

Mike Coleman & Anne Brewster  
Stevenson Mining Ltd  
99 Gavin St  
Ellerslie  
Auckland



**CRL Energy Ltd**

Dear Mike and Anne

68 Gracefield Road 5010  
PO Box 31-244  
Lower Hutt 5040  
New Zealand  
TEL + 64 4 570 3700  
FAX + 64 4 570 3701  
[www.crl.co.nz](http://www.crl.co.nz)

---

**CHRISTCHURCH OFFICE**

97 Nazareth Avenue  
PO Box 29-415  
Christchurch 8540  
New Zealand  
TEL + 64 3 341 2120  
FAX + 64 3 341 5500

---

**HAMILTON OFFICE**

C/- Ruakura Research Centre  
Private Bag 3123  
Hamilton 3240  
New Zealand  
TEL + 64 7 929 4864  
FAX + 64 7 929 4865

---

**GREYMOUTH OFFICE**

43 Arney Street  
PO Box 290  
Greymouth 7840  
New Zealand  
TEL + 64 3 768 0586  
FAX + 64 3 768 0587



Quality  
ISO 9001

**Re: Documents from Department of Conservation related to access to the Te Kuha coal deposit**

I have reviewed the following documents from the Department of Conservation related to access to the Te Kuha coal deposit and compiled the following notes.

- MP 41289 Engineering and Mine Plan Review - West Circle 2014a - 22 Dec 2014.pdf
- 41289 AA Application Significance Assessment Report - Draft for consultation - 2 June 2015.pdf
- 41289 DRAFT Te Kuha Mine Project description and AEE - 2 June 2015.pdf

In general, the review of water management and geochemistry information that CRL Energy compiled for Stevenson by the Department of Conservation and subcontractors is balanced and fair. In this letter I will cover several points related to the review including:

1. A revised geological interpretation that changes the distribution of coal measures rocks in the permit area and mine footprint.
2. The latest permit outline operated by Stevenson including an extension to the east of the previous permit area
3. Concern raised by the reviewer related to potential for acid mine drainage at the Te Kuha deposit
4. The current and future CRL Energy work programme for water management at Te Kuha.

**Distribution of Coal Measures in the Te Kuha area**

During geological investigations related to assessing the coal resources at Te Kuha, CRL Energy and collaborators identified both Brunner and Paparoa Coal Measures in this area. This is different to previous geological interpretations for the Te Kuha area that only identified Brunner Coal Measures and these new interpretations are made possible because of the drilling and analysis programme that Stevenson commissioned in 2011. This is a significant discovery because previously the Paparoa Coal Measures were not thought to occur north of the ranges inland from Punakaiki. Our revised interpretation means that the Brunner Coal Measures at Te Kuha are restricted to an area almost entirely within the proposed mine footprint, and the Paparoa Coal Measures occur in an area both within the mine and in much of the remaining permit area outside the mine footprint (Figure 1). This is our best and current interpretation, however, it could be revised further if new information becomes available from exposure of rocks along the planned access road, future drilling programmes or mine activity should operations at Te Kuha proceed.

This document must not be reproduced except with permission from CRL Energy Ltd

It is likely that this updated geological interpretation has implications for the assignment of ecological areas that are related to geology such as the Brunner Coal Measures Ecological Areas. The outline for these ecological areas appear to be related to the previous geological interpretations (Nathan et al., 2002) that indicated a wider distribution of Brunner Coal Measures and are now out of date. These interpretations are referred to in Application documents supplied to Department of Conservation from Consultants engaged by Stevenson and also from reviewers of these documents engaged by Department of Conservation. The new geological interpretations by CRL Energy and collaborators have been presented to the New Zealand geological community at a national conference (Dutton et al., 2013), and will be submitted to the New Zealand Journal of Geology and Geophysics for peer review.

### **Current permit boundary**

An extension to the previous permit boundary was granted on 2<sup>nd</sup> February 2014. This means that the current permit shape (Figure 1) should be revised in the review documents supplied by the Department of Conservation.

### **Concern related to potential for acid mine drainage**

Treatment of acid mine drainage is unlikely to be required at the proposed Te Kuha mine site as long as waste rock management is completed in an appropriate manner. A detailed design plan for waste rock management will be completed as part of the current work programme that is under way by CRL Energy. There are potentially acid generating rocks at the site, however, these can be managed by blending with non-acid forming rocks and by constructing dumps in a manner that prevents oxygen ingress. There is a risk associated with re-handling a substantial portion of the material that AMD will form during final re-contouring and rehabilitation of the site, however, this can be quantified and managed by completion of appropriate studies and design closer to mine closure.

In the unlikely event that acid mine drainage did occur at this site, it likely to be isolated and could be managed by a lime dosing plant.

Should trace elements be present at concentrations that cause concern for protection of aquatic ecosystems, then alternative treatment might be required. These assessments are underway.

### **Our current and future work programme**

CRL Energy is currently working on a probabilistic water management plan and related studies that will refine many aspects of the concept level studies completed to date including:

- Water storage volumes
- Water quality
- Pump sizes and rates required
- Volumes and distribution of flow to each sub-catchment each year
- Runoff characteristics for the site
- Improved understanding of linkages between groundwater and surface water
- Improved characterisation of the treatment effectiveness of flowmax and with flocculent addition for treatment of suspended sediment and coal fines
- Improved detail on waste rock management
- Monitoring and sampling programme to provide management data

Regards

A handwritten signature in black ink, appearing to read 'J Pope', written in a cursive style.

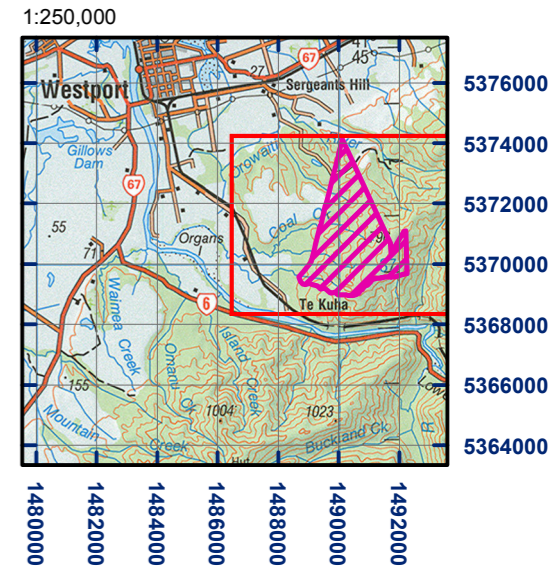
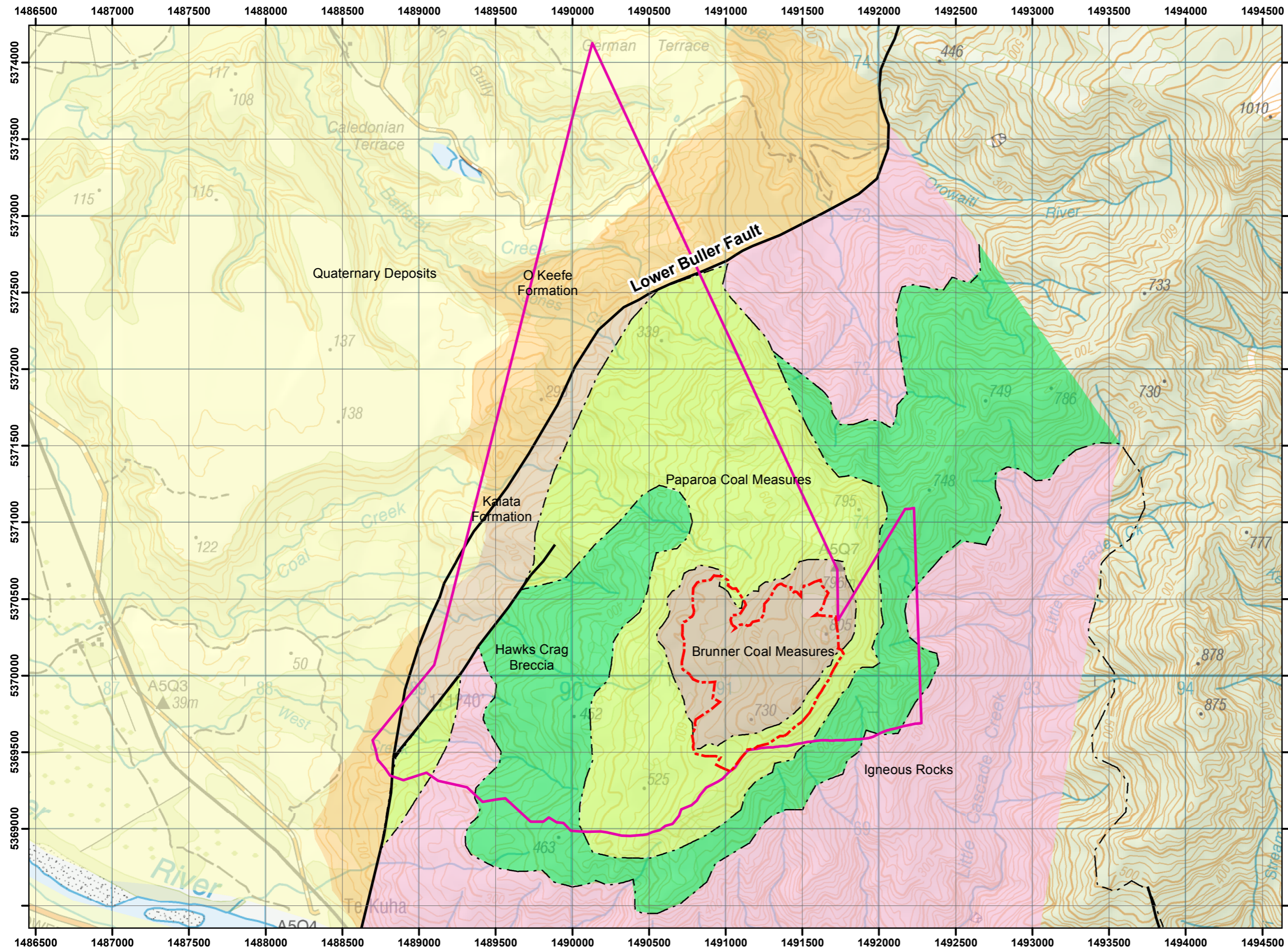
James Pope

CRL Energy  
General Manager (South Island)

### **References**

- Dutton, A., Newman, J., Newman, N., Pope, J., and Field, A., 2013, The Te Kuha Sector, Buller Coalfield: A revised model, AusIMM Annual Branch Conference, New Zealand: Nelson.
- Nathan, S., Rattenbury, M. S., and Suggate, R. P., 2002, Geology of the Greymouth Area, 1:250000 Geological Map. QMap 12: Institute of Geological & Nuclear Sciences Limited, scale 1:250000 Geological Map.

# Te Kuha Regional Geology Map



**Legend**

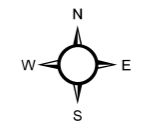
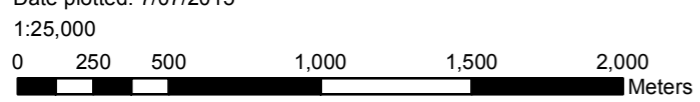
- - - Mine footprint outline
- MP 41289
- Major Faults
- Formation contacts

**MAP\_UNIT**

- Quaternary Deposits
- O'Keefe Formation
- Kaiata Formation
- Brunner Coal Measures
- Paparoa Coal Measures
- Hawks Crag Breccia
- Cretaceous Igneous Rocks



Author: Aaron Dutton - Senior Geologist  
Date plotted: 7/07/2015



CRL Energy Ltd Coordinate System: NZGD 2000 New Zealand Transverse Mercator

Confidentiality Clause: This document and any accompanying attachments are confidential to the intended recipient. The document may contain information that is subject to legal privilege. The contents may not be passed on or copied in whole or part, for or by any third party. Any form of reproduction, dissemination, copying, disclosure, modification, distribution and/or publication of this document or attachments is strictly prohibited.