# MAC-ENC-PRO-063 SURFACE AND GROUND WATER RESPONSE PLAN

Document Owner

Michael Gale, Superintendent Environment Analysis and Improvement

#### **Document Approver**

Sarah Withell, Head of Health, Safety and Environment

Version No	Date Published	Details
Version 1	20 August 2012	Approved by the Department of Planning & Infrastructure on 20/8/2012.
Version 2	23 January 2015	Updated surface and ground water exceedance protocol, inclusion of alluvial cut-off wall management measures
Version 3	5 February 2015	Revision incorporating DP&E comments
Final	28 April 2015	Approved by the Department of Planning & infrastructure on 28/4/2015.





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# 1.0 Scope

This Surface and Ground Water Response Plan has been prepared to detail the relevant surface water, stream health and groundwater impact assessment criteria and associated response procedures for managing potential water impacts in accordance with Department of Planning and Infrastructure (DP&E) and Environmental Protection Authority (EPA) requirements.

This document details the following:

- Surface Water and Groundwater Exceedence Protocol
- Stream Health Protocol
- Protocol for Adverse Effects to Nearby Users
- Measures to Mitigate Groundwater Leakage from Alluvial Aquifers

### 1.1 Responsibilities

The NSW Energy Coal Asset President is responsible for ensuring that all legal and other requirements described in this management plan are met.

HVEC employs environmental specialists and sufficient other staff with experience and qualifications acceptable to establish, maintain and fulfil the requirements of this management plan.

### 1.2 Review and modification

This management plan is reviewed annually as a minimum. Any required amendments identified during the review will be updated in a revision of the program and submitted to Department of Planning and Environment for approval.

### 1.3 Context

This management plan meets the requirement for a Surface and Groundwater Response Plan under Schedule 3 Conditions 29 and 34 of the Mt Arthur Coal Modification Project Approval (PA 09\_0062 MOD1).



# 2.0 Detailed Procedure

Surface and groundwater assessment criteria are outlined in Surface Water Monitoring Program and the Groundwater Monitoring Program, respectively. The monitoring programs detail a number of monitoring locations and sampling frequencies which will be used to identify any exceedence(s) in the criteria. Should assessment criteria in these monitoring programs be exceeded, the response protocols presented in this plan will be initiated. Incident management processes, including the process for reporting incidents to relevant government agencies is described in the Environmental Management Strategy.

# 2.1 Surface Water and Groundwater Exceedance Protocol

In the event of a surface water or groundwater stage 1 or stage 2 impact assessment criteria or groundwater level trigger assessment criteria being exceeded, the protocol outlined in Table 1 will be followed.

Exceedence criterion	Exceedance protocol
Stage 1 surface water or groundwater impact assessment criteria (trigger value calculated as	<b>Step 1:</b> Quality assurance check of the sampling procedure and analytical data acquired, reported and entered.
95% confidence interval) *	<b>Step 2:</b> For a single exceedence of a 1st stage trigger value, no further action is required other than to record the exceedence. If the 1st stage trigger value of the same parameter is exceeded at the same location on the subsequent sampling then the actions required for exceedence of the 2nd stage trigger values should be carried out.
Stage 2 surface water or groundwater impact assessment criteria (trigger value calculated as 99% confidence interval) *	<ul> <li>Step 1: Notify the DP&amp;E of an 'interim exceedance' as soon as practicable after becoming aware of the exceedance and relevant information required for the notification is confirmed (including preliminary quality assurance of information).</li> <li>Step 2: If quality assurance check of the sampling procedure and analytical data acquired, reported and entered, the trigger value is still exceeded, then an investigation of the exceedence should be carried out and reasons for the exceedence identified.</li> </ul>
	<ul><li>Step 3: Consult with the DP&amp;E to determine if a written report on the exceedance will be required.</li><li>Step 3: Implement identified corrective/preventative actions.</li></ul>

#### Table 1: Surface Water and Groundwater Exceedance Protocol



Groundwater level imp assessment criteria	ndwaterlevelimpactStep 1: Notify the DP&E of an 'interim exceedance' as soossment criteriaas practicable after becoming aware of the exceedance and relevant information required for the notification is confirme	
	(including preliminary quality assurance of information).	
	procedure and analytical data acquired, reported and entered, the trigger value is still exceeded, then an investigation of the exceedence should be carried out and reasons for the exceedence identified.	
	<b>Step 3:</b> Consult with the DP&E to determine if a written report on the exceedance will be required.	
	Step 3: Implement identified corrective/preventative actions.	

\* Confidence level indicates probability of measured value being different to those already measured in the historical dataset. 95 per cent confidence level = average measured value + (1.96 x standard deviation of historical dataset) 99 per cent confidence level = average measured value + (2.58 x standard deviation of historical dataset)

The preliminary investigation to establish the cause(s) will involve the consideration of the monitoring results in conjunction with:

- a) site activities being undertaken at the time;
- b) baseline monitoring results;
- c) monitoring results in nearby locations;
- d) the prevailing and preceding meteorological conditions; and
- e) changes to the land use/activities being undertaken in the contributing hydrogeological or surface water regime.

An investigation report would be submitted to DP&E and any other relevant department (within 7 days of the incident). If the investigation report recommends further detailed investigations these would be conducted in consultation with DP&E and any other relevant department (further detailed investigation timeframe to be determined with DP&E and relevant departments).

Corrective/preventative measures will be developed in consultation with DP&E and any other relevant department and implemented in response to the outcomes of the investigations. The timeframe associated with development and implementation of corrective/preventative measures is to be determined in consultation with DP&E and relevant departments.

Additional monitoring would be implemented to measure the effectiveness of corrective/preventative measures, where necessary. The timeframe associated with



additional monitoring is to be determined in consultation with DP&E and relevant departments.

## 2.2 Stream Health Protocol

In the event of riparian and in-stream vegetation impact assessment criteria being exceeded, the following protocol will be followed:

1. The area will be inspected to confirm the condition of vegetation in the photograph and the condition of vegetation in other similar areas of the site. The magnitude of the change in erosion/deposition will be verified within 24 hours of erosion or channel deposition change being confirmed. If the inspection confirms a significant impact to vegetation specific to the area or additional erosion or deposition has occurred, DP&E and any other relevant departments will be notified.

2. An investigation will then be undertaken in consultation with DP&E and any other relevant department and will involve the consideration of the visual inspection documented above in conjunction with:

- a) site activities being undertaken at the time;
- b) baseline surface water and groundwater monitoring results;
- c) surface water and groundwater results in nearby locations;
- d) the prevailing and preceding meteorological conditions;
- e) hydrological conditions; and
- f) changes to the land use/activities being undertaken in the contributing catchment or hydrogeological regime.

The investigation timeframe will be determined in consultation with DP&E and other relevant departments. Consultation with the DP&E will be undertaken to determine if a written report on the exceedance will be required.

3. If the investigation shows that the stream health impact is linked to activities undertaken by Mt Arthur Coal, causal factors will be addressed and rectified if possible. Corrective/preventative measures will be developed in consultation with DP&E and any other relevant department and implemented in response to the outcomes of the investigation. Such measures could involve direct revegetation or vegetation offsets. The timeframe associated with development and implementation of corrective/preventative measures is to be determined in consultation with the DP&E and relevant departments.

4. Additional monitoring would be implemented to measure the effectiveness of corrective/preventative measures if appropriate. The timeframe associated with



additional monitoring is to be determined in consultation with DP&E and relevant departments.

# 2.3 Protocol for Adverse Effects to Nearby Users

Landowners on neighbouring and nearby privately-owned properties may use surface water and/or groundwater for water supply, and there is potential that mining activities may impact on these supplies.

In the event of a reportable pollution incident, potentially affected neighbours and the community will be notified as part of the response to an incident in accordance with the Pollution Incident Response Management Plan.

In the event that a complaint is received, the Community Complaints Handling, Response and Reporting procedure will be initiated, in conjunction with the following protocol and Landholder Consultation and Investigation Process detailed in Appendix 1:

1. Check and validate the nature of the complaint (as soon as possible and within 24 hours).

2. Where the complaint is deemed potentially attributable to Mt Arthur Coal operations, DP&E and any other relevant department would be notified of the nature of the complaint (within 24 hours of receipt of complaint if practicable).

3. An investigation will be undertaken to establish the cause(s) and unmitigated consequences to the future utility of the supply to the affected landholder. The investigation timeframe will be determined in consultation with DP&E and other relevant departments. Consultation with the DP&E will be undertaken to determine if a written report on the complaint/incident will be required.

4. Corrective/preventative measures will be developed in consultation with DP&E and any other relevant department and implemented in response to the outcomes of the investigation. The timeframe associated with development and implementation of corrective/preventative measures is to be determined in consultation with DP&E, relevant departments and the affected landowner.

5. Additional monitoring would be implemented to measure the effectiveness of corrective/preventative measures, where necessary. The timeframe associated with additional monitoring is to be determined in consultation with DP&E and relevant departments.



### 2.4 Measures to Mitigate Groundwater Leakage from Alluvial Aquifers

Groundwater leakage from alluvial aquifers must be minimised, prevented or offset, particularly for the Hunter River and Saddlers Creek alluvial.

A combined groundwater cut-off wall and flood levee has been constructed parallel to Denman Road along the northern boundary of the site to prevent both surface and subsurface migration from the Hunter River to the active mining pit. The cut-off trench is composed of a soil-bentonite slurry mixture and is constructed from the crest of the embankment levee to the top of the weathered sandstone/siltstone to an average depth of approximately ten metres. The levee bank is constructed to provide protection from a 1 in 1000 year flood event.

The following safeguards associated with the ongoing management of this low permeability barrier wall will be implemented to minimise, prevent or offset groundwater leakage from the alluvial aquifer:

- bi-monthly visual inspection, utilising survey pins which will be installed in close proximity to the barrier wall to monitor movement.
- annual structural engineering inspection of the barrier wall.
- groundwater monitoring adjacent to the barrier wall to confirm the effectiveness of the wall and its' performance as a barrier in the long term.
- quarterly vegetation maintenance inspections.

Requirements of the NSW Office of Water approval cut-off wall and levee are provided in Appendix 2.



# 3.0 References

### 3.1 External Documents

Resource Strategies (2013), Mt Arthur Coal Open Cut Modification – Environmental Assessment. Prepared for Hunter Valley Energy Coal Pty Ltd.

Australasian Groundwater and Environmental (AGE) Consultants (2013), "Mt Arthur Coal – Appendix B Groundwater Impact Assessment". Report prepared for Resource Strategies January 2013.

Gilbert and Associates Pty Ltd (2013), "Mt Arthur Coal – Appendix C Surface Water Assessment". Report prepared for Resource Strategies April 2013.

Standards Australia (1998), "Water quality - Sampling - Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples" Australian/New Zealand Standard AS/NZS 5667.1:1998, Sydney.

### 3.2 Internal Documents

MAC-ENC-MTP-034 Site Water Management Plan MAC-ENC-PRO-061 Surface Water Monitoring Program MAC-ENC-MTP-041 Environmental Management Strategy MAC-ENC-PRO-062 Groundwater Monitoring Program MAC-ENC-PRO-042 Community Complaints Handling, Response and Reporting NEC-STE-MTP-009 Pollution Incident Response Management Plan



# **Appendix 1: Landholder Consultation and Investigation Process**



Figure A1.1: Landholder Consultation and Investigation Process



# **Appendix 2: Correspondence Records**

#### NSW Office of Water Approval of Cut-off Wall and Levee 21 June 2013



Hunter Valley Energy Coal Pty Ltd Thomas Mitchell Drive Muswellbrook NSW 2333 
 Contact:
 Hemantha DeSilva

 Phone:
 02 4904 2525

 Fax:
 02 4904 2503

 Email:
 hemantha.desilva@water.nsw.gov.au

 Our ref:
 20CW802614/208L173661

21 June 2013

Dear Licence holder

#### Subject: Licence under s115 of Part 5 and Approval under Section 175 of Part 8 of the Water Act 1912

Please find enclosed Licence 20BL173551 for construction of a cut off wall (bore) and Flood Controlled Works Approval 20CW802614 for the construction of a new levee on lots 2//601359 and 2//806149.

Your attention is drawn to the nature and description of the work, terms, limitations and conditions under which the licence and approval are issued. It is imperative that those carrying out construction of the works do so in accordance with these terms and conditions.

If you have any further questions in relation to this matter, please do not hesitate to contact our Newcastle office on (02) 4904 2500.

Yours sincerely

Stands ()

Hemantha De Silva Senior Water Regulation Officer (Projects) 21 June 2013

www.water.nsw.gov.au | NSW Office of Water is a separate office within the Department of Primary Industries Level 3, 26 Honeysuckle Drive, Newcastle | PO Box 2213, Dangar NSW 2309 | t 02 4904 2500 | t 02 4904 2503

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		NSW Office	of Water		
Hunter Region Po Box 2213 3/26 Honeysuckle Drive Dangar NSW 2309 Phone: (02) 49042500		BORE LICENSE CERTIFICATE 20BL17355 UNDER SECTION 115 OF THE WATER ACT, 1912		20BL173551	Generation of Primary Industries
				LICENSE NUM 20BL173551 DATE LICENSE VAL	BER ID FROM
	Hunter Valley E	nergy Coal Limited		21-Jun-201	3
	PMB8			DATE LICENSE VA	LID TO
	Muswellbrook N	ISW 2333		20-Jun-201	4
				FEE	
				\$151.00	PAID
Portian(5) or Lot/Section 2//601359 2//806149	aDP	LOCATION O PARISH Vaux Vaux	F WORKS COUNT Durban Durban	( ) )	
			E.G.		_
TYPE OF WORKS		PURPOSE(S) FOR WHICH WATER MAY	BE USED		
Excavation	C.	RTA · RECENS · QUA	M - PURA - NIT	S	
CONDITIONS APPLY	ING TO THIS LICENSE.	ARE	- Charles -	- States	

As shown on the attached Condition Statement

ORIGINAL



20BL173551

### NSW Office of Water

### CONDITIONS STATEMENT REFERRED TO ON 20BL173551 ISSUED UNDER PART V OF THE WATER ACT, 1912 ON 21-Jun-2013

#### THE FOLLOWING DEFINITIONS APPLY TO THIS LICENCE:

"BORE" MEANS ANY BORE OR WELL OR ANY EXCAVATION OR OTHER WORK CONNECTED OR PROPOSED TO BE CONNECTED WITH THE SOURCES OF SUB-SURFACE WATER AND USED OR PROPOSED TO BE USED OR CAPABLE OF BEING USED TO OBTAIN SUPPLIES OF SUCH WATER WHETHER THE WATER FLOWS NATURALLY AT ALL TIMES OR HAS TO BE RAISED EITTHER WHOLLY OR AT TIMES BY PUMPING OR ORTHER ARTIFICIAL MEANS.

"ALLUVIAL WATER INFLOW" MEANS WATER CONTAINED WITHIN AN ALLUVIUM WHICH, IF INTERCEPTED BY THE EXCAVATION, WILL GIVE RISE TO AN INFLOW OF WATER INTO THE EXCAVATION.

"THE ALLIVIUM" IS DEFINED AS AN EXTENSIVE STREAM-LAID DEPOSIT OF UNCONSOLIDATED MATERIAL, INCLUDING GRAVEL, SAND, SILT AND CLAY.

"CUT-OFF WALL" (WORKS) IS THE STRUCTURE DESCRIBED IN THE UNDATED 'HUNTER VALLEY ENERGY COAL HUNTER RIVER CUT-OFF WALL APPRVOAL VERSION 3.2'

(2) THE LICENCE SHALL LAPSE IF THE WORK IS NOT COMMENCED AND COMPLETED WITHIN ONE YEAR OF THE DATE OF ISSUE OF THE LICENCE.

(3) THE LICENCE HOLDER MUST CONSTRUCT AND MAINTAIN THE WORKS WITH MINIMUM IMPACT TO THE WATER SOURCE.

(4) THE LICENCE HOLDER MUST ENSURE THAT ALL TAKE OF WATER FROM ALLUVIAL AQUIFERS AS A RESULT OF THE WORKS IS FULLY ACCOUNTED FOR BY WAY OF WATER ACCESS LICENCE UNDER THE WATER MANAGEMENT ACT 2000.

(5) THE LICENCE HOLDER MUST ESTIMATE AND KEEP RECORD OF THE VOLUME OF ALLUVIAL MATERIAL REMOVED DURING CONSTRUCTION OF THE CUT-OFF WALL.

(6) THE LICENCE HOLDER MUST WITHIN TWO (2) MONTHS OF COMPLETING CONSTRUCTION OF THE WORKS (CUT-OFF WALL) PERMITTED BY THIS LICENCE PROVIDE NSW OFFICE OF WATER THE FOLLOWING:

- LOCATION OF WORKS ON THE LOT AND DEPOSITED PLAN PREFERABLY USING GPS REFERENCES;

- CROSS-SECTION DIAGRAMS OF THE WORK INDICATING THE EXTENT OF THE ALLUVIUM;

- PHOTOGRAPHS TAKEN DURING CONSTRUCTION OF THE CUT-OFF WALL;

- AN ESTIMATE TOTAL VOLUME OF GROUNDWATER EXTRACTED DURING CONSTRUCTION;

- AN ESTIMATE OF GROUNDWATER TAKEN FROM THE ALLUVIAL AQUIFER.

(7) THE VOLUME OF GROUNDWATER EXTRACTED FROM THE WORKS AUTHORISED BY THIS LICENCE SHALL NOT EXCEED 10 MEGALITRES IN ANY 12 MONTH PERIOD COMMENCING 1ST JULY.

End Of Conditions

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behalf of the abovenamed holder and accepted or modified by the Nsw Office Of Water is hereby declared to be an Approved Work under the Water Act.

This Approval is effective for the five year period set out above, and is subject to the terms, limitations and conditions set out hereunder and/or on the attached statement.

Regional Director

ORIGINAL



20CW802614

### NSW Office of Water

#### CONDITIONS STATEMENT REFERRED TO ON 20CW802614 ISSUED UNDER PART VIII OF THE WATER ACT, 1912 ON 21-Jun-2013

 THE APPROVAL HOLDER MUST CONSTRUCT THE WORKS IN ACCORDANCE WITH THE PLAN HELD BY THE NSW OFFICE OF WATER WHICH DETAILS THE LOCATION AND NATURE OF THE APPROVED CONTROLLED WORK.

(2) THE APPROVAL HOLDER MUST OBTAIN PRIOR WRITTEN APPROVAL FROM THE NSW OFFICE OF WATER FOR ANY VARIATIONS FROM THE APPROVED PLAN.

(3) THE APPROVAL HOLDER MUST WITHIN TWO (2) MONTHS OF COMPLETING CONSTRUCTION OF THE WORKS PERMITTED BY THIS APPROVAL PROVIDE NSW OFFICE OF WATER WITH THE FOLLOWING:

- LOCATION OF WORKS ON THE LOT AND DEPOSITED PLAN PREFERABLY USING GPS REFERENCES

- CROSS-SECTIONS DIAGRAM INDICATING THE HEIGHT OF THE ELEVATION OF THE CREST OF THE LEVEE (FLOOD WORKS)

- PHOTOGRAPHS TAKEN DURING CONSTRUCTION OF THE FLOODWORK.

(4) THE APPROVAL HOLDER MUST, WITHIN SIX (6) MONTHS OF CONSTRUCTION OF THE FLOOD CONTROLLED WORKS PROVIDE THE NSW OFFICE OF WATER WITH A PLAN DETAILING DECOMMISSIONING AND REHABILITATION OF THE STRUCTURE AT THE END OF ITS OPERATIONAL LIFE.

End Of Conditions



### **EPA Consultation**

From:	Gale, Michael (NSWEC)
Sent:	Friday, 23 January 2015 3:47 PM
To:	hunter.region@epa.nsw.gov.au
Cc:	kurt.sorensen@epa.nsw.gov.au; Withell, Sarah (NSWEC)
Subject:	Groundwater and Surface Water Plans   Mt Arthur Coal
Attachments:	150123 Groundwater Monitoring Program Draft.docx; Groundwater Monitoring Program current.pdf; 150123 Surface Water Monitoring
	Program Draft.docx; Surface Water Monitoring Program current.pdf; 150123 Surface and Ground Water Response Plan Draft.docx; Surface
	and Groundwater Response Plan current ndf: Additional Information docy

Dear Kurt,

In accordance with the requirements of Schedule 3 Condition 29 of the Mt Arthur Coal Modification Project Approval (PA 09\_0062 MOD1), I would like to invite comment and input from the EPA on the following draft programs/plans:

- Groundwater Monitoring Program revised to incorporate holistic groundwater network review and two-stage trigger procedure.
- Surface Water Monitoring Program revised to incorporate two-stage trigger procedure.
- Surface and Groundwater Response Plan revised to incorporate groundwater and surface water exceedance protocol and alluvial cut-off wall management
  measures according to Schedule 3 Condition 28 of the Modification Project Approval (PA 09\_0062 MOD1).

The attached document 'Additional Information.doc' provides an overview of the proposed two-stage trigger procedure as it relates to surface water for your background to the revisions. This methodology has also been incorporated into the newly revised groundwater monitoring program. I have also attached the previously approved document versions for your reference.

Regards,

Mike.



resourcing the future Michael Gale Superintendent Environment Analysis & Improvement Mt Arthur Coal



#### NOW Consultation and Endorsement



BHP Billiton Mt Arthur Coal By Email Michael.Gale@bhpbilliton.com Contact Alison Collaros Phone (02) 4904 2527 Fax (02) 4904 2501 Email Alison.collaros@dpi.nsw.gov.au

Our ref ER20491 Your ref PA09\_0062\_MOD1

ATTN: Mr Michael Gale

Dear Mr Gale

#### Mt Arthur Coal Mine – Hunter Valley Energy Coal Pty Ltd – Response to Submissions in relation to Revised Surface Water and Groundwater Monitoring Programs and Response Plan

NSW Office of Water has reviewed the Supplementary Report and the additional information supplied by BHP Billiton Mt Arthur Coal in response to the recommendations issued by NSW Office of Water in the letter dated 24 February 2015. It is considered that the proponent has provided a satisfactory response to each of the issues raised. Office of Water considers that appropriate information has been provided in relation to the water quality monitoring program and time variant plots and that suitable work is underway to allow the re-assessment of trigger levels within a timeframe of 12-30 months.

If you require further information regarding Office of Water's comments, please contact Alison Collaros, Senior Water Regulation Officer on <u>Alison.collaros@dpi.nsw.gov.au</u> or (02) 4904 2527.

Yours sincerely

Mitchell Isaacs Manager, Strategic Stakeholder Liaison 1 April 2015



### Approval from DP&E



 Contact:
 Scott Brooks

 Phone:
 6575 3401

 Fax:
 6575 3415

 Email:
 scott.brooks@planning.nsw.gv.au

 Our ref:
 09-0062

Michael Gale Superintendent Environment Analysis & Improvement Mt Arthur Coal PMB 8 MUSWELLBROOK NSW 2333

Dear Mike,

#### Mt Arthur Coal Groundwater Monitoring Program and Surface and Groundwater Response Plan.

Thank you for providing the most recent versions of the Mt Arthur Coal Groundwater Monitoring Program and the Surface and Groundwater Response plans on the 1<sup>st</sup> April for review. These are required by Condition 33 & 34 Schedule 3 of Approval 09-0062.

I can advise that the Department has reviewed these plans and can advise that the Secretary has approved both plans.

Could you please ensure that the finalised management plans are forwarded to the Department by the 15<sup>th</sup> May 2015 and that the plan is uploaded onto the company's website as soon as possible.

If you require further information or clarification in this matter please contact Scott Brooks on 6575 3401 or by email to <u>scott.brooks@planning.nsw.gov.au</u>.

Yours sincerely

2095 28-Scott Brooks

Investigations (lead) Compliance Singleton As Nominee of the Secretary, Dept of Planning & Environment.