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J.1 In-Pit Tailing Storage Facility Management Plan

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IN-PIT TAILINGS STORAGE FACILITY MANAGEMENT PLAN

New Acland Coal Mine Stage 3 Project

JANUARY 2014

Contents

1. Introduction

1.1. Overview

New Acland Coal Pty Ltd (NAC) currently operates the New Acland Coal Mine (the Mine) as a 4.8 million tonne (product coal) per annum (Mtpa) open cut coal mine on Mining Lease (ML) 50170 and ML 50216, adjacent to Mineral Development Licence (MDL) 244, under the approval of Environmental Authority (EA) EPML00335713. The Mine reserve is forecast to be depleted by 2017. The revised Project involves the extension and operation of the Mine, while increasing production from 4.8 Mtpa up to 7.5 Mtpa of thermal product coal.

The revised Project involves the extension of the Mine's operating life to approximately 2029 with the inclusion and progressive development of two new resource areas within MLA 50232. These resource areas are identified as the Manning Vale and Willeroo resource areas. The revised Project will include mining in three new mine pits, namely Manning Vale West, Manning Vale East and Willeroo mine pits.

The operation of the In-Pit Tailings Storage Facilities (ITSFs) involves the production, transport, placement of tailings into the ITSFs, the removal and transfer of reclaimed water from the ITSFs for processing in the Coal Handling Preparation Plants (CHPPs), and the decommissioning and rehabilitation of the ITSFs.

1.2. Purpose

The purpose of the ITSF Management Plan is to outline the tailings deposition storage management practices for the revised Project.

2. Tailings Production

Tailings production is controlled by the CHPP. The CHPP currently comprises two modules developed separately for Stage 1 and Stage 2 of the Mine. CHPP Module 1 was commissioned in 2002 and CHPP Module 2 was commissioned in 2007. Run-of-Mine (RoM) coal is processed at a rate of 730 t/h and 540 t/h for CHPP1 & CHPP2 respectively. The process produces two separate waste streams – fine tailings (<2mm) and coarse rejects (>2mm). The main addition to the existing configuration will be an upgrade of Dense Medium Separation capacity and Materials Handling Facility (MHF). The CHPP Module 3 will be designed in a similar fashion to what was achieved with the original CHPP Module 2, and its subsequent upgrade. The CHPP Module 3 will be able to process at a 750 t/h design rate. Fine tailings and coarse reject production rates are dependent on the RoM coal feed rate, RoM coal characteristics, and operational performance. Table 2-1 shows the estimated volumes for tailing storage for the revised Project.

Table 2-1 Tailings Requirements and Storage Capacities for the revised Project

Tailings Requirements for the period 2013 to 2029	
RoM Tonnes Washed	185 Mt
Product tonnes Produced	96 Mt
Reject Tonnes	89 Mt
Proportion of Reject that are fine tailings	30%
Tailings Tonnes Produced	26.7 Mt
Tailings Density #	1.3 t/m^3
Tailings Volume Produced	20.5 Mm^3
Tailings Storage Capacities	
Remaining tailings storage capacity ITSF 1 and 2	1.4 Mm^3
Design Capacity for ITSF 3	3.8 Mm^3
Estimated Design Capacity for ITSF 4	7.9 Mm^3
Estimated Available Volume for Centre Pit Void	8.6 Mm^3
Total Current Estimated Storage Capacity Available	21.7 Mm^3

Typical underflow densities at 25-30% solids = 1.15-1.18 t/m3. After settling and water is removed, assume 50% solids, therefore density = 1.3 t/m3.

The end cycle of the coal washing process concentrates the fine tailings to form a slurry mixture of the fine tailings and water which is then ready for disposal. Concentrating the fine tailings improves the transfer efficiency; flocculants are added to increase density to promote the settling of solids in the ITSF. Standard Operating Procedures (SOP) are currently maintained on-site for the operation of the existing CHPPs (Modules 1 and 2) and will be updated to include CHPP Module 3 for the revised Project.

2.1. Tailings Transport

The CHPP Control Room will manage the operation of the fine tailings transfer system via a computerised control system. CHPP operations and maintenance personnel will be responsible for the safe operation of the transfer system, including routine maintenance, identification of pump breakdowns, blockages, and other defects.

The fine tailings slurry produced by the tailings thickeners will be transferred to the nominated ITSF using centrifugal slurry pumps with variable frequency drives through a HDPE pipeline. Overall, the majority of the fine tailings slurry pipeline will be positioned

above ground to assist efficient inspection. As required, small sections of the HDPE pipeline will be buried and/or protected by steel/concrete casing to allow heavy vehicle crossings.

An appropriately sized thickener will be installed to accommodate the CHPP Module 3's 750 t/h feed rate. Raw coal will be combined with plant water and pumped to the CHPP Module 3. A deslime screen feed sump and two pumps with variable speed motor will undertake this duty. The deslime screen feed sump will be of a wing-tank design, with overflow to a water reticulation sump. The control system will involve the automatic addition of clarified water for level control, a portion of which will be added prior to the engagement with the tertiary sizer. A detailed overview of the tailing transport and management is provided in Chapter 3, Section 3.7.4.

2.2. Tailings Disposal

2.2.1. Methodology

The current tailings strategy utilised on-site involves progressive construction of in-pit tailings cells as part of the dump design. This approach will continue to be practised for the revised Project, with the concept of utilising out-of-pit tailings dams being unfavourable.

By constructing an ITSF, a portion of the dumping volume is displaced, and as a result, a quantity of the excavated material has to be hauled a greater distance than under an out-of-pit tailings management regime. Currently, three ITSFs have been constructed and certified within the North Pit of the Mine. These are namely ITSF 1, ITSF 2/1 and ITSF 2/2. Current estimates have identified that these storages will reach capacity in 2014 which equates to approximately 1.4 Mm3.

Work is currently progressing on design of ITSF 3 which is planned to be located at the junction between the North and Centre Pits of the Mine. Preliminary designs have shown that the likely storage capacity available for this ITSF is in the order of 3.8 Mm3. The combined storage capacity for these nominated ITSFs will have sufficient storage capacity until approximately mid-2017 at the current production rate of 4.8 Mtpa of product coal. On completion of mining within the Centre Pit, the tailings management strategy plans to backfill the Centre Pit's residual void with tailings, which possesses two distinct advantages. It provides additional tailings storage capacity without displacing dumping volume and allows partially backfilling a void which under an out-of-pit tailings management regime would have ordinarily not been backfilled. ITSFs for the revised Project will be operated in conjunction with each other, all with decant areas constructed to reclaim water for use in the CHPPs to ensure their operational life is as long as practically achievable.

The availability of the Centre Pit void in terms of timing is slightly beyond when additional tailings storage is required. Therefore, a fourth ITSF is likely to be required prior to the Centre Pit's residual void being available. The logical place for ITSF 4 is at the south eastern end of the Centre Pit. Currently, the progression of mining within the Centre Pit is in a southerly direction using a west to east stripping orientation. Once mining reaches the southern extent of the Centre Pit, the mining strips will then be re-oriented to run strips north to south as mining progresses in a westerly direction to consume the remainder of the Centre Pit reserves. Consideration will be given to the available dumping volume that exists in the immediate area for the remainder of the Centre Pit waste. The current out-of-pit dump design has taken this into consideration with the likely tailings storage volume of ITSF 4 estimated at 7.9 Mm3.

The advent of ITSF 4 provides sufficient storage capacity up to mid-2023. Subsequent to this arrangement, the Centre Pit's final void will be utilised for tailings storage and an additional ITSF is proposed, namely ITSF 5. This additional ITSF will provide sufficient capacity to hold

the tailings produced by the revised Project. The locations of the ITSFs for the revised Project are shown in Figure 2-1.

LEGEND

- Towns and Localities
- Roads
- Mining Tenements
- In-pit Tailings Storage Facility

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NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 2-1 - Location of In-Pit Tailings Storage Facilities (ITSF)

Scale 1:40,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 18/07/2013 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\01_SEIS\EnvironmentalManagementPlan_Tailings\130715_NewHope_EnvMgtPlanTailings_Figure1-1_LocationOfInPitTailingsStorageFacility.mxd

2.2.2. Tailings Placement

Fine tailings placement will occur at various locations around the ITSF with priorities at locations to achieve:

- placement of discharge to prevent scouring of tailings storage walls;
- equal deposition of tailings;
- timing of relocation of tailings deposition (between storage facilities) to achieve effective crusting for effective rehabilitation; and
- placement of tailings to provide support to constructed walls.

Scouring will be prevented by discharging directly onto water, extending the discharge pipe down the ITSF walls as far as practical, or protecting the ITSF wall with synthetic material if required. Equal deposition of tailings will be achieved by distributing discharge locations around the perimeter of the ITSF. A decant pond area for return water pumping operations will be maintained to ensure return water is of best quality achievable and no fine tailings discharge will occur in this area.

Relocation of the fine tailings discharge points into the available ITSFs will be undertaken in order to allow the fine tailings to crust through evaporation and consolidation which will also assist with rehabilitation of the ITSFs. Fine tailings discharge will only be undertaken if the hydraulic performance criteria are acceptable. The fine tailings will be placed on constructed walls to direct supernatant away from the constructed walls. This strategy minimises the potential risk of seepage through the constructed walls.

3. Process Water Management

The return water decanted from the ITSFs will be pumped via dedicated pumps (either electric or diesel) and pipe to the Pond Return Dam or Raw Water Dam 2.

Water recovery from the ITSFs will take place during the hours of operation of the CHPP. CHPP operation and maintenance personnel, in conjunction with the maintenance department, will be responsible for the safe operation and management of the water recovery system, which includes the routine maintenance and inspections of return water lines and pumps. Flocculent may be added to the tailings discharge pipe to assist the recovery of water and to assist tailings consolidation.

The water recovery pipeline will be positioned above ground to allow ease of inspection. As required, small sections of the pipeline will be buried and/or protected by steel/concrete casing to allow for heavy vehicle crossing over the pipeline. A detailed overview of the water management process is provided in Chapter 3, Section 3.9.2.

4. Environmental Issues

4.1. Overview

Due to the location of the ITSF storages within the mined areas of ML50170, the environmental issues that are associated with the operation of NAC's above ground tailings storage facilities are substantially minimised. In the unlikely event of a main wall failure, tailings would still be contained within previously mined areas and would not be discharged off-site. Routine monitoring includes an inspection of the downstream slope, therefore reducing the risk of wall failure.

4.2. Surface Water Quality

The surface water from all receiving and holding dams on ML50170 and ML 50216 will be monitored regularly to ensure their operation is not causing unauthorised environmental harm either on or off-lease. Surface water will be managed upstream of the ITSFs to ensure runoff into the ITSFs is minimised through the use of water diversion bunds and drainage channels. A detailed Water Resource Management Plan for the revised Project is provided in Appendix J.4. Water levels within the ITSFs will be managed via the maximisation of water recycling from the ITSFs to the CHPP. The rupture of a pipe transporting reclaimed tailings water to the CHPPs will be dealt with under current spill procedures.

4.3. Groundwater Quality

Groundwater is an important resource for the revised Project and surrounding groundwater usewill be the subject of on-going monitoring as part of the revised Projects EA. In terms of the ITSFs, groundwater issues include water quality and any potential connectivity with surrounding aquifers. During design and planning stages of existing ITSFs, no groundwater resources at current excavation depths that have the potential for impact by in-pit tailings disposal were identified in the vicinity of the Mine.

The tailings produced as a result of the revised Project will be deposited into ITSF 4 & ITSF 5 (as depicted in Figure 2-1) within the Centre Pit void area. Therefore, it is considered unlikely that the area designated for the disposal of tailings from the revised Project will result in impacts on groundwater resources. Monitoring to date has shown that there is no evidence that ITSF seepage has occurred into any localised shallow basalt and deeper coal measure aquifers. However, the potential seepage from the ITSF infiltrating the localised shallow basalt and deeper coal measure aquifers will be monitored by NAC's groundwater monitoring regime under the revised Projects EA.

4.4. Dust Control

The location of the ITSFs below surface level reduces the impacts of dust generated by exposed tailings to the environment. In the event that exposed tailings do become a source of excessive dust, the following strategies will be applied on an 'as required' basis:

- If operationally possible, additional water is applied to exposed tailings surface via spraying or flooding.
- Disturbance of the exposed tailings surface is kept to a minimum.
- If operationally possible, the exposed tailings surface will be armoured with moist coarse rejects.
- Rehabilitation activities will be commenced as early as operationally possible.
- If necessary, the use of suitable alternate dust mitigation measures (e.g. chemical surfactants and foggers) will be investigated.

5. Operational Staff

NAC's CHPP Superintendent is the nominated ITSF Manager and is responsible for the overall management of the ITSFs. CHPP supervisors are the nominated ITSF Supervisors and responsible for overseeing the management of the ITSFs and associated pumps and piping. CHPP operations and maintenance personnel will conduct the general duties/activities associated with the daily functioning of the tailings discharge.

NAC's Environmental Officer is responsible for monitoring the functioning of the ITSFs for environmental compliance.

NAC's Technical Services Superintendent and Environmental Officer are responsible for environmental compliance issues.

NAC's Mining Superintendent is responsible for providing operational/logistical support to the ITSF Manager through the provision of specific machinery and earthworks functions required for the proper functioning of the ITSFs. NAC's Mine Surveyor will conduct survey and technical monitoring functions.

Off-site specialists or consultancy services will be utilised as required for technical assistance and specific monitoring/audit functions.

6. Monitoring

Table 6-1, Table 6-2 and Table 6-3 present the statutory, operational and environmental monitoring and reporting requirements for the operation and management of the ITSFs. Rehabilitation monitoring will be incorporated into future updates of the ITSF Management Plan as it becomes an applicable issue for the ITSFs.

The main statutory reporting requirement for the ITSFs is an annual regulated dam inspection of the ITSFs which includes the assessment of the general condition and integrity of the embankment walls, review of Design Storage Allowance (DSA) and Mandatory Reporting Level (MRL). The inspection will be undertaken by a suitable qualified Registered Professional Engineer on or about 1 October but prior to the 1 November. The inspection will be reported to the Department of Environment and Heritage Protection (DEHP) within 28 days of the inspection. NAC's Technical Services Superintendent is responsible for ensuring compliance with this requirement.

Monitoring and reporting records will be kept for general DEHP inspections and requests for information as required under the revised Projects EA. NAC's Environmental Officer is responsible for the maintenance and upkeep if all monitoring records. Appendix A of this Management Plan outlines the In-Pit Tailings Monthly Inspection Field Sheet.

Table 6-1 Statutory monitoring and reporting requirements

Parameter	Monitoring Method	Interval	Responsible Officer	Reporting Requirements
Structural Integrity and Mandatory Reporting level and Design Storage Allowance	Inspection and certification by suitably qualified engineer	Annual - October each year	Technical Services Superintendent (arrange inspection by external consultant) Environmental Officer (submit report to DEHP)	Report submitted to DEHP on 28 days after inspection.

Table 6-2 Operational monitoring and reporting requirements

Parameter	Monitoring Method	Interval	Responsible Officer	Reporting Requirements (exceptions only)
Tailings production	CHPP Computerised Control	Daily (continuous)	CHPP Operator	CHPP Superintendent (via Shift Supervisor)
Pipeline integrity (tailings slurry & return water lines)	Field Inspection	Daily (each shift)	CHPP Operator	CHPP Superintendent (via Shift Supervisor)
Tailings slurry pump operation	CHPP Computerised Control & Inspections	Daily (continuous)	CHPP Operator	CHPP Superintendent (via Shift Supervisor)
Tailings outlet placement/deposition	Field Inspection	Daily (each shift)	CHPP Operator/ITSF Supervisor	CHPP Superintendent (via Shift Supervisor)
Decant water pump operation	Field Inspection	Daily (continuous)	CHPP Operator, maintenance department/ITSF Supervisor	CHPP, Maintenance, (via Shift Supervisor)
Decant water level	Field Inspection	Daily	ITSF Supervisor	Technical Services Superintendent
Overall functioning	Field Inspection	Daily (each shift)	Mining Supervisor/CHPP Operator/ITSF Supervisor	Mining Superintendent, CHPP Superintendent and Technical Services Superintendent (via Shift Supervisor)
Structural integrity of the ITSF	Field Inspection	Monthly	Technical Services Superintendent/Environmental Officer	Technical Services Superintendent

Table 6-3 Environmental monitoring and reporting requirements

Parameter	Monitoring Method	Interval	Responsible Officer	Reporting Requirements (exceptions only)
Phreatic surface level	Piezometer water level measurements	Monthly	Environmental Officer	Technical Services Superintendent and Environmental Officer Environmental Officer to advise DEHP if required
Groundwater Quality – specific parameters designated in EA	Groundwater Bore Samples	Six monthly	Environmental Officer	Technical Services Superintendent and Environmental Officer Environmental Officer to advise DEHP if required
ITSF downstream water quality	Grab sample	Monthly	Environmental Officer	Technical Services Superintendent and Environmental Officer
ITSF water quality	Grab Sample	Monthly	Environmental Officer	Technical Services Superintendent and Environmental Officer
Dust deposition	Dust Deposition Gauges	Monthly	Environmental Officer	Technical Services Superintendent and Environmental Officer
PM_{10} monitoring	High Volume Samplers	Quarterly	Environmental Officer to commission external consultant	Technical Services Superintendent and Environmental Officer

7. Decommissioning and Rehabilitation

A separate plan will be developed that will outline the decommissioning and rehabilitation works to be undertaken for ITSFs. Timing for the completion of all decommissioning works will be influenced by the rate of tailings dewatering and tailings placement objectives.

Rehabilitation of the disturbance area of ITSFs will be appropriately costed and incorporated into the financial assurance and Schedule of Rehabilitation of NAC's Plan of Operations. The rehabilitation costs for the ITSFs will be a third party cost sourced from quotes provided by external contractors.

In summary, future rehabilitation activities will include:

- a suitable period for desiccation for the deposited tailings;
- capping of the tailings area with a minimum one meter thick layer of course rejects to provide an impermeable cap above the tailings. The rejects will be dumped and pushed with low ground pressure dozers at a rate that prevents tailings bow waves and provides a smooth consistent cap;
- placement of a layer of inert spoil above the rejects layer to provide a further seal above the tailings and allow integration into the surrounding topography.
- final contouring of the covering spoil into the surrounding topography to improve drainage and visual amenity and meet slope stability requirements;
- establishment of drainage structures to ensure free drainage off the capped ITSFs;
- topsoiling and seeding with appropriate native and exotic pasture species; and
- ongoing monitoring of rehabilitation to determine success in terms of erosion, stability, groundcover, sustainability and crust penetration.

NAC will continue to investigate alternative rehabilitation strategies for the ITSFs and consult with the DEHP if any new methods are proposed. Other beneficial uses for the tailings will be explored in consultation with the DEHP.

NAC will maintain responsibility for the ITSFs and will be unable to surrender the EA, Mining Leases, or recover the deposited financial assurance until the ITSFs have been appropriately rehabilitated and the DEHP has accepted the Final Rehabilitation Report (FRR) and Environmental Audit Statement (EAS). The FRR and EAS will include a summary of how NAC has met the conditions of its EA over the life of the mine, the relevant environmental monitoring activities, and evidence of demonstrated rehabilitation success.

Appendix A – In Pit Tailings Monthly Inspection Field Sheet

IPT Dam Monthly Inpection

Inspectors:_____ Inspection Month:_____ Date:_____

IPT Dam_____	
Major observations from last inspection **(prefill area prior to inspection)**	
Current inspection observations **(vegetation, seepage, erosion, sheeting, cracking, water levels, failures, hazards, pipes, pumps etc)**	
Northern Wall	
Eastern Wall	
Southern Wall	
Western Wall	
Other (water levels, activities etc)	
Corrective Actions Required	