PIPELINE RIDGE CU-PB-ZN-AU PROSPECT, COBAR DISTRICT, NSW

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LOCATION

The Pipeline Ridge prospect is located at 31º42"S, 146º25"E, 40 km SE of Cobar in Central NSW, on the Nymagee (SI55-02) 1:250 000 map sheet.

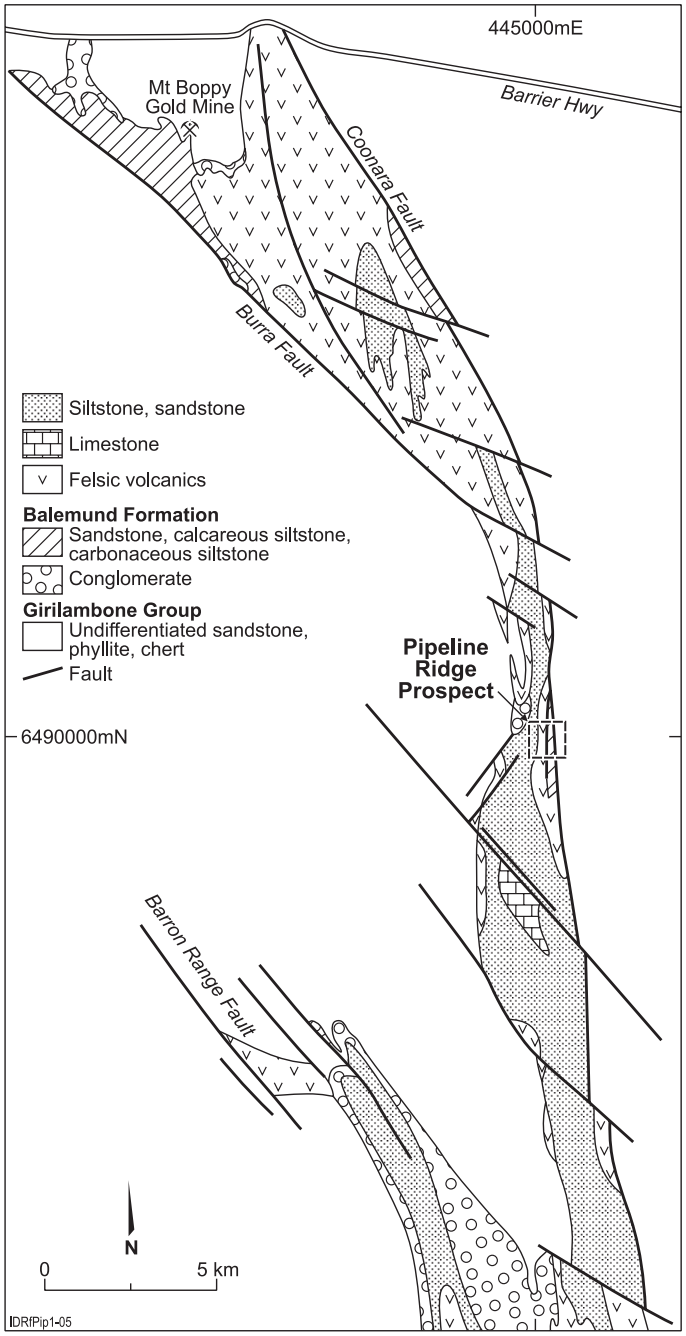

Figure 1. Geological map of the environs of the Pipeline Ridge Prospect.

DISCOVERY HISTORY

The prospect was discovered in 1976 by Mines Exploration Proprietary Ltd using combined auger, RAB and airtrac drilling which targeted Siluro-Devonian rocks beneath shallow cover in the Kopyje Basin. Initial traverse lines were spaced at 500 m with follow-up at 100 m. Sample spacing was at 25 m along the lines. Analysis of the <180 µm fraction of the top metre of bedrock revealed a strong Pb and a moderate Zn anomaly 1000x150 m in size. The anomaly was investigated by an IP survey and diamond drilling. The drilling intersected bands of steeply dipping breccia containing 1.41% Cu, 0.47% Pb, 1.5% Zn, 70 g/t Ag and 3 g/t Au over a strike of 400 m (Leeson, 1980). The exploration method was effective in evaluating the area although, in hindsight, the margins of the basin appear to be the most prospective and should have been tested first.

PHYSICAL ENVIRONMENT.

The terrain is typical of the Cobar District with isolated low-lying hills, with outcrop or residual soil, and intervening broad valleys filled with sediment. Pipeline Ridge is a low, N-trending ridge of outcropping, silicified, felsic volcanic rock. The up-dip, up-plunge extension of drilled mineralization occurs immediately to the E and SE of this outcrop beneath transported cover. The average annual rainfall exceeds 300 mm with a mean maximum summer temperature of 35°C and a mean winter maximum of 16°C. Pipeline Ridge is covered with native eucalyptus forest; the broad valleys on either side are predominantly covered with grassland used for grazing.

GEOLOGICAL SETTING

The prospect occurs in a high strain zone on the E side of the Kopyje Basin within Silurian felsic volcanic rocks adjacent to the N-trending Coonara Fault (Figure 1). The fault is the boundary between western basin fill (Siluro-Devonian conglomerates, siltstones, felsic volcanics and micritic limestones), and the eastern Girilambone Group (Ordovician micaceous sandstones siltstones and cherts; Felton, 1981). Glen *et al.* (1996) postulate a rift basin model followed by inversion in the mid-late Devonian. Unconformities, with channel-fill conglomerates, were transformed into faults and thrusts The Siluro-

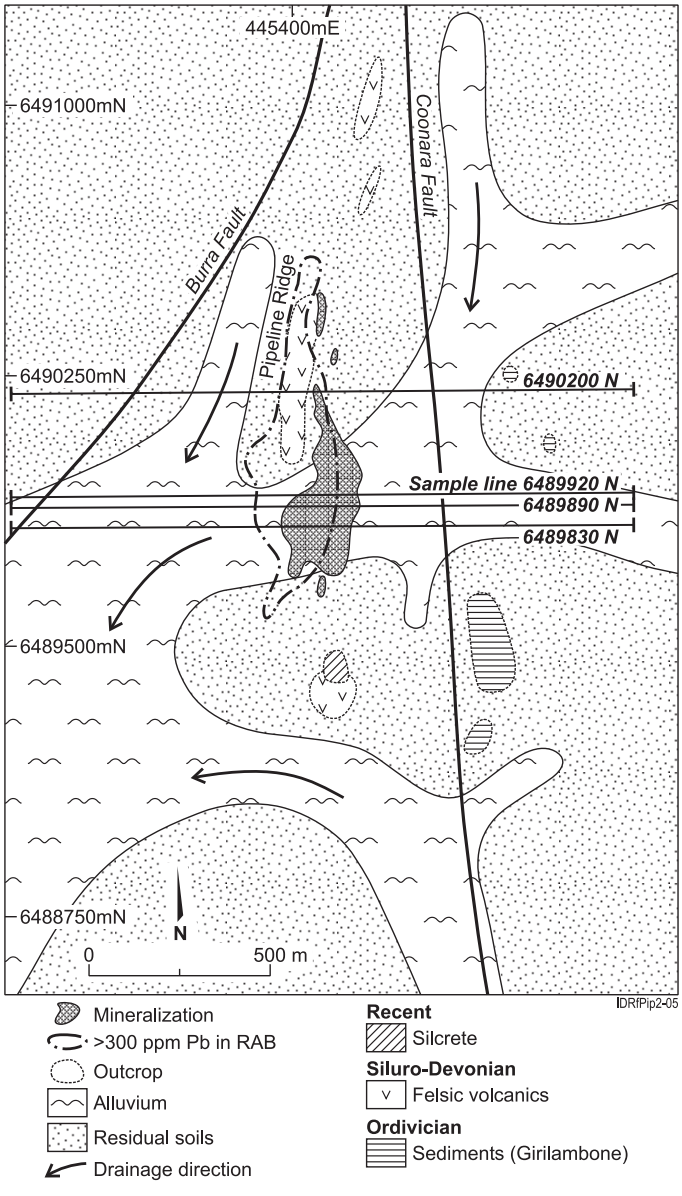

Figure 2. Local regolith geology in relation to mineralization and sampled lines.

Devonian rocks were preserved in synclinoria. Felton (1981) interprets the basin as a synclinorial half-basin where the E limb is overturned and locally truncated by the fault. Subsequent sinistral fault movements in a transtensional environment have produced pull-apart extensional zones with E-W trending boundary faults (Glen *et al.,* 1996; Edwards *et al.,* 1998).

REGOLITH

Residual soils occur on the margins of Pipeline Ridge and merge with sheetwash and alluvium over the mineralized zone, where a broad drainage traverses the site from NE to SW (Figure 2). Shallow drilling in this zone indicates that transported cover is 3-10 m deep and overlies saprolite 6-25 m thick. Saprock occurs at 20-35 m depth on fresh rock and sulphide mineralization.

MINERALIZATION

Primary mineralization

White (1998) describes E-dipping, steeply S-plunging, mineralized, polymictic hydrothermal breccias contained within a broader zone of crackle brecciation, silicification, sericitization and sulphide veins (Figure 3). These are hosted in pumiceous crystal tuff, which is bounded by massive rhyolite and bedding parallel faults both in the hanging and footwall. Individual breccia shoots have a short strike (10-30 m) are narrow (10-15 m) and are elongated down-plunge (50-100 m). The entire zone of mineralization has a grade of about 1 g/t Au, 0.5% Zn, 0.5% Pb, 0.5% Cu and 0.1% As.

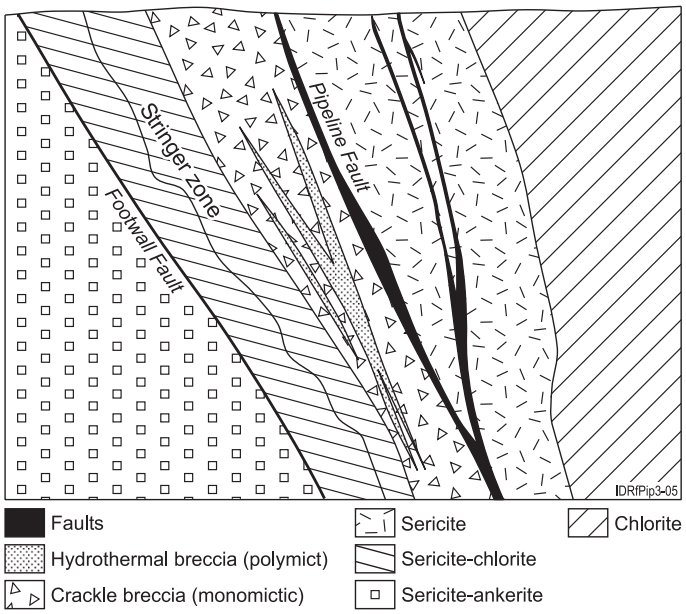

Figure 3. Alteration mineralogy on section 6489875mE.

Weathered primary mineralization

Copper and Zn tend to be depleted to 100-300 ppm and 100-1000 ppm respectively in the weathered zone although Zn locally reaches >1%. Lead remains high (500-8000 ppm) over broad intersections with isolated values of >1%. Gold is highly anomalous (0.1->1g/t) over broad (5-10 m) intersections. Old drill logs are insufficiently detailed to distinguish the nature of the material, but it would appear to be clay-rich with interspersed layers of Fe oxide. Anomalous Au (>0.1 ppm) appears to be more extensive than in the primary mineralization.

Supergene mineralization

Locally, Cu, Pb and Au are elevated at or up to 8 m above the oxidation interface. The base metals reach grades of several percent and Au up to 30 g/t. These zones are highly variable and close-spaced (10 m spaced drilling has failed to define continuity).

REGOLITH EXPRESSION

Drill hole data indicates that the transported cover contains no significantly anomalous material, with Cu, Pb and Zn all <100 ppm and commonly <50 ppm. Gold is commonly below detection (0.01 ppm). However, a small number of holes, generally on the flanks of outcrops or directly above mineralization in areas of thick cover display

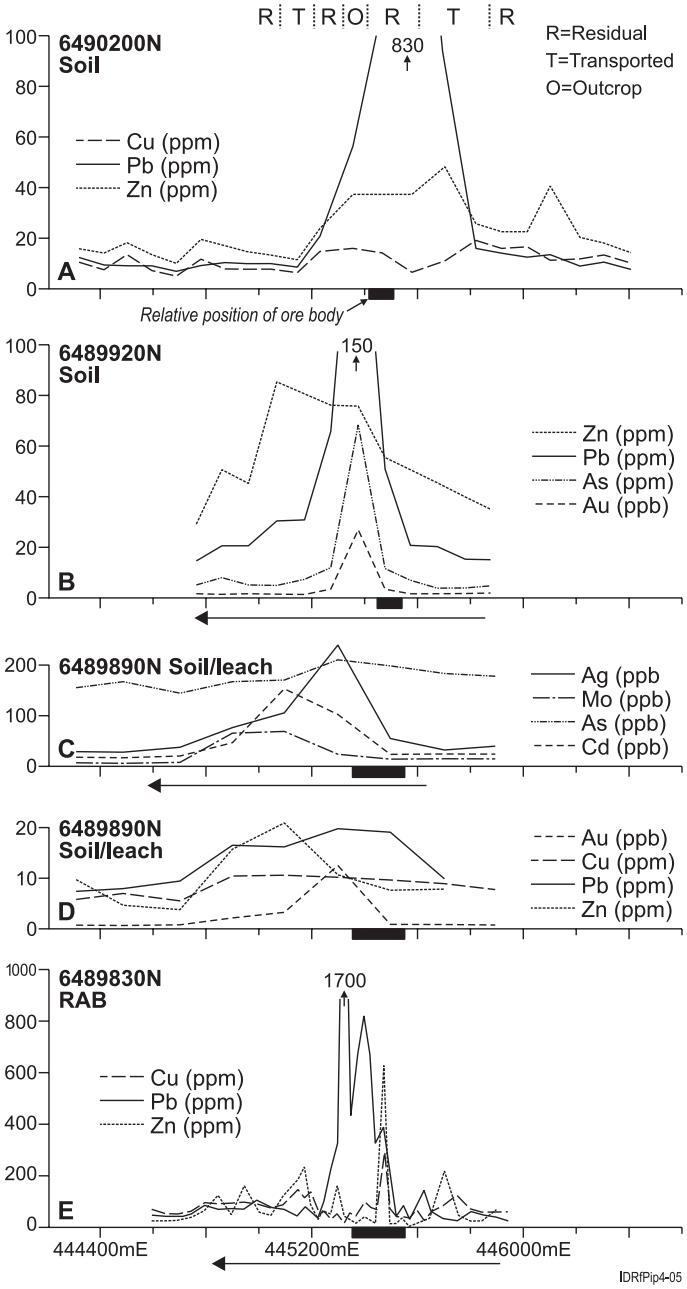

Figure 4. Geochemical profiles along traverses shown in Figure 2 using various media: - (A) <180 µm soil by Golden Cross Resources Ltd.; (B) Au using BLEG on <180 µm soil and Pb, Zn and As on >180 µm soil by Arimco; (C) Soil (<2 mm) using Regoleach by Golden Cross Resources Ltd.; (D) Soil using Regoleach by Golden Cross Resources Ltd.; (E) RAB drilled spoil (<180 µm) by Mines Exploration Pty Ltd.

weak anomalies from the surface, presumably because they sample saprolitic material or residual soil. One of the original Mines Exploration Proprietary Ltd discovery RAB lines, 6489830mN (Figure 4E) shows a surface anomaly directly above primary mineralization. Similarly, the GC <180 µm; 6490200mN soil survey (Figure 4A) shows anomalies in Pb, Au, As and weakly in Zn in areas mapped as residual soil on the E side of the outcrop. The Regoleach partial leach technique effectively shows a downstream dispersion anomaly in Au, Ag and Pb close to mineralization and in Zn, Cd, Fe, Mo and Ba further away (Figures 4C and 4D). A <180 µm BLEG survey by ARIMCO (Figure 4B) also detected a downslope, downstream anomaly in Au, As and Pb close to mineralization and Zn further away.

REFERENCES

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SAMPLE MEDIA - SUMMARY TABLE

Sample media	Indicator elements	Analytical method	Detection limits (ppm)	Background (ppm)	Threshold (ppm)	Maximum anomaly (ppm)	Dispersion distance (m)
Primary	Au	Fire assay	0.01	BD	0.1	6	Nil
	Pb	AAS	2	100	400	20 000	
	Zn	AAS	2	50	350	15 000	
	Cu	AAS	1	40	250	13 000	
	As	HG	1	20	150	9000	
	Ag	AAS	1	BD	20	120	
Alteration Zone	Au	Fire assay	0.01	BD	0.1	1	50
	Pb	AAS	2	100	250	4000	100
	Zn	AAS	2	30	150	2000	50
	Cu	AAS	1	10	100	500	20
	As	HG	1	20	60	3000	100
	Ag	AAS	1	BD	5	10	10
Supergene	Au	Fire assay	0.01	BD	0.1	30	100
	Pb	AAS	2	100	300	10 000	150
	Zn	AAS	2	10	100	1000	20
	Cu	AAS	1	10	100	500	20
	As	HG	1	20	100	3000	150
	Ag	AAS	1	BD	5	10	10
Saprolite	Au	Fire assay	0.01	BD	0.1	12	100
	Pb	AAS	2	100	300	10 000	150
	Zn	AAS	2	10	100	10 000	20
	Cu	AAS	1	10	100	500	20
	As	HG	1	20	100	3000	150
	Ag	AAS	1	BD	5	10	10
Residual soil (<180 µm)	Au	AAS	0.001	BD	0.1	0.5	30
	Pb	ICP-AES	1	10	300	1000	200
	Zn	ICP-AES	1	10	30	60	100
	Cu	ICP-AES	1	5	10	150	50
	As	ICP-AES	1	20	100	3000	150
	Ag	ICP-AES	0.1	BD	1	4	10
Transported soil (<180 µm)	Au	AAS	0.01	BD	0.1	0.1	30
	Pb	ICP-AES	2	15	100	1000	200
	Zn	ICP-AES	2	5	30	60	100
	Cu	ICP-AES	1	5	10	150	50
	As	ICP-AES	1	10	80	3000	150
	Ag	ICP-AES	1	BD	1	4	10
Transported soil/Stream sediments by Regoleach	Au	Regoleach	0.001	BD	0.002	0.012	600
	Ag	Regoleach	0.005	0.035	0.05	0.23	600
	Pb	Regoleach	0.01	10	15	50	700
	Zn	Regoleach	0.05	5	10	25	600
	Mo	Regoleach	0.01	0.01	0.025	0.075	500
	As	Regoleach	0.005	0.1	0.125	0.21	500
	Cd	Regoleach	0.005	0.02	0.04	0.16	600
Transported soil/Stream sediment (<180 µm)	Au	BLEG	0.001	BD	5	25	100
Transported soil/Stream sediment (>180 µm)	Pb	AAS	5	15	30	180	500
	Zn	AAS	2	5	30	85	600
	As	AAS	1	10	30	75	200

All AAS determinations follow aqua regia digests. HG = hydride generation after aqua regia digest. ICP-AES follows HCl digestion and solvent extraction. BD = below detection.