



Centennial Coal



CLARENCE COLLIERY
Independent Environmental
Audit – Action Plan

April 2017



Independent Audit Recommendations	Clarence Response and Actions	Status as at 28/04/2017
<p>REC 01 CLR IEA 2016</p> <p>Implement measures to reduce the risk of pollution/licence exceedances from the Polishing Lagoon.</p>	<p>Clarence have implemented a Polishing Lagoon Transfer that transfer's water from the Polishing Lagoon through the Water Treatment Plant.</p>	<p>Completed.</p>
<p>REC 02 CLR IEA 2016</p> <p>Implement at source water pollution controls at the pit top where practical.</p>	<p>Refer REC 01 Action. The Polishing Lagoon Transfer eliminates untreated discharge from site. Clarence continues to maintain dirty water control structures.</p>	<p>Completed and ongoing.</p>
<p>REC 03 CLR IEA 2016</p> <p>Review the design of the grit trap and implement changes to better manage and treat dirty water generated at this area.</p>	<p>Refer REC 02 Action.</p>	<p>Completed and ongoing.</p>
<p>REC 04 CLR IEA 2016</p> <p>Investigate the options for the long term management and disposal of WTP Sludge</p>	<p>Clarence have designed and are in the construction phase of the Water Treatment Plant Residuals Receiving Facility, which has been designed and overseen by a Third Party Dam Engineer.</p>	<p>Ongoing. Expected completion Q2 2017.</p>
<p>REC 05 CLR IEA 2016</p> <p>Maintain sediment controls and stabilise areas of erosion in the area below Leachate Dam 2 and below REA IV.</p>	<p>Erosion controls and drainage improvements have been installed at REAIV, as well as significant earthworks completed at Leachate Dam 2.</p>	<p>Completed and ongoing.</p>
<p>REC 06 CLR IEA 2016</p> <p>Revise the WMP to reflect actual on-site water flows and management and to reflect findings of and responses to the recent assessment of water management at Clarence.</p>	<p>The Clarence WMP is currently being reviewed and updated to align with the recently developed Western Region WMP.</p>	<p>Ongoing. Expected completion Q2 2017.</p>
<p>REC 07 CLR IEA 2016</p> <p>Further assess and implement recommendations of the independent review of Clarence's surface water management.</p>	<p>Refer REC 06 Action.</p>	<p>Ongoing.</p>
<p>REC 08 CLR IEA 2016</p>	<p>Comprehensive compaction and permeability testing</p>	<p>Completed.</p>

Obtain evidence that the base of REAVI achieved the specified permeability standards.	was completed during the installation of the clay liner in REAVI, with testing confirming the required permeability was achieved/	
REC 09 CLR IEA 2016 Reshape and rehabilitate REAIII promptly and effectively with local native vegetation.	Detailed engineering assessments are underway at REAIII, with the findings to inform a HRA Application and the final landform design, as well as a revision of the Clarence MOP.	Ongoing. HRA submission anticipated for mid 2017. Native seed collection ongoing, with native grass trials underway at REAVI.
REC 10 CLR IEA 2016 Undertake Improvement works in REAIV including weed control, additional groundcover planting and drainage works. These works should be directed by suitably qualified experts in rehabilitation.	Drainage improvement works have been completed at REAIV by rehabilitation contractors, with oversight from Centennial Rehabilitation Specialist. Weed management continues across the site. Life of Mine Seed Harvest, Propagation and Planting Plan being developed by Rehabilitation contractor.	Completed and Ongoing.
REC 11 CLR IEA 2016 Undertake a compliance assessment of the new lighting installed at REAVI with AS4282	To be completed.	Expected completion end of Q2 2017.
REC 12 CLR IEA 2016 Investigate ways to reduce greenhouse gas emissions and report on these in the AEMR.	Engineering investigations include replacing outdated conveyor drives with more efficient system where possible. Feasibility review of solar PV system install at Admin Building scheduled.	Ongoing. Solar PV feasibility review to be completed Q3 2017.
REC 13 CLR IEA 2016 Revise the EMS following completion of this IEA and submit for DPE approval.	EMS to be reviewed following completion of Water Management Plan and Environmental Monitoring Program.	Expected completion end of Q2 2017.
REC 14 CLR IEA 2016 Ensure records are maintained to demonstrate the DPE has been immediately notified of all incidents and provided with a written report within 7 days.	Environment & Approvals Business Management Framework sets out correspondence documentation and filing standards.	Ongoing.
REC 15 CLR IEA 2016 Consider revising Incident Investigation Form to include a prompt for reporting the incident to DPE.	PIRMP updated to include DPE in notification list.	Completed.
REC 16 CLR IEA 2016		Completed.

Enter 2 July 2015 incident into ECD database. A reference can be included detailing where all supporting information can be found.		
REC 17 CLR IEA 2016 Ensure a copy of the CCC Meeting minutes are provided to the DPE within a month of acceptance of the minutes by the CCC.	Approved meeting minutes are uploaded to the Clarence website	Ongoing.
REC 18 CLR IEA 2016 Ensure revised management plans are provided to Council, relevant agencies and the CCC following approval.	Actions added into Compliance Database to prompt approved plans are provided to Council, relevant agencies and the CCC.	Completed and ongoing.
REC 19 CLR IEA 2016 Prepare and Implement an Effluent Irrigation Operational Environment Management Plan (EIOEMP)	EIOEMP was prepared and submitted as part of the REA VI EIS.	Completed.
REC 20 CLR IEA 2016 Include discussion of the additional surface and groundwater monitoring requirements in the next revision of the WMP.	Refer REC 06 action.	Ongoing. Expected completion Q2 2017.
REC 21 CLR IEA 2016 Ensure a rapid assessment on the established cross sections within the THPSS Community is undertaken annually in the summer months.	Action loaded into Compliance Database to ensure assessment is completed.	Assessment scheduled for Q1 2017, and to continue annually, with results to be provided in Annual Review.
REC 22 CLR IEA 2016 Undertake line marking in the car parking area to delineate parking spaces		To be completed Q2 2017.
REC 24 CLR IEA 2016 Develop and implement a monitoring program in accordance with the Australian Drinking Water Guidelines to ensure potable water meets required standards.		Completed and ongoing.

<p>REC 25 CLR IEA 2016</p> <p>Reshape and rehabilitate REAIII promptly and effectively with local native vegetation once stop works order has been lifted.</p>	<p>Refer REC 9 Action.</p>	<p>Ongoing. HRA submission anticipated for mid 2017. Native collection ongoing, with native grass trials underway at REAVI.</p>
<p>REC 26 CLR IEA 2016</p> <p>Update the Environmental Monitoring Program to include details of flora and fauna undertaken and provide to the NPWS for consultation.</p>		<p>To be completed Q2 2017</p>
<p>REC 27 CLR IEA 2016</p> <p>Confirm with the DPE whether consultation with the Soil Conservation Service is required during topsoil stripping and stockpiling associated with REAV.</p>		<p>To be completed.</p>
<p>REC 28 CLR IEA 2016</p> <p>Develop a detailed rehabilitation plan for REAV and REAVI within 6 months of commencement of REAV and submit to the DRE, Soil Conservation Service and Council for approval.</p>	<p>Clarence are required to update the MOP prior to commencement of REAV, and propose this will be completed with sufficient rehabilitation detail.</p>	<p>To be completed 6 months prior to commencement at REAV.</p>
<p>REC 29 CLR IEA 2016</p> <p>Confirm with the DPE whether consultation with the Soil Conservation Service is required during topsoil stripping and stockpiling associated with REAV.</p>	<p>Refer REC 27 action.</p>	
<p>REC 30 CLR IEA 2016</p> <p>Obtain a copy of the Original EPL Application and ensure compliance with the application.</p>	<p>Clarence considers that complying with the most current version of EPL726 is appropriate.</p>	
<p>REC 31 CLR IEA 2016</p> <p>Undertake general housekeeping of the pit top, including cleaning up of minor spills, ensuring stores are appropriately banded, cleaning out grit traps.</p>	<p>Housekeeping is continually undertake on the Clarence Pit top, with routine inspections completed to ensure a high standard is maintained.</p>	<p>Ongoing.</p>
<p>REC 32 CLR IEA 2016</p> <p>Consider whether an oil water separator is required to</p>	<p>Clarence consider an oil water separator is not required, with washdown bay water reporting to the WTP following the implementation of the Polishing</p>	<p>Complete.</p>

manage waste water from the washdown bay.	Lagoon Transfer.	
REC 33 CLR IEA 2016 Review and update the Electrical Engineering Management Plan and Mechanical Engineering Management Plan.	Both the Electrical Engineering Management Plan and Mechanical Engineering Management Plan are reviewed as required by WHS (MP) Act 2013 and the WHS (MP) Regulations 2014.	Complete and ongoing.
REC 34 CLR IEA 2016 The 'Methodology of Water Analysis' spreadsheet within the monthly monitoring results Excel workbook provided by ALS should be revised to ensure the list of test methods includes all the tests conducted as required by the EPL. This table should also include a reference to the Approved Methods prescribed by the NSW EPA and clarify or note any variations between the methods used. ALS should confirm and document within its analytical reports that samples are analysed within laboratory holding times.		Complete.
REC 35 CLR IEA 2016 Attach noise monitoring results to the Annual Return or receive written confirmation from the EPA that it is satisfied with receiving the results as part of the AEMR/Annual Review.	Results to be submitted with Annual Return as required.	Completed and ongoing.
REC 36 CLR IEA 2016 Ensure the meteorological station is measuring the sigma theta and that this data is provided to Clarence.	Confirmation received from service provider that Sigma Theta is measured and can be supplied as required.	Completed and ongoing.
REC 37 CLR IEA 2016 Obtain evidence of submission of the Annual Return within the specified timeframe from Centennial Corporate and maintain/file on site.	Submission evidence located and saved within appropriate filing system.	Completed and ongoing.
REC 38 CLR IEA 2016 Install signs clearly marking licensed discharge points with the EPA identification number as close as practical		Completed.

to the points.		
<p>REC 39 CLR IEA 2016</p> <p>Implement recommendations made in the 2015 Rehabilitation Monitoring Report (AECOM 2016). These included:</p> <ul style="list-style-type: none"> - undertaking maintenance direct seeding to increase ground cover. - undertaking maintenance tube stock planting of endemic canopy species in areas where trees and shrubs are failing to establish - undertaking regular walkthrough of rehabilitated areas to visually monitor erosion and consider implementing remediation works as required if overall landform stability gets compromised. - adding / spreading organic material on the ground to enhance ground cover and organic matter due to the lack of topsoil. - continuing the implementation of the pro-active weed control program including undertaking a regular (at least monthly) walk through of the rehabilitated areas to detect potential onset of weeds. 	<p>Refer REC 10 actions.</p> <p>Budget provisions have been made for further rehabilitation maintenance, including direct seeding and soil amelioration.</p>	Completed and ongoing.
<p>REC 40 CLR IEA 2016</p> <p>Ensure continual review of rehabilitation performance by competent persons and regular implementation of strategies to improve rehabilitation.</p>	<p>Annual rehabilitation monitoring to continue, with monthly rehabilitation review and inspections scheduled with Centennial Rehabilitation Specialist.</p>	Ongoing.
<p>REC 41 CLR IEA 2016</p> <p>Make available a copy of the Bank Guarantee to ensure compliance CCL705 Condition 26</p>	<p>Advice provided by Company Manager Property Titles & Survey that security is paid as required.</p>	Completed.
<p>REC 42 CLR IEA 2016</p> <p>Seal off open borehole near Leachate Dam 1</p>	<p>Borehole currently in use. To be sealed once no longer required, as per EDG01 Borehole Sealing Requirements on Land.</p>	NA

Independent Audit Opportunity For Improvement	Clarence Response and Actions	Status as of 28/04/2017
OFI 01 CLR IEA 2016 Include further details of the water balance in the AEMR including volumes of water discharged by the mine.	Volumes of water discharged by Clarence are reported Monthly in Environmental Monitoring Reports as well as annually in the Annual Review. The Clarence Water Balance is under review and will be included in future Annual Review's.	Draft Water Balance Under Review. To be submitted to Department of Planning and Environment with the revised Clarence Water Management Plan by the 5 June 2017.
OFI 02 CLR IEA 2016 Include a drawing/plan showing the location of erosion and sediment control structures and key water features within the next revision of WMP	Key water features, including sediment and erosion control structures, have been included in the Draft WMP.	To be submitted to Department of Planning and Environment with the revised Clarence Water Management Plan by the 5 June 2017
OFI 03 CLR IEA 2016 Verify status of Draft Regional Biodiversity Offset Strategy and ensure a plan is in place to ensure compliance with DA504-00 S3-15 prior to end of Dec 2016.	Western Region Biodiversity Offset Package was submitted to DPE on 23 December 2016 as required.	Submitted 23 December 2016. Currently being reviewed.
OFI 04 CLR IEA 2016 Include a brief discussion of the unattended noise monitoring results within the Noise Compliance Assessment reports including their purpose and an interpretation of the results.	To be included in future Noise Compliance Assessment Reports.	Ongoing.
OFI 05 CLR IEA 2016 Revise the Conceptual Rehabilitation and Mine Closure Plans to reflect changes since 2012.	Clarence considers that the current Mining Operations Plan, which is significantly rehabilitation orientated, supersedes the Rehabilitation and Mine Closure Plans.	Acceptance to be confirmed by DPE.
OFI 06 CLR IEA 2016 Notification requirements of this (S4-1) and any other relevant condition should be entered into the subsidence TARP within the SMP's.	Accepted.	

OFI 07 CLR IEA 2016 Ensure that all exceedances of subsidence criteria are notified to landholders and the DPE.	Accepted.	Ongoing.
OFI 08 CLR IEA 2016 Revise the Environmental Monitoring Program to be consistent with current monitoring requirements and the EPL.	The Clarence Environmental Monitoring Program is currently being reviewed, following the revision of the Clarence EPL by the EPA, as well as the update of the WMP.	Revised EMP to be submitted to DPE by 19 May 2017.
OFI 09 CLR IEA 2016 Request a formal response from the DRE on the 2014 AEMR for Clarence's records.	Accepted	Awaiting formal response.
OFI 10 CLR IEA 2016 Ensure require (g) to identify any trends in the monitoring results over the life of the development is included in the AEMRs for parameters including air, noise and water.	Monitoring results are being trended in Annual Reviews dating back to 2013. Clarence propose that this is sufficient in place of the life of the development monitoring trends, as monitoring requirements, methodologies and technologies are continually changing.	Monitoring results to be trended from 2013 onwards for future Annual Reviews, when possible.
OFI 11 CLR IEA 2016 Include results of 6 monthly TSP monitoring in the Monthly Environmental Monitoring Reports when results become available.	Accepted.	To be completed.
OFI 12 CLR IEA 2016 Include within Appendix C of the Noise Management Plan Western Region discussion of the implementation of acoustical mitigation at receivers R1 to R6.	Discussion to be included following next revision of Western Region Noise Management Plan.	TBC.
OFI 13 CLR IEA 2016 Undertake a review to determine whether EPA Point 1 is required and if not seek to remove it form the Licence. If the review determines it is a relevant Discharge Point then seek to better define it both within the description of the EPL and physically on site (i.e. with signage and a better established discharge	Despite not being a currently active Licensed Discharge Point, Clarence will retain LDP001. Signage will be installed at the location.	May 2017

and monitoring point.)		
OFI 14 CLR IEA 2016 Introduce a mechanism for ensuring maintenance is undertaken as necessary to desilt the Leachate Dams for example including a work order in the PULSE system and/or including a check on the Environmental Inspections	Leachate Dams are currently inspected daily by CHPP personnel. All water management structures are included in Weekly and Monthly environmental inspections. An existing 4 Monthly Work Order details for sediment removal from the Primary Arrestor and Grit Trip. Leachate Dams will be added to this inspection.	Completed.
OFI 15 CLR IEA 2016 As per previous IEA, discuss with State Forests how the condition of the roads could be improved.	Clarence make annual payments to State Forests that are contributions towards the up keep of roads and tracks.	Ongoing.
OFI 16 CLR IEA 2016 Ensure all incidents, including minor Category 5 incidents are reported internally and logged in ECD.	A monthly action has been loaded to the Clarence Compliance Database, acting as a reminder to review the previous month's incidents (if any) and add into ECD.	Completed.
OFI 17 CLR IEA 2016 Environmental Management Strategy Recommendations	Recommendations to be taken into consideration during the update of the EMS.	Submission Q2.
OFI 18 CLR IEA 2016 Environmental Monitoring Program Recommendations	Recommendations have been taken into account during the update of the EMP.	EMP to be submitted to DPE 19 May 2017.
OFI 19 CLR IEA 2016 That monitoring of flooded areas be undertaken for as practicable to confirm stabilisation to a limit for mined areas impacted by flooding.	Monitoring of flooded areas is currently undertaken. All approved subsidence monitoring (under the Subsidence Management Plan process) is undertaken until the Principal Subsidence Engineer approves that it be terminated. Clarence has long term subsidence monitoring in place and it will continue until such times as the Principal Subsidence Engineer determines that the areas are stable. Subsidence monitoring results are reported in the Four Monthly Subsidence Management Status Reports and the End of Year reports.	Ongoing.
OFI 20 CLR IEA 2016 That in future subsidence reviews and modelling by	As a part of its subsidence monitoring, Clarence already investigates the influence of flooding within	Ongoing.

<p>independent experts, the influence of flooding of workings affecting subsidence be further investigated; particularly in respect of how these influences may impact Clarence conforming to the subsidence criteria in the long term. Future subsidence models should take into account such influences.</p>	<p>workings. All three subsidence models actively take flooding into account. Through subsidence data review, this is kept live as set out below.</p> <p>Clarence reviews subsidence data on an ongoing basis. Every 2 to 3 years, Clarence carries out a formal review of subsidence data to calibrate the model, review and check performance measures against predictions. This includes data from older subsidence lines that overly areas that are flooded. To predict subsidence, Clarence utilises three methodologies including:</p> <ul style="list-style-type: none"> - analytical; - empirical; and - numerical. <p>Analytical techniques utilise the geomechanical properties of the strata and estimates average stress changes. Site specific data (typical moduli) from geotechnical testing is used for this method. In the case of a flooded scenario, the lower bound moduli values of the geotechnical data set is used. This effectively considers a "worst case" scenario (ie. following flooding)</p> <p>The empirical technique back analyses subsidence data, focusing on the relationship between subsidence and panel geometry. On a panel by panel basis, measured subsidence is compared to pillar geometry; the relationships identified from the resulting database aid the subsidence prediction. The analysis is based on around 17 years of data across 11 subsidence monitoring lines. Two subsidence estimates are made including a short to medium term estimate as well as a long term flooded estimate.</p>	
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	<p>The numerical technique utilises a numerical model with site specific input data (collected from subsidence monitoring and quantitative pillar monitoring). A series of numerical modelling exercises have been conducted since 2008, aimed at:</p> <ul style="list-style-type: none"> - Verifying the likely performance of designs derived using the empirical methodology. - Assessing the impact of anomalies, such as the effect of faults on subsidence. - Back analysing surface and underground monitoring results to arrive at an improved (“calibrated”) input data-set, largely for future subsidence prediction. <p>The use of complimentary analytical, empirical and numerical methodologies for subsidence estimation is regarded as good engineering practice, enabling a very high degree of confidence with regard to both short and long-term subsidence prediction (which includes flooding), across the range of partial extraction geometries applied at Clarence. Clarence will continue to take relevant influences into account through its regular subsidence reviews</p>	
<p>OFI 21 CLR IEA 2016</p> <p>Continue to implement recommendations made by Aurecon to repair and reinstate damaged equipment such as by the fires to maintain an adequate array of monitoring equipment.</p>	<p>Service and calibrations continue on groundwater monitoring equipment as recommended.</p>	<p>Next service scheduled Q2.</p>
<p>OFI 22 CLR IEA 2016</p> <p>It is recommended that groundwater monitoring be conducted for suitable swamp(s) such as Paddy’s Swamp East to provide Clarence with information to inform third parties that monitoring is adequate with suitable coverage; and that no groundwater impacts from recent mining are occurring in selected swamps.</p>	<p>2 shallow groundwater monitoring wells have been installed with Paddy’s Swamp East, and will be monitored on a 2 monthly basis, with the data to be provided to OEH.</p>	<p>Completed and ongoing.</p>



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