



**MOUNT ISA
MINES**

A GLENCORE COMPANY

**Technical Report
3970**

**Exploration Permit for Minerals No 18199
'Waggaboonyah West, Queensland,
Partial Relinquishment Report for the Periods Ended
4 September 2013 and 4 September 2014**

XSTRATA COPPER EXPLORATION PTY LTD

TECHNICAL REPORT

No. 3970

TITLE: EXPLORATION PERMIT FOR MINERALS No. 18199
'WAGGABOONYAH WEST', QUEENSLAND,
PARTIAL RELINQUISHMENT REPORT FOR
THE PERIODS ENDED 4 SEPTEMBER 2013
AND 4 SEPTEMBER 2014

HOLDER: MOUNT ISA MINES LIMITED

OPERATOR: MIM RESOURCE DEVELOPMENT PTY LIMITED

1:250,000 SHEETS: SE54-1 'MOUNT ISA'

1:100,000 SHEETS: 6758 'KENNEDY GAP'

**INVESTIGATIONS
CONDUCTED BY:** MIM RESOURCE DEVELOPMENT PTY LIMITED

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SUMMARY

Aim of Project

The Waggaboonyah area was selected as prospective for Isa-style copper mineralisation, and fault-hosted Gunpowder-style copper mineralisation.

Object of Report

This report provides details of all exploration carried out on EPM 18199 'Waggaboonyah West' sub-blocks relinquished in 2013 and 2014.

Location

'Waggaboonyah West' EPM 18199 is located approximately 60km north-northwest of Mount Isa. The tenement can be accessed via several tracks leading east from the unsealed McNamara Road (Lady Annie Mine access road), or leading west from the unsealed Gunpowder Road, or north from the Barkly Highway.

Tenure

Exploration Permit for Minerals (EPM) 18199, currently comprising ten sub-blocks, was granted to Mount Isa Mines Limited (MIM) on the 5th of September 2011 for a period of five years.

Summary of Work Completed on Relinquished Sub-blocks

2013

Two hundred and eight (208) soil samples were collected in 2012 and assayed with a portable XRF instrument. No significant results were recorded, and sub-blocks 159 s,y and 231 s were recommended for relinquishment.

2014

Three hundred and forty-eight (348) soil samples were collected in 2013 and assayed with a portable XRF instrument. No significant results were recorded, and sub-blocks 231 d, j, r, u & v were recommended for relinquishment.

Conclusions and Future Work

Exploration work completed during tenure on the relinquished sub-blocks included interpretive review of GIS data sets and historic geochemistry. A substantial soil sampling program was conducted over the relinquished sub-blocks on 1 kilometre spaced lines. No significant copper or base metal anomalies were identified, and the sub-blocks were recommended for relinquishment.

1. INTRODUCTION

Exploration Permit for Minerals (EPM) 18199 'Waggaboonyah West' is located northwest of Mount Isa in northwest Queensland. The tenement is part of an area called the 'Kennedy Project'. Both areas target the Kennedy Structure - a northern extension of the Mount Isa Fault and a comparable structural setting to that hosting the Mount Isa Mine copper deposits.

The tenement hosts several structural and lithological elements considered important in the genesis of an Isa-Style copper deposit. The primary conceptual exploration target is economic epigenetic sediment-hosted Mount Isa-style copper mineralisation. The type example of this style of mineralisation is at Mount Isa Mines (255Mt @ 3.3% copper (Perkins, 1990)) where the copper mineralisation consists of chalcopyrite within a silica-dolomite alteration system. The system is structurally controlled at the faulted contact between a Proterozoic quartzite/mafic volcanic sequence (Eastern Creek Volcanics) and a Proterozoic dolomitic carbonaceous siltstone-dominated sequence (Mount Isa Group). Waggaboonyah West has both Isa equivalent stratigraphy and Eastern Creek Volcanics basement (Davey, 2008).

This report documents all exploration carried out on sub-blocks relinquished in 2013 and 2014.

2. LOCATION AND ACCESS

The 'Waggaboonyah West' EPM covers approximately 58km² and is centred approximately 60km north-northwest of Mount Isa, in north-west Queensland. The tenement sits in the southern portion of the Kennedy Gap (6757) 1:100,000 sheet, and within the north-eastern quadrant of the Mount Isa (SF54-1) 1:250,000 sheet. Access is via several tracks leading east from the unsealed McNamara Road (Lady Annie Mine access road), leading west from the unsealed Gunpowder Road, or north from the Barkly Highway. Topography varies from flat to rolling hills with local deeply incised creeks, however steep hills occur in the SE corner where Eastern Creek Volcanics outcrop. Station tracks are poorly maintained and access is poor.

3. TENURE

EPM 18199 was granted to Mount Isa Mines Limited (MIM) on the 5th of September 2011 for a period of five years, over eighteen sub-blocks. Three (3) sub-blocks were relinquished in 2013 (159 s,y and 231 s). Five (5) sub-blocks were relinquished in 2014 (231 d, j, r, u, v). A listing of the currently held sub-blocks is shown below.

The location of the tenement and the sub-blocks for the reporting periods is shown in Drawings 62071 and 62081.

BIM	Block	Sub-Blocks
CLON	231	k, l, m, n, o, p, q
CLON	232	f, l, q
Total		10 Sub-blocks

4. REGIONAL GEOLOGY

The tenement lies on the northern extension of the Mount Isa Fault (known as the Kennedy Structure) and hosts sediments of the McNamara Group (Gunpowder Creek and Paradise Creek Formations) unconformably underlain by the Haslingden Group including the Myally Sub-Group and members of the Eastern Creek Volcanics. The Gunpowder and Paradise Creek Formations occupy the north, east, and west portions of the EPM and are regarded as favourable hosts for Isa-style copper mineralisation. The south of the EPM is occupied by Haslingden Group sediments and Eastern Creek Volcanics. Important structural elements in the area include the Twenty-nine Mile Fault Zone, a large NW striking structure that links the N-S Mount Isa Fault and the NE-SW striking Mount Gordon Fault. The EPM is dominated by a fragmented NW plunging syncline, the axial plane of which is associated with the Twenty-nine Mile Fault Zone. A NW striking graben has developed across the centre of the tenement, adjacent to the Twenty-nine Mile Fault.

Extreme tropical weathering has affected the Kennedy Region, probably since the start of the Tertiary, resulting in massive leaching and elemental remobilisation to greater than 100m depth. A NW-SE continental drainage divide transects the tenement, and weathering profiles increase in development to the west of this divide. Typical weathering profiles in Proterozoic rocks at Waggaboonyah West have in the order of 100m of bleached saprolite, overlain by transported or in-situ duricrusts (generally ferricrete) up to 20m thick). In neighbouring tenements to the NW, copper mineralisation is generally not encountered at surface, and usually occurs as supergene malachite in saprolite at around 90m.

5. PREVIOUS EXPLORATION

The area around the current tenement at Waggaboonyah West has been actively explored since the 1970s. Exploration has focused on Mount Isa-style Cu/Ag-Pb-Zn deposits, however significant exploration has also been conducted for diamonds and uranium. Details of previous exploration are summarised in Table 1 below.

Table 1: Summary of Historical Exploration at Waggaboonyah West Tenement

Historic EPM	Period	Company	CR	Activities
14488	2007-09	Xstrata Copper Exploration	53347	Review of AGSO geology, open file review, and regional rock chip sampling comprising 129 samples in the south of the tenement. Data from existing MIM Exploration airborne magnetic and radiometric compilations was reprocessed.
14364	2005-07	Universal Resources	49275	Review of topographical, geological, geophysical and geochemical data
13417	2005-07	Summit Resources Limited	49693	No exploration completed
12589	2004-06	Lady Annie Operations Pty Ltd and Copper Co Limited	45693	Open-file review
11445	1998-2000	MIM Exploration Pty Ltd	32645 31287 30624	Rock chip sampling
9292	1993-98	Rio Tinto Exploration Pty Ltd	30010 27162 28943 28891 27904 27756 26713 25602 25568	245 stream sediment samples, soil sampling comprising 602 samples, mapping
10298	1994-96	CRA Exploration Pty Limited	28074 27755	Review of previous exploration
9753	1996-98	MIM Exploration Pty Ltd	30649 30038 29644	Aeromagnetic survey, geological mapping, geochemistry of stream sediments, rock chip sampling, soil sampling and bulk sediment leaching sampling
9191	1993-94	BHP Minerals Pty Ltd	257592 5903 24538	Open-file data review
7732	1991-93	BHP Minerals Pty Ltd	25244 24538 24368 23586	Soil auger sampling, RAB drilling, EM survey and RC drilling
7337	1990-92	Hunter Resources Limited	24220	Open-file review, gridding, RAB drilling, soil sampling and aerial photo interpretation

Historic EPM	Period	Company	CR	Activities
5753	1987-89	BP Aust Gold Pty Ltd	20835	Stream sediment sampling
5751	1987-89	BP Minerals Australia	20835	Stream sediment sampling and bulk sediment leaching
4022 3936 3933	1985-86	CRA Exploration Pty Limited	15443 15367 14575 14577	Stream sediment sampling for diamonds
3723	1984-86	BHP Minerals Pty Ltd	13689 16371	Review of aeromagnetic data, ground magnetic survey
2406	1980-82	The Shell Company of Australia Limited	11656 10757 10756 9327 8495	Data review, photo interpretation, geological mapping, gossan search, magnetic/radiometric airborne survey, trenching and rock chip and soil sampling.
2039	1978-80	Godkin Uranium Pty. Limited	7757 7234	Ground radiometric surveys based on aerial radiometric surveys
1058	1972-74	Anaconda Australia Inc. and Newmont	5088	Aerial photo interpretation, diamond drilling, surface mapping, stream sediment sampling, auger drilling and surface chip sampling
617	1969-71	Anaconda Australia Inc. and Eastern Copper Mines N.L.	3778 3558 4191	Grab sampling along fault and shear zones, mapping, chip sampling, soil sampling, auger drilling, diamond drilling, limited induced polarisation, aerial photo interpretation,
616	1970-71	Anaconda Australia Inc. and Eastern Copper Mines N.L.	3786 3648 4191	Surface mapping, gossan search, rock sampling, soil geochemistry, auger drilling and induced polarisation

6. WORK COMPLETED ON RELINQUISHED SUB-BLOCKS

6.1 Sub-Blocks Relinquished in 2013

Three (3) sub-blocks were relinquished (159 s,y and 231 s; Figure 1 and Drawing 62081).

In 2012 a first-pass soil sampling program was conducted over sub-blocks 159 s & y on approximately one kilometre spaced east-west lines (Fig. 1). Samples were collected from 15cm depth and sieved to minus 20 mesh, and collected in paper bags. A total of 1428 samples were collected in 2012, of which 208 are within the relinquished area and are here reported.

Samples were assayed through the paper bag using an Olympus Delta portable XRF instrument with a 20 to 30 second read time. Twenty four elements (Ag, As, Bi, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Rb, Sb, Se, Sn, Sr, Th, U, V, W, Zn, Zr) were assayed with the limit of detection typically near 10ppm. Elements which are in much lower abundance reported as below detection. Gold was not assayed. Cobalt assays are not reliable due to the high iron content of some samples. Silver assays should also be treated with caution. Digital assay and sampling data is attached in Appendix 1.

The geochemical response levels are lower than over many other Isa Group Rocks. The maximum Cu value was 164ppm, which may be considered elevated in some of the more weathered terranes in this region. However there was no clustered anomalism and no further exploration was undertaken in the 2013 field season.

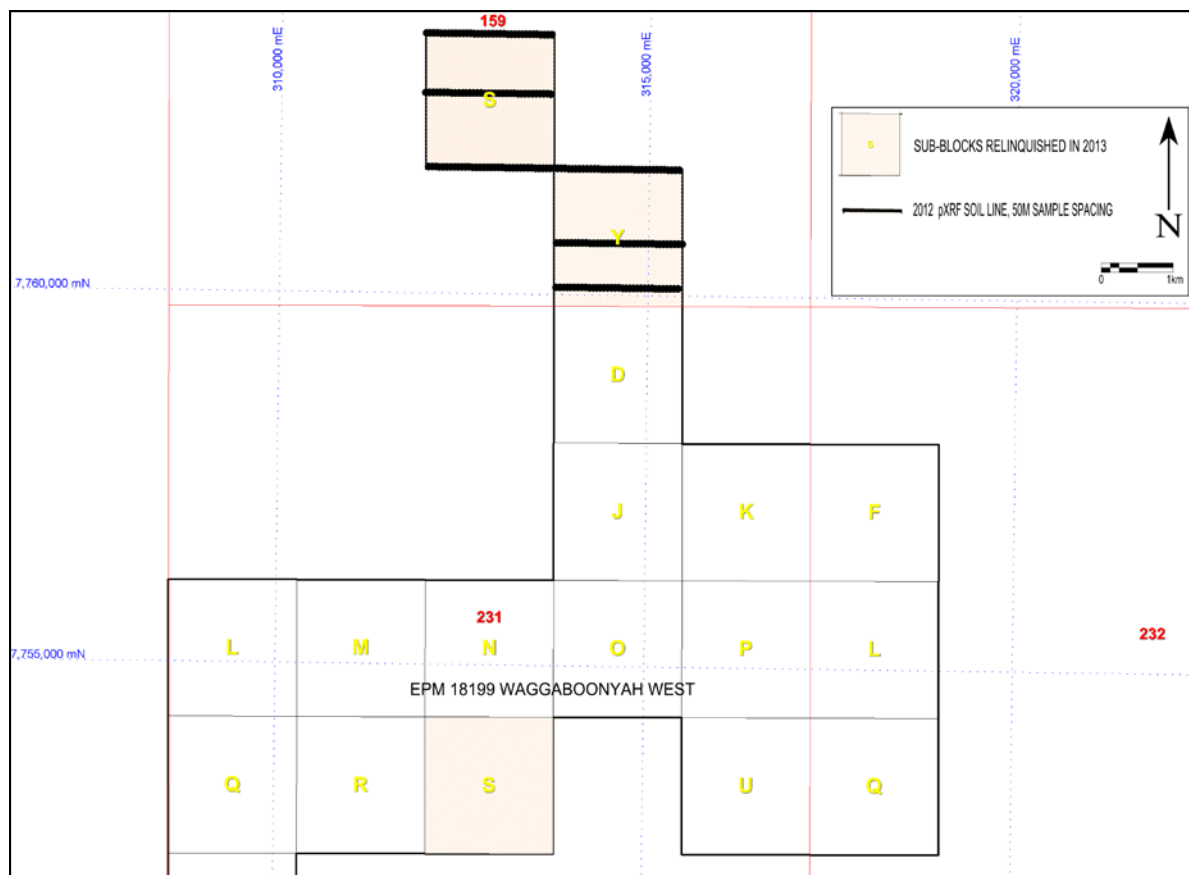


Figure 1: EPM 18199 'Waggaboonyah West' Sub-Blocks Relinquished in 2013 with 2012 pXRF Soil Lines

6.2 Sub-Blocks Relinquished in 2014

Five (5) sub-blocks were relinquished in 2014 (231 d, j, r, u & v; Fig 2 and Drawing 62071).

In 2012 a first-pass soil sampling program was conducted on sub-blocks 231 d, j, r, & v on approximately 0.5 to 1 kilometre spaced N-S and E-W lines; on sub-block 231 u spacing was increased from 100m to 200m due to the presence of less-prospective Eastern Creek Volcanics (ECVs; Fig. 2). Samples were collected from 15cm depth and sieved to minus 20 mesh, and collected in paper bags. A total of 348 samples are within the relinquished area and are here reported.

Samples were assayed through the paper bag using an Olympus Delta portable XRF instrument with a 20 to 30 second read time. Twenty four elements (Ag, As, Bi, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Rb, Sb, Se, Sn, Sr, Th, U, V, W, Zn, Zr) were assayed with the limit of detection typically near 10ppm. Digital assay and sampling data is attached in Appendix 2.

The geochemical response levels are lower than over many other Isa Group Rocks. The exception was in sub-block 231 u, where ECVs are exposed. These rocks are typically elevated in Cu, and here the maximum Cu recorded was 343ppm. Again however there was no clustered anomalism and no further exploration was undertaken in the 2013-14 field season on these sub-blocks.

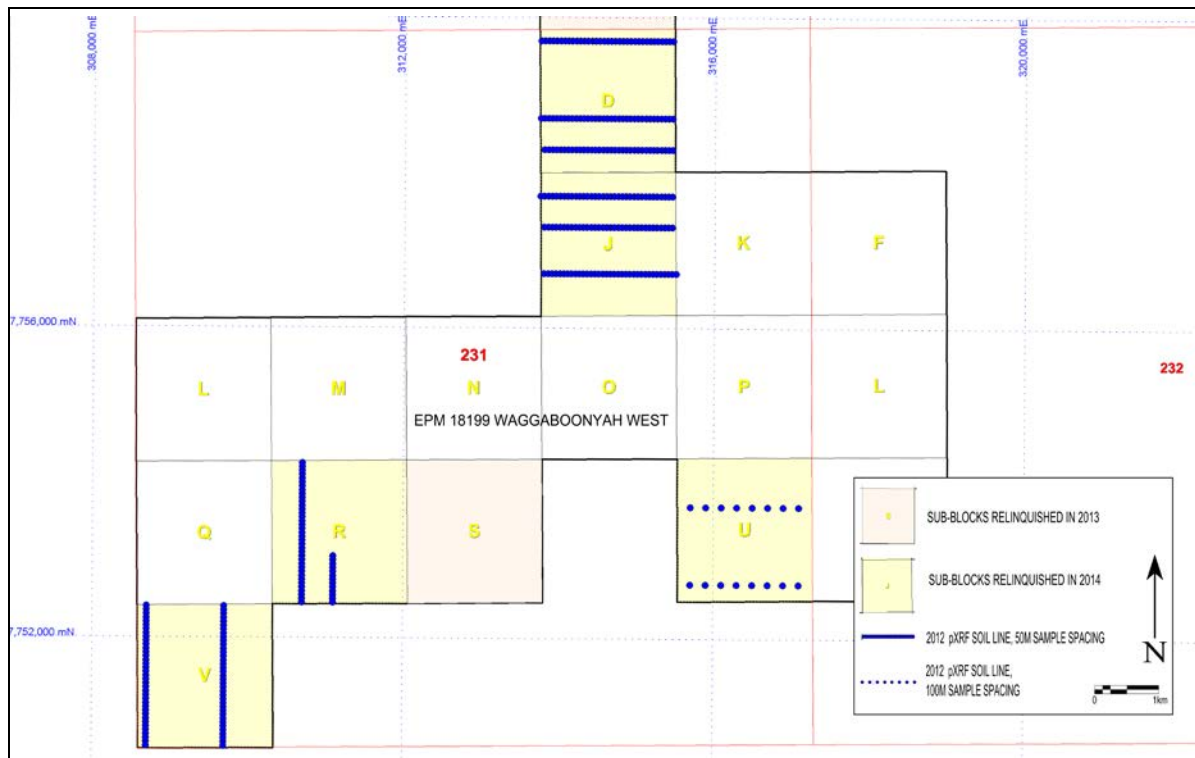


Figure 2: EPM 18199 'Waggaboonyah West' Sub-Blocks Relinquished in 2014 with 2012 pXRF Soil Lines

7. CONCLUSIONS

Exploration work completed during tenure on the relinquished sub-blocks included interpretive review of GIS data sets and historic geochemistry. A substantial soil sampling program was conducted over the relinquished sub-blocks on approximately 1 kilometre spaced lines. No significant copper or base metal anomalies were identified, and the sub-blocks were recommended for relinquishment.

8. REFERENCES

Perkins, WG, 1990, *Mount Isa copper orebodies*, in *Geology of the Mineral Deposits of Australia and Papua New Guinea* (Ed FE Hughes), 935-941, The Australasian Institute of Mining and Metallurgy: Melbourne.

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DRAWINGS

APPENDICES