

23 May 2016

Ms Kim Vaux  
Approvals Advisor (Compliance)  
External Affairs  
South 32-Illawarra Coal  
PO Box 514  
Unanderra NSW 2526

Via email: [kim.vaux@bhpbilliton.com](mailto:kim.vaux@bhpbilliton.com)

Dear Ms Vaux,

**Re: West Cliff Colliery, Longwall 38 End of Panel Report - Aboriginal Heritage Assessment**

As requested, Niche Environment and Heritage (Niche) has undertaken a site assessment and review of the predicted and observed impacts on Aboriginal heritage sites and their associated values resulting from the extraction of coal at Longwall 38 at West Cliff Colliery. This assessment is attached for inclusion in the South 32- Illawarra Coal (Illawarra Coal) End of Panel Report for Longwall 38.

There were no new observable impacts noted during the site inspections. Observable impacts have previously been noted to Aboriginal shelter sites Georges River No. 2 (AHIMS # 52-2-2243) and Georges River No. 3 (52-2-2243). These impacts were as a result of subsidence movements from Longwall 35 (Niche 2013) and Longwall 36 (Niche 2014) and have not been further impacted by the extraction of coal at Longwall 38. The following recommendations have been provided to Illawarra Coal with consideration of past and present site observations:

- Illawarra Coal should notify all other necessary internal and external parties of the results of this End of Panel report as per the Bulli Seam Operations Project: Heritage Management Plan BSPO Approval Performance Measures and the Trigger Action Response Plan.

Please do not hesitate to contact me on 0488 224 758 should you require any further information.

Yours sincerely,



Renée Regal  
Senior Heritage Consultant  
**Niche Environment and Heritage**

# West Cliff Colliery, Longwall 38 End of Panel Report: Aboriginal Heritage Assessment

## Background and Introduction

Niche was commissioned by Illawarra Coal to conduct an End of Panel (EoP) assessment of the Aboriginal cultural heritage and archaeological sites within the limit of subsidence effects of Longwall 38 at West Cliff Colliery. This area has been defined as the 'Subject Area' and is shown in Figure 2, which is reproduced from Cardno 2013:8.

This EoP Aboriginal heritage assessment report includes a summary of:

- previous monitoring.
- the results of the Subsidence Report prepared by MSEC.
- the results of a site inspection.
- a discussion, and
- conclusions and recommendations.

Monitoring of Aboriginal archaeological sites at West Cliff Colliery to-date has been carried out as recommended by Biosis Research (2007).

## Subsidence Monitoring Results Summary (MSEC)

The End of Panel Subsidence Report for Longwall 38 prepared by MSEC (MSEC807\_Revision 01) is a comprehensive report which addresses all aspects of the recorded subsidence parameters resulting from the extraction of Longwall 38.

Specifically, in relation to matters that may affect Aboriginal cultural heritage values, MSEC notes the following:

- In relation to the Georges River, measured subsidence parameters (incremental and total subsidence movements; incremental and total upsidence and closure) the maximum observed incremental and total upsidence and closure movements at the Georges River cross lines O,P and R after the completion of Longwall 38, were generally less than the maxima predicted. The maximum observed incremental and total upsidence and closure movements for the Georges River cross lines L and H after the completion of Longwall 38, were greater than the maxima predicted ( less than 10mm in each instance).
- The observed total upsidence and closure exceeded the predictions at the G-Line, H-Line (closure only) L-Line, M-Line and N-Line. In each of these cases, the observed movements had exceeded the predictions prior to the extraction of Longwall 38.

- The incremental exceedances of upsidence and closure for the remaining monitoring lines were all less than the incremental predictions (MSEC807\_REV01:6-7.)
- Additional fracturing occurred following extraction of Longwall 38. Fracturing was identified at Rockbar 49 on the Georges River, with the largest fracture 10 metres long and 0.04 metres wide. Fracturing and associated uplift was observed in tributaries GR104, GR108 and GR110.

## Site inspection and results

Six Aboriginal archaeological sites were inspected as part of this assessment and included:


- AHIMS #52-2-2243 an Aboriginal shelter with art and deposit,
- AHIMS #52-2-2244 an Aboriginal shelter with art and axe grinding grooves,
- AHIMS #52-2-2234 Shelter with art,
- AHIMS #52-2-2241 Shelter with art, and
- AHIMS #52-2-2242 Shelter with Art (See Figure 2 Cardno 2013:8).




These sites were inspected because one was located within the possible zone of subsidence movements associated with Longwall 38. The other two were noted to be impacted by subsidence movements associated with Longwalls 35 and 36.



One shelter with art (AHIMS #52-2-2235) could not be accessed during this inspection due to access issues.



The site inspection was carried out on 17 February 2016 by Renée Regal and Sian Griffiths (Niche), who were accompanied by Ben Davis (Illawarra Coal). A summary of the findings of the site visit are outlined in Table 1 and Table 2.

**Table 1: Summary of the site visits to the Aboriginal heritage sites in proximity to Longwall 38**

AHIMS site number	Site Name	Results of inspection	Photograph of current condition of site
52-2-2243	Georges River 2	Impacts to this shelter had been noted in Niche (2014). Observations found that impacts had not increased and remained in the same condition as described by Niche in 2014, due to the extraction of Longwall 36. The Thin, vertical cracking previously observed in the shelter roof to the right side of the art panel remains the same as previously described.	 <p>Northern end of shelter examples of horizontal and vertical cracking that remain the same as previously described.</p>

AHIMS site number	Site Name	Results of inspection	Photograph of current condition of site
		<p>The cracking does not appear to have altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth associated with the cracking.</p> <p>The art panel remains in the same condition as described in Biosis Research 2007 and Niche 2013b, 2014, 2015 and has not been affected by the observed changes.</p>	 <p>Picture of art panel still in same condition as described by Biosis 2007, Niche 2013b and 2014</p>  <p>View of the shelter facing north. Same as depicted by Biosis 200, Niche 2013b and Niche 2014.</p>
52-2-2244	Georges River 3	<p>This shelter was in the same condition as described by Niche in 2014. There has been no further movement of the horizontal bedding plane joints of the shelter and the cracking and exfoliation observed in relation to Longwall 35. The site remains the same as previously described.</p> <p>The cracking does not appear to have altered seepage or water movements in the shelter, and there is no evidence of water flow or recent micro-vegetation growth</p>	 <p>Example of the cracking along the back wall of the shelter, in the same condition as depicted in Niche 2014.</p>

AHIMS site number	Site Name	Results of inspection	Photograph of current condition of site
		<p>associated with the cracking.</p> <p>The art panel remains in the same condition as described in Biosis Research 2007, Niche 2013b, 2014 and 2015.</p>	
52-2-2242	Georges River No 4	<p>Shelter and Art are in the same condition as described by Biosis Research 2007 and Niche Environment and Heritage 2011, 2013, 2014 and 2015. The art has started to loose granular substrate and there has been some cracking and flaking to the panel due to case hardening. Artefacts were not observed in the drip-line of the shelter.</p>	 <p>52-2-2242 remains in the same condition as described and pictured 2007.</p>  <p>Charcoal infill art present at 52-2-2242 remains in the same condition as described in Biosis Research 2007 and Niche Environment and Heritage 2013, 2014 and 2015.</p>

AHIMS site number	Site Name	Results of inspection	Photograph of current condition of site
52-2-2234	Georges River 1	<p>This shelter is in the same condition as previously described in both Biosis Research 2007 and Niche Environment and Heritage 2011, 2013, 2013b and 2014. Natural weathering of the art panel has caused further granular loss, and a white leeching process has occurred over the infill kangaroo.</p>	
52-2-2241	Georges River 5	<p>Shelter and Art are in the same condition as described by Biosis Research 2007 and Niche Environment and Heritage 2011, 2013 and 2014. The previously reported charcoal drawings were in the same condition as described previously by Biosis 2007.</p> <p>The single quartz artefact was not observed in the shelters drip line during this assessment.</p>	

General photograph facing north of Georges River 1

General photograph of Georges River 5 facing east of boulder with infill charcoal kangaroo.

## Discussion and conclusion

There were no observable changes as a result of the extraction at the sites:

- Georges River 1 (52-2-2234)
- Georges River 4 (52-2-2242)
- Georges River 5 (52-2-2241)

There were no further changes as a result of the extraction at the following sites:

- Georges River No. 2 (52-2-2243)
- Georges River No. 3 (52-2-2244)

The following site could not be accessed due to landholder issues:

- Georges River 6 (52-2-2235)

The Trigger Action Response Plan (TARP) (Table 2) contains the Performance Measures along with the proposed Corrective Management Actions for Aboriginal heritage sites; as outlined in the Longwalls 37 and 38 Heritage Management Plan (Cardno, 2013).

In addition to the TARP, the Longwall 37-38 Extraction Plan (Niche 2013) and the Bulli Seam Operations Project Heritage Management Plan (Biosis 2012) state the following actions in the event of impacts to an identified Aboriginal site:

*Notification: DoPI, RAPs and OEH will be notified of the find and the ICHPL Corrective Action Procedure will be initiated.*

*Management Actions:*

*– In consultation with OEH, RAPs, DoPI and a qualified archaeologist, the site will be inspected and a management strategy developed.*

*– The management strategies will be implemented in accordance with current conservation practice and the conservation principles contained within the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter. RAPs must be consulted regarding appropriate management methodologies and any advice would be taken into consideration in the development of the management strategies.*

*– An appropriate monitoring program will be developed to report on the effectiveness of the management strategy.*

*Reporting: A report detailing the impact, details of consultation, management actions undertaken and effectiveness of management actions undertaken will be completed by a qualified archaeologist within 6 months of the completion of the impact monitoring program. A copy of this report will be provided to DoPI, OEH and RAPs (Biosis 2012)*

*In the event that there are subsidence impacts to any site being monitored, management strategies specific to the impact will be developed. The management strategies will be implemented in accordance with current conservation practice and principles contained within the Australia International Council on Monuments and Sites (ICOMOS) Burra Charter, and the*

*DEC Guidelines for Aboriginal Heritage Impact Assessment (Draft). The advice of the identified Aboriginal communities regarding appropriate management methodologies will form an integral part of the development of the management strategies.*

*All contingent management strategies will be developed in consultation with relevant stakeholders. (Cardno Forbes Rigby 2008)*

The draft report was submitted for review and comment to each of the Aboriginal stakeholder groups outlined in the Bulli Seam Operations Project: Heritage Management Plan on 9 May 2016. There were no further comments received from any of the groups in response to this report.

The recommendations presented below are intended to allow Illawarra Coal to discharge its obligations under the Longwalls 37 to 38 Extraction Plan and the Bulli Seam Operations Heritage Management Plan.

## **Recommendations**

The activities undertaken for the completion of this EoP Report have satisfied several of the response actions required by the TARP. It is not recommended that an additional monitoring program be implemented for the site Georges River No. 2 (52-2-2243). There is also no evidence that the hydrological regime at the site has been affected by the subsidence impacts.

The following recommendations have been made with consideration of past and present site observations:

- Illawarra Coal should notify all other necessary internal and external parties of the results of this End of Panel report, as outlined in Table 2 overleaf.



**Table 2: BSOP Approval Performance Measures Table**

Feature	Performance Measures	Observations	Actions as a result of LW 38
Sites determined to hold 'special significance' as a result of studies required for Extraction Plans. (no sites applicable for Longwall 38)	Negligible impact or environmental consequence.	N/A	None required.
Sites determined to hold high or moderate significance as a result of studies required for Extraction Plans: Georges River 2 (52-2-2243)	Less than 10% of such sites across the mining area affected by subsidence impacts (other than negligible impacts or environmental consequence).	No changes site as a result of Longwall 38 extraction.	None required.
Other Aboriginal Heritage Sites: Georges River 3 (52-2-2244) Georges River 4 (52-2-2242) Georges River 1 (52-2-2234) Georges River 5 (52-2-2241) Georges River 6 (52-2-2235)	Less than 10% of such sites (or 1 such site, whichever is the greater) within any Longwall mining domain area is affected by subsidence impacts (other than minor impacts or environmental consequence).	No impacts as a result of Longwall 38 extraction.	<p>Notify RAPs and advise of impact <b>COMPLETED BY THIS REPORT</b></p> <p>Provide a report detailing the impact, details of consultation, management actions undertaken and effectiveness of management actions undertaken, completed by a qualified archaeologist within 6 months of the completion of the impact monitoring program. Provide a copy to DoP, OEH and RAPs. <b>ACTION NOT REQUIRED</b></p> <p>Continue with monitoring program <b>COMPLETED BY THIS REPORT</b></p>

## References

Biosis Research 2007 *Archaeological Cultural Heritage Assessment: Review of West Cliff Area 5- Longwalls 34-36, Appin NSW*. An unpublished report for BHP Billiton Illawarra Coal

Biosis Research 2010 *West Cliff Area 5 Longwall 33 End of Panel Report: Cultural Heritage*. An unpublished report for BHP Billiton Illawarra Coal

Biosis 2012. *Bulli Seam Operations Project: Heritage Management Plan*. An unpublished report for BHP Billiton Illawarra Coal

Cardno Forbes Rigby (2013) *West Cliff Area 5 Longwalls 37 and 38 Extraction Plan, Annex F Heritage Management Plan, Rev A, August 2013*. An unpublished report for BHP Billiton Illawarra Coal.

MSEC 2006 *The Predictions of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Sub-surface Features Due to Mining Longwalls 31 to 33 at West Cliff Colliery in Support of an SMP Application*. An unpublished report prepared for BHP Billiton – Illawarra Coal. Report Number MSEC208, Revision B, Mine Subsidence Engineering Consultants.

MSEC 2007. *The prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Natural Features and Surface Infrastructure resulting from the extraction of proposed Longwalls 34 to 46 in Area 5 West Cliff Colliery in support of the SMP Application*. Report prepared for BHP Billiton - Illawarra Coal. Report Number MSEC326, Revision A.

MSEC 2015 *BHP Billiton Illawarra Coal: West Cliff Colliery- Longwall 37 End of Panel Subsidence Monitoring Report for West Cliff Longwall 37*. An unpublished report prepared for BHP Billiton Illawarra Coal. Report Number MSEC740 Revision A, Mine Subsidence Engineering Consultants.

MSEC 2014 *BHP Billiton Illawarra Coal: West Cliff Colliery- Longwall 36 End of Panel Subsidence Monitoring Report for West Cliff Longwall 36*. An unpublished report prepared for BHP Billiton Illawarra Coal. Report Number MSEC270 Revision A, Mine Subsidence Engineering Consultants.

Niche Environment and Heritage 2011 *Aboriginal and European Heritage Assessment for West Cliff Colliery - Longwall 34 End of Panel Report*. An unpublished report prepared for BHP Billiton Illawarra Coal.

Niche Environment and Heritage 2013 *Heritage Assessment: West Cliff Colliery Longwalls 37 and 38 Extraction Plan*. An unpublished report prepared for BHP Billiton Illawarra Coal.

Niche Environment and Heritage 2013b *West Cliff Longwall 35 End of Panel Heritage Assessment*. An unpublished report prepared for BHP Billiton Illawarra Coal.

Niche Environment and Heritage 2014 *West Cliff Colliery Longwall 36 End of Panel Heritage Assessment*. An unpublished report prepared for BHP Billiton Illawarra Coal.

Niche Environment and Heritage 2015 *West Cliff Colliery Longwall 37 End of Panel Heritage Assessment*. An unpublished report prepared for South 32 Illawarra Coal.