TECK AUSTRALIA PTY LTD

ABN 35 091 271 911

Myrtle Extended Project

ANNUAL REPORT FOR THE PERIOD 3rd JULY 2010 TO 2nd JULY 2011

EL23515

Operator: Teck Australia Pty Ltd, Level 2/35 Ventnor Avenue, West Perth WA 6005, Australia

Tenure holder: Rox Resources, Level 1, 30 Richardson Street, West Perth, WA, 6005

(admin@roxresources.com.au)

Compiled by: D. Sully - Teck Australia Pty Ltd

Date: 28th July 2011

Target Commodities: Zn, Pb, Ag

Bauhinia Downs 250K Mapsheet
Glyde, Borroloola, Batten and Mallapunyah 100K Mapsheets.
GDA 1994 Zone 53

Distribution: Department of Resources- Minerals and Energy (Northern Territory)
Rox Resources
Teck Australia
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Declaration

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SUMMARY

This document is submitted as an annual report for the Myrtle Extended exploration licence EL23515. Exploration activities for this license year were impacted by a number of factors, including: record 2010/2011 wet season and issues with finding contractors and suppliers.

EL23515 forms part of the greater Myrtle-Reward project area owned by Rox Resources that has now been joint-ventured to Teck Australia Pty Ltd, who will commence field work on the area in 2011. EL23515 is prospective for SEDEX (sediment-hosted) style zinc-lead mineralisation. At the nearby Myrtle prospect, significant SEDEX style zinc-lead deposit has been discovered and defines a resource of 43.6 million tonnes grading 4.09% Zn and 0.95% Pb.

EL23515 was not managed by Teck for the entire license year, which reduced the work period significantly. Work undertaken was limited to literature searches, database compilation, general research and report preparation.

Work by previous explorers was limited in nature and failed to identify any significant anomalous zinc-lead values. EM conductors and favourable geology may indicate prospective areas for SEDEX style zinc-lead mineralisation and will be investigated during the next tenement year.

Acquisition and re-processing of geophysical data was undertaken and showed up a number of areas worthy of further work, namely the area just north of the Myrtle deposit. Examination of old Mines Department reports did not reveal any results of significance.
INTRODUCTION

This report summarises the exploration activities conducted on EL23515 during the reporting period June 2010 to June 2011. EL23515 is part of an integrated exploration project titled the ‘Myrtle Extended Project’ (also referred to as the Myrtle-Reward Project).

Exploration Licence 23515 is centred approximately 700 kilometres southeast of Darwin, and some 15km south of the McArthur River zinc-lead mine (Figure 1). The Myrtle Extended project area is immediately north-east of the adjacent Myrtle zinc-lead deposit. During 2008/2009 Rox Resources demonstrated the economic potential of the Myrtle zinc-lead deposit and in 2010 formed a joint venture with the Australian subsidiary of Canadian-based Teck Resources, Teck Australia Pty Ltd to explore the Myrtle project. EL23515 is part of the tenement package included in that joint venture. This report is for the 9th year of the licence and is the first Annual Report for the tenement prepared by Teck Australia.

During the reporting period, no field activities were undertaken. A literature search, database compilation and summary report of the tenement has been completed with the report attached here as Appendix 1.

LOCATION AND ACCESS

Access to the tenement from Darwin is via the Stuart Highway south to Daly Waters (approximately 550km), thence westward via the Carpentaria Highway to the McArthur River mine (approximately 400km). Alternatively, access from Mount Isa is via the Barkly Highway and then either the Ranken Road or Tablelands Highway to Cape Crawford. Driving time from Mount Isa is typically 8 to 9 hours.

Vehicle access within the tenement is by way of graded station tracks, old exploration tracks and fence lines. Track condition is variable depending upon the season; many areas become waterlogged and boggy during the wet season whilst bulldust rapidly forms in the pale clayey soils during the dry season.

The nearest township is Borroloola, located approximately 110km to the north-northeast by road. Borroloola has a permanent population of about 700 people, the majority of which are indigenous residents.

The McArthur River is the major drainage system in the area, passing through the tenement and all other watercourses within the tenement drain into the river either directly or via major tributaries.

Land use in the local region is predominantly beef cattle grazing on large pastoral holdings. Mining, fishing and tourism are also active within the region. EL EL23515 is located entirely within the boundary of the McArthur River Station. The pastoral lease is owned by Mount Isa Mines Pty Ltd, a wholly owned subsidiary of Xstrata PLC and the operator of the McArthur River mine. McArthur River Station is over 8,000km² in area and stocks approximately 10,000 head of beef cattle.
TENURE INFORMATION

Exploration Licence EL23515 was granted to Rox Resources Limited on the 2\textsuperscript{nd} of November, 2010. The tenement currently consists of 35 sub blocks, covering an area of 101.01 km\textsuperscript{2} (Figures 2 and 3), and is current to the 3\textsuperscript{rd} of July 2013 over the same area. The latitude and longitude of EL23515 is shown in Figure 2.

2. Latitude and Longitude of EL23515.
EXPLORATION RATIONALE

The Myrtle Extended Project area is prospective for Proterozoic stratabound Zn-Pb-Ag deposits, similar to the McArthur River deposit. The area is underlain by sediments of the Barney Creek Formation. Several major, basin-controlling faults traverse the area and control low-grade, stratabound sulphide mineralisation.

Teck has commenced a multi-disciplinary exploration strategy in the Myrtle Extended area designed to systematically test geological features and concepts identified through comprehensive targeting exercises.
GEOLOGY

The Reward Project is located within the McArthur Basin, a north-westerly extension of the Proterozoic rocks that comprise the Mt Isa Block (Figure 4). The McArthur Basin hosts numerous base metal and diamond occurrences, the largest of which is the McArthur River zinc-lead deposit 234 million tonnes at 9.3% Zn, 4.1% Pb and 60 g/t Ag. The current mining reserve is 46 million tonnes grading 9.6% Zn, 4.2% Pb and 43 g/t Ag.

The Myrtle prospect is hosted by the same stratigraphic units. And currently has a mineral resource of 43.6 million tonnes at 4.09% Zn, 0.95% Pb (Rox Resources Limited ASX Release 15 March 2010).

Figure 4. Regional Geology.
stratigraphic column of the local geology is:

The Lynott Formation contains thinly bedded and laminated, medium to dark grey, variably pyritic, carbonaceous dolomitic siltstone and minor dolomitic siltstone, sandstone and breccia. Traction current-generated sedimentary structures, load casts and soft sediment slump folds commonly occur within the unit.

The Reward Dolomite in the tenement area is a thick unit comprising massive to (less commonly) thinly bedded dolostone, algal dolostone and dolomitic siltstone with black shaly flakes and fragments of carbonaceous siltstone that conformably overlies the Barney Creek Formation. It also includes monomictic breccia which may be matrix or clast supported. The unit is characterised by chert or dolomitic nodules, which are generally 1-10mm in size. The unit commonly exhibits load casts, water escape structures, sedimentary dykes, soft sediment slump folds and convoluted bedding.

The Barney Creek Formation comprises massive to thinly bedded and laminated, variably pyritic, carbonaceous dolomitic siltstone and minor dolomitic siltstone, sandstone, breccia and tuffaceous siltstone. Interbedded and interlaminated green-grey siltstone and dolostone occurs at the base of the Barney Creek Formation in parts of the Glyde and Myrtle sub-basins. The Barney Creek Formation has been interpreted to have been deposited in a moderate to deep water, reasonably placid environment, dominated by periodic emplacement of dolostone rich turbidites and mass flow units. The Barney Creek Formation includes the target HYC Shale Member, which comprises very thinly laminated pyrite ± sphalerite ± galena mineralisation (as found at the McArthur River and Myrtle deposits) and black, carbonaceous, dolomitic siltstone with minor matrix to clast supported breccia, granular siltstone and sandy siltstone. The upper contact of the HYC Shale is characterised by the appearance of massive to laminated pyritic carbonaceous dolomitic siltstone.

The Teena Dolomite is a thick unit of interbedded massive to laminated, light grey to pinkish grey dolostone, algal and stromatolitic dolostone, dolomitic siltstone, dolomitic breccia and peletal sandstone. The unit conformably overlies the Emmerugga Dolomite and has a gradational upper contact.

The Emmerugga Dolomite is represented in the tenement area by the Mitchell Yard Dolomite, which is the upper part of the unit. It consists of massive light grey dolostone and algal dolostone and minor algal plate breccia. The upper contact is characterised by a change from laminated algal and stromatolitic dolostone (Teena) to massive dolostone (Mitchell Yard).

<table>
<thead>
<tr>
<th>Lynott Formation</th>
<th>Hot Spring Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caranbirini Member</td>
<td></td>
</tr>
<tr>
<td>Reward Dolomite</td>
<td></td>
</tr>
<tr>
<td>Barney Creek Formation</td>
<td>HYC Pyritic Shale Member</td>
</tr>
<tr>
<td></td>
<td>Cooley Dolomite Member</td>
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<tr>
<td></td>
<td>W-Fold Shale Member</td>
</tr>
<tr>
<td>Teena Dolomite</td>
<td>Coxco Dolomite Member</td>
</tr>
<tr>
<td></td>
<td>Lower undifferentiated member</td>
</tr>
<tr>
<td>Emmerugga Dolomite</td>
<td>Mitchell Yard Member</td>
</tr>
</tbody>
</table>

PROPOSED WORK

Proposed exploration on EL23515 for the next year includes:

- Literature searches
- Database compilation
- General research
- Report preparation
- Geological mapping
- Rock/soil/stream sediment sampling
- Airborne geophysics
- Ground geophysics (e.g. IP and Gravity)
- Drilling
APPENDIX 1

Prospect Review for the Myrtle-Reward Area

The following report summarises historical exploration work conducted in the Teck Australia Pty. Ltd. / Rox Resources joint venture (JV) area. The JV area is within the McArthur River Region of the Northern Territory, Australia, and covers exploration licenses EL26406, EL23515, EL27541 and EL10316. Exploration tenure falls within the Bauhinia Downs 1: 250 000 sheet and the Batten, Borroloola, Mallapunyah and Glyde Foelsche 1:100 000 sheets. This report does not review the Reward or Myrtle prospects, and instead focuses on the Teena (Boko Hill), Mitchell Yard, Larra Keyah (Amelia), Barney Creek Basin, Berjaya/Bindawodgie and Buffalo Lagoon Basin prospects. It should be noted that the historic Pb (Zn) Reward mine is on a 16 hectare mining lease and is excised from EL10316. Conclusions and recommendations are at the end of this report.

Figure 1 Teck/Rox JV tenements, existing prospects within the JV tenements are boxed in red
<table>
<thead>
<tr>
<th>Report Numbers</th>
<th>Berjaya/ Bindawodgie</th>
<th>Buffalo Lagoon</th>
<th>Barney Creek Basin</th>
<th>Mitchell Yard</th>
<th>Teena/ Boko Hill</th>
<th>Larra Keyah/ Amelia</th>
<th>Reward</th>
<th>Myrtle</th>
<th>Hot Springs</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR19570006</td>
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<td>MIM: Geochemical survey 2 miles SW of the Reward Pb prospect</td>
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<td>CR19570009</td>
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<td>MIM: Covers exploration across the Reward, H.Y.C., Coxco Valley and Teena prospects</td>
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<td>CR19630001</td>
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<td></td>
<td></td>
<td>CEC: Report does not cover Zn-Pb-Ag prospects relevant to Teck/Rox tenement areas</td>
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<td>CR19680001</td>
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<td></td>
<td>CEC: Limited diamond drilling and some maps/cross-sections</td>
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<td>CR19720015</td>
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<td>CEC: Numerous geochemical surveys covering the McArthur River (H.Y.C.) region</td>
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<td>CR19720011</td>
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<td>CEC: soil sampling program and two diamond drill holes</td>
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<td>CR19730012</td>
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<td>CEC: Limited diamond drilling and some maps/cross-sections</td>
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<td>CR19740008</td>
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<td>CEC: Stream sediment sampling and one diamond drill hole</td>
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<td>CR19760010</td>
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<td>CEC: Contains information about a drilling program and some detailed maps/sections</td>
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<td>CR19770003</td>
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<td>CEC: Detailed maps of prospect areas- blank patches on some of the sheets</td>
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<td>CR19770153</td>
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<td>A.O.: Highly detailed regional literature review and preliminary work in the McArthur Region</td>
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<tr>
<td>CR19790008</td>
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<td>A.O.: Review of Zn-Pb-Ag mineralisation and the Margoo Cu deposit in the McArthur Region</td>
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<td>CR19790013</td>
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<td>Amoco: Covers the Caranbirini Prospect</td>
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<td>A.O.: Contains maps and some geochemical data</td>
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<td>CR19800196</td>
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<td>A.O.: Detailed basin study, no conclusive findings</td>
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<td>CR19810078</td>
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<td>Ashton Mining: Mapping and some geophysics in the Myrtle-Reward Area</td>
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<td>Shell Co. of Australia: Discusses a single drill hole at Berjaya that did not reach its target</td>
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<td>CR19820020</td>
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<td>Shell Co. of Australia: Drilling at Leila Yard, not in Teck/Rox tenement area</td>
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<td>CR19820230</td>
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<td>BHP: Focuses on area north of Teck/Rox tenements, some work done in the Barney Creek Basin</td>
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<td>CR19820269</td>
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<td>Shell Co. of Australia: Two drill holes at Berjaya, no significant mineralisation observed</td>
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<td>CR19820292</td>
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<td>Shell Co. of Australia: geochemistry, gravity, RAB drilling and mapping</td>
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<td>CR19830018</td>
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<td>Shell Co. of Australia: Covers Leila Yard and some of the Myrtle-Reward Prospects</td>
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<td>CR19830256</td>
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<td>BHP: Some new geophysics and a general summary of work done in the Reward-Myrtle area</td>
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<td>CR19830260</td>
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<td>BHP: Summary report of exploration in the Reward-Myrtle area (nothing new)</td>
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<td>CR19850254</td>
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<td>BHP: Re-assaying and reexamination of Berjaya DDH- BJ1</td>
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<td>CR19870045</td>
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<td>CRA: Covers an area to the south and east of Reward-Myrtle</td>
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<td>CR19870297</td>
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<td>CEC: Re-assaying of Berjaya core for Au, Pt, As, very weak Au anomalies identified</td>
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<td>CR19900065</td>
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<td>Perilya Mines: No new information- detailed maps are damaged</td>
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<td>Ashton Mining:BHP: No significant information pertaining to Teck/Rox tenement areas</td>
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<td>MIM: QUESTEM and some geochemistry in for Buffalo Lagoon</td>
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<td>CR19940139</td>
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<td>BHP: Focus on Mallapunyah and Margoo area, not relevant to Teck/Rox tenements</td>
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<td>CR19940892</td>
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<td>MIM: Covers and summarises work done on Myrtle, Berjaya &amp; Buffalo Lagoon- nothing new.</td>
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<td>CR19950153</td>
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<td>MIM: Report Discusses Berjaya</td>
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<td>CR19970061</td>
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<td>MIM: Report Discusses Berjaya (and Caranbirini and Leila)</td>
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<td>CR19970094</td>
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<td>MIM: Covers the Boko Prospect and covers a drilling program</td>
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<td>CR19970289</td>
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<td>BHP: Boomerang Creek GeoTEM survey- not relevant to Teck/Rox tenements</td>
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<td></td>
<td>Ashton Mining: Base metal and diamond exploration just east of Teck/Rox tenements</td>
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<td>CR19980232</td>
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<td>MIM: Several geophysical surveys and a general summary of MIM’s exploration</td>
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<td></td>
<td>MIM: Prospect west of Larra Keyah prospect, VERY basic exploration work conducted</td>
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<td>CR20010785</td>
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<td>MIM: Prospect west of Larra Keyah prospect, VERY basic exploration work conducted</td>
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</tbody>
</table>

Table 1 Summary table for reports relating to the Reward-Myrtle area and surrounds. Note: CRA Conzinc Riotinto of Australia, CEC Carpentaria Exploration Company, MIM Mount Isa Mines, BHP Broken Hill Proprietary
**Berjaya/ Bindawodgie**

Berjaya is 3km west of the Reward Prospect and approximately 20km west of the MacArthur River Mine (H.Y.C). The Berjaya Prospect falls within the Bauhinia Downs (SE 53-3) 1:250 000 scale Geological Sheet area and is covered by AGSO Bulletin 220 (Geology of the Southern MacArthur Basin). A summary of drill logs and 3D interpretation of the basin, based on drill logs can be found in report [CR19790008, Sect31: page 1](#).

To date most exploration work has been conducted by the Bauhinia Joint Venture (BJV; 1976 to the early 1980s) and by the MacArthur River Joint Venture (MRJV). In 1992 Mt Isa Mines (MIM) farmed into the MRJV and over five years carried out three drilling programs and geochemical and geophysical surveys.

Berjaya was located in 1976 by a geophysical survey, where a number of EM targets were identified over a 3km strike length. The Bauhinia Joint Venture (BJV) identified further IP and soil geochemistry anomalies (up to 1800ppm Pb, 5500ppm Zn). The BJV drilled four diamond holes which intersected several metres of pyritic Reward Dolomite, four 1m intersections contained >1% Zn.

Stream sediment and soil sampling undertaken during the 1993 field season by MIM failed to outline areas of base metal anomalism. Field mapping was however able to delineate the base of the Hot Spring Member/ top of the Caranbirini and confirmed that the base of the Caranbirini Member/ top of the Reward Dolomite contact was under cover. SIROTEM surveys were successful in defining numerous conductive horizons. Subsequent drilling showed that the conductive horizons were pyritic siltstones within the Caranbirini Member, and leached siltstones/clay/groundwater interactions- depending on where soundings were taken.

Diamond drilling by MIM at the Berjaya Prospect in 1995 confirmed that the source of the conductive anomalies were pyritic siltstones or clay/water interactions. Low grade zinc and lead mineralisation was encountered during drilling, best drill results were from PPD16 which returned 5m @ 3.30% Zn and 0.52% Pb. A helicopter borne magnetic survey was conducted in 1996 and showed that mineralisation at Berjaya was associated with a fault zone. Mineralised samples from Berjaya were examined by an external consultant and based on petrology (see Report [CR19970061: Sect04](#)) it was decided that they were related to an MVT system. This assumption downgraded the priority of the Berjaya Prospect as a significant exploration target area.

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*Figure 3* cross-section through the Berjaya Prospect showing the distribution of prospective formations, e.g. the Barney Creek Formation.
The Teena and Boko Prospects (Figs. 4 and 5A respectively) are located about 2.5 km SE-ESE of the Reward Prospect. Detailed maps of the Reward-Teena-Boko area can be found in report CR19760110, Sect14 and Sect15.

Lead is rarely visible in hand specimen around the Teena Prospect; however assaying has confirmed its presence in the chert-jasper beds that form the deposit. Mineralised beds are contained in a flat southerly pitching syncline, which has resisted erosion due to its highly silicified nature. Four hand dug costeans were sampled (Fig. 4); these and other rock chip samples along the prospect were sampled, with a peak assay value of 4.0% Pb. Assay data for two bulldozer costeans that have been cut at the prospect could not be found.

A 6000 X 3000 foot grid was sampled at 500 foot intervals in an attempt to find possible continuity between the Reward and Teena Prospects. Anomalous results were attributed to the main outcrop at Teena rather than mineralisation under the black soil.

Three diamond holes were drilled at Teena by the CEC (Teena 2DD, 3DD and 4DD) and one at Boko (Boko 1DD; report: CR19760110, Sect01, pages 8-11). Teena 2DD was drilled to test the centre of a syncline between the Wickens Hill Prospect (to the east) and Teena Hill, and was completed to a depth of 676.6 m. Mineralisation grading 3.49% Zn and 0.44% Pb over 9.2 m was intersected in this hole. Teena 3DD was sited to test the western extent of mineralisation encountered in 2DD. The hole was completed to a depth of 172.5 m and intersected no significant mineralisation. Teena 4DD was sited to test the northern extent of mineralisation intersected in 2DD. Teena 4DD was completed to a depth of 771.4 m in pyritic shale. The hole was stopped due to the incapacity of the rig to drill deeper. Boko 1DD was sited to test a similar geological environment to that occurring in the Teena

Figure 4 Map of the Teena Prospect showing the location of Pb mineralisation (Report: CR19570009, Sect06, page 2)
The hole was abandoned in Lower Lynott Siltstone at 136.2m due to drilling difficulties. Boko diamond drill hole 3 was drilled in 1978; a stratigraphic summary of this hole can be found in report CR19790008, Sect06, page 7.

Figure 5 (A, left) Drill hole locations and geology of the Boko Prospect area (Report CR19970094, Figure01); (B, right) Ground magnetics over the Reward/Teena Prospect areas (Report CR19980232, Sect6).

MIM exploration drilled two new diamond holes in the Boko prospect, Boko 4 and 5. Drill hole Boko 4 was sited to test the effect of possible shallowing of the H.Y.C. Pyritic Shale in the Boko Basin where the block east of the Reward West Fault was thought to have been upthrown by some 50 m; it appears to be about 600 m. No significant mineralisation was observed. Since Boko 4 had hit what was interpreted as a horst block a question remained over what lay in the Boko Syncline, a normal hole (Boko 5) was drilled 800 m to the west in the Caranbirini Formation. No significant mineralisation was encountered in this hole either, although one sample recorded 7220 ppm Zn and 1760 ppm Pb. The report concluded that the thickness of the H.Y.C. Pyritic Shale in drill hole Boko 4 was considerably reduced due to faulting, therefore the potential for H.Y.C. style mineralisation in the block is still untested (see report CR19970094, Sect01).

Barney Creek Basin

The Barney Creek Basin is approximately 2.5x8 km and is elongated along an east-west axis. A small outcrop of the Lower Lynott and Reward Dolomite occurs in the centre of the basin. The rest of the basin is covered by alluvium and the structural control of the basin is poorly understood.

A diamond drill hole 6 miles west of the H.Y.C. ore body tested a resistivity anomaly which coincided with a magnetic low. The hole progressed to 570 feet in a massive grey algal dolomite; the following year drilling was discontinued at 600 feet without a change in the succession as no significant mineralisation was encountered. Report: CR19680014, Sect01, page 5.
The following paragraph and table are based on report CR19800019, Sect03, pages 6-15. The Barney Creek Basin is situated marginal to a north-south line of gravity highs, (in one of which is located the H.Y.C. deposit) and within a broad, regional magnetic anomaly reflecting susceptibilities within the basement. Outcrops of Reward dolomite and Lower Lynott Formation have been mapped in the central part of the basin by the CEC, and had dips of 15-20° to the north and north-west. Diamond drill hole Barney Creek No. 3 was drilled adjacent to this outcrop and intersected 183.9 m of H.Y.C. Pyritic Shale, which using an average CBA measurement of 40° gives a corrected thickness of 118m. North of Buffalo Lagoon, the CEC mapped an incomplete section of steeply dipping Basal Tuff Beds (equivalent to the W-Fold Shale). Indicated thickness of the exposed shale is 120-130 m, which represents a substantial thickness of the order recorded in the environs of the H.Y.C deposit (Table 2).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Wickens Hill No. 1 (m)</th>
<th>W-Fold No. 3 (m)</th>
<th>H.Y.C. Deposit (m)</th>
<th>Reward No. 10 (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surprise Creek Dolomite</td>
<td>34+</td>
<td>130+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H.Y.C. Pyritic Shales</td>
<td>182</td>
<td>166</td>
<td>490</td>
<td>14</td>
</tr>
<tr>
<td>W-Fold Shales</td>
<td>50</td>
<td>180</td>
<td>150</td>
<td>168</td>
</tr>
</tbody>
</table>

Table 2 Interpreted unit thicknesses in different localities around H.Y.C.

An INPUT survey outlined by Geoterrex and falling partly or wholly within the Barney Creek Basin identified three anomalous zones, named B30, B31 and B32, the location of these anomalies is shown on Plan 1 (Fig. 5). Based on photogeographic interpretation one structural feature of possible significance was identified. This was a northwest trending linear feature, some 32 km in length which follows one of the three fundamental structural trends in the McArthur River area- the Calvert Fault trend, the northwestern and southwestern extremities of this linear feature have been mapped as faults (Report CR19800019).

Ashton Mining coordinated a mapping program in the Barney Creek Basin to outline the distribution of the Barney Creek Formation. Preliminary mapping work suggests the possibility of a linkage between the Barney Creek and the Buffalo Lagoon Basins, as well as an east-west bounding fault along the northern edge of the Barney Creek Basin. Outcrop is poor and so airphoto interpretation was used extensively in producing a map. A regional gravity survey was undertaken in the Buffalo Lagoon Basin (N-S oriented lines, 1 km spacing, station spacing of 200 m). No outstanding gravity features were identified other than basin bounding faults. Based on the results of mapping and the gravity survey, Ashton Mining decided that the Buffalo Lagoon area did not warrant further exploration. It should be noted that the facies of the T4 and basal tuffaceous Barney Creek Formation in the two outcrops near the fault are indicative of a thickening basin sequence adjacent to the fault; however, gravity profiles gave no indication of mineralisation. This work and the conclusions drawn by Ashton Mining are outlined in report CR19810078, Sect01, pages 13-14; and Sect02, page 1 (there is also a short discussion about basin stratigraphy).

In 1982 BHP conducted a small INPUT-EM survey in the Barney Creek Basin and identified three anomalies MB1, MB2 and MB3, MB1 was assigned the highest priority (Report CR19820230, Sect06, pages 6-8 and 12). No follow up of priority target MB1 could be found despite a company recommendation to.

Shell Company of Australia conducted an INPUT-EM survey over the Buffalo Lagoon and Barney Creek Basins however detailed results could not be found (survey lines are shown in report CR19830018, Sect19, page 4).
In 1983 the CEC drilled three diamond holes in the Barney Creek Basin; the only information available about DDH Barney Creek No. 2 was that it was abandoned at 183m in grey algal dolomite. Analytical results were low, with average results for Pb (103 ppm) and Zn (173 ppm) (Report CR19830018, Sect01, page 19; drill hole locations are shown in Sect18).

In 1983 BHP conducted a seismic survey in the Barney Creek Basin to obtain structural and stratigraphic information in areas of poor outcrop and black soil cover. Data processing issues occurred due to poor quality raw data. The sections indicate that there are seismic reflectors in nearly flat lying units underneath black soil cover and that high angle faults are probably present. The exact location of these lines could not be located and one part of the appendix from the report is missing. Results from an EM survey indicate that a reasonable conductor exists under much of the black soil plains, and initial interpretation is that it may be due to pyritic black shales belonging to the Barney Creek Formation (See report CR19830256, Sect01, pages 10-14).

Figure 5 Geology and geophysical anomalies of the Barney Creek Basin (from report CR19800019, Sect10)

Buffalo Lagoon Basin
Buffalo Lagoon Basin is roughly triangular in shape, being fault bounded along the northeastern and northwestern margins. The Buffalo Lagoon Basin is situated marginal to a north-south line of gravity highs, (in one of which is located the H.Y.C. deposit) and within a broad, regional magnetic anomaly reflecting susceptibilities within the basement. The western portion of the basin consists of a gently dipping sequence from the Mitchell Yard Dolomite up to the Reward Volcanics. Recorded dips vary mostly from 3° to 15° northwest. The CEC has drilled six holes in the area, which indicates that the H.Y.C. shales are up to 120m thick. Drilling located some low grade mineralisation (e.g. 6m at 3.22% Pb) but failed to define a significant deposit. Plan 2 (Fig. BL Basin) outlines the geology of the Buffalo Lagoon Basin and the Reward Sub-Basin. A detailed I.P. survey was conducted by Scintrex in the Buffalo Lagoon area; however the data is relatively poor. Logs and assay data relating to a number of drill holes is missing as well. A more detailed discussion of what has been done in the Buffalo Lagoon is contained within report CR19800019, Sect03, pages 16-23.

Based on company investigations, Ashton Mining undertook some mapping in the Buffalo Lagoon Basin with the intention of outlining the Barney Creek Formation. Outcrop is poor and so airphoto interpretation was used extensively in producing a map. An outcrop of basal Barney Creek Formation 2 km west of diamond drill hole Buffalo Lagoon No. 1 indicates a facies, which at best is a marginal basin facies only. A regional gravity survey was undertaken in the Buffalo Lagoon Basin (N-S oriented lines, 1 km spacing, station spacing of 200 m). No outstanding gravity features were identified other than basin bounding faults. Based on the results of mapping and the gravity survey Ashton Mining decided that the Buffalo Lagoon area did not warrant further exploration. This work and the conclusions made by Ashton are outlined in report CR19810078, Sect01, page 13; and Sect02, page 1 (there is also a short discussion on stratigraphy in the basin).

Drilled by CEC (Report: CR19680014) with the intent to test the stratigraphic succession 4 miles SW of the Reward Mine, over a significant IP anomaly. Black, carbonaceous, dolomitic shale with blebs of pyrite and rare fracture fillings of sphalerite and galena occurred from 50 to 100 feet. Basal tuff beds occurred from 100 to 220 feet and were followed by laminated dolomites with disseminated pyrite. After penetrating Mitchell Yard Dolomite, the hole was terminated in the Mara Dolomite at 677 feet. Disseminated galena was observed in the upper Mitchell Yard Dolomite but assays less than 1% Pb over 20 feet. A copy of the stratigraphic log can be found in report CR19680014, Sect02, page 3.

A soil survey was carried out by CEC over the Buffalo Lagoon Prospect in 1972, Cu, Pb and Zn were analysed for. Copper values were generally low (5-10 ppm) with some zones of 20 ppm and a peak of 65 ppm. Lead and Zn values were higher and defined a weak zone of anomalous values, with soil values of 30 to >100 ppm Zn (peak of 215 ppm) and Pb values of 30-75 ppm (peak of 135 ppm). For Zn survey results see CR19720015, Sect12, page 1; for Pb and Cu results see Sect11, pages 5 and 6; the results of an IP survey over the Buffalo Lagoon area are shown in Sect14, page 6.

Shell Company of Australia conducted an INPUT-EM survey over the Buffalo Lagoon and Barney Creek Basins however detailed results could not be found (survey lines are shown in report CR19830018, Sect19, page 4).

In 1976 a third diamond hole was drilled by CEC to test the H.Y.C. pyritic shale member in the area to the North of Buffalo DH No. 1. The hole intersected no significant base metal mineralisation and was drilled to a depth of 327 m (Report: CR19760110, Sect01, pages 7-8).

An additional diamond hole (101.8 m) was drilled by CEC in 1973 to check the up-dip extension of mineralisation obtained in the first drill hole (CR19680014). Only specks of galena were observed and the core was not split due to the negligible amount of mineralisation. A (modified) schematic cross section based on the two holes is shown below; the unedited version is from report: CR19730012, Sect07, page 2.
MIM targeted the area around the M7-1 INPUT anomaly, which AMOCO had previously identified as a zone weak geochemical anomalism. MIM undertook a program of stream sediment and soil sampling late in the 1992 field season to test this possibility. Stream sediment sampling showed a clear Zn anomaly in all fractions (peak of 320 ppm Zn) along the northern section of the contact between the Yalco Formation and the Looking Glass Formation, at the intersection of this contact with a northeast trending fault. Very weak gold anomalism was also detected in this area. A QUESTEM survey over Buffalo Lagoon revealed a pronounced northwest-trending structural control in the Myrtle Basin area (see report CR19930561, Sect01, pages 13-16).

Figure 6 Cross-section through the Buffalo Lagoon Basin Prospect based on drilling (see report CR19730012, Sect07, page 2)

Figure 7 QUESTEM survey (MIM) for the Buffalo Lagoon and Myrtle Basins (Report CR19930561, drawing 41058)
Figure 8 Geology and geophysical anomalies of the Buffalo Lagoon Basin (from report CR19800019, Sect11)
Larra Keyah/ Amelia

The Larra Keyah/ Amelia Prospects sit adjacent to the Emu Fault (Fig 10) and have produced some strong anomalous stream sediment results (see report CR19720015, Sect11, pages 1-4); Pb, Zn and Cu anomalies are roughly coincident:

- Pb: Peak value of over 1210 ppm, samples consistently in the 100's of ppm range
- Zn: Peak value of 1500 ppm, samples consistently in the 100's of ppm range
- Cu: Peak Value of 225 ppm, samples consistently over 25ppm

Additional highly anomalous results from a soil sampling program are shown in Sect12 (pages 5-6) and Sect13 (pages 1-2). Mineralisation within the Larra Keyah/Amelia prospects has been attributed to small pods of mineralisation in a dolomite, possibly equivalent to the Cooley Member (Sect21, page 14).

Reports CR20100785 and CR20100629 detail the relinquishment of exploration licenses around the Amelia/Larra Keya Prospects by MIM in August 2010. The reason this occurred was because MIM failed to meet their minimum expenditure requirements for the areas held. No work was conducted in the five years that MIM held the prospects due to a lack of technical staff. Relinquishment was seen as an oversight and MIM have indicated that they will re-apply for the ground.

Report CR19820292 by Shell Company of Australia describes exploration conducted around the Amelia Prospect region for the period July 1978 to May 1982. Work undertaken includes:

- Geological mapping;
- Geochemistry, which generally showed low base metal values (max 140 ppm Pb, 530 ppm Zn) within the target area. Some samples in the Myrtle sub-basin area returned sporadic elevated Zn-Pb values;
- A gravity survey highlighted a number of lows within the Amelia Basin, which were interpreted as corresponding to deeply weathered shales;
- Thirty-eight RAB drill holes (total 254 m) returned no significant results.

This report concluded by saying that exploration results obtained from within the Amelia Basin were not encouraging and that the potential of the license area to host HYC-type mineralisation had been downgraded.

Report CR19800195 by A.O. (Australia) Pty. Ltd. contains a ‘detailed basin study’ of the Amelia Basin. The basin is interpreted as having several favourable features, including: the known presence of H.Y.C pyritic shale with a thickness in excess of 100m, with a possibility of thickening to the south and the dominant structural control of the basin with a margin faulted parallel to the Emu fault trend.

Report CR19740087 by the CEC details a stream sediment sampling program that closed of an anomaly. One diamond hole was drilled and returned reasonable results, including 1 m @ 6% Zn, 0.2% Pb, 6.2g/t Ag, and 1.3 m @ 5.7% Zn, 0.061% Pb, 9 g/t Ag.

Report CR19730011 by the CEC describes a soil sampling program in the Amelia prospect area. Two diamond holes were drilled, the first being abandoned at 44 m due to rods snapping and the second being drilled to 152.5 m. The second drill hole encountered weak lead and patchy copper mineralisation.

The Bullet points below are copied from report CR20100629 and detail the exploration undertaken by MIM in the early nineties.

In the period 1990-1993 Mount Isa Mines explored AN314 (subsequently AN366), the ‘Emu Fault Project’, with renewed enthusiasm. The target of this exploration campaign was coarse-grained, vein and breccia-hosted lead-zinc and copper mineralisation associated with the 20km of
prospective Emu Fault Zone covered by AN314 south of HYC. In the year ending June 1991, this work included:

- A structural framework study of the McArthur Basin by Environmental Resources Analysis (ERA) Ltd of Dublin. This study used satellite Thematic Mapper imagery and airborne Magnetic data to formulate exploration concepts for AN314
- Aerial photography was collected over AN314 for 1:25,000 scale geological interpretation
- Additional detailed geological mapping (e.g., Wilkins, 1991) over prospects provided new insights into the geology and defined further exploration targets
- 5370 soil samples concentrated along faults and areas previously not sampled were assayed for Pb, Zn and Cu. No significant new anomalies were outlined.
- Geoterrex Pty Ltd flew 1329km of airborne magnetics and GEOTEM across AN314 at a line spacing of 200m. Magnetics revealed little contrast in the dominantly dolomitic rock types but the GEOTEM provided valuable mapping data and outlined numerous low order conductors for evaluation.
- A 71km IP survey designed to locate coarse grained sulphide mineralisation was completed by Zonge Engineering across the major faults of the Emu Fault Zone. One hundred meter dipoles were used with data recorded to n=6. Numerous anomalies were defined but those drilled within resistive rocks were related to minor pyrite and no significant mineralisation was found.
- A total of 6500 metres of percussion and diamond drilling tested geochemical, geophysical, geological and conceptual targets throughout AN314. Apart from the Amelia Prospect, drilling failed to intersect significant mineralisation. Best results at Amelia were: 24m @ 2.17%Zn including 12m @ 4.06%Zn (26RC in the weathered zone); 30m @ 2.31%Zn (24RC straddling the weathered fresh transition)
- Expenditure for the first year of AN314 exploration was $1,572,430.

Amelia Prospect

- Sequence: Mara Dolomite-'Coxco Dolomite' (Mitchell Yard Dolomite-Teena Dolomite on 1972 CEC mapping) - 'Reward' Dolomite-Lynott Formation (Hot Springs Member)
- Emu Fault strands show west-side-up movement
- East-west Gap Fault active in Reward-time as shown by facies changes
- Soils over the 'Coxco'-‘Reward’ contact zone are variable anomalous in Zn, lesser so in Pb and occasionally in Cu. West of the Lamont Fault anomalism is decreased.
- Drilling (PD Amelia 15-31, Amelia 6-7) identified weak mineralisation associated with the ‘Coxco Dolomite’ Member and basal ‘Reward’ Dolomite
- No relationship between mineralisation and faulting demonstrated In the period ending June, 1993, the work on AN314 (replaced by AN366 on 8 June, 1992) included:
  - Refinement of geological relationships along the Emu Fault Zone from the 1991 geophysics in an ongoing attempt to locate coarse-grained mineralisation
  - Further 1:5000 mapping and -80mesh soil sampling (1034 samples) at West Cattle Creek, south of Amelia Prospect along the Emu Fault
  - A total of 1057 metres of RC and diamond drilling in 7 holes. These failed to intersect any significant sulphide mineralisation at Amelia Prospect, beneath the Lamont Copper anomaly, on the Lamont East Fault or south of Amelia Prospect at the West Cattle Creek prospect. The best result (at Amelia) was 6m @0.22%Zn, 0.41%Pb (Amelia 61DD from 116m). The economic potential of Amelia Prospect was considerably downgraded.
Figure 9 Geology of the Larra Keyah and Amelia prospects, from report CR19800195
Mitchell Yard

This study could not identify any significant exploration work in the Mitchell Yard area, other than some geochemical sampling around “South Mitchell”, which is equivalent to the northern Myrtle Area. The area around the Mitchell Yard prospect - based on existing maps - is approximately 9 km west of the Emu Fault; and consists of a number of small, fault bound sub-basins. Existing maps indicate extensive Quaternary and Cenozoic cover, and the presence of Emmerugga Dolomite in some of the sub-basins.

Hot Springs Basin

The basin is approximately 2x7 km and is elongated along a north-south axis. The western margin of the basin is terminated against the Hot Springs Anticline. The northern part of the basin terminates against a fault while the southern margin has a stratigraphic closure. Due to Cretaceous cover the uppermost unit is uncertain however the highest unit observed is the Upper Lynott Formation, below the Donnegan Member. It is expected that the Yalco Formation would be present in the area. No work is known to have been undertaken by the CEC other than that it was included in their detailed 1”=1600’ mapping program. The Hot Springs Basin is a large basin with low dips and only minor structural control. There are no outstanding features which highlight the basin a priority target for drilling. The results of a stream sediment sampling program are shown in report CR19720015, Sect06 (pages 5 and 6) and Sect07 (pages 1 and 2). Copper values for the survey were typically 5-10 ppm, Zn values were typically 5-20 ppm and Pb values were 5-30 ppm.

Conclusions and Recommendations

Prospects within the Teck/Rox JV area remain relatively untested by modern exploration techniques and are still prospective for SEDEX Zn-Pb-Ag style mineralisation. Historically, exploration targeting has been flawed by a poor understanding of local stratigraphy and structure; a lack of high resolution, good quality geophysical surveys; and a lack of detailed local/regional mapping. It could also be argued that drilling – which has historically been focused on shallow mineralisation <100 m – has not been sufficiently deep enough to encounter significant mineralisation; this was shown at the Myrtle Prospect where initial drilling was not deep enough to test the basal section of the H.Y.C. Pyritic Shale, which is where ore grades occur. There are a number of areas within the JV tenement area that despite being mapped as having favourable lithologies have been very poorly tested or not tested at all (Fig 10).

The extents of the basin in which the Teena and Boko Prospects occur appears to be relatively small, and hence of lower priority - although geophysics would be useful in better defining the extents of the basin (there appears to be no high resolution geophysical data for the Teena-Boko Area). The area between Teena Hill and Wickens Hill (intersect of 3.49% Zn and 0.44% Pb over 9.2 m) may be of interest. At this stage reconnaissance mapping and geophysics (gravity/magnetics) would be useful to help assess the prospectivity of Teena and Boko. The possibility of a sequence thickening at the northern edge of the Barney Creek Basin should be investigated. The INPUT-EM anomaly, MB1, identified by BHP and (apparently) never tested should also be re-examined. At this stage reconnaissance mapping and geophysics (gravity/magnetics) would be useful to help assess the prospectivity of the Barney Creek Basin. The best drilling results from the Barney Creek Basin to date are:

Barney DD3: 47.6m @ 0.28% Zn, 0.08% Pb from 265.9m depth, including 10m @ 0.42% Zn, 0.12% Pb from 292m depth
The Buffalo Lagoon Basin is proximal to the Bald Hills Fault, a regionally significant structure. Geophysics would help greatly with defining targets and basin structure. The best results to date are:

\[
\begin{align*}
\text{BF1:} & \quad 6\text{m} @ 3.22\% \text{ Pb from } 134\text{m depth} \\
\text{BF3:} & \quad 119.5\text{m} @ 0.055\% \text{ Zn, 0.01}\% \text{ Pb from } 195\text{m depth}
\end{align*}
\]

In addition, the Berjaya and Larra Keyah/Amelia prospects are of particular interest. For the Berjaya Prospect see separate report; the Larra Keyah/Amelia Prospect will be reviewed upon receipt of additional NTGS reports.

At this stage it is recommended that field level reconnaissance work should be conducted in all prospects and in areas where favourable lithologies/structural settings have been recognized (e.g. areas shown in figure 10). Geophysical surveys (IP, EM, and gravity) within the Myrtle-Reward area will greatly help in constraining basin architecture and significant structures, and in the identification of additional targets.

**Figure 10** Geological map of the Teck/Rox JV area highlighting zones where limited or no exploration work has been conducted and where lithologies favourable to mineralisation occur