Centennial Newstan (Awaba) Colliery
2016 End of Year
Subsidence Status Management Report

Report Number: **9**

Reporting Period: **2016**

Distribution List:

- Director Environmental Sustainability
- Industry Coordination
- Subsidence Executive Officer
- District Inspector
- Principal Subsidence Engineer
- Subsidence Engineer
- NSW Department of Primary Industry | Water
- Office of Environment & Heritage
- Department of Planning & Environment
- Ausgrid
- RailCorp (Transport NSW),
- Subsidence Advisory NSW,
- Origin Energy,
- Telstra
- Newstan (Awaba) Mine Manager,
- Newstan (Awaba) Environmental Coordinator.

General Comments:

Stage 1:

- Approval to mine Stage 1 of Mine Subsidence Management Plan (MSMP) at Awaba Colliery was granted on 03/09/2007
- Mining completed on 26/06/2009.
- Monitoring variation from 3 to 6 monthly approved 28/06/2011.
- January and March 2014 resurveys recorded greater than predicted maximum subsidence along Main South Crossline between XL24 to XL66 – and 8NE Centreline between CL01 to CL16. Monitoring frequency was temporarily increased.
- Relatively stable results were achieved during the second half of 2014.
- Relatively stable results continued through 2015 and 2016.
- Monitoring variation from monthly to 6 monthly approved 09/12/2016.

Stage 2:

- Approval to mine Stage 2 of MSMP at Awaba Colliery was granted on 29/08/2008
- Mining completed on 08/03/2012.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- July 2014 resurvey recorded greater than predicted subsidence along Main South Crossline Extension between XLE01to XLE22 – and 8SW Centreline between 8SW22 to 8SW43. Monitoring frequency was temporarily increased.
- A Sinkhole was found and reported on 03/02/2015 near 8SW29-30. The sinkhole has been filled. The area is being rehabilitated in accordance with the sinkhole rehabilitation plan.
- Relatively stable monitoring results were achieved in 2015, and continued through 2016.
- Monitoring variation from monthly - to 2 monthly for 6SW, and 6 monthly for all other points - approved 09/12/2016.

Stage 3:

- Approval to mine Stage 3 of MSMP at Awaba Colliery was granted on 15/12/2010
- A Sinkhole was found and reported following heavy rain over the June 2011 long weekend. The sinkhole was filled. The area was rehabilitated in accordance with the sinkhole rehabilitation plan.
- Mining Completed on 22/12/2011.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- Additional amendments to Stage 3 monitoring program in consultation with Principal Subsidence Engineer (PSE) and relevant stakeholders.
- Monitoring results show subsidence within predictions.
- 4NW monitoring was temporarily increased to Monthly – to match the frequency of Stage 1 and 2.
- There continues to be relatively stable monitoring results recorded from surveys.
- 4NW Monitoring variation from monthly to 6 monthly approved 09/12/2016.

Awaba Colliery Great Northern Seam Mining Ceased 08/03/2012.

- All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012.
- Underground workings are no longer accessible.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (a) – Stage 1 23 (a) – Stage 2 24 (a) – Stage 3	**Summary of Subsidence and Environmental Monitoring Results**	The Following subsidence surveys and inspections have been completed: ***Surface Surveys –*** All scheduled subsidence surveys completed to December 31st, 2016. There were No Notifiable Subsidence Incidents in 2016. **Maximum subsidence** in **2016 period** – was in **Stage 2** - XLE17, -1.409m. **Stage 1** - Maximum subsidence was at XL40, -1.342m. **Stage 3** - Subsidence monitoring results in 2016 were well within predicted levels and continue to be relatively stable.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Environmental inspections were carried out in January 2014. Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. The 2014 survey found no impact on Stony Creek, and was the last Ecological Survey. ***Underground Surveys –*** All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012 Underground workings are no longer accessible.
22 (b) – Stage 1 23 (b) – Stage 2 24 (b) – Stage 3	**Analysis of Subsidence and Environmental Monitoring Results**	After reporting greater than predicted subsidence in both Stage 1 and Stage 2 during 2014 – Monitoring Results for 2015 and **2016** were consistently relatively stable.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		January and March Surveys of **2014** found greater than predicted subsidence in Main South **Stage 1** Area. A report was prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure. Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders. The significant increase in subsidence occurred approximately 175 to 300 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles. There have been no observed visual environmental impacts in Stage 1 Area.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		July 2014 Surveys found greater than predicted subsidence in Main South **Stage 2** Area. Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders. The significant increase in subsidence occurred approximately 250 to 350 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles. Environmental impacts in Stage 2 - Cracking that was observed and reported, associated with the greater than predicted subsidence. The Sinkhole reported on 03/02/2015 near 8SW29-30. The sinkhole has been filled. The area is being rehabilitated in accordance with the sinkhole rehabilitation plan. No visual disturbance has been identified on tracks & trails.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Stage 3 Subsidence monitoring results in 2016 were within predicted levels and continue to be relatively stable. Environmental impacts in Stage 3 - have been confined to the previously reported and rehabilitated sinkhole.
22 (c) – Stage 1 23 (c) – Stage 2 24 (c) – Stage 3	**Trends in Monitoring Results**	In general - the trend in monitoring results shows that the majority of subsidence occurs during and shortly after mining extraction. In the following months the rate of subsidence decreases toward a stable environment. However after approximately 6 years of relative stability – there was greater than predicted subsidence in Main South **Stage 1** and **Stage 2** in **2014**. During 2014 – after the initial sudden increase in subsidence - results began to trend toward decreasing movement. In 2015 and **2016** surveys have consistently shown relatively stable results.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (d) – Stage 1 23 (d) – Stage 2 24 (d) – Stage 3	**Management Actions of Potential Impacts**	In general - current Public Safety and Subsidence Management Plans are considered adequate. Following greater than predicted subsidence in **Stage 1** Main South Cross line / 8NE Centreline area in 2014; All relevant government agencies and stakeholders were notified as per condition 20, after results of January survey. Centennial Newstan conducted a follow up survey – including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders. A visual inspection was carried out on 21/03/2014 - by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were included in a geotechnical report. A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence. A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014. A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical

SMP Approval Condition No.	Requirement Summary	Comment / Description
		consultant, and Transport NSW. During the Chatswood meeting – it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation. Monitoring frequency was increased on 04/04/2014 to provide further data until the area became stable; and to monitor any possible increased subsidence moving toward the rail corridor. Following greater than predicted subsidence in **Stage 2** Main South Crossline Extension / 8SW Centreline area - All relevant government agencies and stakeholders were notified as per condition 21, after results of the July survey. A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014. Agreement was reached with the PSE and Transport NSW - to increase monitoring frequency to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the Railway Protection Zone (along 8SW) or the Railway Mining Barrier (along 6SW) - will trigger further communication and review of the situation. Monitoring frequency was increased on 16/07/2014.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		A meeting to discuss the trend of consistent relatively stable monitoring results in both **Stage 1** and **Stage 2** - was held in Burwood on 12/08/2015. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Burwood meeting – it was agreed to amend the frequency of surveys from fortnightly to monthly for a period of six months (commencing from August). If results continued to be stable during this period – agreement would be made to further reduce monitoring frequency. On October 7th, 2015, official approval was granted by PSE to vary this monitoring to monthly. A meeting between Centennial Newstan and PSE was held on 20/07/2016 to discuss the consistent relatively stable monitoring results in **Stage 1, 2, 3**. A report reviewing the recent subsidence data, prepared by a geotechnical consultant, was distributed to Transport NSW and the PSE on 25/08/2016. In addition, a letter requesting agreement from Transport NSW to amend the monitoring program to 2 monthly for 6SW points, and 6 monthly for other nominated **Stage 1,2,3** points was submitted on 25/08/2016. Agreement to amend the monitoring program was received from Transport NSW on 08/12/2016. Agreement to amend the monitoring program was received from PSE on 09/12/2016.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Following the reporting of the **Stage 2** localised sinkhole in February 2015, - The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. The location of the sinkhole was plotted and is shown on the Stage 2 Face Position plan AW2075. The sinkhole has been filled. The area is being rehabilitated in accordance with the Sinkhole Rehabilitation Plan. Following the formation of the **Stage 3** Sinkhole in June 2011 -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. Rehabilitation of the site has since been completed. The location of the sinkhole was plotted, and is shown on the Stage 3 Face Position plan AW2176. Due to the partial reactivation of this hole - further minor rehabilitation works were carried out during 2015, in accordance with the Sinkhole Rehabilitation Plan.

Grant Watson

Centennial Newstan (Awaba) Colliery – Mine Manager

For any comments or questions please contact
Grant WATSON– Mine Manager
Ph.(W) 02 49560227 or
Mob. 0438 560 227
grant.watson@centennialcoal.com.au