

Monitoring of the Nepean River and its associated tributaries is undertaken in accordance with the approved Appin Area 7 Extraction Plan (EP). Monitoring is conducted by the Illawarra Metallurgical Coal Environmental Field Team (IMCEFT) on a monthly basis, prior to mining and weekly during mining. Water quality and surface water levels are measured along with photographic and observational records. Longwall 708B began extraction on 24 April 2020 and as of 25 October 2020, had progressed approximately 965m (Figure 1). Changes to a historical gas zone were identified during the most recent inspection.

AA7_LW703_Gas Zone 10 Update (E 292967, N 6217438)

AA7_LW703_Gas Zone 10 is a historical gas release zone on Ousedale Creek that was first identified on 21 May 2010 during the extraction of Longwall 703. The site is approximately 2050m from Longwall 708B at its closest point (Figure 1). The zone was initially observed as three separate intermittent releases. During the latest inspection, 10 to 12 light, intermittent releases were identified in a 15m by 5m surface area creek, towards the confluence with the Nepean River (Photo 1 and Photo 2). No other Appin Area 7 gas zones were active during the latest inspection.

AA7_LW703_Gas Zone 10 remains a Level 1 Trigger as per the Trigger Action Response Plan (TARP) in the Appin Area 7 EP (Appendix A, Table 1):

- Identification of strata gas plume of flow rate < 3000 L/min.



Photo 1: AA7_LW703_Gas zone 10 on Ousedale Creek. Taken on 2/11/2020.



Photo 2: AA7_LW703_Gas zone 10 on Ousedale Creek. Taken on 2/11/2020.

Corrective Management Actions (CMAs)

Monitoring and reporting will continue as required by the EP. The following actions have been initiated:

- Continue monitoring program
- Submit an Impact Report to relevant stakeholders
- Report in the End of Panel Report
- Summarise actions and monitoring in the AEMR

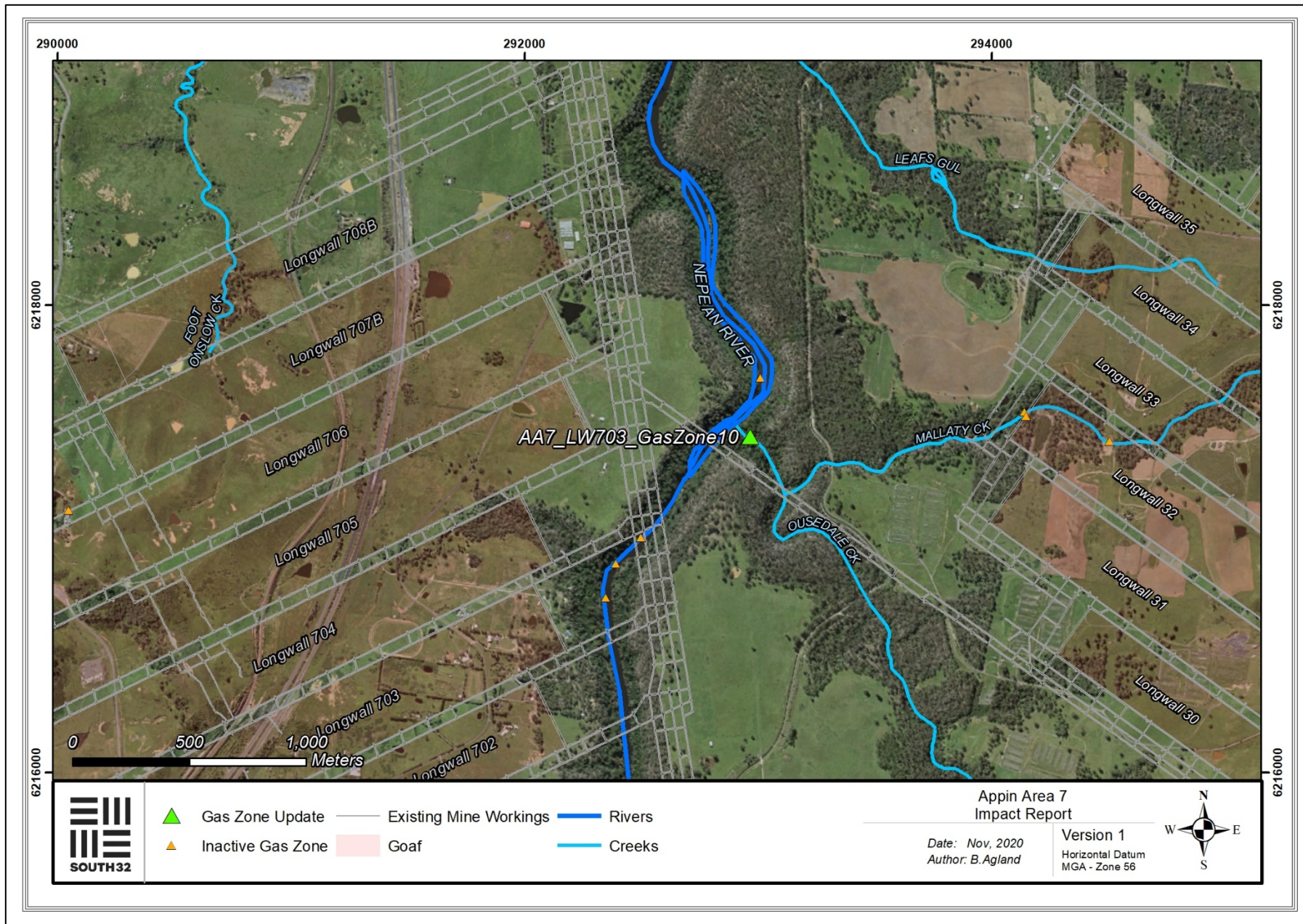


Figure 1: Subsidence impacts in relation to Appin Area 7.

Appendix A

Table 1: Extract from Appin Area 7 Trigger Action Response Plan.

| MONITORING | TRIGGER | ACTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|---------|---------|-------------|-------|-------|-------|-------------|------|------|------|---------------|-------|-------|-------|---------------|-------|-------|-------|--|--|-------|-------|---------------|-------|-------|-------|-------------|--|--|--|----|------|------|------|--------|-------|-------|-------|-------------|-----|----|----|---------------|-------|-------|-------|---------------|-------|-------|-------|--|--|
| WATER QUALITY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Nepean River Impact monitoring sites adjacent to longwalls:</p> <ul style="list-style-type: none"> NR12 NR13 <p>Refer to Figure 1</p> <p>Notes: Baseline upriver site NR110 will be used for cross-checking upriver perturbations⁽³⁾</p> | <p>Level 1⁽¹⁾ Impact monitoring sites:</p> <ul style="list-style-type: none"> pH reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months DO reduction greater than 1 standard deviation but less than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months Identification of strata gas plume of flow rate < 3000 L/min⁽²⁾ | <ul style="list-style-type: none"> Continue monitoring program Report impacts to key stakeholders Summarise impacts and record | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Impact Sites</th> <th>Mean</th> <th>1 STDEV</th> <th>2 STDEV</th> </tr> </thead> <tbody> <tr> <td colspan="4">NR12</td> </tr> <tr> <td>pH</td> <td>7.54</td> <td>0.34</td> <td>0.68</td> </tr> <tr> <td>DO (%)</td> <td>88.03</td> <td>10.62</td> <td>21.23</td> </tr> <tr> <td>SpC (µS/cm)</td> <td>180</td> <td>50</td> <td>100</td> </tr> <tr> <td>Tot Fe (mg/L)</td> <td>0.421</td> <td>0.135</td> <td>0.270</td> </tr> <tr> <td>Tot Mn (mg/L)</td> <td>0.034</td> <td>0.012</td> <td>0.023</td> </tr> <tr> <td colspan="4">NR13</td> </tr> <tr> <td>pH</td> <td>7.43</td> <td>0.35</td> <td>0.70</td> </tr> <tr> <td>DO (%)</td> <td>86.99</td> <td>12.82</td> <td>25.63</td> </tr> <tr> <td>SpC (µS/cm)</td> <td>180</td> <td>49</td> <td>98</td> </tr> <tr> <td>Tot Fe (mg/L)</td> <td>0.407</td> <td>0.129</td> <td>0.259</td> </tr> <tr> <td>Tot Mn (mg/L)</td> <td>0.034</td> <td>0.013</td> <td>0.026</td> </tr> </tbody> </table> | Impact Sites | Mean | 1 STDEV | 2 STDEV | NR12 | | | | pH | 7.54 | 0.34 | 0.68 | DO (%) | 88.03 | 10.62 | 21.23 | SpC (µS/cm) | 180 | 50 | 100 | Tot Fe (mg/L) | 0.421 | 0.135 | 0.270 | Tot Mn (mg/L) | 0.034 | 0.012 | 0.023 | NR13 | | | | pH | 7.43 | 0.35 | 0.70 | DO (%) | 86.99 | 12.82 | 25.63 | SpC (µS/cm) | 180 | 49 | 98 | Tot Fe (mg/L) | 0.407 | 0.129 | 0.259 | Tot Mn (mg/L) | 0.034 | 0.013 | 0.026 | <p>Level 2⁽¹⁾ Impact monitoring sites:</p> <ul style="list-style-type: none"> pH reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months DO reduction greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months EC, total Fe and total Mn increases greater than 2 standard deviation from pre-mining mean resulting from the mining for two consecutive months Identification of strata gas plume of flow rate >3000 L/min⁽²⁾ | <ul style="list-style-type: none"> Actions as stated for Level 1 plus: Review monitoring program Notify relevant specialists (South32 IC) and develop and implement remedial action if necessary <p>Strata Gas Emission Plume:</p> <ul style="list-style-type: none"> Estimate gas emission flow rates. Re-estimate should significant change be observed Take sample of plume (if possible) for: <ul style="list-style-type: none"> chemical composition dissolved methane from exactly above gas plume and at established downriver monitoring sites dissolved sulfide and total phenols from exactly above gas plume and at nearest downriver monitoring site(s) |
| Impact Sites | Mean | 1 STDEV | 2 STDEV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NR12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | 7.54 | 0.34 | 0.68 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DO (%) | 88.03 | 10.62 | 21.23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SpC (µS/cm) | 180 | 50 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tot Fe (mg/L) | 0.421 | 0.135 | 0.270 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| NR13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | 7.43 | 0.35 | 0.70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DO (%) | 86.99 | 12.82 | 25.63 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SpC (µS/cm) | 180 | 49 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tot Fe (mg/L) | 0.407 | 0.129 | 0.259 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tot Mn (mg/L) | 0.034 | 0.013 | 0.026 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Control Site NR110</p> <table border="1"> <tbody> <tr> <td>pH</td> <td>7.90</td> <td>0.42</td> <td>0.84</td> </tr> <tr> <td>DO (%)</td> <td>84.19</td> <td>15.22</td> <td>30.44</td> </tr> <tr> <td>SpC (µS/cm)</td> <td>240</td> <td>92</td> <td>184</td> </tr> <tr> <td>Tot Fe (mg/L)</td> <td>0.328</td> <td>0.131</td> <td>0.262</td> </tr> <tr> <td>Tot Mn (mg/L)</td> <td>0.025</td> <td>0.015</td> <td>0.031</td> </tr> </tbody> </table> | pH | 7.90 | 0.42 | 0.84 | DO (%) | 84.19 | 15.22 | 30.44 | SpC (µS/cm) | 240 | 92 | 184 | Tot Fe (mg/L) | 0.328 | 0.131 | 0.262 | Tot Mn (mg/L) | 0.025 | 0.015 | 0.031 | <p>Level 3⁽¹⁾ Impact monitoring sites:</p> <ul style="list-style-type: none"> Level 2-type reduction in water quality resulting from the mining observed for six consecutive months | <ul style="list-style-type: none"> Actions as stated for Level 2 Notify OEH, D&PI, NoW & DRE and any other relevant specialist. Consultation with stakeholders. Collect laboratory samples and analyse for: <ul style="list-style-type: none"> pH, EC, Total Fe and Mn Suite of Filterable metals. Dissolved methane, sulfide and total phenols (if relevant). Develop any site management measures as soon as practically possible (pending stakeholder availability) and seek any approvals required to implement Review the relevant TARP and Management Plan in consultation with key stakeholders | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH | 7.90 | 0.42 | 0.84 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DO (%) | 84.19 | 15.22 | 30.44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SpC (µS/cm) | 240 | 92 | 184 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tot Fe (mg/L) | 0.328 | 0.131 | 0.262 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tot Mn (mg/L) | 0.025 | 0.015 | 0.031 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Exceeding Prediction</p> <ul style="list-style-type: none"> More than negligible gas releases | <ul style="list-style-type: none"> Actions as stated for Level 3 Investigate reasons for the exceedance Update future predictions based on the outcomes of the investigation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |