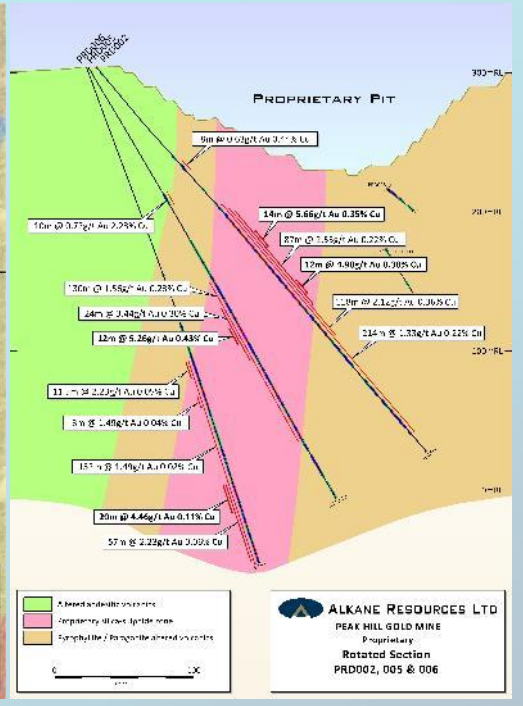
Central core of pyrophyllite – illite –muscovite with residual silica bodies. The silica pyrite – tennantite – enargite mineralisation oxidised to depths of around 100m

Initial open cut, heap leach gold recovery operation.

The host sequenced has been strongly folded and faulted, but limited dating placed the alteration at around 407–411Ma, suggesting a possible link to the large mineralised porphyry systems within the Macquarie Arc.

Production commenced in 1996 and 153,000oz of gold was recovered up to closure in 2003 (depletion of oxidized ore).





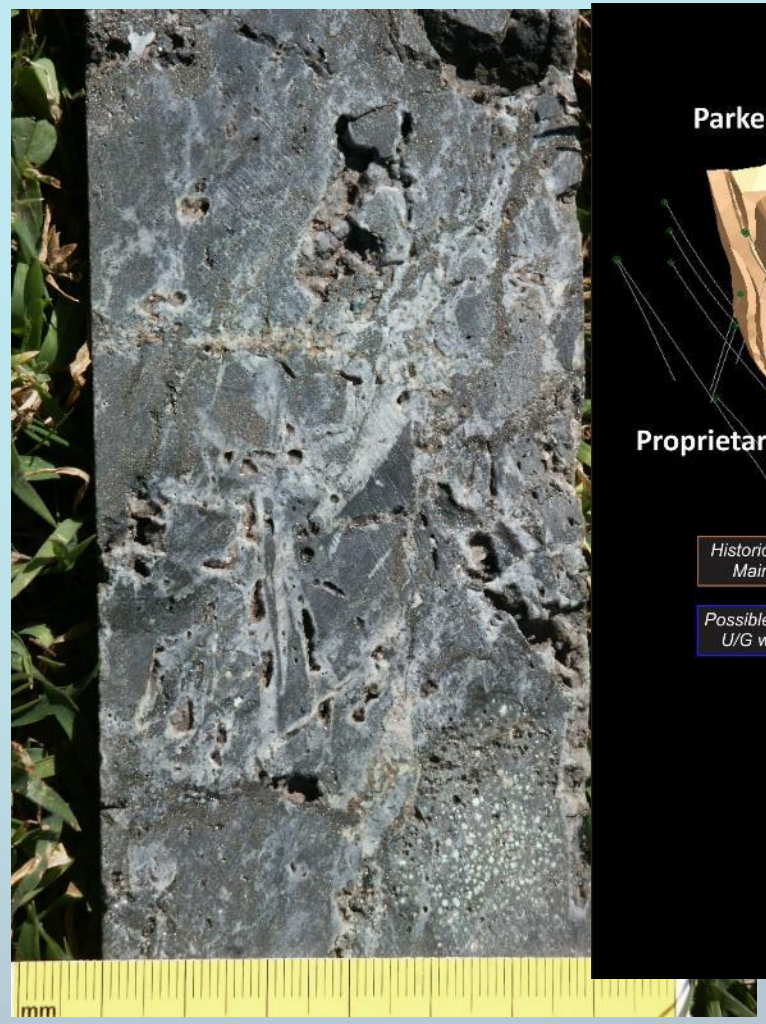
Peak Hill

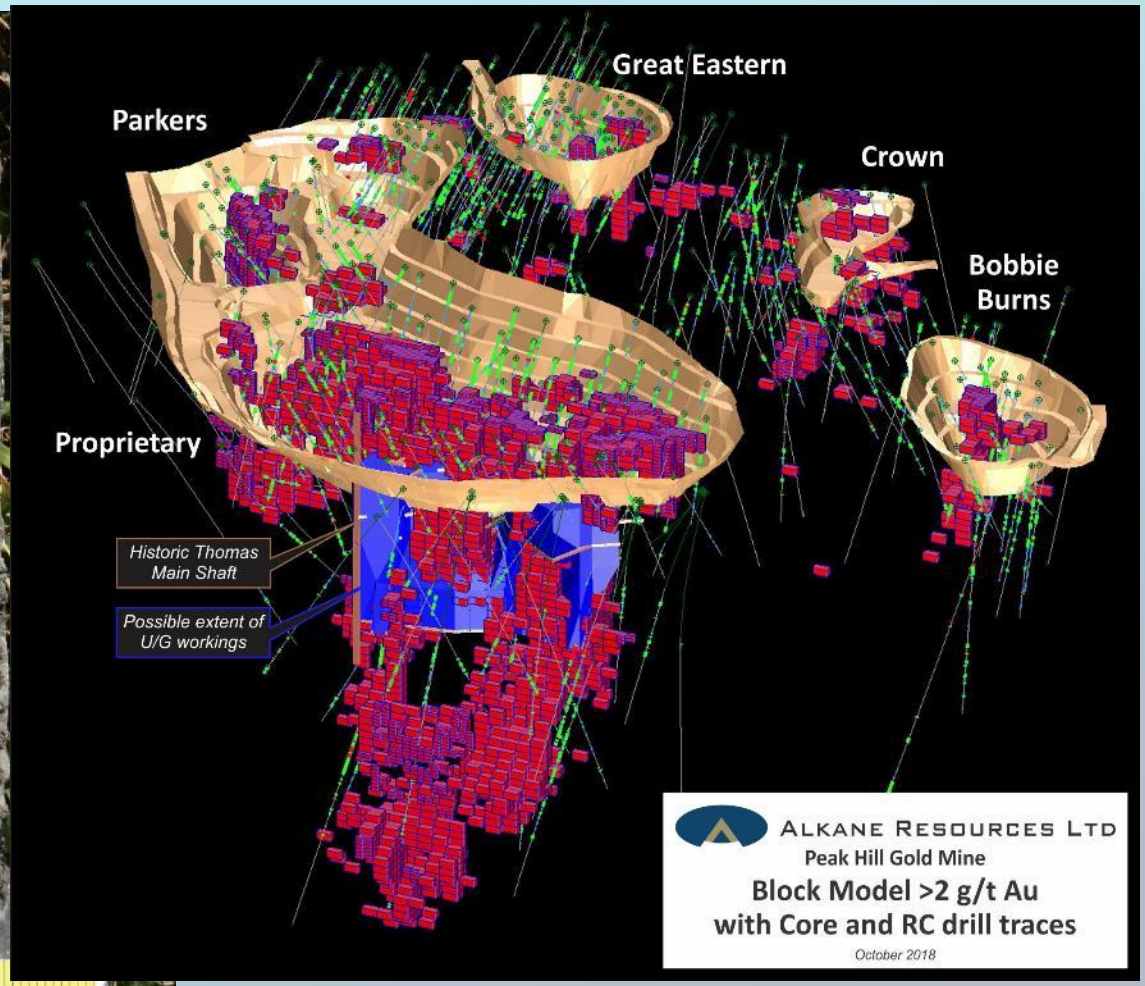
The Sulphide Zone.

Core drilling (2000 / 2018), mainly targeting the Proprietary body, identified extensive sulphide mineralisation to 350m depth, hosting about 500,000oz Au.

Initial metallurgical testing indicated that the ore is refractory and would need a sophisticated processing facility.

Discovery of the Tomingley deposits shifted development focus and Peak Hill was ‘parked’…





Pyrite – enargite – tennantite barite brecciated silica ore

Peak Hill

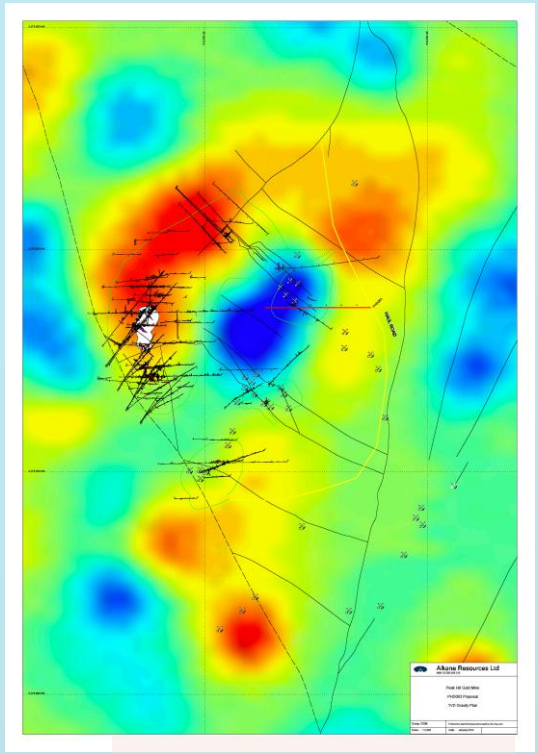
Reactivated Interest

Research with CODES (UTAS) and honours student (2023) reviewing the alteration, mineralisation and geochemistry led to definition of probable hydrothermal fluid outflow zones and potential for porphyry source.

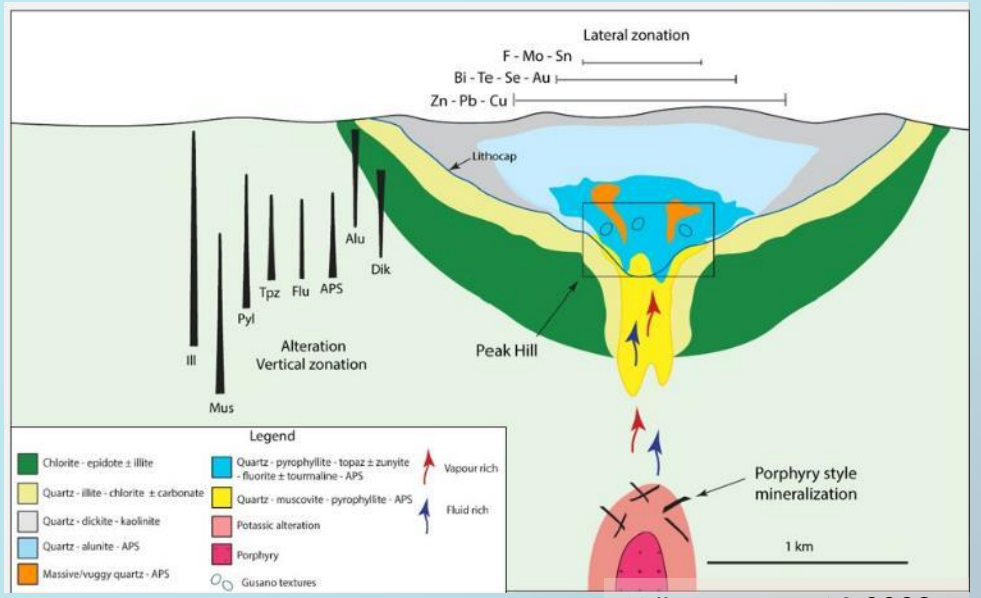
Geophysics included aeromag, gravity, IP and ANT.

New metallurgical testing provided metal recovery options.

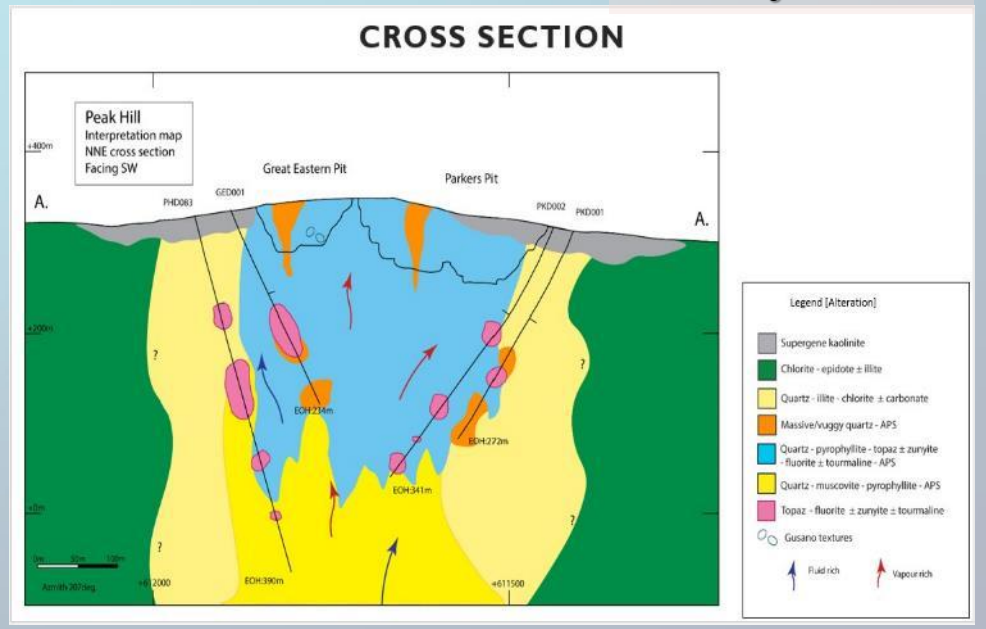
Drilling proposed to define and expand sulphide resource potential and test for a porphyry source.

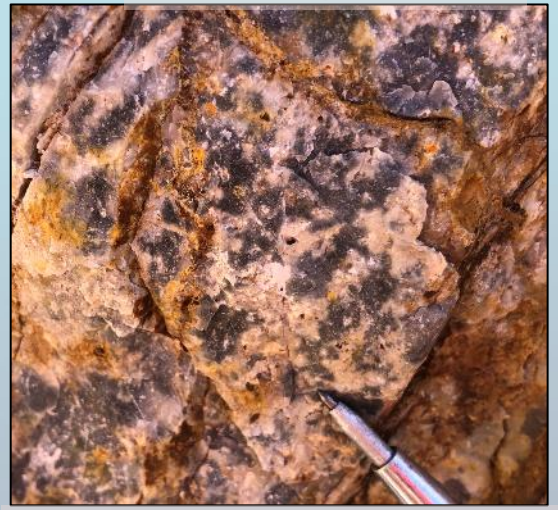


1VD Gravity.



Millie Young UTAS 2023





Patchy gusano texture with quartz – pyrophyllite - topaz.

Tomingley

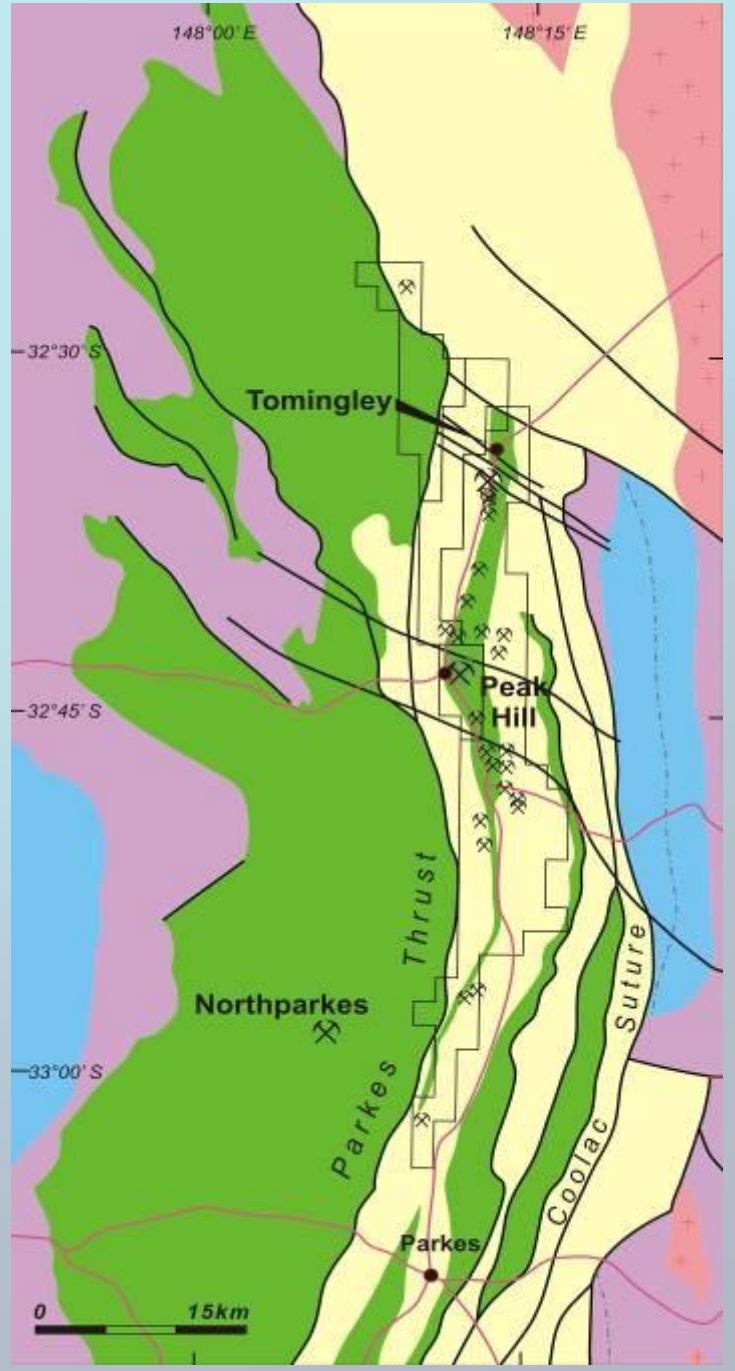
The New Gold Discovery

The cash flow from Peak Hill and a search for potential feed to the heap leach operation, led to the Tomingley discovery in 2000.

Alkane was approached by companies with tenements in the area, which resulted in two farm-in agreements including most of the prospective Ordovician volcanic stratigraphy.

Prospective belt (~40km) is covered by transported overburden with limited outcrop or known gold occurrences, such as Myall United (historic UG production 62k oz) 2km south of Tomingley town site. Previous recon aircore drilling located anomalous Au (As) results between Tomingley and Myall but the companies did not follow up due to other priorities.

ALK considered that the geochemistry and veining were typical of orogenic style mineralisation and embarked on a grid based aircore drilling program, leading to the discovery of the Wyoming deposits.



Tomingley

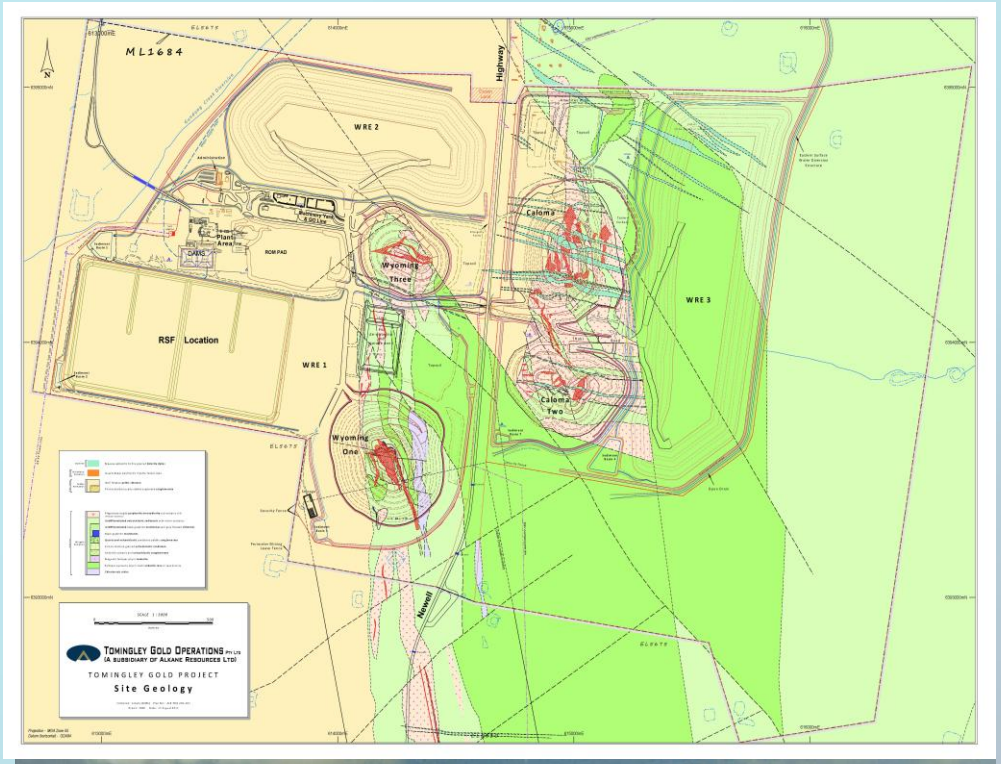
The Development

Approx 240,00m of AC, RC and DD drilling progressively defined the Wyoming One, Wyoming Three, Caloma One and Caloma Two deposits through to 2013. Expenditure, including feasibility study ~$35M.

Feasibility was completed in 2012 and Development Consent in 2012. Total Capex was ~$110M and largely funded from existing internal funds. Initial resource 0.92 Moz.

Open cut mining of Wyoming One and Three started in 2013 and processing through a 1Mtpa standard CIL plant commenced in 2013. First gold was produced in 2014.

Underground mining commenced at Wyoming One 2018 and has since expanded to include Caloma One and Two.



There were some heavy rainfalls during the Caloma drill out

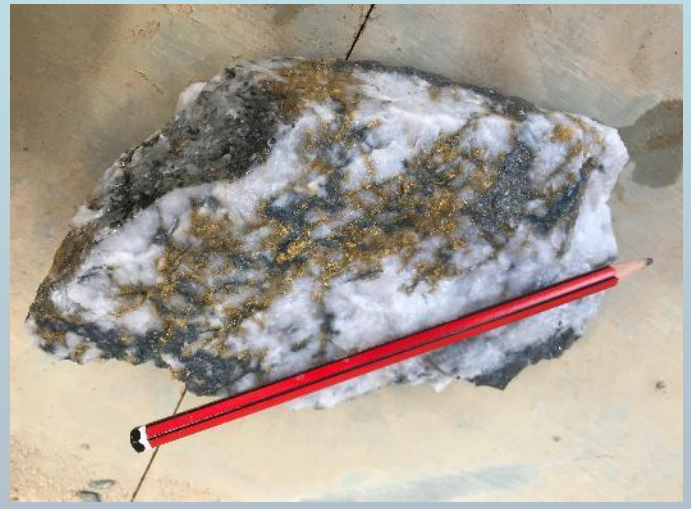
Tomingley

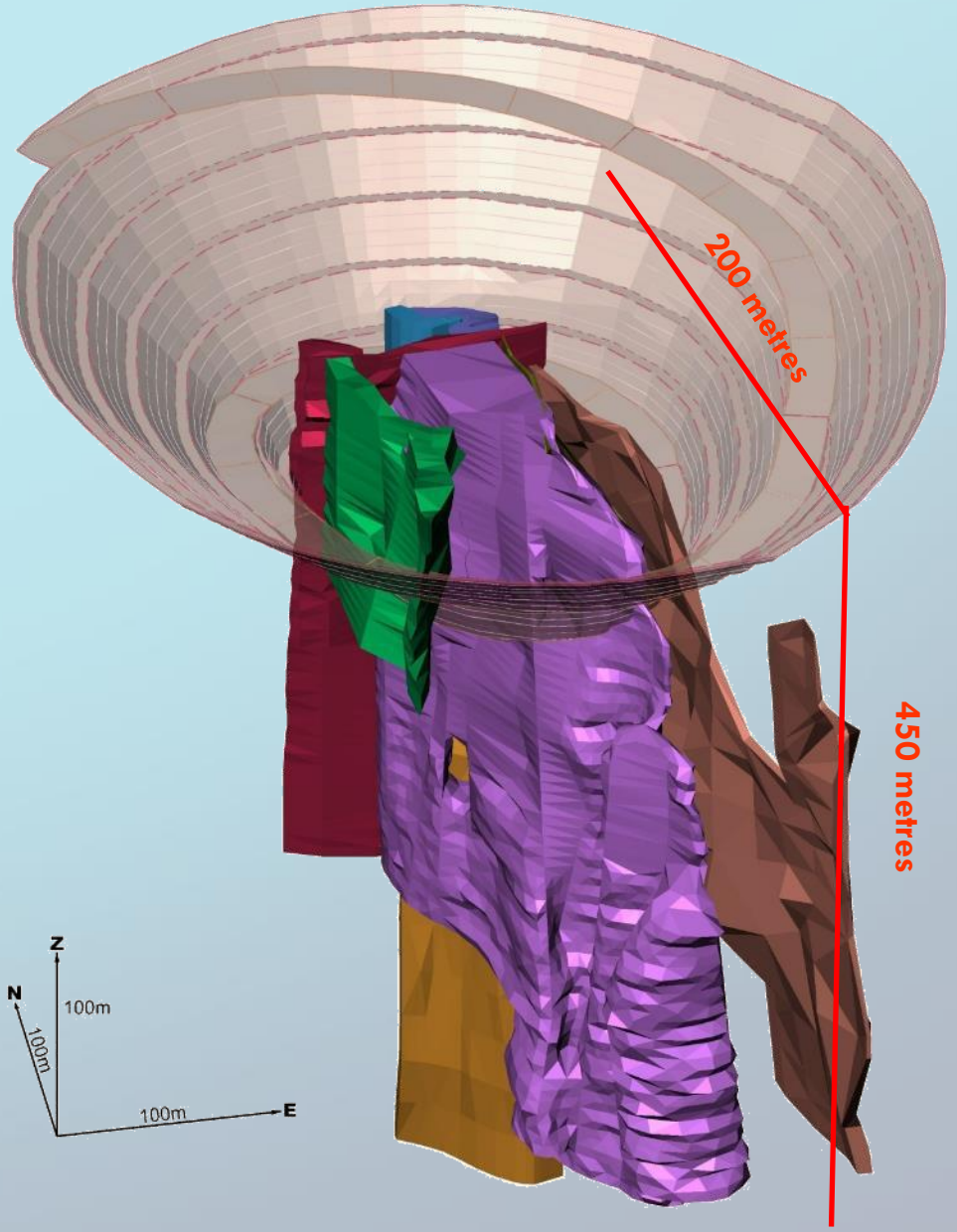
Wyoming One Deposit

The Tomingley deposits are typical orogenic style with gold found within quartz-chlorite-pyrite-arsenopyrite veining associated with sericite-carbonate-albite-quartz alteration.

Deposits are focussed by competency contrast between the andesitic volcanics / intrusives and surrounding siltstones and sandstones.

Ore lenses have dilationary geometry; relatively short strike length (<200m); can be up to 30m in width; and extend to 450m depth. Range from massive quartz veins to extensive hydraulic breccias.





Identified ore zones at start-up

Tomingley

The Extension

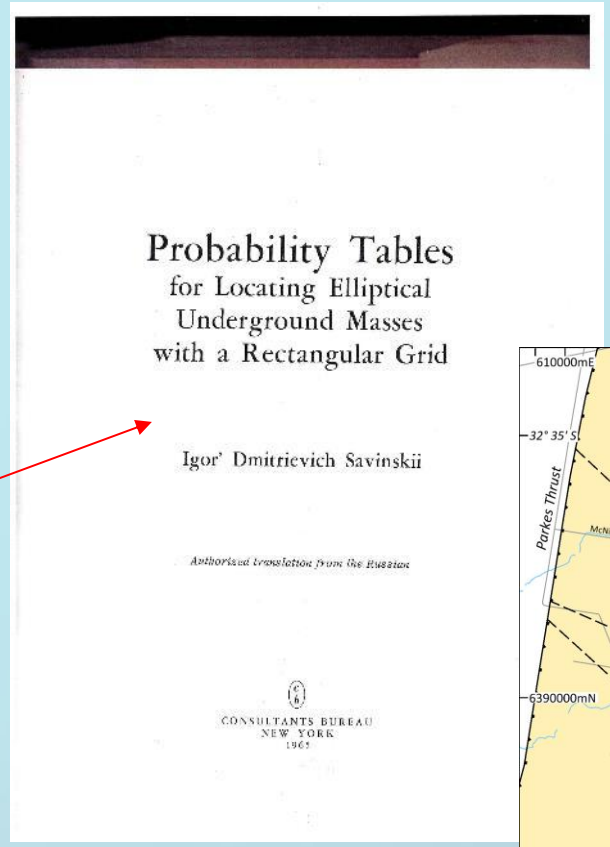
Cash flow from operations in 2017 enabled escalation of the exploration effort to the south, based on the detailed aeromagnetic data in the area.

Grid based aircore drilling using the arsenic ‘halo’ of the TGO mineralisation based upon the famous Savinskii Probability Tables. Two deposits were defined in 2018, with Roswell – San Antonio advanced to Resource status 2019/20.

The R–SA deposits are about 1.5km in length, similar mineralogy and alteration to Tomingley and located close to the overlying Cotton Formation sediments contact but covered by up to 60m transported overburden.

Pre-mining resource ~1.5Moz.

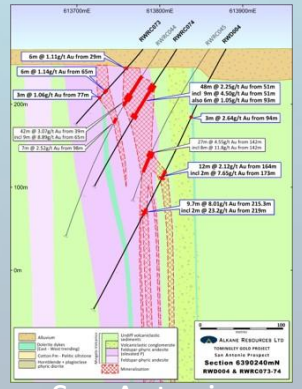
To accelerate production, a 2.7km exploration decline was developed from W1 to Roswell. Production commenced in April 2024.

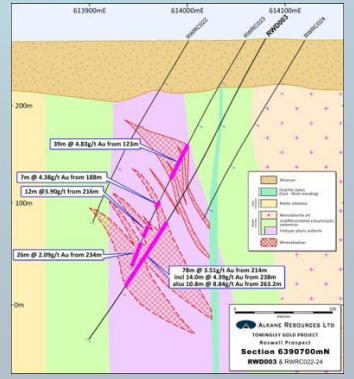

Probability Tables
for Locating Elliptical
Underground Masses
with a Rectangular Grid

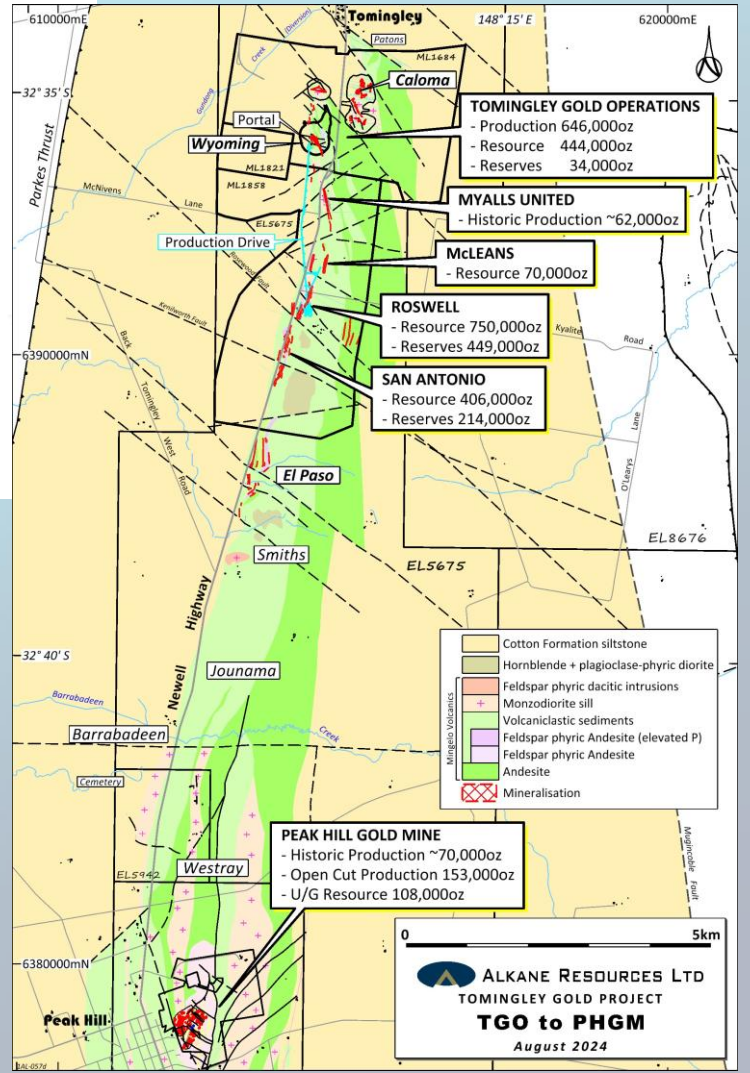
Igor' Dmitrievich Savinskii

Authorized translation from the Russian

CONSULTANTS BUREAU
NEW YORK
1965


San Antonio


Roswell



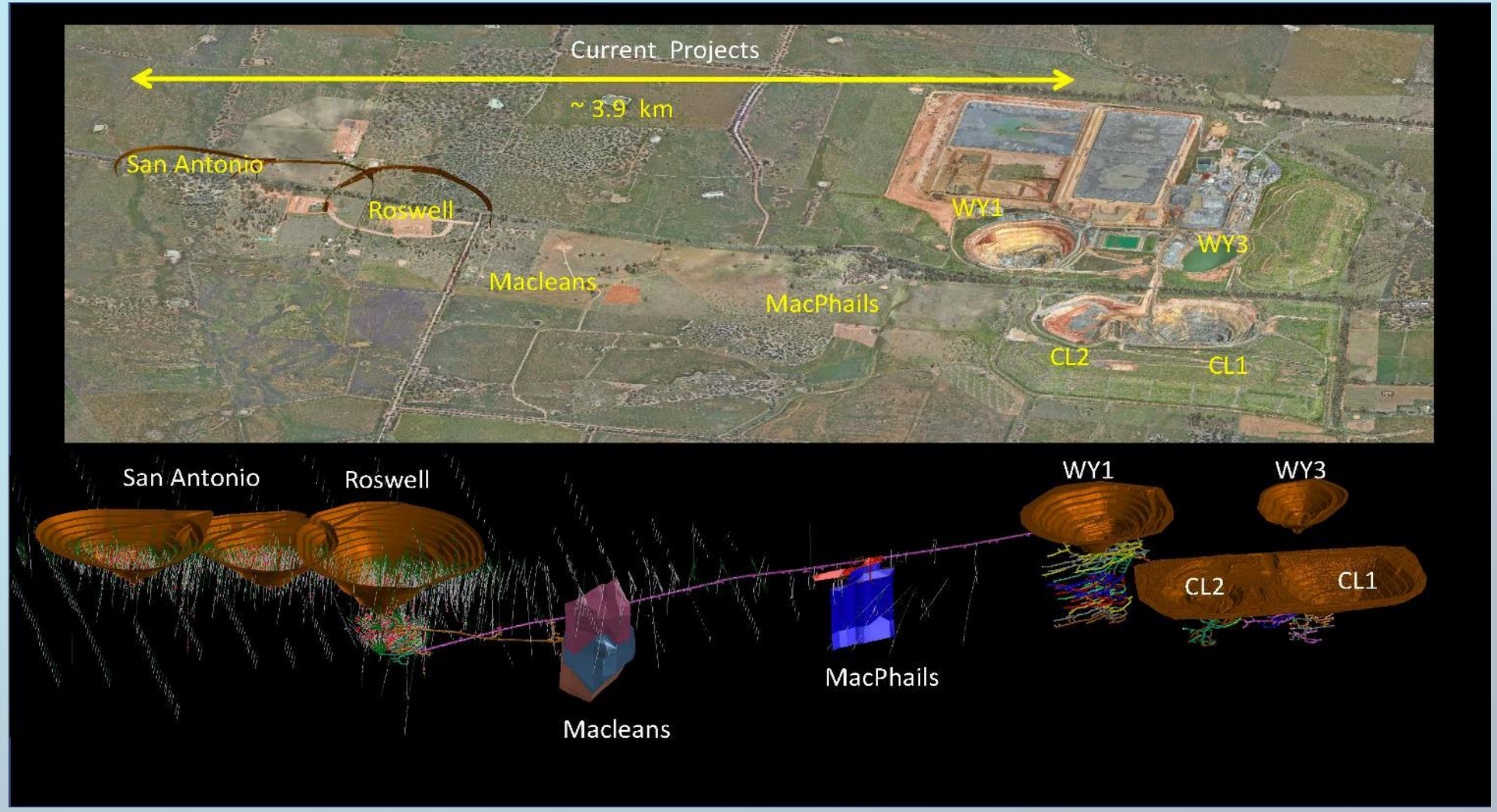
Tomingley

The Extension

With production, the Tomingley system now totals ~3Moz (ex Peak Hill).

Additional resource potential at depth of all deposits, and ‘new’ targets of Macleans and MacPhaills.

Other nearby targets at El Paso, Tomingley One and Two, and Glen Isla, all within 10km of the TGO plant.



Exploration included aeromagnetics; detail ground magnetics; airborne gravity; IP; ANT; 2D Seismic; limited EM

ANT = ambient noise tomography

Dubbo Rare Metal Project

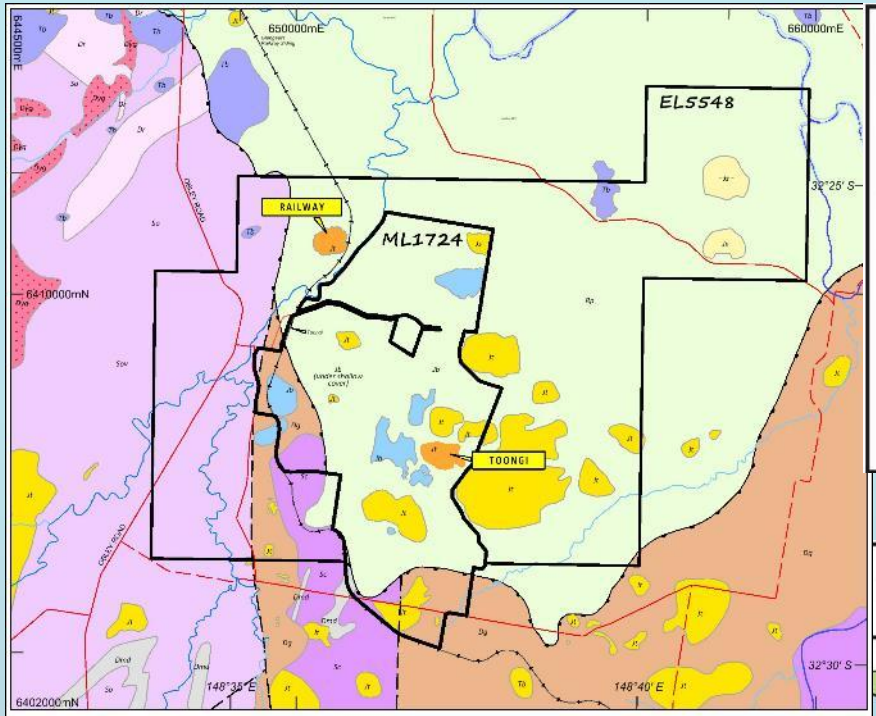
Toongi Zr, Hf, Nb, (Ta), LREE, HREE

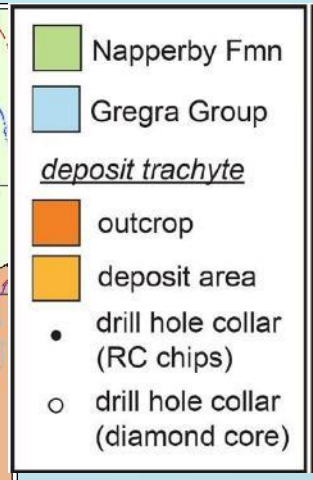
Outcrop noted by BMR as moderately radioactive.

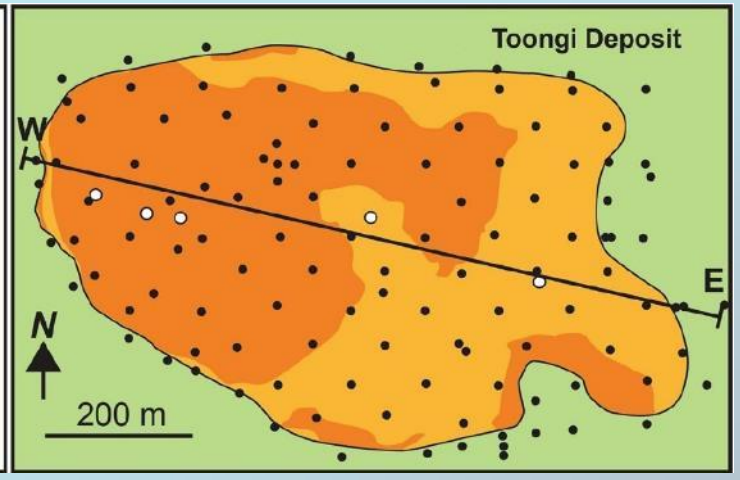
Investigated by Geopeko as part of their early 2000's Cu search.

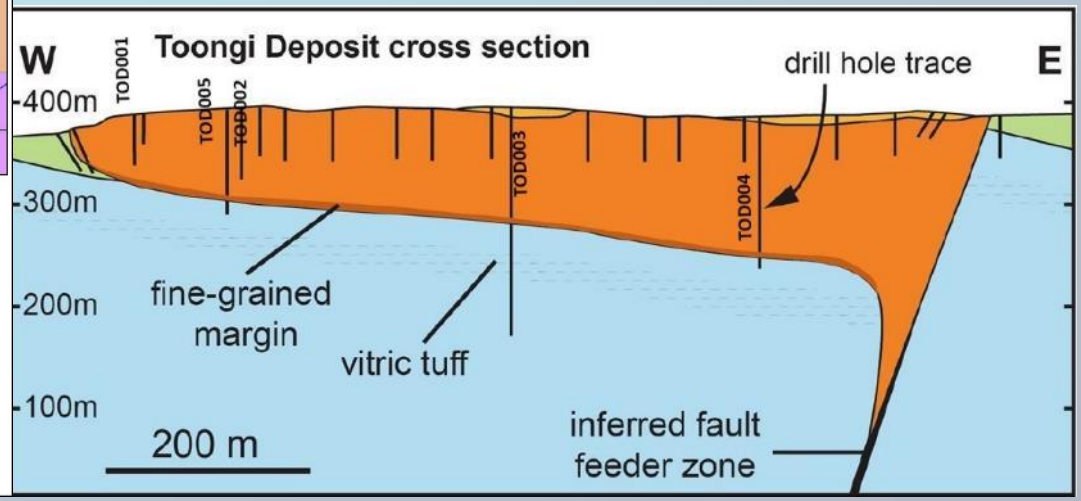
Jurassic aged trachyte intrusive or flow 900m E-W x 500m N-S, and up to 150m thick.

Unusual rare metal minerals but evenly distributed throughout the deposit.







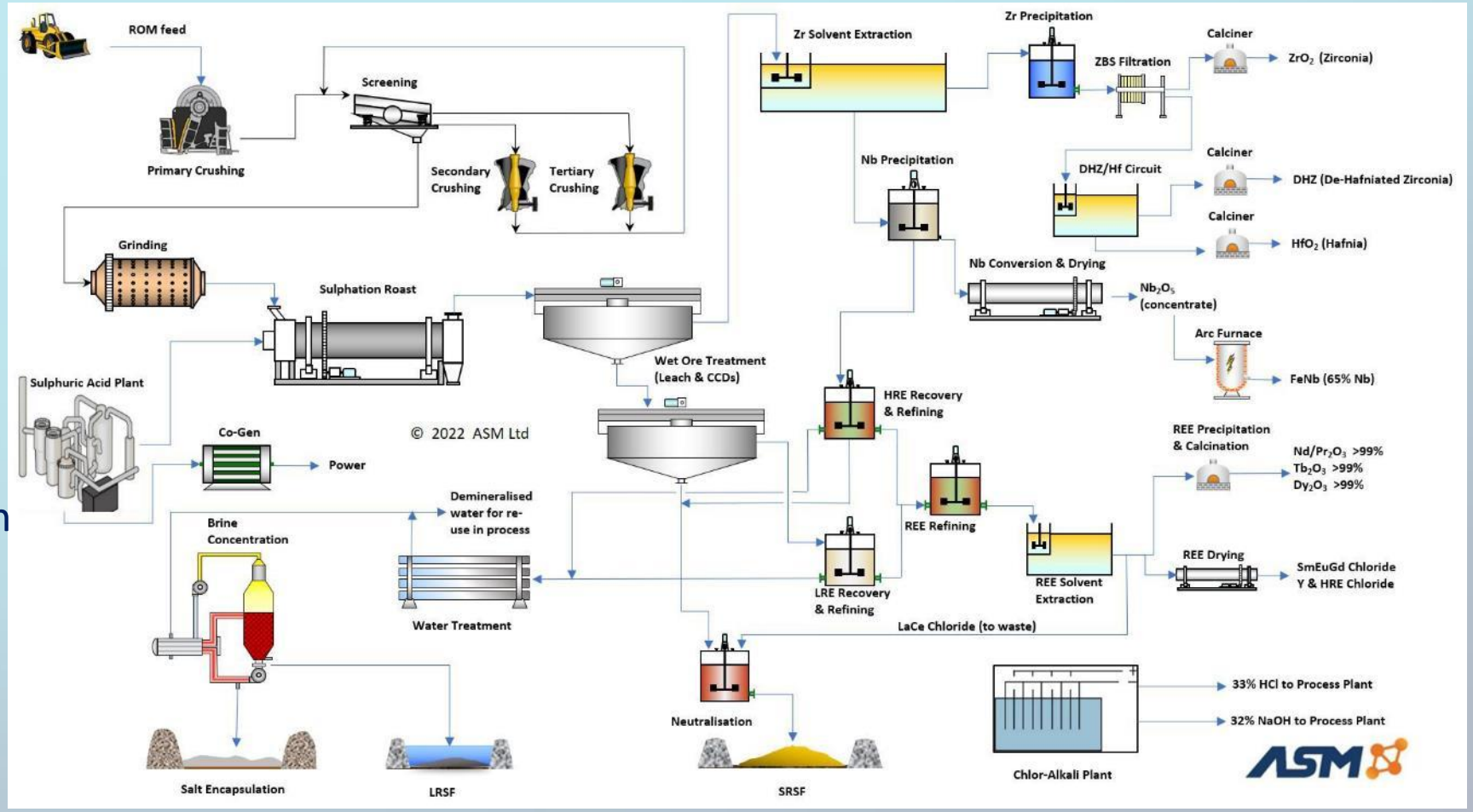


Dubbo Rare Metal Project

Toongi Zr, Hf, Nb, (Ta), LREE, HREE

In parallel with Tomingley development and based on the knowledge from Brockman, a technically proved flowsheet, including pilot plant operation, developed and continually optimised over 15 years at ANSTO (2006 →).

Flow sheet is whole-of-ore, sulphuric roast leach, SX separation and refining to produce a number of saleable products.



Eisenhower School for National Security and Resourcing Strategy
National Defense University, Washington DC
Visit to ASM DPP ANSTO 2018

Dubbo Rare Metal Project

ANSTO process development

Section of the Demonstration Pilot Plant at ANSTO

The hafnium zirconium solvent extraction and separation circuit (a world first)

Australian Strategic Materials (ASM) was successfully demerged from Alkane in 2020

Dubbo Rare Metal Project

Korean Metal Plant

The KSM metal plant at Ochang, South Korea.

Process developed in conjunction with Chungnam University.

Metal furnaces.

First NdPr Metal (2022).

McPhillamys

A brief interlude

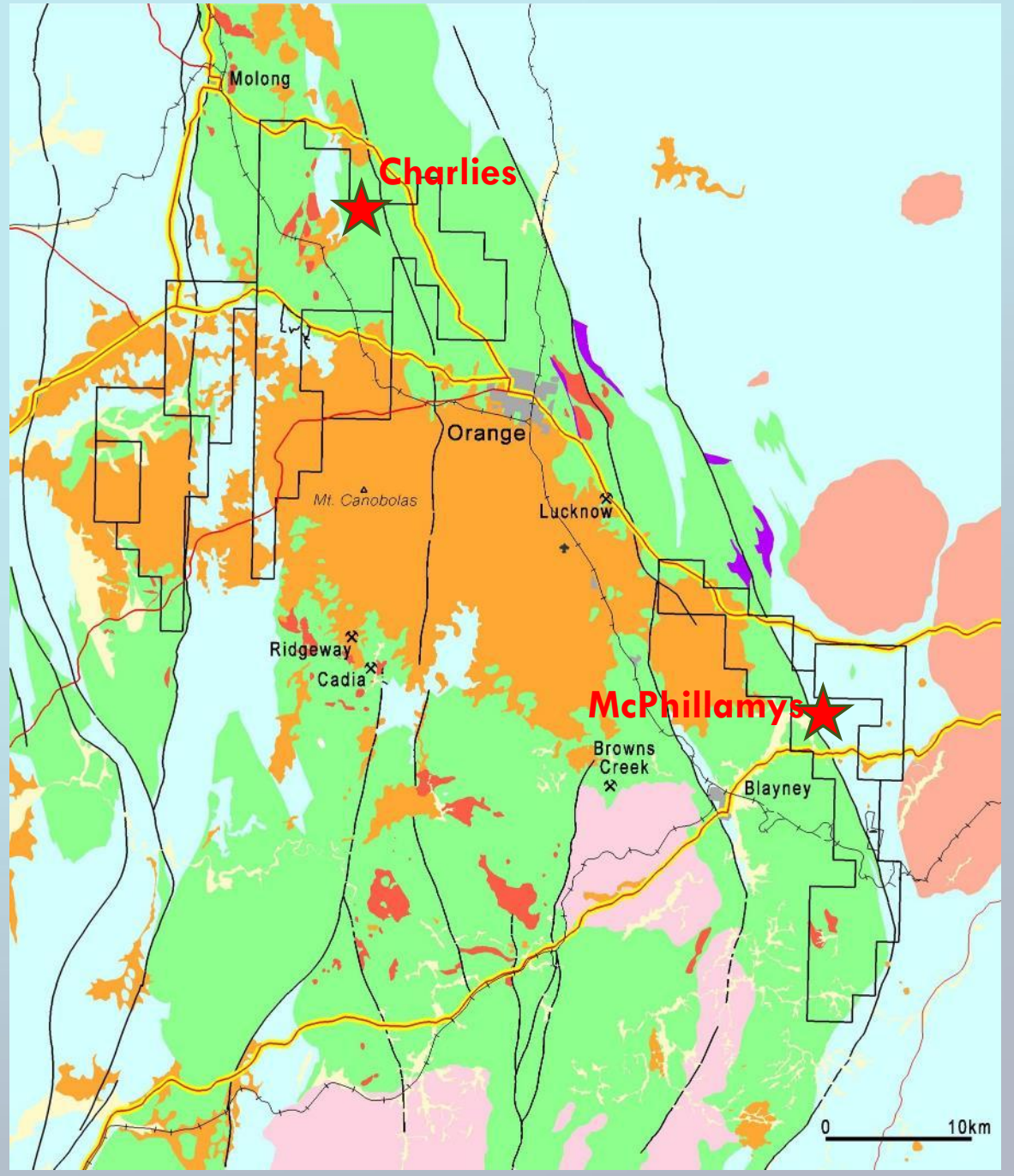
Alkane seed funded LFB Resources in 1997 to enable that group to acquire a package of properties held by Rio Tinto. Other tenements were added later.

Market was not conducive to funding junior resource companies and LFB was rolled back into ALK in 1999.

Newmont had re-established itself in the region and their prospect analysis highlighted a number of ALK projects.

Newmont entered into a JV to farm-in to LFB in 2005 which was managed/funded by NEM and staffed by ALK.

Initial work focussed on the north porphyry target (Charlies) but “hard work” finally facilitated land access to follow up previous soil results at McPhillamys in Silurian volcanics near Blaney in 2006.



McPhillamys

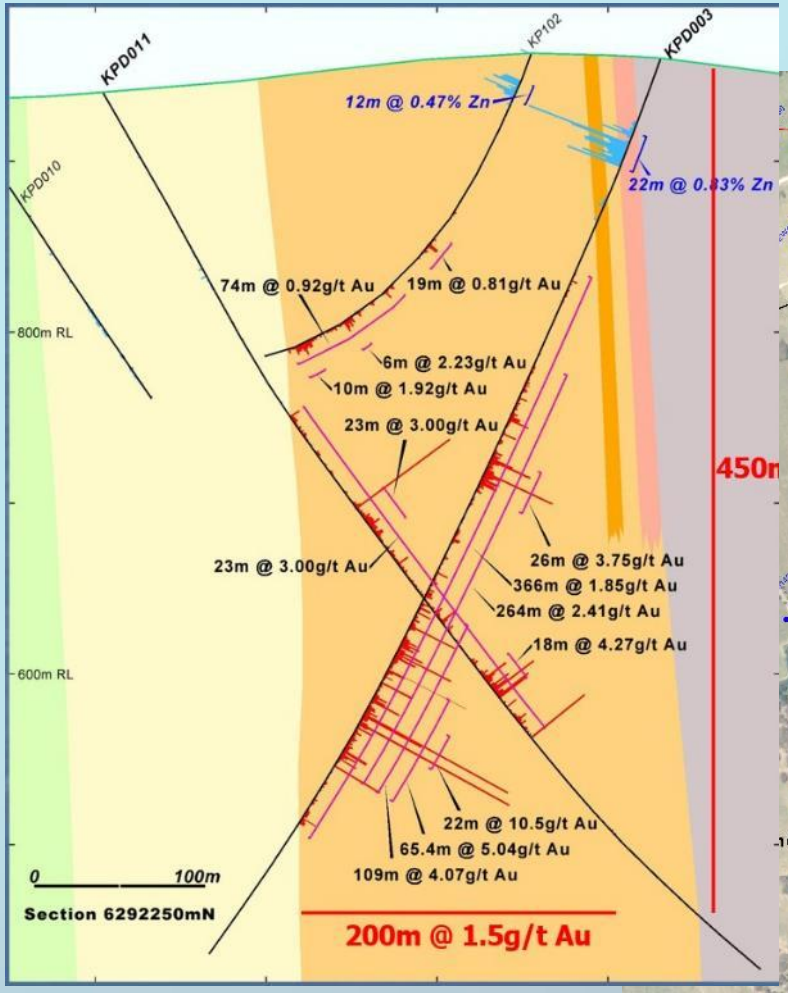
A brief interlude

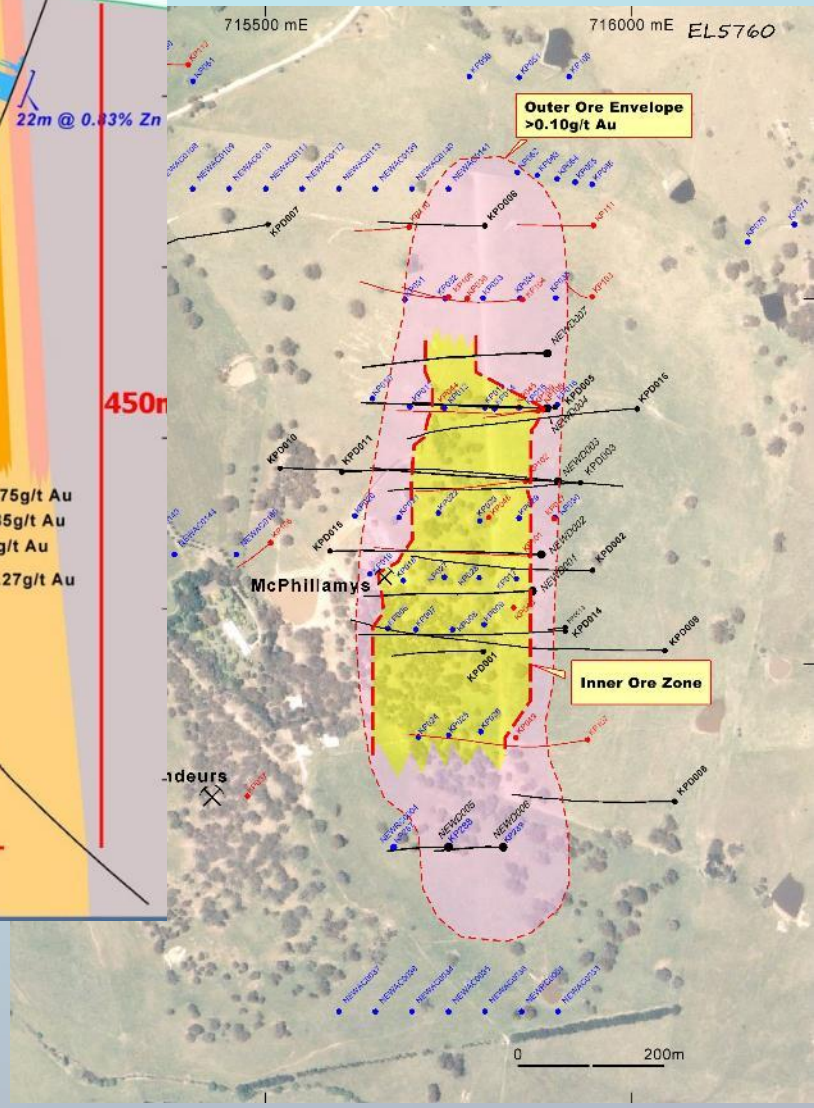
Initial air core drilling indicated extensive gold mineralisation and follow up RC and core drilling confirmed a substantial discovery 2006.

A resource was compiled by the JV and reported in July 2010 at 2.96Moz.

Newmont had earned its initial 51% in 2009 and elected to proceed to complete a BFS, earning an additional 24%.

After completing scoping studies, including metallurgy and mining, Newmont concluded that the Project did not meet its investment criteria, and elected to sell its 51%.





Alkane was heavily committed to developing the Tomingley and Dubbo projects and also decided to sell its equity.

McPhillamys

A brief interlude

Due to NEM's existing shareholding in Regis Resources, they were deemed as the best option for sale. The full price was A$150M to be satisfied by the issue of RRL shares.

Alkane ultimately sold its 49% netting about $60M. These funds were applied to the Tomingley development.

The future is in Regis' hands.

The big chill …… perhaps a sign of things to come.

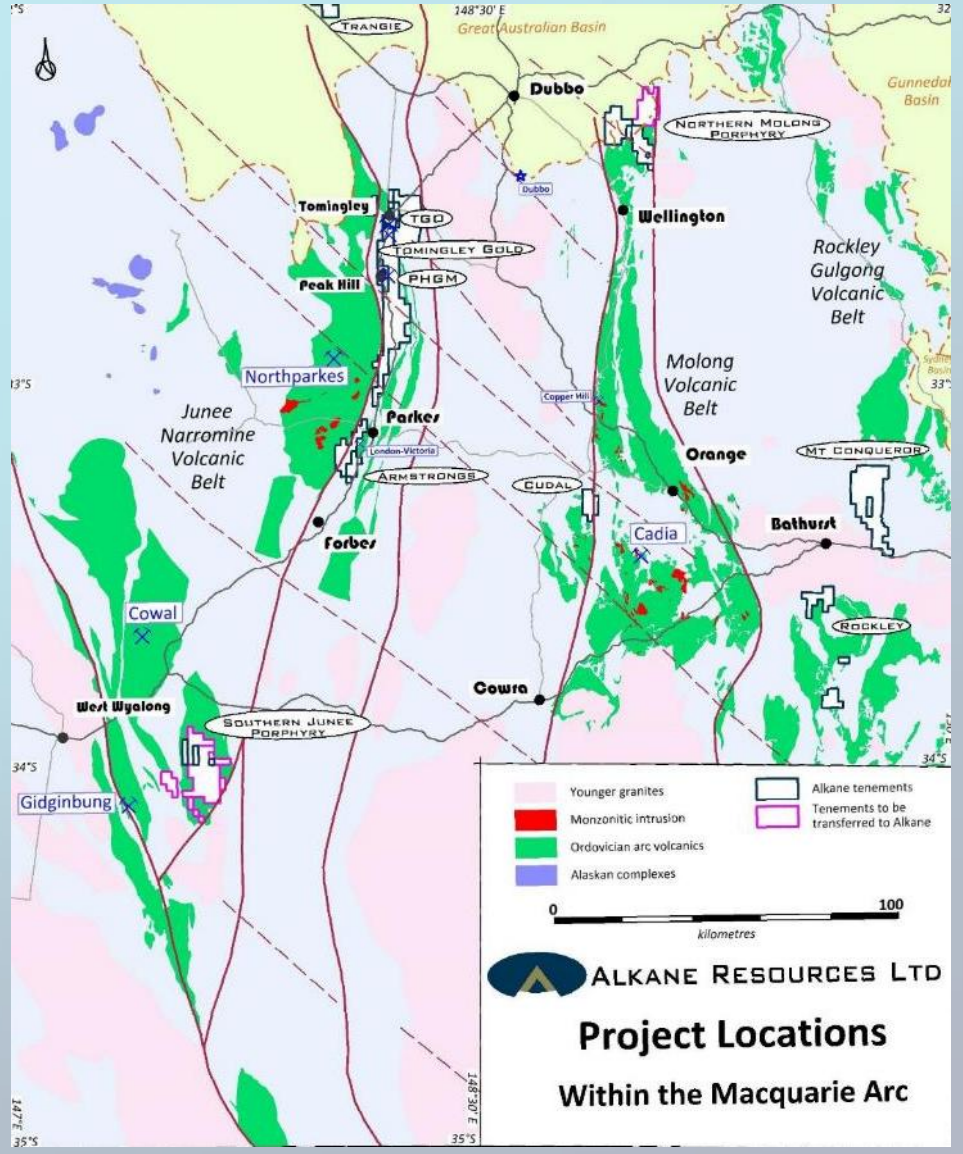
North Molong Porphyry Project (NMPP)

History

Original tenement acquired from CRAE (Rio Tinto Exploration) 2004. Initial interest being the historically mined (70,000 ozs) high grade quartz vein at Bodangora (Mitchell's Creek mine).

Following drill testing of Bodangora, Alkane initiated a thorough review of a substantial data base on the whole project area. This work highlighted a number of potential porphyry type targets demonstrated by the outcropping alteration and mineralisation at the small historic workings at Kaiser, within a favourable Ordovician volcanic arc.

Focussed by the significant lithogeochemistry characterisation prospectivity of the Macquarie Arc by CODES (UTAS) and GSNSW, it was apparent the volcanic-intrusive sequences are of "alkalic" affinity, similar to modern day oceanic island arcs and very prospective for large porphyry and epithermal Au-Cu systems.



NMPP

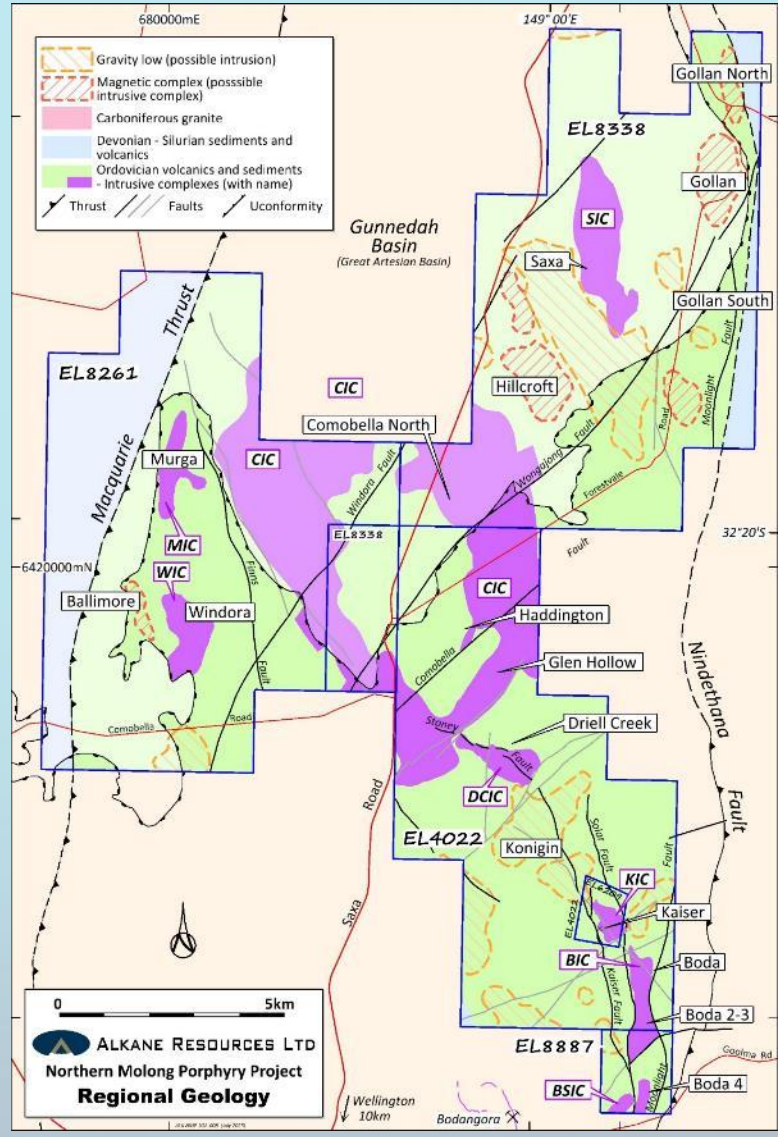
Boda – Kaiser discovery

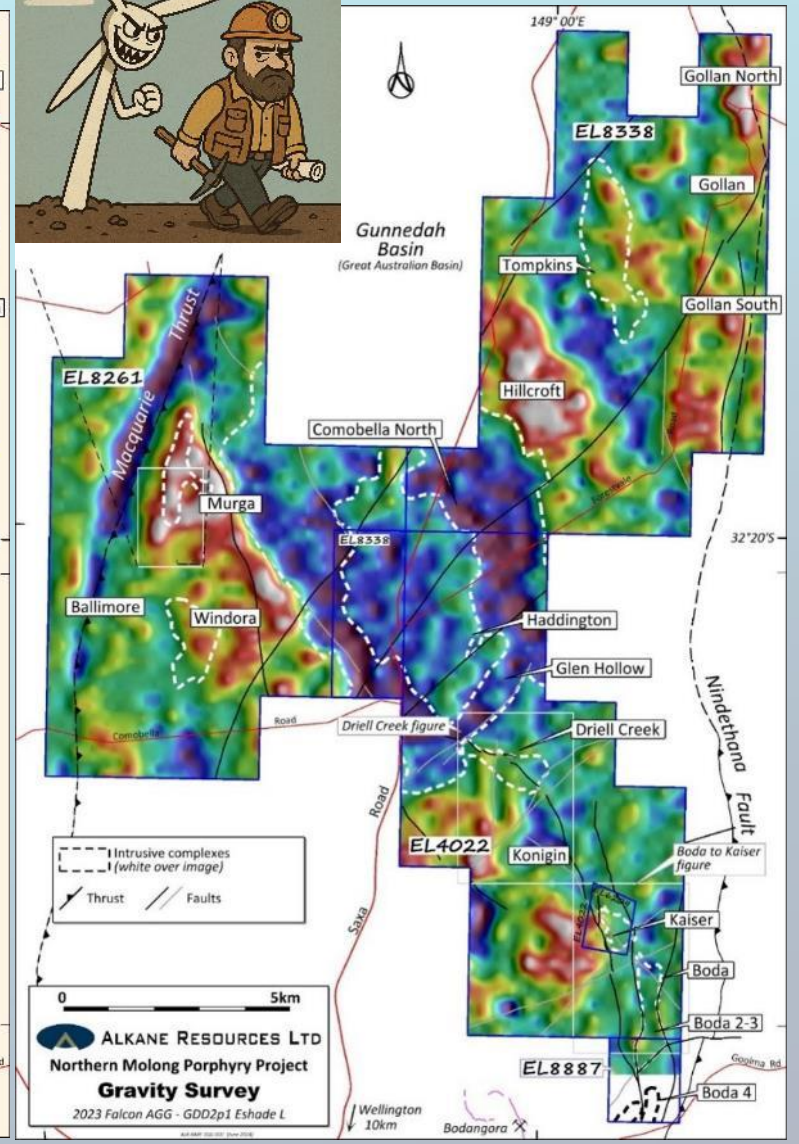
Seven monzonitic intrusive complexes identified by a combination of geological mapping; aeromag - radiomentrics; airborne gravity; supported by IP, ANT.

Reconnaissance drilling tested several areas (2016 - 17), with most encouraging at Boda and Kaiser in the SE of the Project area.

Exploration was halted (2017-18) by State approval to build a wind farm, with turbines scattered over the Boda and Kaiser targets.

Following agreement with the power company, drilling recommenced in 2019 and significant Au – Cu mineralisation within extensive alkalic type porphyry alteration was identified.





NMPP

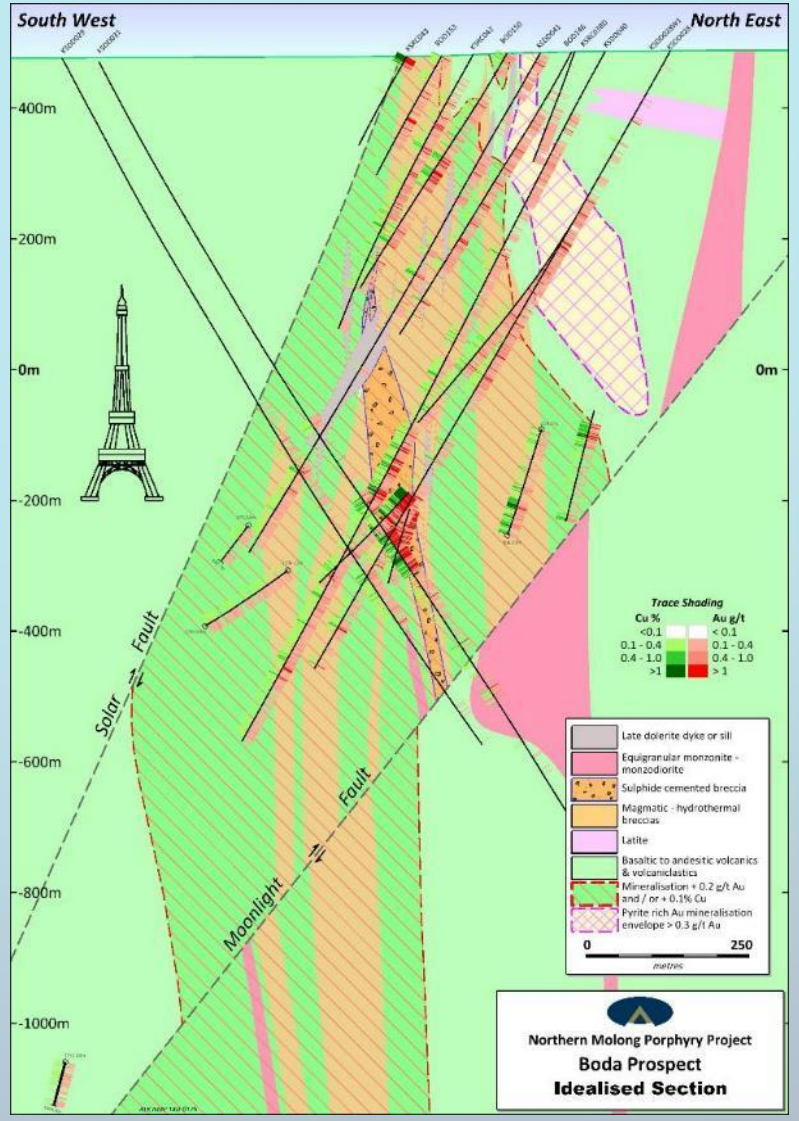
Boda – Kaiser geology

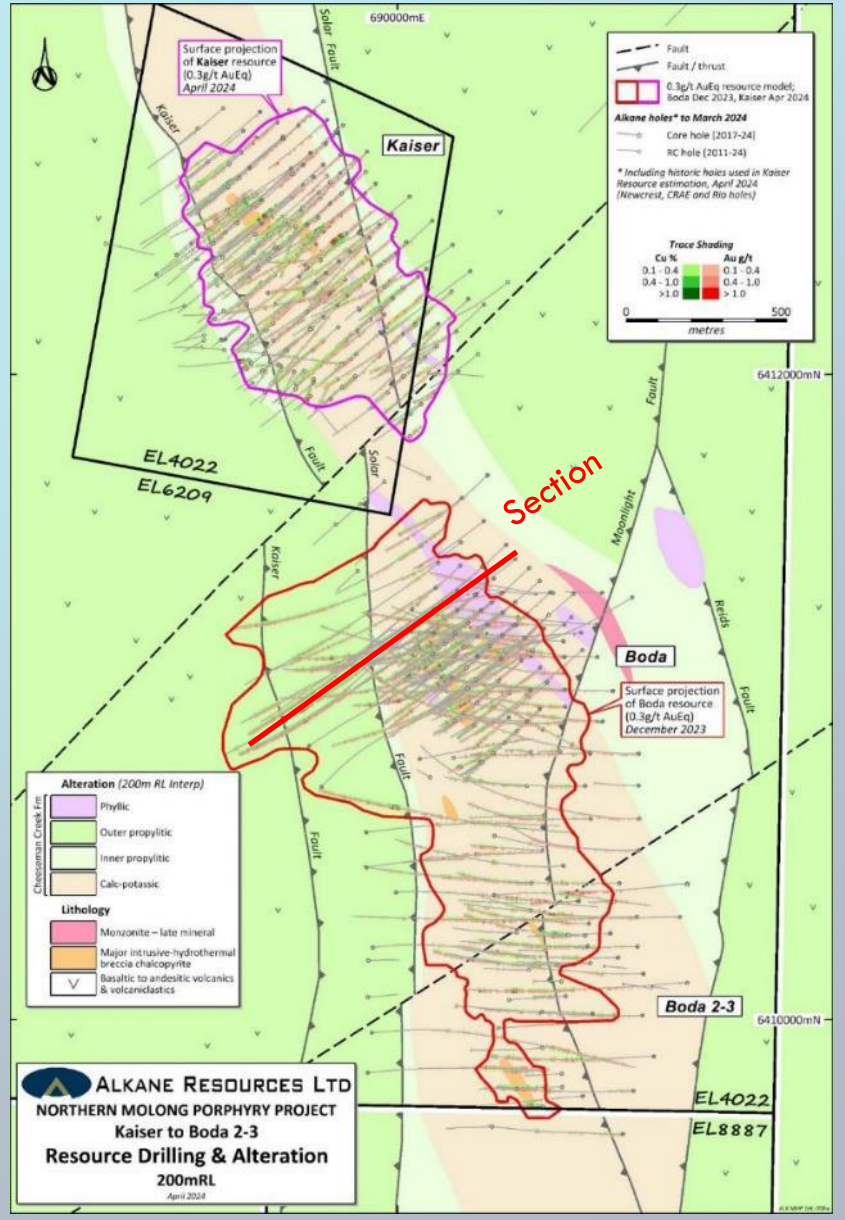
Since 2019, around 250,000m of core and RC drilling has defined a large porphyry Au-Cu deposit.

The drilling has demonstrated >3km long and ~500m wide zone of calc-potassic alteration (biotite-actinolite-epidote-magnetite) with disseminated Py-Cpy(-Bn).

Highest grades focussed in hydrothermal breccias such as:

KSDD007 - 96.8m @ 3.97g/t Au and 1.52% Cu
Chalcopyrite cemented breccia
within calc-potassic alteration of 1,167m @ 0.55g/t Au and 0.25% Cu from 75 metres

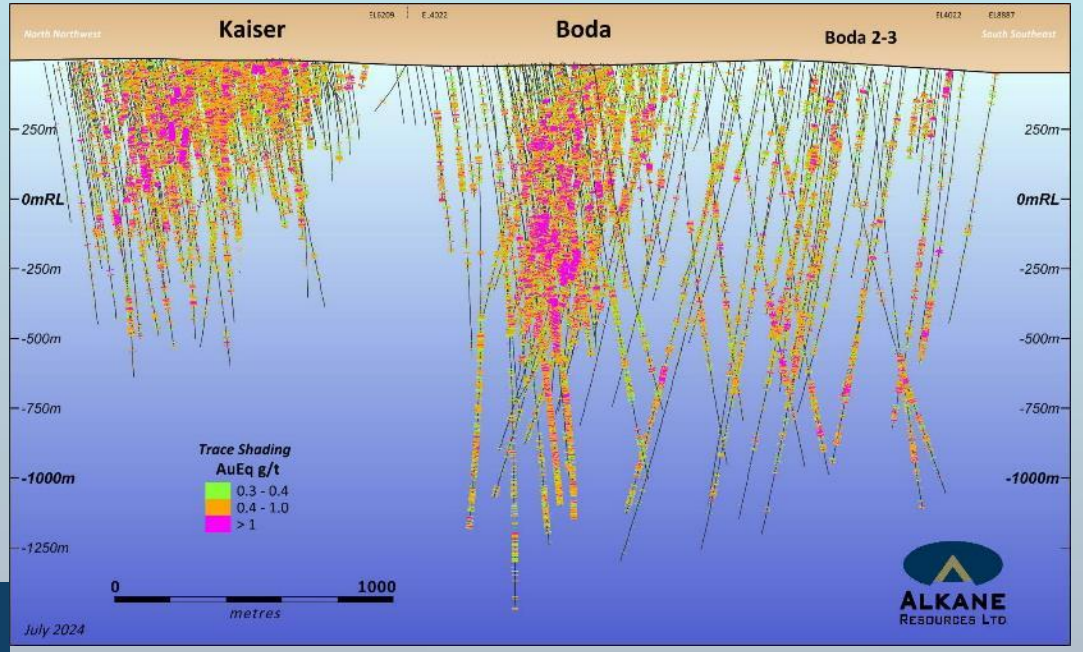


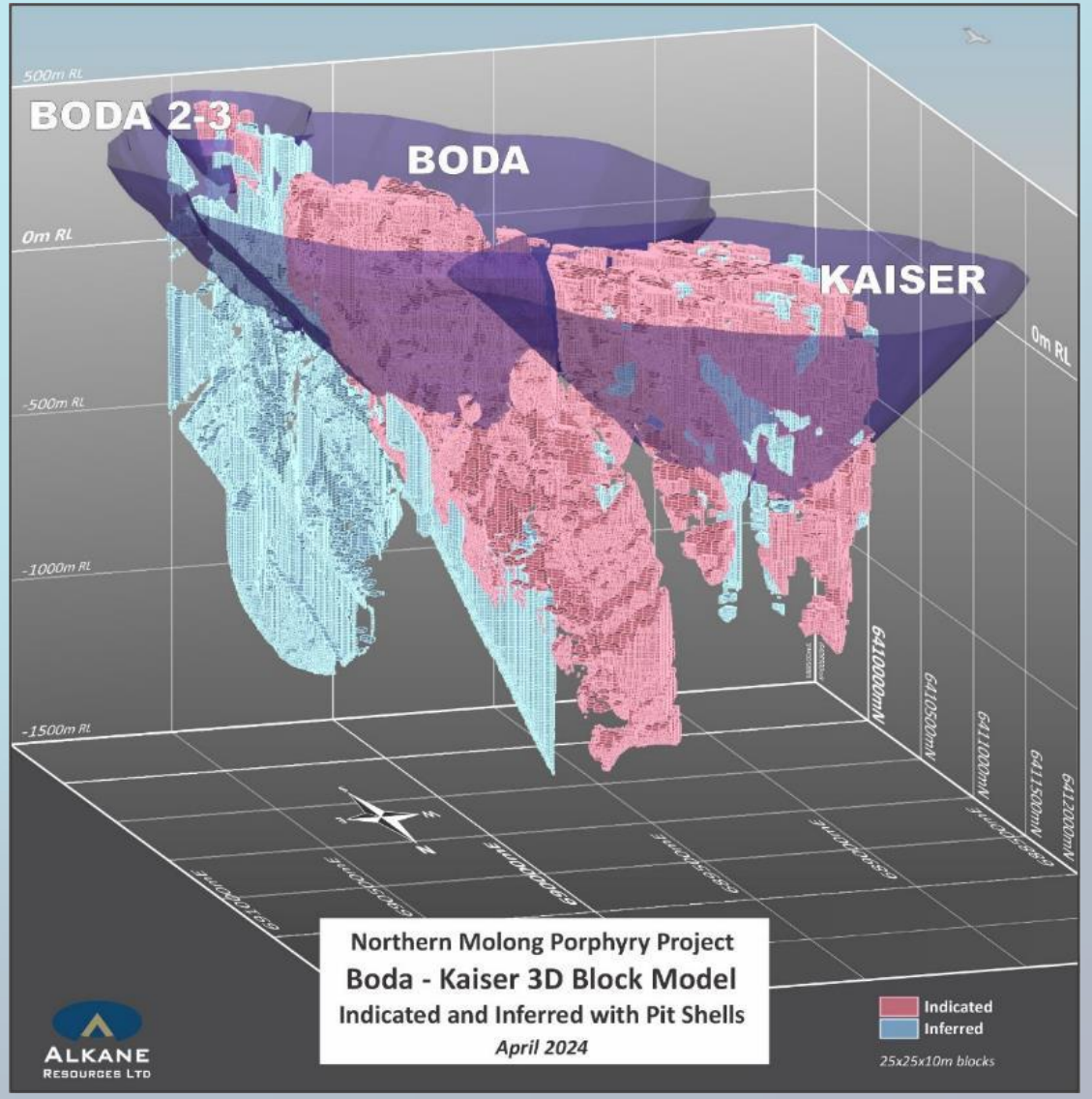


NMPP

Boda – Kaiser Resource

DEPOSIT	INDICATED			INFERRED			TOTAL				METAL		
	Tonnes (Mt)	Au (g/t)	Cu (%)	Tonnes (Mt)	Au (g/t)	Cu (%)	Tonnes (Mt)	AuEq* (g/t)	Au (g/t)	Cu (%)	AuEq* (Moz)	Au (Moz)	Cu (Mt)
Open Pittable Resource (cut-off 0.3g/t AuEq)													
Boda	191	0.36	0.17	42	0.29	0.16	233	0.58	0.35	0.17	4.31	2.60	0.39
Kaiser	179	0.27	0.20	10	0.29	0.14	189	0.54	0.27	0.19	3.28	1.66	0.37
Subtotal	**370**	**0.32**	**0.18**	**52**	**0.29**	**0.16**	**422**	**0.56**	**0.31**	**0.18**	**7.59**	**4.26**	**0.76**
Underground Resource (cut-off 0.4g/t AuEq)													
Boda	151	0.34	0.20	198	0.34	0.18	350	0.59	0.34	0.18	6.63	3.78	0.65
Kaiser	16	0.30	0.22	8	0.36	0.20	24	0.61	0.32	0.21	0.46	0.24	0.05
Subtotal	**167**	**0.34**	**0.20**	**206**	**0.34**	**0.18**	**374**	**0.59**	**0.34**	**0.18**	**7.09**	**4.02**	**0.70**
TOTAL	**537**	**0.32**	**0.19**	**258**	**0.33**	**0.18**	**796**	**0.58**	**0.33**	**0.18**	**14.7**	**8.28**	**1.46**





NMPP

Boda – Kaiser Findings

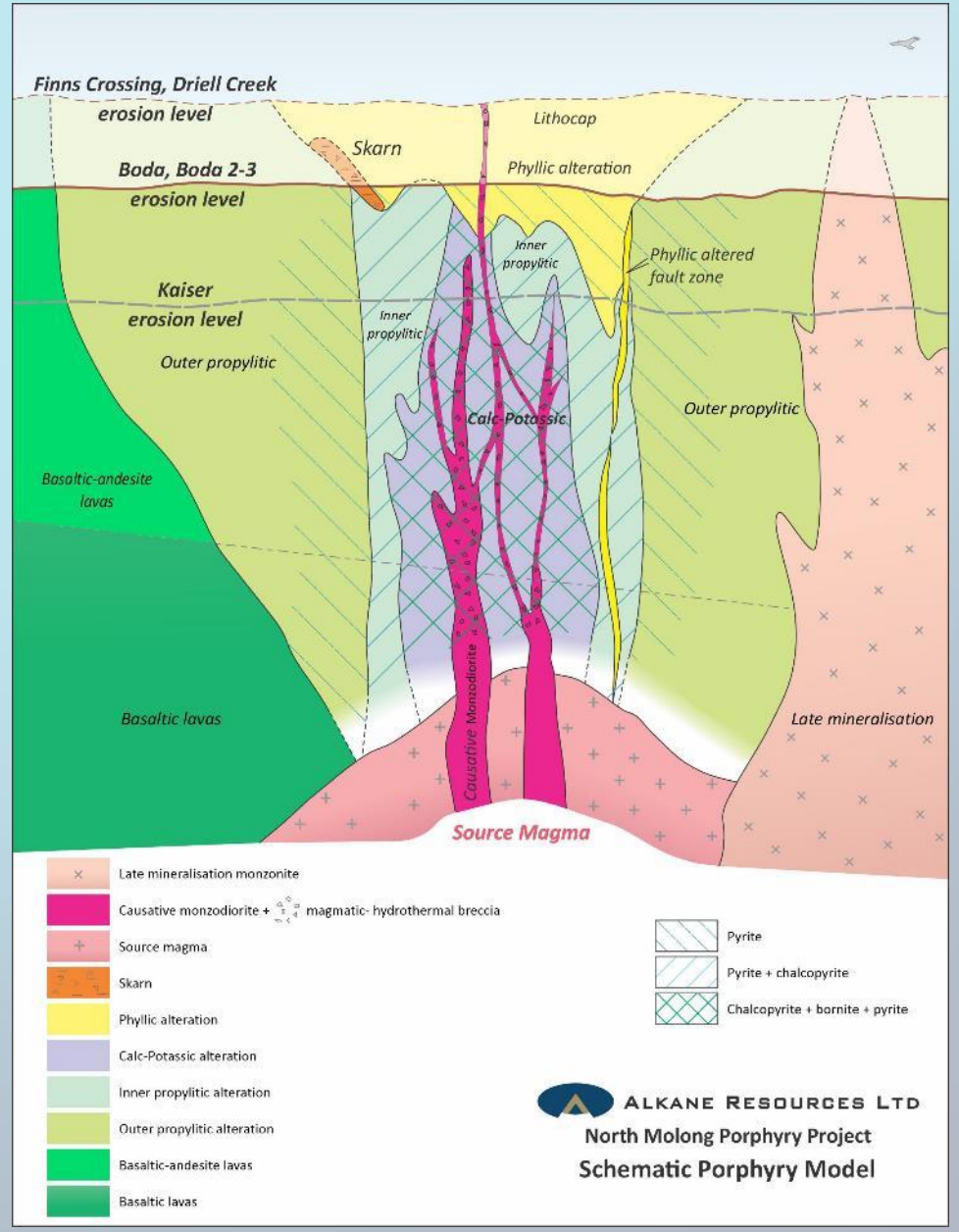
System is a silica undersaturated calc-alkalic, intrusive monzonitic complex within a late Ordovician alkalic volcanic arc. The monzonites have been dated at ~443 – 437Ma.

While complicated by late thrust structures, the alteration trends from a broad outer propylitic → inner propylitic → calc-potassic (minor potassic) “cored” by narrow monzonitic magmatic dykes often with hydrothermally breccia above.

There is a clear lateral geochemical zonation from inner Cu → Au-Cu → Mo → Mn – Zn – Pb → As - Sb etc but is sometimes “messed up” by the late thrust structures.

Lithocaps of extensive phyllic alteration are preserved in a number of locations regionally.

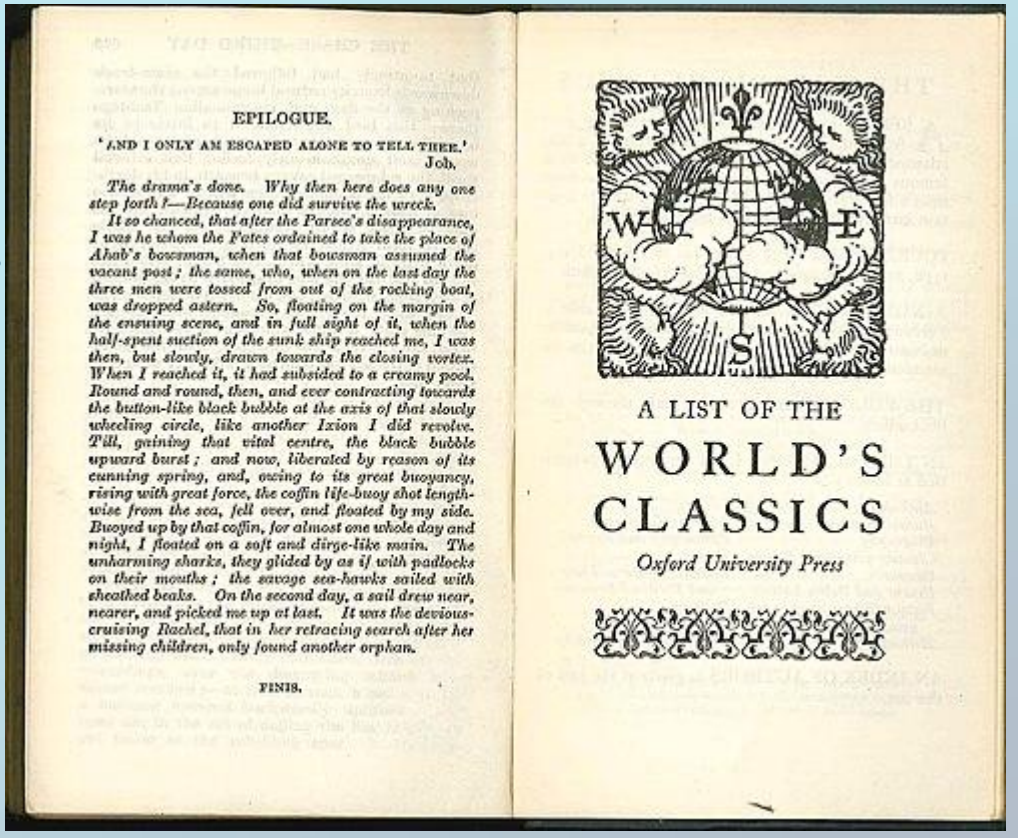
Next to lithogeochemistry, detailed magnetics provide the best targeting aid with the hydrothermal cells often being outbound to monzonitic intrusive complexes.



Epilogue

The ten recommendments

- Funding – what strategy. Find and develop or find and sell (the “Canadian Model”. Financial markets are very unreliable.
- Promote a strong technical team (doesn’t have to be big) – encourage technical excellence and further education. Engage specialist consultants.
- Select mineral systems (commodities) that suit the regional geology and metal markets. Don’t become a commodity grasshopper at financial markets whims.
- Investigate geochemical and geophysical advances and techniques, and confirm they are practical for your targets.
- Core drill early (if possible) to understand geology and structure.
- Re-rate projects after each exploration phase – risk/reward.
- Be regionally focussed to maximise your available cash resources.
- Initiate and maintain communications with local stakeholders.
- Work with research institutes as much as possible (cheap knowledge).
- Apply science to environmental management.



EPILOGUE.

'AND I ONLY AM ESCAPED ALONE TO TELL THEE.'
Job.

The drama's done. Why then here does any one step forth?—Because one did survive the wreck.

It so chanced, that after the Parsee's disappearance, I was he whom the Fates ordained to take the place of Ahab's bowsman, when that bowsman assumed the vacant post; the same, who, when on the last day the three men were tossed from out of the rocking boat, was dropped astern. So, floating on the margin of the ensuing scene, and in full sight of it, when the half-spent suction of the sunk ship reached me, I was then, but slowly, drawn towards the closing vortex. When I reached it, it had subsided to a creamy pool. Round and round, then, and ever contracting towards the button-like black bubble at the axis of that slowly wheeling circle, like another Ixion I did revolve. Till, gaining that vital centre, the black bubble upward burst; and now, liberated by reason of its cunning spring, and, owing to its great buoyancy, rising with great force, the coffin life-buoy shot lengthwise from the sea, fell over, and floated by my side. Buoyed up by that coffin, for almost one whole day and night, I floated on a soft and dirge-like main. The unharming sharks, they glided by as if with padlocks on their mouths; the savage sea-hawks sailed with sheathed beaks. On the second day, a sail drew near, nearer, and picked me up at last. It was the devious-cruising Rachel, that in her retracing search after her missing children, only found another orphan.

FINIS.

A LIST OF THE
WORLD'S
CLASSICS
Oxford University Press

Acknowledgements

It is not possible to mention all the individuals and groups that have been part of this saga, so all I can say is

Thank you

Today

Future

Alkane 2.0

Alkane is moving to its next stage through the merger with Mandalay Resources. Another overnight success?

A Strong Base to Grow a Mid-Tier Gold Company:

3 Operations in Premier Jurisdictions

ALKANE RESOURCES LTD

ASX: ALK TSX: ALK OTCQX: ALKEF

TOMINGLEY NSW, Australia

Jul 24 – Jun 25 Production

70.1koz Au[1]

COSTERFIELD Victoria, Australia

Jul 24 – Jun 25 Production

49.4koz AuEq[1]

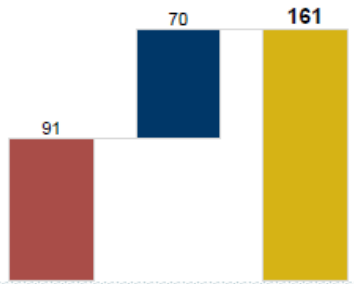
BODA-KAISER NSW, Australia

M&I Resources[2]

~9.8Moz AuEq

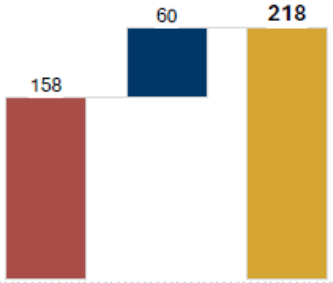
FY2025 PRODUCTION[1]

koz AuEq



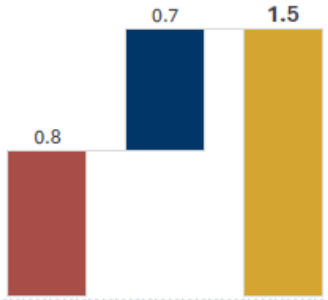
30 JUNE 2025 A$ CASH & BULLION[1]

A$



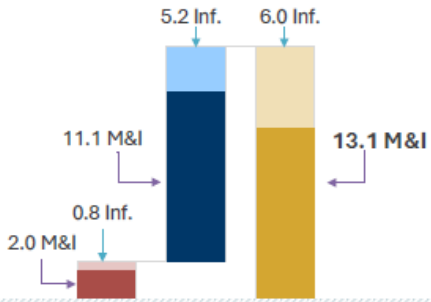
RESERVES[2]

Moz AuEq



RESOURCES[2]

Moz AuEq



BJÖRKDAL Skellefteå, Sweden

Jul 24 – Jun 25 Production[1]

41.4koz Au

1. Mandalay prior results and calendar half-year update from Mandalay 9 July 2025 news release and Alkane fiscal year update from ALK Announcement 7 July 2025. Refer to Page 3 of this presentation for information on metal equivalent calculation.
2. Details of all resources and reserves follow in the Appendix, including in relation to the calculation of metal equivalents (refer p 23-27).

MANDALAY ALKANE COMBINED CO.

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