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Dear Chloe

INTEGRA UNDERGROUND: LONGWALL 16 BI-MONTHLY SUBSIDENCE REPORT FOR AUGUST AND SEPTEMBER 2020

HV Coking Coal Pty Ltd (HVCC) are currently mining Longwall 16 in the Middle Liddell (ML) Seam at the Integra Underground (IUG) Mine near Camberwell, 12km northwest of Singleton in the Hunter Valley of NSW. The approved Extraction Plan (EP) for Longwalls 15 and 16 requires IUG to monitor and report subsidence impacts on a bi-monthly, six-monthly and annual basis. HVCC commissioned SCT Operations Pty Ltd (SCT) to review and analyse the subsidence monitoring conducted and prepare reports suitable for submission to the Department of Planning, Industry and Environment (DPIE) and the Resources Regulator, if required. This report presents the results of our review and analysis of subsidence monitoring for the mining of Longwall 16 during August and September 2020.

Our review indicates:

- No significant subsidence impacts to natural or built features have been observed.
- No subsidence impacts to the Mt Owen Railway Line/Bettys Creek bridges and associated infrastructure have been reported. Minor maintenance and preparation for undermining by Longwall 16 was conducted by the Technical Committee to maintain this infrastructure in a safe and serviceable condition.
- No subsidence impacts to the Mt Owen - North Pit open cut mining operations have been recorded.

Minor subsidence impacts recorded during the mining of Longwall 16 to date are consistent with or less than expectations presented in SCT Report INT4852 – "Integra Underground Mine: Subsidence Assessment for LW15 and LW16 Extraction Plan" (SCT 2018).

Our review considers the available monitoring data and observations for the August and September 2020 reporting period including:

- Weekly inspections for subsidence impacts from Longwall 16 conducted by IUG personnel during the two-month period in accordance with the IUG Subsidence Monitoring Program in the Longwalls 15 and 16 Extraction Plan.
- Ongoing Technical Committee communications for the monitoring and management of subsidence impacts to the Mt Owen Railway Line, Bettys Creek bridges and associated infrastructure.
- Measurements of subsidence effects and observations of impacts from longwall mining at the Mt Owen - North Pit reported by the Senior Geotechnical Engineer.

On this basis, the observed subsidence effects and impacts are considered compliant with the performance indicators and subsidence performance measures for the EP required under modified IUG Project Approval (PA08_0101). However, it should be recognised that assessment of compliance requires input from other specialists.

1. BACKGROUND AND SITE DESCRIPTION

Consent for the current mining of Longwall 16 in the ML Seam at IUG is provided by Modification 8 (MOD8) to Project Approval (PA) 08_0101 for the Integra Underground Project. The EP for Longwalls 15 and 16, with supporting subsidence management plans for natural and built features, required by PA08_0101 was approved in August 2019.

Figure 1 shows the longwall mining areas, superimposed onto a Google Earth image of the surface from August 2018 (the Mt Owen - North Pit has not extended over the extracted longwall panels since this time). This figure is a copy of Figure 4 from SCT (2018) amended to show the completed mining in Longwall 14 and the mining in Longwalls 15 and 16, during the bi-monthly reporting periods, up to the end of September 2020.

Longwall 16 commenced secondary extraction on 9 June 2020 at CH1738m, approximately 120m to the southwest of the start line location approved by MOD8 to PA08_0101 (SCT 2017) and included in SCT (2018).

During the August and September 2020 reporting period, Longwall 16 mined from CH1439m to approximately CH1000m, at total of 439m.

At the end of September 2020, the total void length for Longwall 16, including the 9m installation roadway width, was approximately 747m. The void for Longwall 16 is nominally 257m wide.

The total overburden thickness above the face line of Longwall 16 at the end of September 2020 is approximately 490-510m. This total includes approximately 10-30m of waste rock fill material of the West Dump emplaced above the natural ground level at this location.

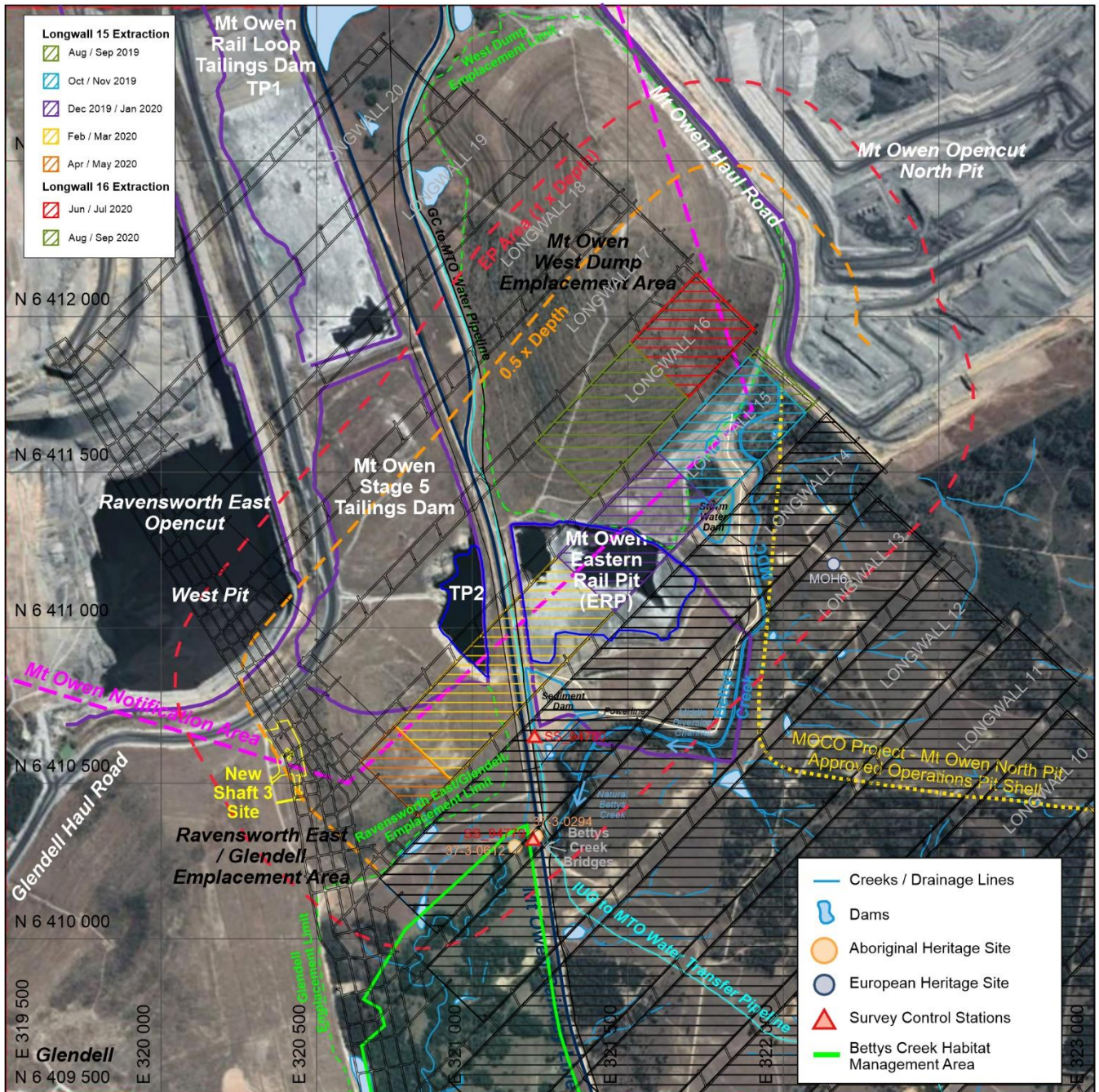


Figure 1: Locations of surface features and Bi-monthly mining areas.

Full subsidence movements over Longwall 16 and the adjacent Longwall 15-16 chain pillars are expected to be developing by the end of September 2020.

The surface above Longwalls 15 and 16 comprises areas modified by surface mining and items of mining related infrastructure. Natural features are limited to small sections of native and planted vegetation adjacent to the remaining upper reaches of the Betty's Creek middle diversion channel (MDC), small farm dams and the natural ground along the Mt Owen Railway Line corridor.

A section of open void and capped portion of the ERP, a section of the Mt Owen Railway Line with associated infrastructure and parts of the open void and filled portion of the Mt Owen Stage 5 Tailing Dam (also known as TP2) are located above Longwalls 15 and 16. Sections of the rehabilitated Mt Owen West Dump and Ravensworth East/Glendell emplacement areas are located above the areas to be mined by Longwalls 15 and 16. Parts of the surface water management system including the eastern storm water dam for the West Dump (Dam4) and ERP sediment dam with associated pumping and power supply equipment are located above Longwall 15. Water supply and transfer pipelines, an overhead powerline, gas drainage boreholes and related equipment associated with IUG, are also located above, or cross the surface above Longwalls 15 and 16.

Other natural or built features within the EP Assessment Area for Longwalls 15 and 16, but generally above the area mined by Longwall 14, include natural dams (ponds), minor drainage lines, Aboriginal and historical (European) heritage sites, survey control stations, the natural section of Bettys Creek and adjacent floodplain, and an area of natural land set aside as the Bettys Creek Habitat Management Area (BCHMA). The rail and road bridges over Bettys Creek are positioned between Longwalls 13 and 14.

Longwall 16 started mining below the eastern slope of the rehabilitated West Dump approximately 120m short of the approved location. This actual start line position increased the offset distance between the mining of Longwall 16 underground at IUG and the surface operations at Mt Owen – North Pit.

During the August and September 2020 reporting period, Longwall 16 mined below:

- A section of the eastern slope of the West Dump emplacement area.
- Gas drainage installations and equipment.
- Other minor built features such as access roads and four-wheel drive tracks.

As at the end of September 2020, Longwall 16 was approximately 130m from mining below the ERP and 260m from the Mt Owen Railway Line and TP2 to the west of the railway line.

2. MONITORING AND REVIEW

The Subsidence Monitoring Programs for Longwalls 15 and 16 require a minimum of weekly visual inspections for the various surface features above and in the vicinity of these panels. IUG personnel reported no significant subsidence impacts from the mining of Longwall 16 in the weekly inspections during August and September 2020.

No significant subsidence impacts from longwall mining have been reported to:

- the West Dump emplacement area
- gas drainage installations and associated equipment
- surface infrastructure and built features.

Changes to the landform of the West Dump such as minor ponding in contour drains after rainfall, minor holes from settlement of fill material and areas of erosion have been reported. However, these are unlikely to be related to subsidence from longwall mining. Observations indicate the holes and erosion pre-date Longwall 16. The ponding is likely to be within the gradient variation of the as built contour drains.

Any potential subsidence impacts, including minor changes to the landform, are not expected to be out of character with the changes due to earthworks for gas drainage installations and the earthworks associated with the construction of the drop structure drainage channel.

Areas of erosion, slumping and settlement of excavated areas for gas drainage installations have been reported after the heavy rainfall in July and August 2020, but these are unlikely to be subsidence impacts from longwall mining. **Figure 2** shows examples of changes to a gas drainage equipment pad, cut into the slope of the West Dump, after rainfall. These changes include erosion of the upper bank from the contour drain above the pad and settlement of the unconsolidated batter slope on the down-slope side of the pad.

Management of subsidence impacts the Mt Owen Railway Line, Bettys Creek bridges and associated infrastructure from Longwall 15 and previous panels has continued during the reporting period. Ongoing impacts are less than and consistent with expectations presented in SCT (2018).

Monitoring (including a baseline ground survey) and communications between members of the Technical Committee continued as required by the asset management plan to maintain this infrastructure in a safe and serviceable condition while preparing for Longwall 16 to mine below the railway.

A report for the monitoring of highwall stability at Mt Owen – North Pit during the first 500m of mining in Longwall 16 was published in late August 2020. Subsidence impacts from Longwall 16 are less than forecast in SCT (2018) consistent with the increased offset between Longwall16 and the North Pit.

The report by the Senior Geotechnical Engineer for Mt Owen - North Pit operations presents a summary and interpretations of the radar measurements for ground movement at the western highwall adjacent to the start lines of Longwalls 15 and 16. The report indicates the maximum total horizontal movements during the period of monitoring the active longwall mining was 85mm in a direction towards to the open North Pit excavation.

The period of active monitoring and longwall mining indicates outward horizontal movement of the highwall off the end of Longwall 16 of about 65 ± 20 mm (measured in a direction at about 45° to the line of the highwall).



a) Erosion at top bank of Gas Drainage Pad.



b) Settlement or slumping of bunding and bottom batter slope of Gas Drainage Pad.

Figure 2: Examples of changes to excavated areas after rainfall.

Further to the south off the end of Longwall 15, outward movement reduces to 15 ± 10 mm.

The correlation of movement with rainfall is clear. Unfortunately, the correlation is coincidental with the period where mining Longwall 16 would be expected to be most actively affecting the highwall, so it is not possible to differentiate the two effects.

Advice from the Senior Geotechnical Engineer indicates the low-magnitude subsidence effects measured have not resulted in any significant impacts to the North Pit operations.

To assist with formal reporting requirements, a summary of the monitoring for the reporting period has been prepared. This summary uses a pro-forma checklist for all features assessed for subsidence impacts in the preparation of the EP for Longwalls 15 and 16 and comparison with forecasts in SCT (2018). This data is arranged in the order of impact assessment in SCT (2018) and is recorded as a reference for reporting or auditing purposes. The checklist is provided in Table 1.

Observations of subsidence effects or impacts and management measures in Table 1 cover the area above the active panel, as well as the previous panel. Where features are currently outside the subsidence zone of the active panel longwall face position (within half overburden depth, for Longwalls 15 and 16 this is 200-250m) they are marked 'n/a' (not applicable).

If you have any queries, or require further clarification of any of these issues, please don't hesitate to contact me directly.

Yours sincerely



Stephen Wilson
Mine Planner

3. REFERENCES

SCT 2017 'Integra Underground Mine: Subsidence Assessment for Modification to PA08_0101' SCT Report INT4648 – 22 November 2017

SCT 2018 'Integra Underground Mine: Subsidence Assessment for LW15 and LW16 Extraction Plan' SCT Report INT4852 – 24 December 2018.

Table 1: Surface Features and Subsidence Impact Monitoring

August – September 2020			
Longwall 16 Bi – Monthly Subsidence Monitoring			
Surface feature, subsidence effect or management measure	New effect or impact observed Yes/No	Exceedance of predictions Yes/No	Exceedance within performance measure and/or performance indicator Yes/No
Bettys Creek	n/a	n/a	n/a
-natural drainage line tributaries	n/a	n/a	n/a
Bettys Creek (MDC)	NO	no	n/a
Bettys Creek (natural)	n/a	n/a	n/a
Natural Dams (Ponds)	n/a	n/a	n/a
Natural Vegetation	NO	no	n/a
BC Habitat Management Area	n/a	n/a	n/a
Aboriginal Heritage	n/a	n/a	n/a
Historical Heritage	n/a	n/a	n/a
Mt Owen Railway Line	YES	NO	n/a
Bettys Creek Bridges	n/a	n/a	n/a
Communication Cables	n/a	n/a	n/a
Maintenance Road	n/a	n/a	n/a
Embankments/Cuttings	n/a	n/a	n/a
-causeway ERP-TP2	n/a	n/a	n/a
Water Supply Pipeline	n/a	n/a	n/a
Water Transfer Pipeline	n/a	n/a	n/a
Powerlines	n/a	n/a	n/a
Mt Owen – North Pit	YES	NO	n/a
Ravensworth East - West Pit	n/a	n/a	n/a
Glendell haul road	n/a	n/a	n/a
ERP (and 500m past)	NO	no	n/a
TP2 (to End of Panel)	n/a	n/a	n/a
Emplacement area (West dump)	NO	no	n/a
Emplacement area (Ravensworth/Glendell)	n/a	n/a	n/a
Sediment Dam	n/a	n/a	n/a
Storm Water Dam	n/a	n/a	n/a
Gas Drainage equipment	NO	no	n/a
Agricultural land	n/a	n/a	n/a

August – September 2020			
Longwall 16 Bi – Monthly Subsidence Monitoring			
Surface feature, subsidence effect or management measure	New effect or impact observed Yes/No	Exceedance of predictions Yes/No	Exceedance within performance measure and/or performance indicator Yes/No
General:			
Fences/Gates	NO	no	n/a
Access Roads	NO	no	n/a
Farm dams	n/a	n/a	n/a
Forest Road	n/a	n/a	n/a
Shaft 3 & infrastructure	n/a	n/a	n/a
Subsidence Impacts:			
Surface cracks or steps	NO	no	n/a
Surface humps	NO	no	n/a
Slope instability	NO	no	n/a
Surface water (ponding)	NO	no	n/a
Management measures:			
Warning signage	NO	no	n/a
Remediation measures:	n/a	n/a	n/a

