

PEKO WALLSEND-RISE AND DEMISE -SMALL COPPER MINE TO MAJOR MINING
COMPANY, BUILT ON EXPLORATION SUCCESS AT TENNANT CREEK
FOCUS ON EARLY 1960'S

Juno wedge run off intersection – 15m at 9.2 ozs/t gold/1964
Warrego gold – crosscut sampled – 50m at 65.5 ozs/t gold/1972

Life at Tennant Creek in the early 1960's
The mines discovered and developed/acquisitions
Why was exploration initially successful
What exploration methods were used
Geopeko staff levels
Are there lessons to be learnt/Decline

ACKNOWLEDGEMENTS

- My comments are based on first hand knowledge as the principal exploration geologist from 1960 to 1965; site geologist for discovery holes at Juno and Warrego; and on events after 1965 from a book by John Elliston, “Australians successfully exploring Australia” There may be errors in dates etc.
- I would also like to acknowledge the professionals who most influenced my professional thinking and life and who taught me to be sceptical of all accepted theories in geology and in ore genesis – Professor Sam Carey, University of Tasmania and John Elliston, Managing Geologist, Geopeko Ltd

PEKO MINE IN 1960

- Peko Mines NL in 1960 was based on a small high grade copper/gold mine
- Gold production from 1933 to 1949
- Copper gold production from 1954 to 1975
 - 1954/55 milled 24,000t at 7.64% Cu and 6.6g/t Au
 - 1960 increased to 165,000t at 4% Cu and 3.99g/t Au
 - Produced a copper concentrate, bagged on site, transported by road train to Alice Springs, then train (Old Ghan) to Port Augusta and then four times per year to Japan by ship. At some later date shipments went to smelter at Mt Morgan
- John Elliston hired in 1957 to “find more ore”. Peko had only 4/5 years reserves at that stage





SUMMARY - THE MAIN MINES AND THEIR SUBSEQUENT CASH FLOW THAT ENSURED GROWTH AND SUCCESS BUT ALSO ULTIMATE DEMISE

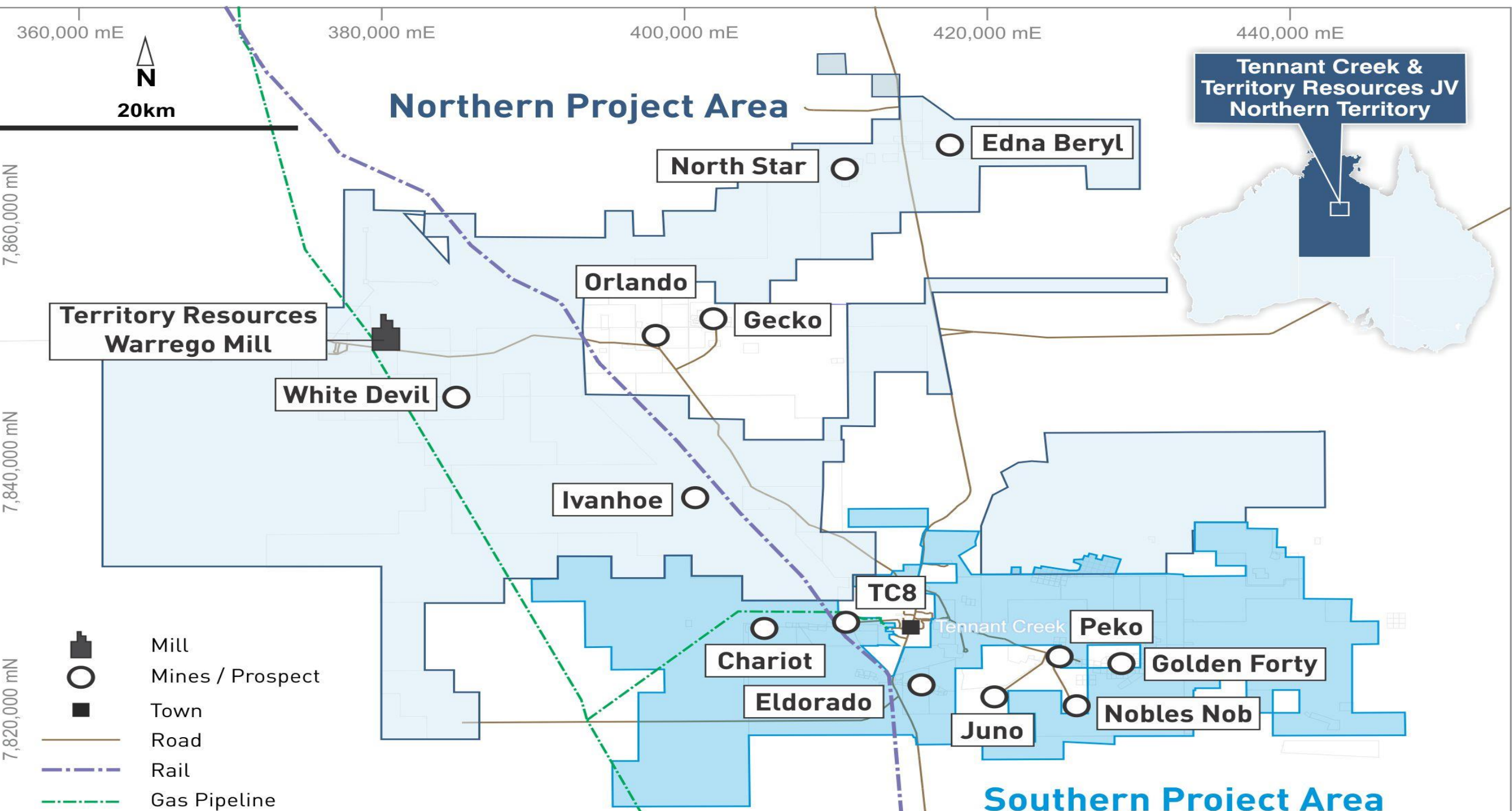
- Six new mines plus satellite orebodies at Peko discovered and developed from 1959 to 1982 at Tennant Creek
- The Juno high grade discovery ensured expansion in the late 1960's
 - **839,000 ozs Au produced at 54.75g/t Au**
- The discovery of high grade gold at the then copper, and in production Warrego Mine in 1970 continued this expansion until the early 1980's
 - **860,000 ozs Au produced at ????**

Peko assets 1960 - \$4.6m

Peko Wallsend profit 1980 - \$47m/shareholders equity \$483m

Profit 1981 - \$3.6m/Loss 1982 – \$18.2m

Merged with North Broken Hill - 1988



TENNANT CREEK – 1960/65

- What was Tennant Creek like in early 1960's
- Remote; 315 miles to Alice Springs, 630 miles to Darwin, 417 miles to Mt Isa. Narrow sealed roads constructed for war effort.
- In 1960 only radio Australia short wave; ABC repeater station established 1961
- Basic hotel/shops. Food ordered weekly from Adelaide – ordered by carton. No such thing as a restaurant
- Peko provided basic housing for staff- ours was small, 700sq ft. Evaporative cooling installed late 1960. Kindergarten provided for all "toilet trained children. Non staff accommodation poor
- Strong sporting activities – basketball, tennis, baseball

Tennant Creek continued

- Marked separation between staff and non staff
- Small basic hospital. Doctors would rotate in / out every few months. We had two children at that hospital – something that might give us second thoughts these days.
- Tasmania to Tennant Creek!! With my wife and a 5 month old baby. We had previously only been to Melbourne so travel to and arrival at Tennant Creek was somewhat of a culture shock. Took two days with overnight Adelaide – TAA- DC6B, Adelaide, Maree, Oodnadatta, Alice Springs, Tennant Creek.
- No such thing as insider trading or share trading restrictions

WHERE/HOW WE LIVED
TRANSPORT – TO / TENNANT CREEK
HOW/WHERE WE WORKED



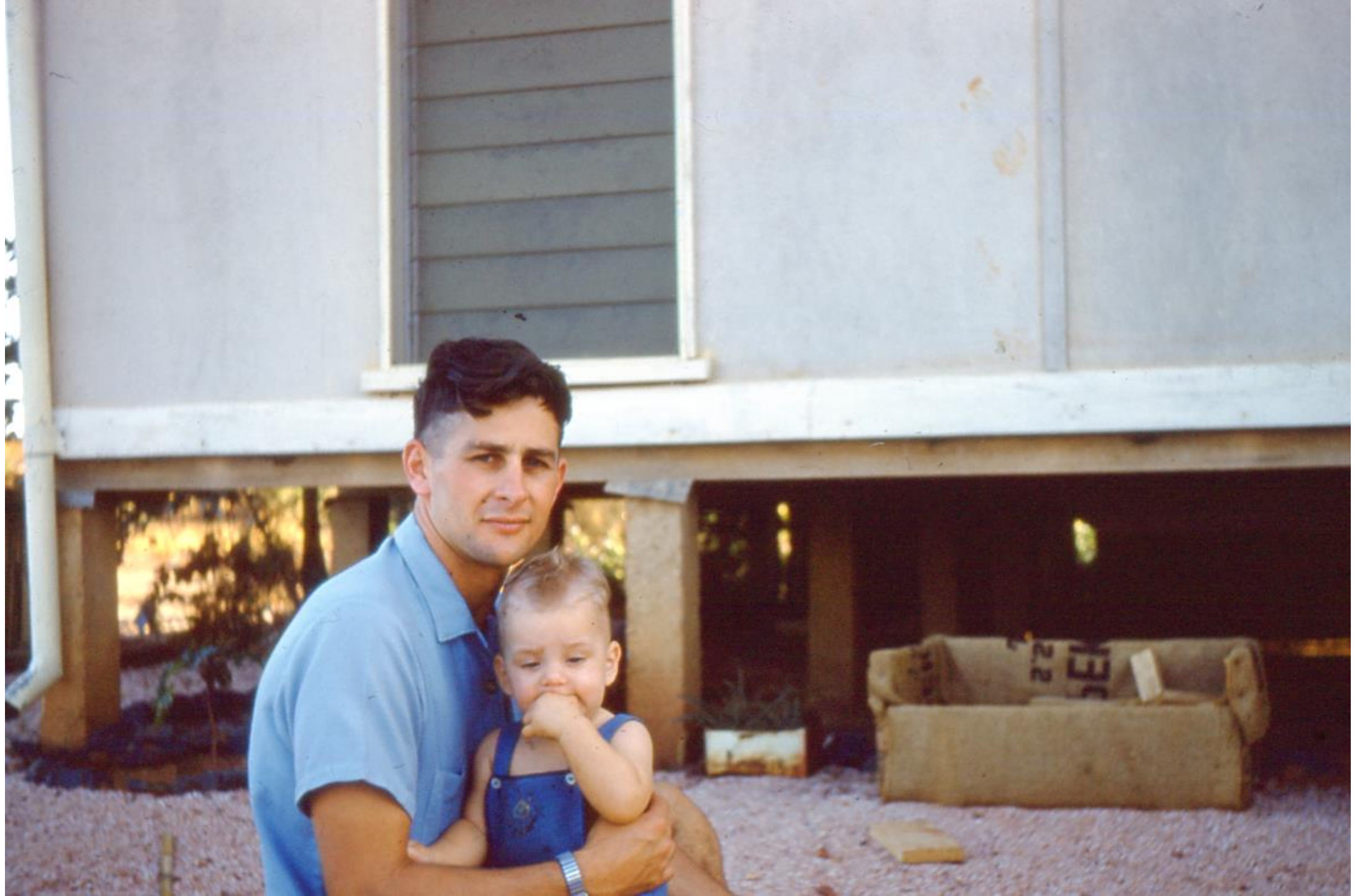














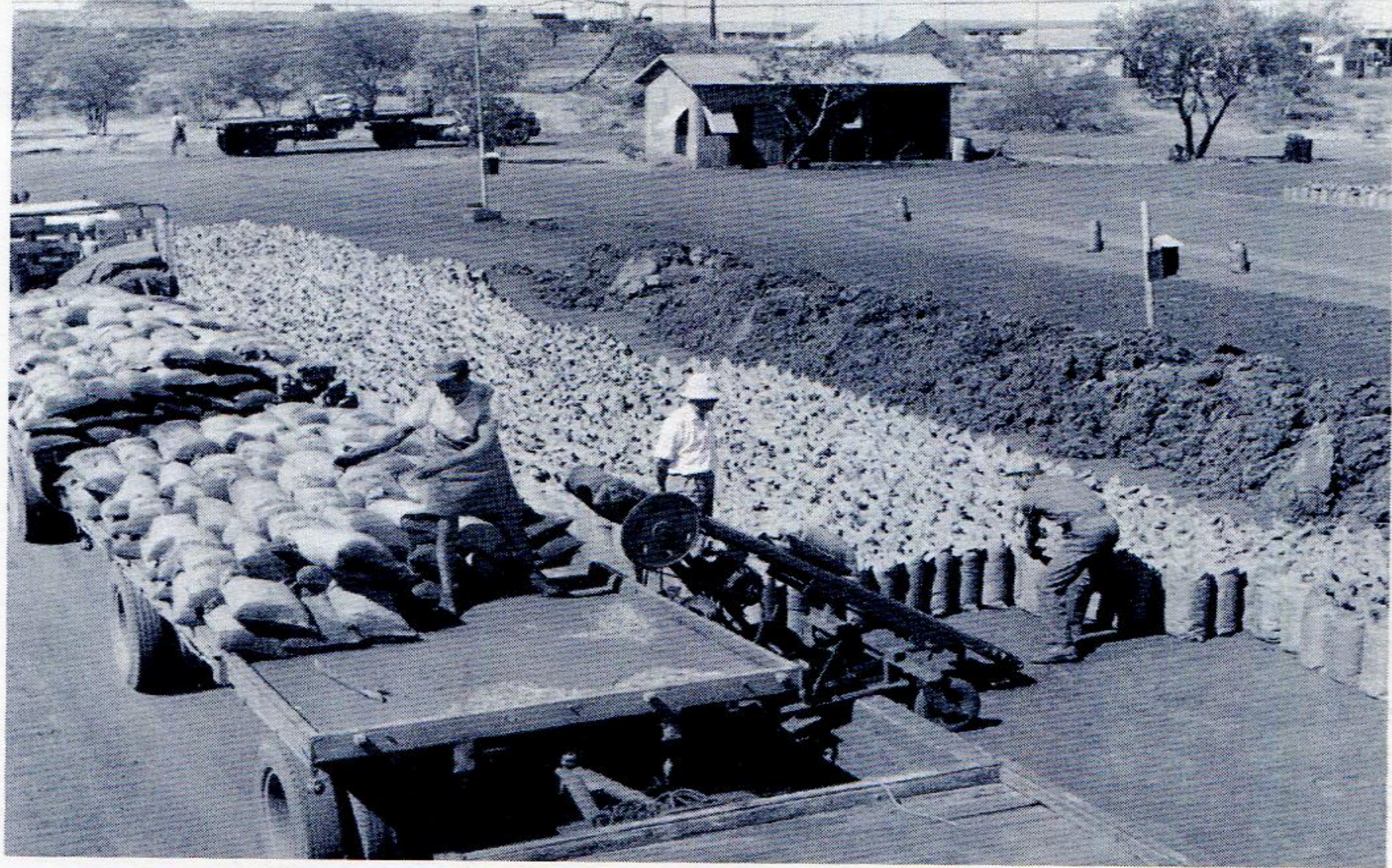












Peko copper concentrate dust was dried in the sun and

TO ALICE SPRINGS/ MAIN STREET TENNANT CREEK







TO/FROM TENNANT CREEK



STUART HIGHWAY



THE GHAN - WILLIAM CREEK





ALICE SPRINGS TO ADELAIDE -1963



HOW/WHERE WE WORKED











WARREGO DRILL

















TIMELINE DISCOVERIES/DEVELOPMENT/ACQUISITIONS

How it all played out

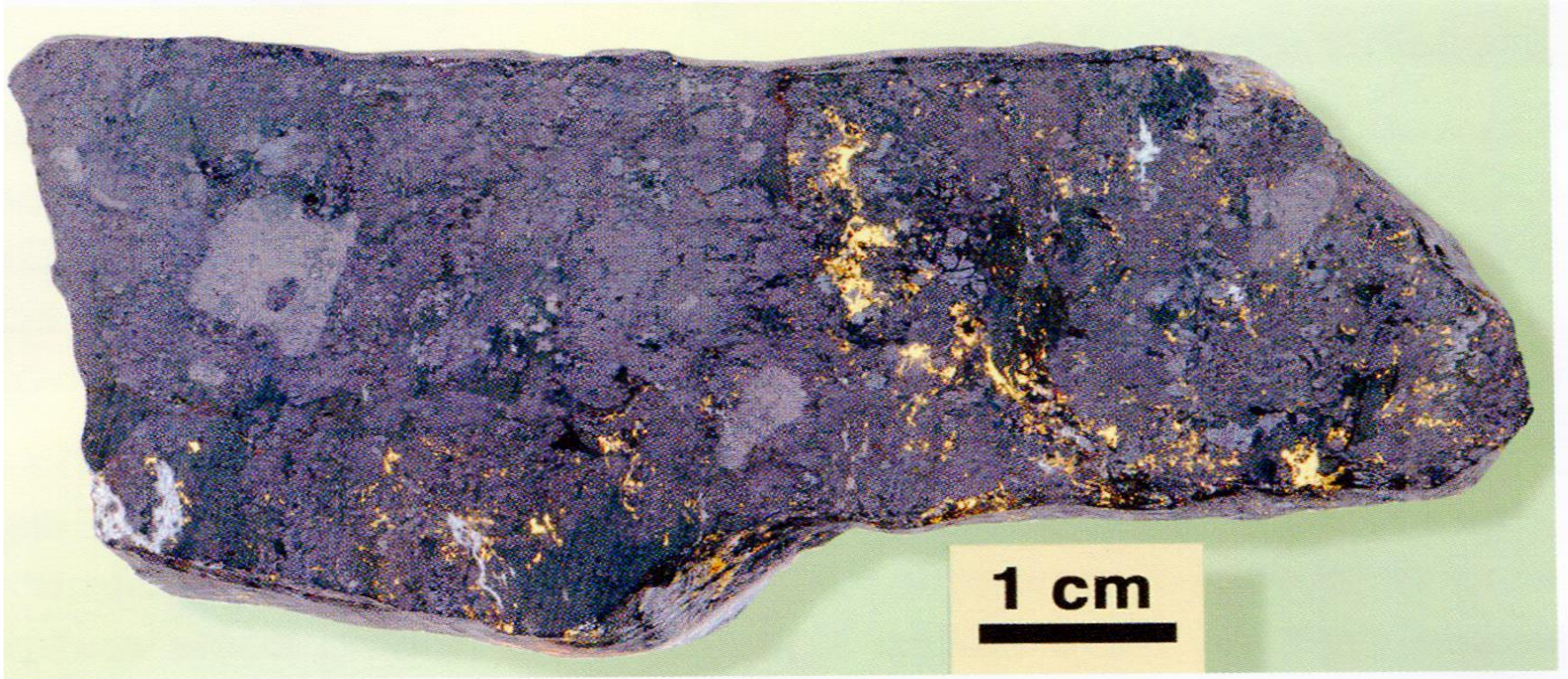
- Peko Mine – 9 smaller, satellite orebodies defined between 1960 and 1973. Extended life and provided initial funding for exploration
- Orlando Mine – initial drill hole 1959, 11m at 39.9g/t Au: 1962 first production; reserves 250,000t at 18g/t Au and 1.1% Cu; **LUCK**
- Merger with Wallsend Coal to form Peko Wallsend Ltd –January 1961
- Geopeko – 1962
- Ivanhoe Mine – first intersection 1961; Initial ore reserves 250,000 to 370,000t at 4.5% Cu and 4.6g/t Au

TIMELINE DISCOVERIES/DEVELOPMENT/ACQUISITIONS cont.

How it all played out -continued

•Juno Mine

1. Leases acquired 1958 from New Merloo Mines for \$100
2. Initial 3 holes, 2 by National Lead and 1 by Peko all deviated and missed target. Very nearly abandoned
3. Surface mapping defined bedding and cleavage directions and discovery hole drilled down cleavage direction.
4. Initial intersections October 1964; 12m at 167g/t Au and 1.3% Bi; 15.5m at 286 g/t Au.
5. Operated March 1968 – 1977, recovered 839,000 ozs at 54.75g/t Au
6. LUCK – This hole deviated about 20m from target. Later found target point was barren ironstone, if this had been intersected Juno would not have been found



Visible gold metal in the Juno ore indicated exceptionally high grades. It justified careful mining procedures and some less scrupulous miners found it might pay to take such attractive pieces home in their lunch tins!

TIMELINE DISCOVERIES/DEVELOPMENT/ACQUISITIONS cont.

How it all played out - continued

- **Warrego Mine**

1. Initial intersection , May 1962, 23m at 3.92% Cu and 3.0g/t Au
2. Initial ore reserves, 1985, 3.1mt at 2.6% Cu and 1.9g/t Au. Not regarded as economic
3. Surface drilling from 1961 to 1969. Apparently sufficient ore proved to justify copper production in 1971, initially treated at Peko until processing plant erected at Warrego
4. Gold orebody defined initially August 1972 – 50m crosscut averaged 65.5 ozs Au/t. 135,000 ozs – 35g/t produced over 4 months
5. 860,000ozs Au produced to 1982
6. Normandy in 1980's acquired all Peko Wallsend Tennant Creek operations for \$15m; extracted \$80m metal from Warrego tailings



By 1976 gold was pouring out of that mine! This gold is approximately one month's production from Zero Stope at a time when copper concentrates had to be sent to Mt. Morgan due to the mining division's inability to operate the Tennant Creek copper smelter.

TIMELINE DISCOVERIES/DEVELOPMENT/ACQUISITIONS cont.

How it all played out - continued

- Mt Morgan/Mt Chalmers -1968; exploration plus new smelter constructed; closed 1981.
- King Island Scheelite – 1968; Bald Head orebody – 1971.
- Gecko – 1975 production; first drilled 1968; 1.5mt at 4%Cu, 0.6g/t Au.
- Warman Holdings acquired 1969.
- Ranger Uranium located 1969 by aerial radiometric survey; J/V with EZ; some luck; anomaly defined by adjacent survey by Noranda; ready for production – 1972 but delayed by Whitlam government with yellowcake not produced until 1981; caused \$13m liability.
- Warrego Smelter – 1972; disaster, many teething problems; operated for only 2 months; attempted reopening of smelter in 1980 but again closed October 1981, producing only 4800t of blister copper; Total loss \$120m quoted by Elliston – (which may include additional cost of transporting Tennant Creek concentrate to Mt Morgan smelter for smelting).

TIMELINE DISCOVERIES/DEVELOPMENT/ACQUISITIONS cont.

How it all played out - continued

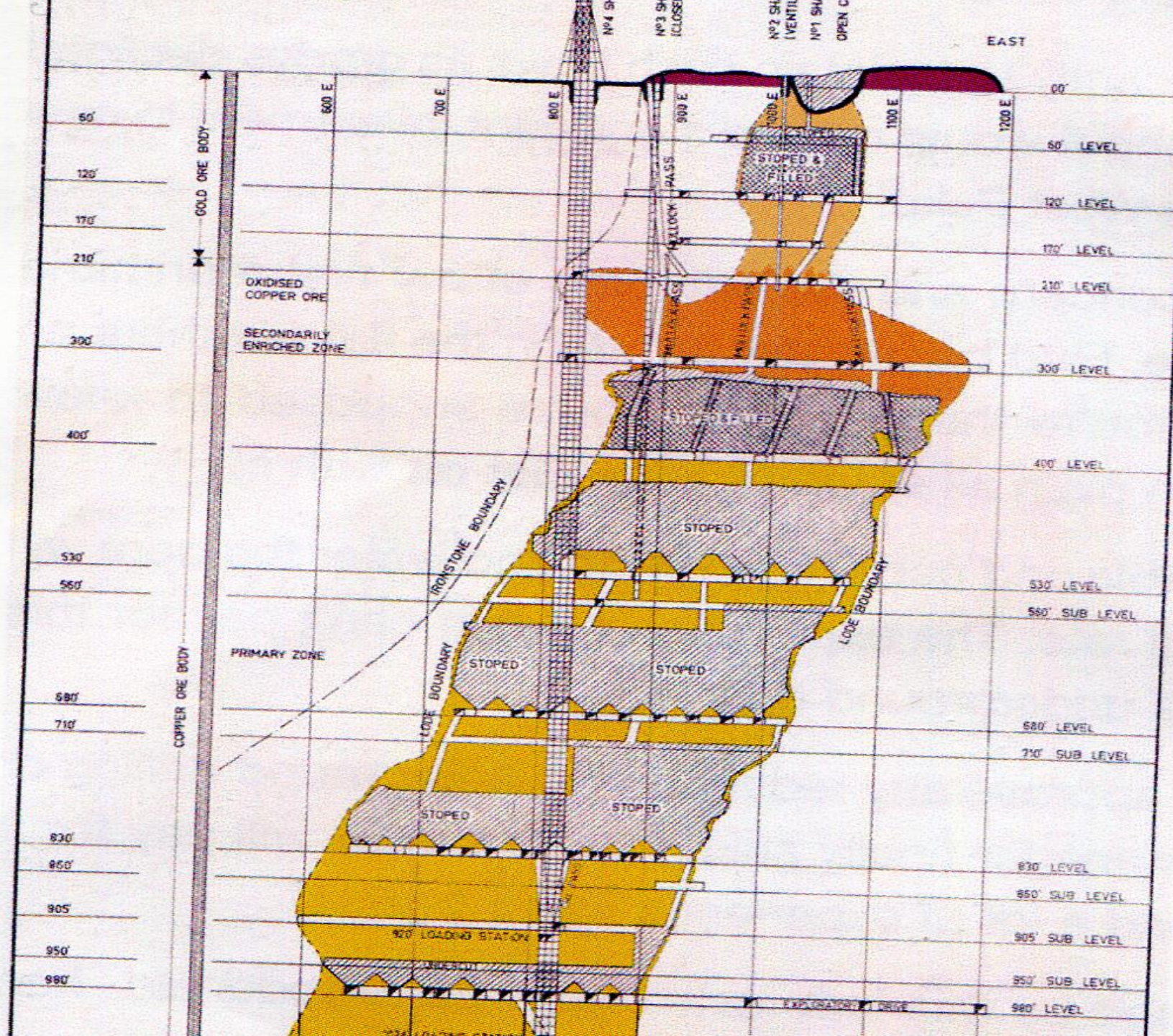
- Austirex formed – 1973; undertake airborne spectrometric /magnetic surveys using new 256 channel spectrometer
- Austirex contract with Iran – 1976; disrupted by revolution; broke even with some payments by 1984
- North Parkes porphyry copper discovered, production 1993; history unknown.
- Sims Consolidated acquired 1979
- 1982 - Argo mine
- 1982 -New Board for Peko Wallsend appointed, Charles Copeman as Chairman; most directors resigned or retired, largely due to Warrego smelter debacle. Most exploration staff resigned or retrenched
- 1983 – Robe River
- 1988 – merger with North Broken Hill

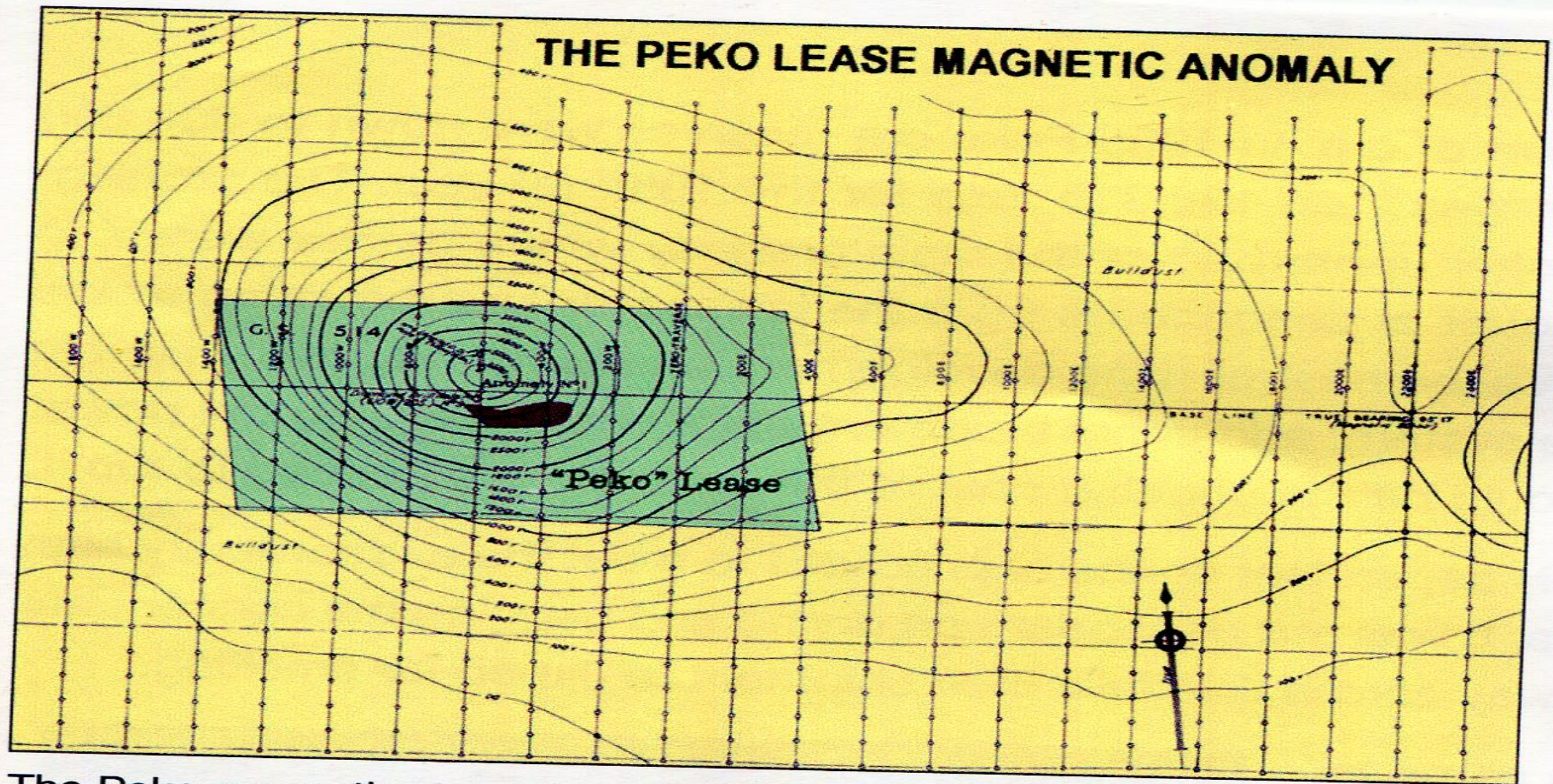
WHAT CONTRIBUTED TO EXPLORATION SUCCESS

- Small staff of two geologists – one for Peko Mine exploration/operations, one for district exploration and new mine geology; plus John Elliston as Supervisor/ Manager. Two field assistants at anyone time and after 1962 a draftsman and secretary. A further geologist joined in 1964.
- Elliston provided dynamic leadership – persuaded Board, Proud in particular, that success would depend on consistent funding and separation from Peko mine management where Mine Manager was ‘god” and did not always support Elliston’s concept of exploration
- Geopeko was set up and operating in 1962
- Elliston developed radical concepts for mineralisation based on colloid chemistry. Persuaded the Board this gave us an ‘edge” over others in exploration – and it probably did indirectly in discovery of Juno

Exploration success continued

- Peko Board, chaired by John Proud, a mining engineer of Stinson fame, dedicated about 30% of Peko Mine net cash flow to exploration – outstanding
- Peko orebody was magnetite/quartz/sulphide and could be defined clearly by aerial magnetics
- BMR released complete magnetic survey maps of Tennant Creek mineral district in 1959.
- Exploration strategy was simple – locate and acquire mineral rights over as many anomalies as possible, by pegging mineral claims, before competitors. Focus expenditure on what you know – Tennant Creek field.
- Almost two hundred were acquired, assessed and drilled from 1959 to 1980 for six new mines.
- Mines were developed cheaply and expediently by using Peko mining expertise and central processing at Peko Mine. Ore trucked to Peko.





The Peko magnetic anomaly was pear shaped but pioneering geophysical analysis (with a mechanical calculator) showed that two magnetic mineral lodes caused it.

EXPLORATION SUCCESS CONTINUED

- Very little regulation for new mines – no environmental impact /native title
- Successful drilling of magnetic anomalies was due to “new/advanced” modelling of anomalies developed by Lew Richardson, (L.A. Richardson and associates – Greg Kater). Critical Importance - cannot be underestimated.
- A crucial point of success was recognition by Elliston that drill hole deviation at Tennant Creek could be severe (up to 70 degrees recorded) First three holes drilled at Juno and two at Warrego deviated substantially and missed the target. At Juno two holes drilled by National Lead of America in late 1950's were thought to have negatively tested Juno but in fact deviated and missed.
- Tropari surveys to test drill hole azimuth were carried out on all Geopeko holes. Tropari's are fiendishly difficult instruments – to quote Elliston
- Luck

HOW WAS EXPLORATION CARRIED OUT

- Based on locating and drilling airborne magnetic anomalies
- In practice quite difficult to locate anomalies from airborne maps. Used aerial photos, dead reckoning, then ground magnetic traverses
- Geological mapping if outcrop available – most places none. No trace of mineralisation at surface above either Juno or Warrego.
- Drilling – if possible along cleavage direction to minimize deflection
- Geochemistry was not available or used in early 1960's. Only gold and copper assays were generally available to us until the advent of AA analysis.

HOW WAS EXPLORATION CARRIED OUT cont.

- Claim pegging, drill hole surveys, core splitting, drafting.
- Workplace health and Safety non existent both in exploration and mine geology; no doors on shaft cages, blasting at any time, no record of who was underground, men carried in ore skips, wandering around the desert alone (did learn to carry plenty of water), no dust masks.
- No such thing as Resources – Reserves were calculated from sections and level plans using slide rule. Board often announced Reserves which differed from our estimates!! No ASX or ASIC oversight.

EFFECT OF DISCOVERIES/CASH FLOW ON GEOPEKO STAFF

1957 to 1966 -

John Proud, Chairman – 1960 -1975; John Elliston, 1957 – 1982;

- Rob Ryan, 1959 – 1961 and 1966 – 1982; Bob McNeil, 1960 -1965;
- Kim Wright, 1962 – 1982; Neil Ross 1962 - ?(draftsman);
- Lew Richardson; 1957 – Greg Kater 1961 -1965 (geophysical consultants)
- Field Assistants – (two at any time); John Rhodes, Mick Meagher, Ray Meagher, Ian Tuxworth, Kevin Conway

1969 – 22 geologists/geophysicists

1973 – 44 professionals

1975 – staff reductions

1982 – most exploration staff gone!

DECLINE

- Many things contributed to the decline and demise of Peko Wallsend in 1982 as broad based mining company.
- The most important was the completion of mining at Warrego and Juno and thus termination of their cash flow by 1981. There was nothing to take their place.
- Also of great importance was the Warrego smelter debacle and its subsequent cost to Peko Wallsend of approximately \$120m – this caused changes to the board.
- The replacement in 1975 of John Proud as Chairman with George Lane, an accountant, in my view contributed to the decline – technical expertise was reduced on the Board.
- By 1980 Peko Wallsend had some 63 subsidiary's or separate businesses; did this mean focus was lost on key profit centres
- The “political” delay in bringing Ranger into production, plus consequent \$13m quarantined expense contributed to cash flow problems in 1982

DECLINE

- Exploration and investment surged in late 1960's and throughout the 1970's ; Geopeko went from 3 professional staff in 1963 to 22 in 1969 to approximately 44 in 1973 – a massive increase; Exploration activity jumped from a single base in 1965 to approximately 9 bases in early /mid 1970's; Tennant Creek exploration had been very focused with high percentage of funds going to drilling. Did rapid expansion and increase in overhead spread resources too thinly? – should exploration in 1970's have been more focused?
- Acquisitions such as Wallsend, Warman, Mt Morgan, King Island and Sims were apparently profitable but in 1981 could not replace the cash flow earlier generated by Juno and Warrego gold. North Parkes was a major orebody and a major cost and could not be defined or brought into production quickly enough to replace Warrego.
- Robe River and North Broken Hill merger is another story