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CRA EXPLORATION PTY. LIMITED  
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**First Annual Report  
For The Period Ending 24 January 1996  
EL 57/94 Mole Creek West, Tasmania**

**OPEN FILE**

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Date: December 1995

Licence Holder: CRA Exploration Pty. Limited

Submitted to: Chief Geologist, Vic/Tas

Copies to: Mineral Resources Tasmania  
CRAE - Vic/Tas District  
CRAE - ETIG

Submitted by: *A. J. Cross (for SA Menpes)*

Accepted by: *Ar. Connolly*

96-3870

FIRST ANNUAL REPORT TO 24 JANUARY  
1996 EL 57/94 MOLE CREEK WEST -  
CRA MENPES SA

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CRAE Report No. 21982

### Abstract

Significant Pb-Zn mineralisation, interpreted to be Irish-style, occurs within the Ordovician Gordon Group carbonates at Oceana and Grieves near Zeehan. Other areas of preserved Gordon Group carbonate are also considered prospective for Irish-style Pb-Zn mineralisation. Hence CRAE acquired EL 57/94 to explore mapped Gordon Group carbonates in the Mole Creek area.

A comprehensive data review was commenced during permit year 1 of EL 57/94 and some data was compiled to 1:25,000 scale base plans. Work carried out to date has highlighted Shell's (Billiton) Wattle Valley Pb-Zn prospect (EL 774) where low grade, syn-genetic Pb-Zn mineralisation was intersected in two exploration holes. This demonstrates that the processes necessary for the formation syn-genetic (early diagenetic), carbonate hosted Pb-Zn deposits have been active in the Mole Creek West licence.

Dr Clive Burrett, a palaeontologist/carbonate sedimentologist from the University of Tasmania with considerable geological knowledge of the Mole Creek/Gunns Plains region, was asked to identify areas in the region with the greatest potential for the development of economic, carbonate hosted Pb-Zn deposits. Dr Burrett identified the Standard Hill area as the most prospective because:

- Sphalerite has been identified in outcrop at the eastern end of Standard Hill within the basal Standard Hill Formation of the Gordon Group
- Two potentially impermeable units within the Gordon Group in the Standard Hill area, the argillaceous Ugbrook Formation and the argillaceous/siliclastic Mole Creek Formation may have acted as barriers to migrating, mineralising fluids.

Only three holes have been drilled to test carbonate hosted Pb-Zn prospects in the Mole Creek West area to date and some potential for the discovery of economic mineralisation remains. Hence future work will focus on developing targets (possibly conceptual) for drill testing. Work planned for the second permit year of EL 57/94 is summarised below:

- Completion of the compilation of existing stream sediment, soil, rockchip, geophysical and drillhole data to 1:25,000 scale base plans
- Review of existing geological maps and colour air photos to determine the likely location(s) of growth faults that may have acted as conduits to mineralising fluids.

Further investigation (soil sampling, wacker bedrock sampling, drilling) of carbonates beneath argillaceous sealing units and known Pb-Zn occurrences proximal to interpreted growth faults.

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**Plans**

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Tv 1060	EL 57/94 Mole Creek West Location Plan	1:100,000

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Table 1	Lithostratigraphic terminology for Wurawina Supergroup strata
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Appendix 1	Letter from C Burrett to S Menpes
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## 1. Conclusion and Recommendation

The following conclusions have been drawn from the work carried out during permit year 1:

- The processes necessary for syn-genetic (early diagenetic), carbonate hosted Pb-Zn deposits have been active in the Mole Creek West licence as evidenced by the low grade, syn-genetic Pb-Zn mineralisation intersected at Shell's Wattle Valley Prospect
- Two units within the Gordon Group in the Standard Hill area may have acted as barriers to migrating, mineralising fluids. They are the argillaceous Ugbrook Formation (immediately overlying the basal Standard Hill Formation) and the argillaceous/siliclastic Mole Creek Formation
- To date only three hole's have been drilled to test carbonate hosted Pb-Zn prospects in the Mole Creek area and some potential for the discovery of economic mineralisation remains.

Work recommended for the second permit year is summarised below:

- Completion of the compilation of existing stream sediment, soil, rockchip, geophysical and drillhole data to 1:25,000 scale base plans
- Review of existing geological maps and colour air photos to determine the likely location(s) of growth faults that may have acted as conduits to mineralising fluids
- Further investigation (soil sampling, wacker bedrock sampling, drilling) of carbonates beneath argillaceous sealing units and known Pb-Zn occurrences proximal to interpreted growth faults.

## 2. Introduction

The Mole Creek West EL 57/94 was granted to CRA Exploration Pty. Limited (CRAE) on 24 February 1995. The licence covers 216 sq km (Plan Tv 1060) and lies approximately 70 km WSW of Launceston.

CRAE acquired the licence area to explore for economic, Irish-style Pb-Zn mineralisation in the Ordovician Gordon Group carbonates. CRAE's preceding exploration of the Gordon Group carbonates in the Zeehan area has resulted in several very encouraging Pb-Zn intersections. Hence CRAE has expanded exploration efforts to other areas of poorly explored Gordon Group carbonates with potential to host economic Irish-style Pb-Zn mineralisation. The Mole Creek West licence area satisfies these criteria.

This report details all exploration activities conducted within EL 57/94 Mole Creek West by CRAE during the first permit year ending 24 January, 1996.

### 3. Review of Previous Work

Significant exploration for carbonate hosted mineralisation carried out prior to the current licence is briefly summarised below:

1974-1975                      *Cygnatrex Pty Ltd*                      *EL 13/74*

Cygnatrex Pty Ltd (US Steel) explored the Mole Creek area initially for Carlin style gold mineralisation and later for Pb-Zn deposits as Au results were uniformly negative.

Wide spaced reconnaissance soil traverses returned four anomalous Pb or Zn analyses. The anomalous locations were gridded, soil sampled and rock chip sampled in narrow hand dug trenches. One anomalous zone (the Mayberry area) and a number of isolated spot anomalies were delineated. Examination of the Mayberry zone revealed that anomalous Pb and Zn values were related to calcite-healed brecciated zones within the carbonate. No visible mineralisation was found and the area was relinquished.

1980?-1984                      *Comalco, Comalco and Shell*                      *EL 7/74*

The Comalco-Shell Joint Venture acquired the western portion of the relinquished EL 13/74 (Cygnatrex) to explore for replacement Sn, W skarn deposits with high level Pb-Zn leakage haloes, and Mississippi Valley style Zn-Pb deposits.

An aeromagnetic-radiometric survey was flown and identified two magnetic anomalies east of the Mersey River near Liena. Both anomalies were gridded and surveyed with ground magnetics, soil sampling and geological mapping. The Liena South anomaly occurred in an area where the Cambrian Dove Granite intrudes Precambrian quartzites. Geochemical responses from rock and soil sampling over the anomaly were weak and no further exploration was warranted. The Liena anomaly was centred over a basalt covered hill surrounded by lower relief Gordon Limestone. Soil sampling over the anomaly returned one extremely anomalous Pb-Zn result (810 ppm Pb, 280 ppm Zn). However the grid was later found to be partly over the Croesus Cave State Reserve and exploration was terminated.

The Wattle Valley Prospect was discovered when a sample acquired during reconnaissance road track soil sampling returned 4100 ppm Pb and 2050 ppm Zn. The anomaly was investigated with Max-Min EM, IP, gravity, SP, ground magnetic and VLF surveys and tested with two drillholes (see section 4.1). Both holes returned elevated Pb-Zn values interpreted to be the cause of the soil geochemical anomaly.

1980-1981                      *Amoco*                      *EL 2/80*

Amoco explored the Mole Creek area for carbonate hosted, Irish style, Pb-Zn-Ag deposits.

The extensive geochemical coverage over most of the licence area by Cygnatrex Pty Ltd highlighted the Mayberry area (south of Standard Hill) as Pb-Zn anomalous. Amoco gridded and soil sampled two anomalous zones and rock chip sampled two other areas. Results discounted any possible economic mineralisation and the ground was relinquished.

1981-1983                      *Shell*                      *EL 43/81*

Shell acquired EL 43/81 to further explore the Mayberry Prospect for carbonate hosted Pb-Zn mineralisation. The possibility that the Pb-Zn geochemical anomalies reflected a deeply buried replacement deposit (Renison type) was also considered.

The Mayberry Prospect was gridded, mapped, soil and rockchip sampled and IP and gravity surveys were carried out. The soil geochemistry confirmed the Amoco anomaly whilst rockchip geochemistry showed uniformly low Pb-Zn values. A percussion hole drilled to test the soil anomaly returned low Pb-Zn values and the licence was relinquished in 1983.

1989-1990

*Placer Exploration Ltd*

EL 9/89

Placer acquired EL 9/89 to explore for Carlin style Au mineralisation in the Ordovician Chudleigh Subgroup carbonates. Placer's exploration model involved the mobilisation of Au from the Dove Granite (actually Cambrian aged?) or possibly underlying Devonian granites.

Placer carried out a regional drainage sampling programme using bulk cyanide leach (Au, Ag, Cu) and -80# stream sediment (Cu, Pb, Zn, Ag, Au, Sn). Soil samples were taken across poorly defined drainages. The work returned isolated anomalous values but these were discounted as no signs of significant mineralisation or alteration were observed. The licence was relinquished with no further work undertaken.

#### 4. Work Completed in the 12 Month Period Ending 24 January 1996

##### 4.1 Literature Review

A comprehensive literature review is only partially complete and will be reported in the second annual report for the Mole Creek West licence. Some data has been compiled to 1:25,000 scale base plans.

Work carried out to date has highlighted Billiton's Wattle Valley Pb-Zn prospect (EL 7/74). The Wattle Valley grid is located on the northern limb of an E-W trending syncline, and overlies Gordon Group carbonates. A north-west trending fault, apparent on air photos, cuts through the grid. The prospect was discovered when a reconnaissance road track soil sample taken on the Mersey Forest Road (437830mE, 5398580mN) returned 4100 ppm Pb, 2050 ppm Zn. Follow up sampling at 50m spacing confirmed the anomaly and an exploration grid was established.

The 1000 ppm Pb in soils contour outlines a bedding parallel zone 100m long by 50m wide. A Max-Min EM survey detected a conductor coincident with the anomaly. IP, gravity, SP, ground magnetic and VLF surveys were also carried out. Evaluation of the geophysical and geochemical results indicated a target zone about 10m wide by 300m strike length extending only 100m down dip.

One vertical percussion hole (WV1) and a vertical percussion-diamond hole (WV2) were drilled to test the prospect. The best intersection was 2m at 270 ppm Pb, 1400 ppm Zn, 8 ppm Cd and 165 ppm Mn from 6m returned from hole WV1. However Zn values were anomalous over the entire hole. Petrographic descriptions confirm the presence of sparse, possibly syn-genetic sphalerite in chalcedonic layers within a partially dolomitised limestone.

#### 4.2 Consultant Recommendations

Dr Clive Burrett, a palaeontologist/carbonate sedimentologist from the University of Tasmania with considerable geological knowledge of the Mole Creek/Gunns Plains region, was asked to identify areas in the region with the greatest potential for the development of economic, carbonate hosted Pb-Zn deposits. Dr Burrett identified the Standard Hill area as the most prospective because:

- sphalerite has been identified in outcrop at the eastern end of Standard Hill within the basal Standard Hill Formation of the Gordon Group.
- two units within the Gordon Group in the Standard Hill area may have acted as barriers to migrating, mineralising fluids. They are the argillaceous Ugbrook Formation (immediately overlying the basal Standard Hill Formation) and the argillaceous/siliclastic Mole Creek Formation

See Appendix 1 (letter C Burrett to S Menpes) for a more detailed discussion.

#### 4.3 Geology

In the Mole Creek area the dominantly siliclastic Cambro-Ordovician Denison Group is represented by the Magog Subgroup where the basal formation, the Roland Conglomerate, conformably overlies the volcanic, volcanogenic and volcanoclastic Cambrian formations (Table 1). The Roland Conglomerate is overlain by the Moina Sandstone which is in turn conformably overlain by carbonates of the Chudleigh Subgroup (Gordon Group equivalent).

The Chudleigh Subgroup consists of seven mappable units which comprise 1300m of limestones and a minor siliclastic unit. The Chudleigh Subgroup is conformably overlain by fossiliferous siltstones and unfossiliferous siliclastic sandstones of the Eldon Group.

The Lower Palaeozoic rocks of the Mole Creek area were folded during the Devonian into SE trending, gently plunging folds. To the north of the prominent Standard Hill anticline deformation is moderate but to the south deformation is much more intense. A large number of minor folds are evident in the Gordon Group of the Mayberry area.

In the south-west of the licence area the Moina Sandstone unconformably overlies the Cambrian Dove Granite which intrudes Precambrian schists and quartzites of the Cradle Mountain Block. In the southern licence area the Devonian Eldon Group is unconformably overlain by a relatively undeformed Permian sequence including sandstones, shales, glacials and coal measures. In the eastern tenement area outliers of Jurassic Dolerite and Tertiary Basalt are preserved. Quaternary glacial till, talus, marsh deposits and residual gravels obscure much of the low relief Chudleigh Subgroup north and east of Standard Hill.

A significant karst landscape is developed on the Gordon Group carbonates in the Mole Creek area. Only the Mersey River and its largest tributary the Lobster Rivulet maintain surface courses across the limestone. Most of the smaller streams that drain the slopes of the Western Tiers, Standard Hill and Mersey Hill disappear into the limestone as soon as it is encountered. Sinkholes (dolines) and extensive cave systems are common in the Mole Creek area.

## 5. Discussion of Results

The processes necessary for the formation of syn-genetic (early diagenetic), carbonate hosted Pb-Zn deposits have been active in the Mole Creek West licence. This is evidenced by the low grade, syn-genetic Pb-Zn mineralisation intersected at Shell's Wattle Valley Prospect. To date only three hole's have been drilled to test carbonate hosted Pb-Zn prospects in the Mole Creek area and some potential for the discovery of economic mineralisation remains.

The compilation of all existing stream sediment, soil, rockchip, geophysical and drillhole data will be completed during permit year two. Existing geological maps and colour air photos will be reviewed to determine the likely location(s) of growth faults that may have acted as conduits to mineralising fluids. Carbonates beneath argillaceous sealing units and known Pb-Zn occurrences proximal to interpreted growth faults will be further investigated (soil sampling, wacker bedrock sampling, drilling).

## 6. Rehabilitation

No field exploration has been undertaken to date.

## 7. Expenditure

Expenditure during current term:      \$10,390

**Total Expenditure: \$10,390**

## 8. References

- |                         |      |  |
|-------------------------|------|--|
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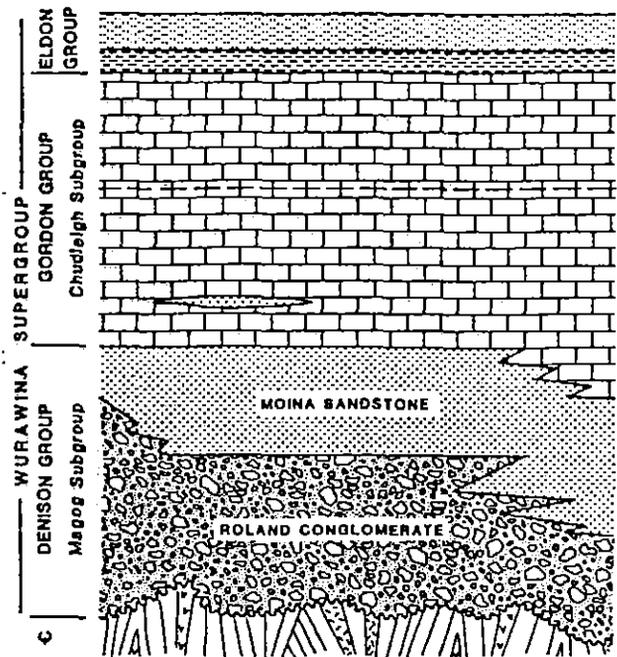
## 9. Location

Burnie	SK55-3	1:250,000
Mersey	8114	1:100,000
Forth	8115	1:100,000
Cethana	4240	1:25,000
Liena	4239	1:25,000
Gog	4440	1:25,000
Mole Creek	4439	1:25,000
Lake Mackenzie	4438	1:25,000

## 10. Keywords

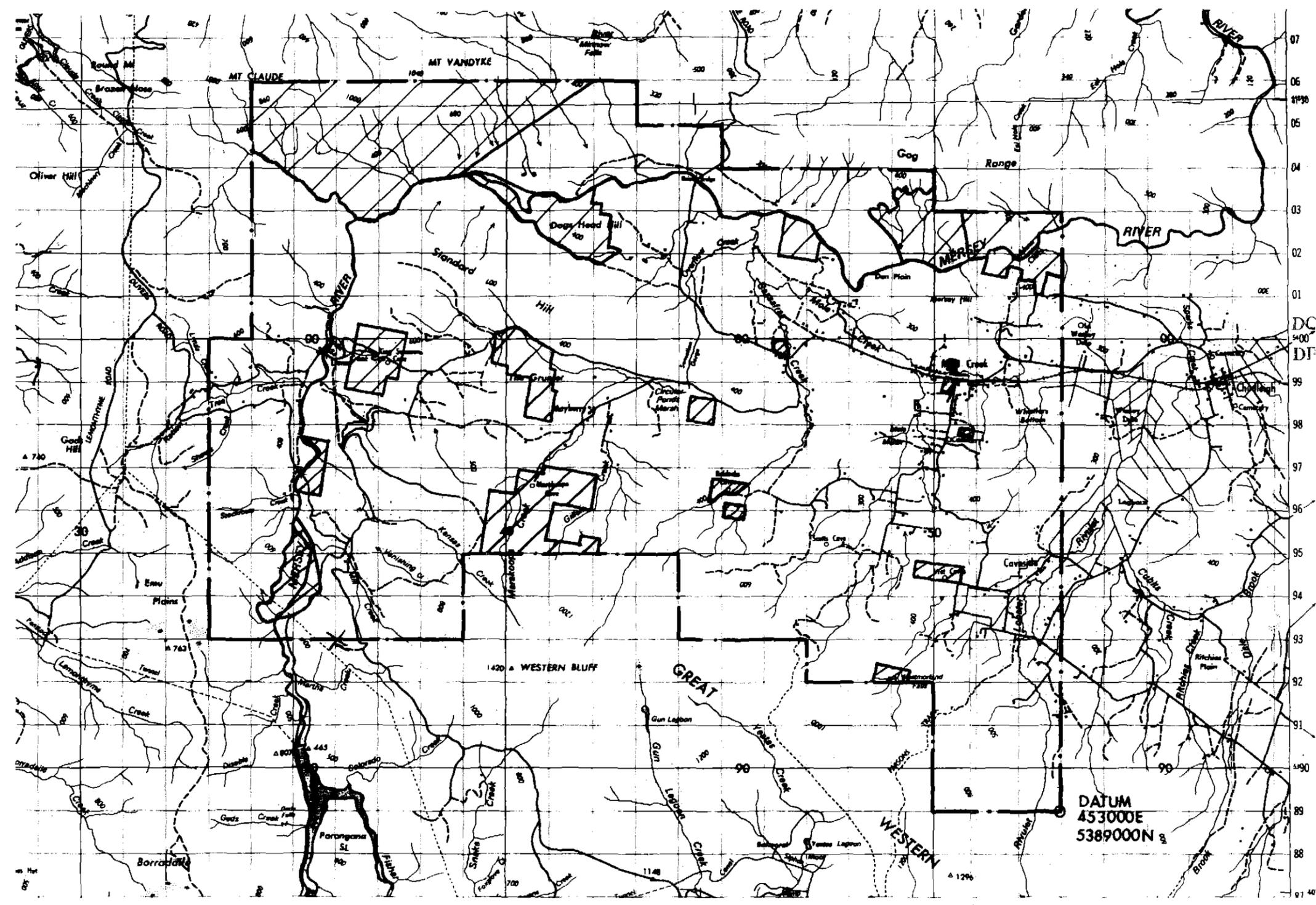
Tasmania, Base Metals, Ordovician, Carbonate Hosted, Review.

Fig. 7 Suggested facies relationships of Denison Group and Gordon Group rocks in the Mole Creek area.



		DENISON RANGE-FLORENTINE VALLEY AREA				MOLE CREEK AREA		
SILICICLASTICS	ELDON GROUP	TIGER RANGE SUBGROUP	McLeod Ck Fm					
			Currawong Quartzite					
			Richea Siltstone					
			Gell Quartzite			Sandstone		
			Arndell Sandstone Fm	Westfield Fm		Siltstone		
CARBONATES	GORDON GROUP	Benjamin Fm	Upper Limestone Member		CHUDLEIGH SUBGROUP	Den Fm		
			Lords Siltstone Member			Overflow Creek Fm		
			Lower Limestone Member			Mole Creek Fm		
		Cashions Creek Formation				Dogs Head Fm		
				Wherretts Chert Member		Sassafras Fm		
Karmberg Formation			Ugbrook Fm	Standard Hill Fm				
SILICICLASTICS	DENISON GROUP	Squirrel Creek Fm	Upper Sandstone Member	Florentine Valley Formation	MAGOG SUBGROUP	Moina Sandstone Fm		
			Siltst.-limest. Member				Mt Field Siltstone Member	
			Lower sandstone Member			Pontoon Hill Siltstone Member		
		Reeds Conglomerate		Tim Shea Sandstone		Churchill Sandstone Member		Roland Conglomerate Fm
		Great Dome Sandstone Fm						
Singing Creek Fm								

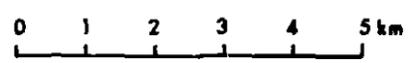
Table 1 Lithostratigraphic terminology for Wurawina Supergroup strata.



DATUM  
453000E  
5389000N

 EXCLUDED AREAS

5 cm



CRA EXPLORATION PTY. LIMITED

MOLE CREEK WEST EL 57/94

LOCATION PLAN

Ref.: SK55 - 3	Scale: 1:100 000
Author: S.A. Menpes	Report No.: 21982
Drawn: A. Jelen	Plan No.: Tv 1060

May 1996

**Appendix 1**

**Letter from C Burrett to S Menpes**

DR. C. BURKETT  
RENO HOTEL  
BANGKOK

Super PAD

704014

No.....

19/1/96

Dear Sandy, I thought about your Mole Cr./Gunn's Plains problem briefly over the Christmas period.

The situation at Mole Creek is similar to Zeehan with a variable thickness siltstone seal in the middle of the limestone sequence. Obvious differences are the presence of a basal 14.5m thickness of oncotic limestone (the Standard Hill Fm) and the 240m thick peritidal sequence of the Overflow Creek Fm in the upper part. The Ugbrooke Fm is very similar to that at Zeehan and may also have acted as a seal as it is very argillaceous in places.

Sphalerite was found at the eastern end of Standard Hill within the oncotic Standard Hill Fm and this may be a good place to start looking for Pb/Zn deposits i.e. at about grid ref. DP 465986.

Any solutions passing through the oncotic Standard Hill Fm would have hit the overlying ~~the~~ Ugbrooke Fm argillites and may have deposited. Similarly, it may be worth while thinking about the south side of Standard Hill where the argillaceous/siliciclastic Ugbrooke Fm was probably an even better seal.

Gunn's Plains is not very well known and there is very little outcrop in the valley. The upper part of the section is identical to that at Mole Creek - i.e. the Overflow Creek Fm and Den Fm. Below that we have very little information.

Assuming that the Khmer Rouge and land mines don't get me, I will be back in Australia on the 18th February at the AGC Canberra and back in Hobart on the 25th.

Cheers  
Clive