BWM PLAN

Rockland Creek Dam Emergency Action Plan

Version 6.0 (25 September 2020)
Status: Approved
Business Owner: Engineering Manager
Doc ID# 000204900

Approved by the delegate of the Chief Executive, Department of Natural Resources, Mines and Energy until 1 August 2021.
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BHP Mitsubishi Alliance – Blackwater Mine
Ardurad Rd, Private Mail Bag, Blackwater, 4717, Australia
T: +61 7 4980 5651
M: +61 457 561 326
F: +61 7 4980 5782
W: http://www.bhp.com/
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1 Introduction

General

1 The purpose of this Emergency Action Plan (EAP) is to reduce the risk of human life loss and injury, and to minimise property damage and environmental harm during an unplanned or emergency event arising from failure of the BHP Billiton Mitsubishi Alliance (BMA) Blackwater Mine (BWM) Rockland Ck dam.

2 This document identifies the emergency conditions which could forewarn of the imminent risk of failure of Rockland Creek Dam and would therefore require immediate action. A set of procedures has been prescribed which shall be followed by BMA BWM Staff in the event of an emergency.

Reference Documents

3 This EAP has been prepared in accordance with Rockland Creek Dam safety conditions and with reference to the following documentation:
   a Queensland Dam Safety Management Guidelines (DERM, 2002)
   b Blackwater Coal Mine, Rockland Creek Dam, Failure Impact Assessment (FIA) (Henderson Geotech, 2014).
   c Rockland Creek Dam, Standard Operating Procedures, Operation and Maintenance Manual, D2# 000204245 (BWM, 2017)
   d BWM Incident Management Manual (BMA, 2017)

4 The Failure Impact Assessment (FIA) report identifies credible failure modes for the Rockland Creek Dam and presents associated hazard maps (failure impact zones).

5 The Operation and Maintenance Manual prescribes the inspection and monitoring requirements for the dam including Trigger Action Response Plans (TARPs). The TARPs prescribe action plans and responsibilities for responding to identified dam defects or deficiencies which could be early warning signs of an elevated risk of dam failure.

6 TARPS have also been included in this EAP document which prescribe actions for responding to identified conditions which forewarn of the imminent risk of dam failure and identify the responsible persons required to execute the associated action response plans.

7 The Incident Management Manual outlines the Incident Management Team (IMT) roles and responsibilities upon activation, responding to and recovering from crisis and emergency situations that occur on the BWM site.

8 Note that a draft FIA by KCB was completed in August 2020 and has been submitted to DNRME Chief Executive for review. This EAP will be reviewed once the FIA has been approved by DNRME.
2 Background

Storage Catchment Area

Figure 1 presents the storage catchment area for Rockland Creek Dam. Essentially the catchment is a 4 km wide strip draining westward from the Shotover Range to the dam, approximately 20 km downstream on Rockland Creek.

Figure 1 - Rockland Creek Dam Catchment (Henderson Geotech, 2014)

Dam Features

A locality plan of the Rocklands Creek Dam is presented below in Figure 2.
Figure 2 - Aerial Photograph of Rockland Dam
3 Rockland Creek Dam is located at the eastern side of R84 mine pit at the current southern end of Blackwater Coal Mine, and has the purpose of reducing and diverting peak flood flow in Rockland Creek to prevent water flowing into the pit.

4 The Rockland Creek Dam As-Constructed plans were prepared by PPK Consultants, copies of which are provided in Appendix A.

5 Rockland Creek Dam consists of a large compacted earth fill embankment which is 1,387m in length, low level outlet, spillway and excavated downstream diversion channel. The outlet works consist of a boxed culvert with internal dimensions of 680mm wide and 1950mm high. The inlet structure consists of 6m high screens, stopping debris from blocking the inlet of the culvert. The box culvert outlet and spillway channel discharges drain water into Rockland Creek Diversion downstream of the dam. The diversion channel is 10m wide and 1,946m in length and consists of two Gabion drop structures that are designed to reduce the rapidity of flow.

6 The spillway is a trapezoidal channel excavated into the northern end of the embankment. The approach channel is 49m wide at the base with 1:1 side slopes. Once waters pass over the embankment and a controlling concrete cutoff section, the channel narrows to approximately 4.5m for about 150m to a concrete stilling basin. From there, flow joins the main creek diversion channel that drains from the low flow culvert outlet. Refer to Appendix B for photographs of the dam wall, spillway, inlet structure, outlet culvert and creek diversion with Gabion structure.

7 Details of the dam and associated structures are summarised in Table 1 below.

<table>
<thead>
<tr>
<th>Dam Feature</th>
<th>Description / Value</th>
</tr>
</thead>
</table>
| Location                     | Lot 2237 on Plan PH1600  
                           23°59'54.7"S, 148°50'15.3"E – 24°00'45.1"S, 148°50'07.7"E |
| Dam description              | Clay fill at upstream side, rock fill at downstream side |
| Embankment height            | 16.1 m (at the outlet channel), RL 280.0m (281.23m AHD) |
| Spillway height              | 13.5 m (at the spillway invert), RL 277.3m (278.53m AHD) |
| Length                       | 1,387 m                                                  |
| Storage capacity to spillway | 13,800 ML                                                |
| Storage capacity to crest    | 20,310 ML                                                |
| Surface area at full capacity| 238 ha                                                   |

*Table 1 - Summary of Rockland Creek Dam Features*
3 BMA Responsibilities

General

1 BMA BWM HSE personnel must maintain and update the EAP in accordance with Queensland Dam Safety Management Guidelines, and provide one copy to the Dam Safety Regulator.

2 BMA BWM must ensure the EAP is distributed to those who have responsibilities under the EAP and shall:
   a Determine and identify those conditions that could forewarn of an emergency and specify the actions to be taken and by whom.
   b Identify all jurisdictions, agencies, entities and individuals who could be involved in the EAP (for example, local governments, the Queensland Police, State Emergency Services and downstream residents), including:
      i Central Highlands Regional Council.
      ii Rockhampton District Disaster Management Group.
   c Any additional group with responsibilities under the Emergency Action Plans.
   d Identify primary and secondary communication systems, both internal (between persons at the dam) and external (between dam personnel and outside entities).
   e Identify key resources, special tools, equipment, keys and where they can be located if required in an emergency.
   f List and prioritise key persons and entities involved (including contact details) in the notification process and the roles and responsibilities assigned to them.

Annual Review and Site Familiarisation Exercise

3 BMA BWM must ensure the contact details in the EAP are up to date at all times and are reviewed by the 1st day of September of each calendar year. Where amendments are made to any EAP, a copy of the updated document is to be forwarded to the Dam Safety Regulator by the 30th day of September of that same calendar year. Where no amendments are necessary, a written notification confirming that the EAP has been reviewed shall be signed by the Dam Owner and forwarded to the Dam Safety Regulator by the 30th day of September of that same calendar year.

4 BMA BWM must ensure the readiness of dam operators with an annual desktop or field emergency training exercise to be undertaken in conjunction with the annual review above.

5 Prior to the wet season (i.e. 1st November) BMA BWM personnel, who have responsibilities within the EAP; will participate in an annual review of the EAP whereby all aspects of the plan are reviewed thus ensuring continuity of responsibility.

6 In addition to the annual review, a site familiarisation exercise will be staged at Rockland Ck Dam whereby all aspects of the dam and EAP will be addressed. The familiarisation exercise will include all relevant BWM personnel as well as offering Blackwater police and the Local Disaster Management Group (LDMG) a chance to attend.

7 A ‘work instruction’ is utilised for both the annual review and site familiarisation exercise. Refer to Appendix C. Both the review and exercise are planned and scheduled to occur annually.

Routine Monitoring and Inspections

8 Monitoring and inspection of the Rocklands Creek Dam is required to be undertaken in accordance with the Operating and Maintenance Manual. The objective of the monitoring and inspections is to assist with the early identification of defects and deficiencies including those conditions which
indicate an imminent failure risk and trigger an emergency response prescribed by this document. The sections below are taken directly from the Operating and Maintenance Manual SOP 003.

Operation and Maintenance Manual and Routine Dam Safety Inspections

9 One of the most important activities in a dam surveillance program is the frequent and regular dam safety inspection for abnormalities in conditions and deterioration of the dam. Routine safety inspections focus on visible physical defects. Major items for inspection and associated response actions are summarised in Table 2 below.

<table>
<thead>
<tr>
<th>Observed Condition</th>
<th>Response / Remedial Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crest elevation lowered by erosion or settlement</td>
<td>Repair damage / Reinstate crest level following advice from RPEQ Dams Engineer</td>
</tr>
<tr>
<td>Reduced spillway capacity due to obstruction, including siltation</td>
<td>Remove blockage</td>
</tr>
<tr>
<td>Inlet or outlet pipe blocked</td>
<td>Remove blockage</td>
</tr>
<tr>
<td>Structural damage to downstream face and toe</td>
<td>Repair following advice from RPEQ Dams Engineer</td>
</tr>
<tr>
<td>Structural damage to upstream face</td>
<td>Repair following advice from RPEQ Dams Engineer</td>
</tr>
<tr>
<td>Progressive increase in gullying</td>
<td>Repair following advice from RPEQ Dams Engineer</td>
</tr>
<tr>
<td>Structural damage to inlet or outlet works</td>
<td>Engage structural engineer and RPEQ Dams Engineer to advise on repair</td>
</tr>
</tbody>
</table>

Table 2 - Rockland Dam Major Components

Timing and Frequency

10 Routine inspections are to be conducted monthly by suitably qualified personnel nominated by the Engineering Manager. As routine inspections are reliant on observations over a period of time, inspections shall be conducted by the same nominated personnel whenever possible.

11 Additional inspections of the dam wall and associated infrastructure will occur directly after any earthquake activity or accompanying tremors in the immediate or surrounding area within a 50km radius of the dam wall. Earthquake activity can be viewed in real time by access the ‘Geoscience Australia’ government website http://www.ga.gov.au/earthquakes/initRecentQuakes.do.

12 Inspections of the dam wall and associated infrastructure will also be completed by suitably qualified personnel nominated by the Engineering Manager before and after each wet season and any significant rain event whereby more than 100mm of rain has fallen during one (1) event.

Reporting

13 Inspections require the accurate location, recording and photographing of questionable areas. The objective is to permit observation and comparison of the state of a dam through time. It is necessary to record the location and extent of areas with identified deficiencies including a brief description of the identified deficiency (e.g. location, type and extent of deficiency). Observations are to be recorded on the Routine Dam Safety Inspection Checklist included in the Operating and Maintenance Manual, and entered into the BMA reporting and records system, along with photographs taken during each inspection. A hard copy of the checklist is to be retained onsite for reference.

14 Relevant Trigger Action Response Plans (TARPs) for Rockland Creek Dam are also included in the Operating and Maintenance Manual. These TARPs shall be referred to where specified in the
Routine Dam Safety Inspection Checklist due to identification of dam defects or deficiencies which could be early warning signs of an elevated risk of dam failure.

**In the Event of Dam Emergency Conditions**

15 In all emergencies, BMA BWM must respond in accordance with the EAP, and must notify the Dam Safety Regulator within forty-eight (48) hours. The notification shall include a brief description of the event and the time of activation of the EAP.

16 Within thirty (30) days of the event the Dam Owner must prepare an Emergency Event Report and provide a copy of the report to the Dam Safety Regulator. The Emergency Event Report must include:

   a A description of the event.
   b Instrumentation readings (where appropriate).
   c Description of any observed damage.
   d Photographs.
   e Details of communication and actions which took place during the emergency.
   f How the EAP was implemented during the event and comment on the adequacy of the EAP and any changes proposed.

**4 Failure Impact Assessment**

**General**

1 In accordance with the (FIA, 2014), Rockland Ck Dam was assessed as being a Category 1 Referable dam under the provisions of the Water Supply (Safety and Reliability) Act 2008 and the Water Act 2000.

2 Rockland Ck dam is referable under the act as it meets the design criteria of being more than ten metres (10m) high with a capacity of more than 1,500 Megalitres (ML) with a potential for Population at Risk (PAR) between two (2) and one hundred (100) people.

3 It was assessed in the (FIA, 2014) that the reasonable range of people impacted in the event of dam failure would be between six (6) and twelve (12). This included occupants of two (2) homesteads and associated cattle yards downstream of the dam.

4 It is noteworthy to mention that the purpose of the dam is to detain floodwaters and attenuate peak flows to protect the adjacent, currently unused, ramp 84 (R84) mine open pit.

**Dam Failure Modes**

5 The FIA (2014) and BMA Failure Modes Effects Analysis (FMEA 2017) identified two credible failure scenarios, Sunny Day Failure and Crest Flood Failure, for the Rockland Dam. These two failure scenarios and the associated failure modes and causes are summarised below.

   a Sunny Day Failure (i.e. dam still retaining water following a rainfall event):
      i Embankment Instability / Piping Failure
         a) Design error
         b) Construction defect
         c) Foundation defect
d) High phreatic surface / blocked outlet structure

e) Dispersive materials

f) Erosion of batters by surface runoff

g) Seismic event in excess of design event

b) Crest Flood Failure:
   i) Overtopping Breach
       a) Design flood capacity exceeded
       b) Blocked spillway
       c) Blocked outlet structure
       d) Outlet structure collapse
       e) Erosion / settlement / slumping of dam crest

**Dam Failure Inundation**

6  Beyond the mining lease, Rockland Creek flows west and then south-west and is joined by several small unnamed creeks until joining with Humboldt Creek about 20 km downstream. A further 15 km north-west Humboldt Creek flows into Comet River, which crosses the Capricorn Highway and passes the town of Comet some 45 km further north.

7  Downstream assets identified from aerial photography as part of the Failure Impact Assessment (Henderson Geotech, 2014), within 3 km of Rockland Creek include buildings and infrastructure at four locations, two public roads crossing the creek and one rail line crossing adjacent one of the roads.

8  There is currently ongoing efforts to work closely with the BWM long term Mine Planning Department to ensure that any mine works progressing in the Ramp 84 Marshmead pit area is reflected in any updates to the Failure Impact Assessment and Emergency Action Plan.

9  The locations of the downstream assets in relation to Rockland Creek Dam are shown below in Figure 3 and Figure 4. Impact areas resulting from sunny day failure and crest failure are presented in Figure 5 and Figure 6, respectively.
Figure 3 - BMA BWM Landowner Contacts
Figure 4 - Downstream Infrastructure Assets (Public Road and Rail line Crossing)
Figure 5 - Sunny Dam Failure Inundation Area (Henderson Geotech, 2014)
Figure 6 - Crest Failure – Zone of Impact (Henderson Geotech, 2014)
5 Emergency

Major Weather Event Plan

1. In the event that the dam storage level is nearing capacity and further rainfall is forecast the below Figure 7 provides general guidance to mine personnel to recommended monitoring and response actions.

2. Leading up to and during a major weather event, continual monitoring of weather reports and dam levels shall be undertaken by the Engineering department. Inspections of the dam are undertaken on a monthly basis whereby structural integrity of the dam wall and any associated damage is reported. In the lead up to a major weather event this monitoring frequency will be escalated.

3. This will include daily inspections until it is deemed unsafe to mobilise to the area of concern whereby all checks will then be conducted by assessing dam water levels and flow only via the remote telemetry station. These inspections will also be conducted by the Engineering department.

4. All other actions arising from the flowchart below are addressed in the Trigger Action Response Plans (TARPs) in Appendix D.

5. The ‘low level’ alarm to initiate a higher frequency of monitoring is defined by the pre-programmed SMS alarm, as stated below, when water has reached 5m below the spillway.
Figure 7 - Major Weather Event Plan

Emergency Event Trigger

6 BMA BWM has a flow gauging station at Rockland Ck Upstream (U/S), located approximately 100m downstream from the dam wall low level outlet. The remote telemetry ‘real time’ station is able to output flow and level values via either a web based data site or SMS functionality.

7 Given the location of the Rockland Ck U/S gauging station, it is not possible to ascertain water levels within the dam during rain events.

8 As of Wednesday 23rd February 2015 a remote telemetry station was commissioned and installed by BMA on the dam crest. The station assesses water levels and spillway flow only and has automated SMS trigger levels assigned to alarm at set water levels.

9 This has overcome the problem of the possibility of not being able to access the dam during heavy rain events and, as such, rising water levels and spillway releases can be viewed remotely, and in real-time.
10 Water levels are entered into a data logger based on ground surveying, elevation assessments and
a spillway rating curve based on RORB modelling. Founded on these assessments an arbitrary water
level point of five metres (5m) below the spillway will be programmed to the telemetry station.

11 The station will send SMS alarms to relevant personnel from this point (i.e. 5m below the spillway)
then progressively at 1m increments until water has reached the spillway. When water reaches the
spillway, alarms will be defined at 0.5m increments. SMS alarming will display a water height both
above the spillway and below crest height. The water level automated alarming system will be
activated based on the arbitrary measurements encompassing both crest and spillway height (mRL).
The spillway rating curve as based on RORB modelling as reported in the Rockland Creek Dam
Acceptable Flood Capacity Assessment (O2 Environmental Pty Ltd, 2011) and upon which spillway
flow measurements will be programmed to the station, can be viewed in Figure 8 below.

12 As stated in the O2 (2011) report, overtopping is the most likely cause of dam failure. The overall
probability of failure has been taken to that applying to overtopping failure. From the dam crest flood
analysis; this has an AEP of about 1 in 10,000 for operational conditions.

13 Peak flood flows resulting from ‘dam crest flood’ and ‘sunny day’ failures, as shown in Figure 5 and
Figure 6, were reported in Henderson Geotech (2009) at 5,200m³/s and 3,200m³/s respectively.
Detailed estimates of failure probability are available only in respect of dam crest failure, but this is
the major failure mode in respect of acceptable spillway flood capacity.

![Spillway Rating Curve](image)

**Figure 8 - Rockland Creek Dam Spillway Rating Curve**

**Water Level Alarm Triggers (via SMS)**

14 **Telemetry Station ID:** 330138 – Rockland Dam  
**Rockland Dam SMS number:** 0457 754 510  
**Orifice Height:** -2.065m  
**Spillway:** 10.000m  
**Dam Wall:** 12.570m

15 The following personnel get notified via SMS in the event any of trigger levels are satisfied.
<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Mobile Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BMA BWM Environmental Principal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMA BWM Environmental Specialist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMA BWM Mine Services Superintendent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMA BWM Engineering Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ALS Technician</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ALS Technician</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3 - SMS Notification List**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Text Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Alarm_Trigger(1)=0 Then Alarm_Trigger(1)=5.000</td>
<td>'SMS level alarm trigger 1 (Falling Only)</td>
</tr>
<tr>
<td>If Alarm_Trigger(2)=0 Then Alarm_Trigger(2)=6.000</td>
<td>'SMS level alarm trigger 2 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(3)=0 Then Alarm_Trigger(3)=7.000</td>
<td>'SMS level alarm trigger 3 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(4)=0 Then Alarm_Trigger(4)=8.000</td>
<td>'SMS level alarm trigger 4 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(5)=0 Then Alarm_Trigger(5)=9.000</td>
<td>'SMS level alarm trigger 5 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(6)=0 Then Alarm_Trigger(6)=10.000</td>
<td>'SMS level alarm trigger 6 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(7)=0 Then Alarm_Trigger(7)=10.500</td>
<td>'SMS level alarm trigger 7 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(8)=0 Then Alarm_Trigger(8)=11.000</td>
<td>'SMS level alarm trigger 8 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(9)=0 Then Alarm_Trigger(9)=11.500</td>
<td>'SMS level alarm trigger 9 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(10)=0 Then Alarm_Trigger(10)=12.000</td>
<td>'SMS level alarm trigger 10 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(11)=0 Then Alarm_Trigger(11)=12.500</td>
<td>'SMS level alarm trigger 11 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(12)=0 Then Alarm_Trigger(12)=12.570</td>
<td>'SMS level alarm trigger 12 (Rising/Falling)</td>
</tr>
<tr>
<td>If Alarm_Trigger(13)=0 Then Alarm_Trigger(13)=13.000</td>
<td>'SMS level alarm trigger 13 (Rising Only)</td>
</tr>
</tbody>
</table>

**Table 4 - Trigger Levels**
Current SMS Alarm Format (example):

```
330138 Rockland Dam WATER LEVEL 10.000m & RISING
Level: 10.001m
Flow: 0.000 Cumecs
Spillway: 10.000m
Dam Wall: 12.570m
Time: 09:35
```

Terrorist Act

In reference to the (DNRME, Draft Emergency Action Plan for Referable Dam Guideline, 2017), an act of terrorism on a referable dam poses a very low risk to the dam owner. The Chief Executive has a responsibility to implement the Queensland Government’s – Queensland Counter – Terrorism Strategy 2018 – 18, and as such this EAP is to acknowledge that acts of terrorism are a dam hazard which could escalate to an emergency event. In consultation with relevant BMA personnel and processes - associated communications, actions and priority order on notifications are to be directed to the National Security Hotline, Police Counter-Terrorism Liaison Officer and triple zero to ensure an effective Counter – Terrorism response. This priority order also assists in a police response.

Trigger Action Response Plans

“Trigger Action Response Plans” (TARPs), included as Appendix E, have been developed for the following two dam failure scenarios and associated failure modes:

a Sunny Day Failure (i.e. dam still retaining water following a rainfall event):
   i Embankment Instability / Piping Failure

b Crest Flood Failure:
   i Overtopping Breach

Contact Details

Key contact details for all personnel who have responsibilities within the EAP are provided in Appendix E.

Area Map – Access Routes

Access routes to Rockland Creek Dam via Blackwater Mine are shown below in Figure 9. Travel distances and approximate travel times during fair and adverse weather conditions are presented in Table 5.

Historically, during large rain events, the road to the dam has not always been accessible using Route No.2; however, Route No. 1 does allow access to the dam during most rain events.
<table>
<thead>
<tr>
<th>Origin</th>
<th>Distance (km)</th>
<th>Approximate Travel Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Office</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>South Coal Processing Plant</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 5 - Travel Distances and Time to Rockland Creek Dam

Figure 9 - Rockland Creek Dam Access Routes
6 Reference List

6. O2 Environmental Pty Ltd, Rockland Creek Dam Acceptable Flood Capacity Assessment, 2011
8. The Chief Executive Officer – Department of Energy and Water Supply, Notice approving emergency action plan Rockland Creek Dam, Dam Number: 406, July 2015

7 Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Author</th>
<th>Change Notes</th>
<th>Date Approved</th>
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</thead>
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<td></td>
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<td>09/03/2011</td>
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<td></td>
<td>Delegate to Principal Environment</td>
<td>Updated position titles, names and formatting.</td>
<td>23/11/2012</td>
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<td>Delegate to Principal Environment</td>
<td>Update position titles, names, formatting, and insertion of current landowner map.</td>
<td>23/08/2013</td>
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<td></td>
<td>Delegate to HSE Lead</td>
<td>Addressed actions arising from the ‘Information Notice’ for the approval refusal for the Emergency Action Plan for Rockland Ck Dam. (issued on 31/07/2014) based on the 2013 Rockland Ck Dam audit.</td>
<td>14/08/2014</td>
</tr>
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<td></td>
<td>Delegate to HSE Lead</td>
<td>Addressed recommendations arising from the ‘EAP Rockland Ck Dam. #406’ email for the approval refusal for the Emergency Action Plan for Rockland Ck Dam (issued on 8/12/2015).</td>
<td>20/02/2015</td>
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<td>07/09/2016</td>
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<td>Delegate of Engineering Manager</td>
<td>Updated position titles, names and formatting.</td>
<td>05/09/2017</td>
</tr>
<tr>
<td>Version</td>
<td>Author</td>
<td>Change Notes</td>
<td>Date Approved</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Engeny Water Management (delegates of Engineering Manager)</td>
<td>Update document objectives and how the EAP relates to the Operating and Maintenance Manual and other relevant BWM documents – Introduction section. Update ‘Monitoring and Inspections’ section to align with the Operating and Maintenance Manual including removal of the previous monthly inspection sheet from the Appendix.</td>
<td>29/09/2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Update ‘Failure Impact Assessment’ section to included identified potential failure modes Update TARPS to better align with the TARPs in the Operating and Maintenance Manual and identified failure modes Re-structured existing content / sections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Delegate of Engineering Manager)</td>
<td>Updated information on remote telemetry station to include all water level alarm triggers (via SMS) and content of the notification messages for each of the emergency conditions/triggers. Included terrorist acts as a potential hazard Updated TARPS to adopt standard QFES emergency event triggers such as “Lean Forward”, “Stand Up” and “Stand Down” Included a representative from Queensland Rail on the distribution list as a section of the railway is located within the inundation area</td>
<td>10/10/2017</td>
</tr>
<tr>
<td></td>
<td>(Delegate of Engineering Manager)</td>
<td>Addressed recommendations from (Central Highlands Regional Council) for the Annual EAP review. No recommendations were put forward from the Rockhampton District Disaster Management Group.</td>
<td>10/11/2017</td>
</tr>
<tr>
<td>5.0</td>
<td>(Delegate of Engineering Manager)</td>
<td>Updated formatting, position titles and names.</td>
<td>26/09/2019</td>
</tr>
<tr>
<td>6.0</td>
<td>(Delegate of Engineering Manager)</td>
<td>Organisation role and contact details</td>
<td>25/09/2020</td>
</tr>
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## Distribution Control Sheet

<table>
<thead>
<tr>
<th>Copy No.</th>
<th>Organisation</th>
<th>Receipt</th>
<th>Organisational Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BMA</td>
<td></td>
<td>General Manager</td>
</tr>
<tr>
<td>2</td>
<td>BMA</td>
<td></td>
<td>Superintendent HSE</td>
</tr>
<tr>
<td>3</td>
<td>BMA</td>
<td></td>
<td>Manager Engineering</td>
</tr>
<tr>
<td>4</td>
<td>BMA</td>
<td></td>
<td>Manager Production Coal</td>
</tr>
<tr>
<td>5</td>
<td>BMA</td>
<td></td>
<td>Manager Production Overburden</td>
</tr>
<tr>
<td>6</td>
<td>BMA</td>
<td></td>
<td>Manager Mine Scheduling</td>
</tr>
<tr>
<td>7</td>
<td>BMA</td>
<td></td>
<td>Manager Maintenance</td>
</tr>
<tr>
<td>8</td>
<td>Department of Environment and Science (DES)</td>
<td>-</td>
<td>Pollution Hotline</td>
</tr>
<tr>
<td>9</td>
<td>Central Highlands Regional Council</td>
<td></td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>10</td>
<td>Central Highlands Regional Local Disaster Group</td>
<td></td>
<td>Chair</td>
</tr>
<tr>
<td>11</td>
<td>Central Highlands Regional Local Disaster Group</td>
<td>Vacant</td>
<td>Deputy Chair</td>
</tr>
<tr>
<td>12</td>
<td>Central Highlands Regional Local Disaster Group</td>
<td></td>
<td>Local Disaster Coordinator</td>
</tr>
<tr>
<td>13</td>
<td>Central Highlands Regional Local Disaster Group</td>
<td></td>
<td>Deputy Local Disaster Coordinator</td>
</tr>
<tr>
<td>14</td>
<td>Aurizon</td>
<td></td>
<td>Commercial Account Manager</td>
</tr>
<tr>
<td>15</td>
<td>Blackwater Police</td>
<td></td>
<td>Officer in Charge</td>
</tr>
<tr>
<td>16</td>
<td>DNRME</td>
<td></td>
<td>Director, Dam Safety, Office of the Water Supply Regulator</td>
</tr>
<tr>
<td>17</td>
<td>Rockhampton District Disaster Management Group</td>
<td></td>
<td>Rockhampton District Disaster Co-Officer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SES Coordinator</td>
</tr>
</tbody>
</table>
Appendix B - Associated Features Photographs
Photograph 1: Photo displays a view of the first Gabion structure in the diversion channel downstream of culvert outlet.

Photograph 2: Photograph of 49m wide overflow spillway viewed looking towards the south west.

Photograph 3: Spillway controlling concrete sill.

Photograph 4: Photograph of outlet structure section.
Photograph 5: Photograph of inlet structure.

Photograph 6: Photograph of dam wall
Appendix C - Work Instruction
1.1 Invite all relevant personnel with responsible roles as listed in the Emergency Action Plan (EAP) (KM# 12509094) to participate in the mandatory Rockland Ck Dam annual review and site familiarisation exercise.

1.2 Ensure all BMA BWM personnel with responsible roles have reviewed a current copy of the EAP.

1.3 Review the EAP informing all personnel of their relevant obligations when initiating an emergency for Rockland Ck Dam.

1.4 Ensure all personnel sign an attendance form.

1.5 Review Site Familiarisation Exercise Template KM# 12853360
## 2 Inspection Details

<table>
<thead>
<tr>
<th>Review of EAP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Discuss the intent of the EAP</td>
<td></td>
</tr>
<tr>
<td>• Discussed how the EAP is applied</td>
<td></td>
</tr>
<tr>
<td>• Discussed the background of the dam</td>
<td></td>
</tr>
<tr>
<td>• Discussed the legislation and why Rockland Dam is a referable dam</td>
<td></td>
</tr>
<tr>
<td>• Discussed the key stakeholders including the ones downstream</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Visit to Rockland Dam</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Key infrastructure were identified including the dam wall, the inlet and</td>
<td></td>
</tr>
<tr>
<td>outlet locations</td>
<td></td>
</tr>
<tr>
<td>• Telemetry stations – identified their location and how they were used</td>
<td></td>
</tr>
<tr>
<td>• Discussed how the remote telemetry system worked</td>
<td></td>
</tr>
<tr>
<td>• Gave a background about the catchment area</td>
<td></td>
</tr>
<tr>
<td>• Discussed the issues around access during the wet and how that is managed</td>
<td></td>
</tr>
<tr>
<td>• Had discussions around why the dam was constructed in the first place and</td>
<td></td>
</tr>
<tr>
<td>how it relates back to the past mining operations</td>
<td></td>
</tr>
<tr>
<td>• Discussed the downstream stakeholders, where they were located and how</td>
<td></td>
</tr>
<tr>
<td>they would be affected</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Review of Area Map</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Showed the key stakeholders on an aerial photo: The size of the catchment</td>
<td></td>
</tr>
<tr>
<td>area</td>
<td></td>
</tr>
<tr>
<td>• The location of the downstream stakeholders</td>
<td></td>
</tr>
</tbody>
</table>

| Additional Comments/Observations                                             |                                                                 |
Appendix D - Trigger Action Response Plans (TARPs)
# BLACKWATER MINE
## ROCKLAND DAM
### Notification Process for EAP Initiation – Water Inflow / Overtopping Breach
#### TRIGGER ACTION RESPONSE PLAN

<table>
<thead>
<tr>
<th>Level</th>
<th>Alert</th>
<th>Lean Forward</th>
<th>Stand Up</th>
<th>Stand Down</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRIGGER Surface Conditions</strong></td>
<td>Dam levels rising to within 5m of spillway (SMS alert from water level monitoring station) and further significant rainfall forecast in catchment. Rainfall is monitored in realtime via the Southern Weather Station (AWS) remote telemetry station located at Ramp 80</td>
<td>Water Starting to flow over the spillway. Spillway height is 2.7m below the dam wall crest</td>
<td>Water Levels are 0.5m below the dam wall crest</td>
<td>Flood receding and dam releases are unlikely to impact others</td>
</tr>
</tbody>
</table>
| **BMA Engineering Manager**                         | • Continual monitoring of flow rates and water levels  
• Increase frequency of dam inspections from monthly to daily whilst safe to do so | • Follow EAP TARP  
• Notify BMA Manager – HSE Execution, BMA General Manager / SSE, BMA Manager Community and IMT leader  
• Advise the following as a courtesy: CHRC, Disaster Management group, DNRME Dam Safety Officer, Blackwater Police  
• Continual monitoring of flow rates and water levels via remote telemetry | • Activate EAP  
• Notify GM/SSE of BWM IMT requirement  
• Activate Emergency Service’s and CHRC Disaster Management Group  
• Notify Manager – HSE Execution  
• Notify DNRME of activation of EAP  
• Continual monitoring with 30min updates to the GM/SSE, CHRC & advisor communities | • Issue correspondence to the emergency services advising the end of the emergency event  
• Issue correspondence to DNRME advising the end of the emergency event  
• Immediately arrange for Dams Engineer to inspect dam following release event |
| **BMA General Manager / SSE**                       | • Nil  
• Ensures support is provided to the Engineering Manager | • Activate BWM IMT  
• Ensures support is provided to the Engineering Manager  
• Provide updates to emergency services with progress (hourly or as requested) | • Nil | • Nil |
| **BMA Manager Mining Production and/or BMA Manager Mining Pre-strip** | • Nil  
• Provides all operational support including manning and machinery for repair works | • Provides all operational support including manning and machinery as required  
• Notify all relevant Coal Mine Workers and if required manage mine evacuation in accordance with BWM IMT process | • Nil | • Nil |
| **BMA Manager Community (Bowen Basin South)**        | • Notify the CHRC Disaster Management Group, alerting them to the situation  
• Advise downstream land owners of the emerging situation | • Provide updates to downstream landowners (hourly or as requested)  
• Control distribution of information to the media and public | • Issue correspondence to the CHRC disaster management Group advising the end of the emergency event | • Issue correspondence to the CHRC disaster management Group advising the end of the emergency event |
<table>
<thead>
<tr>
<th>Role</th>
<th>Land Owners</th>
<th>CHRC Disaster Management Group</th>
<th>Regulator (DNRME)</th>
<th>RPEQ Dams Engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Nil</td>
<td>• Liaise with emergency services and evacuate as required</td>
<td>• Liaise with emergency services and evacuate as required</td>
<td>• Nil</td>
</tr>
<tr>
<td>CHRC Disaster Management Group</td>
<td></td>
<td>• Communicate with BMA community representatives around the progress</td>
<td>• Communicate with BMA community representatives around progress of emergency</td>
<td></td>
</tr>
<tr>
<td>Regulator (DNRME)</td>
<td></td>
<td>• Provide advice and support as required to BWM</td>
<td>• Provide advice and support as required to BWM</td>
<td></td>
</tr>
<tr>
<td>RPEQ Dams Engineer</td>
<td></td>
<td>• Nil</td>
<td>• Nil</td>
<td></td>
</tr>
</tbody>
</table>

**Legend**

- SSE – Site Senior Executive
- BWM – Blackwater Mine
- IMT – Incident Management Team
- TARP – Trigger Action Response Plan
- RPEQ – Registered Professional Engineer Queensland
- EAP – Emergency Action Plan
- CHRC – Central Highlands Regional Council
- BMA – BHP Billiton Mitsubishi Alliance
- GM – General Manager
- HSE – Health, Safety & Environment
- DNRME – Department of Natural Resources, Mines and Energy
- DES – Department of Environment and Science
## Notification Process for EAP Initiation – Dam Wall Conditions / Embankment Instability / Piping Breach

**TRIGGER ACTION RESPONSE PLAN**

### Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Normal Operating Conditions</th>
<th>Lean Forward</th>
<th>Stand Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIGGER Surface Conditions</td>
<td>1. No visible embankment cracks; and 2. No visible embankment bulges / slides; and 3. Embankment Rill erosion &lt; 0.5m deep; and 4. No visible embankment crest depressions / sinkholes; and Outlet 5. structure in good condition</td>
<td>1. Major embankment cracks; or 2. Deep bulges / slumping; or 3. Embankment Rill erosion &gt; 1m deep; or 4. Major embankment crest depression / sinkhole (reduced spillway freeboard); or 5. Major cracking / failure / blockage of outlet structure 6. Earthquake with magnitude &gt; 5 within region and felt at site</td>
<td>1. One or more conditions as identified in the ‘Lean Forward’ column; AND 2. RPEQ Dams Engineer inspection and assessment concludes embankment is not fit to act as a water retaining structure; AND 3. The dam is currently storing water or significant rainfall in the catchment is forecast</td>
</tr>
</tbody>
</table>

### BMA Engineering Manager

- Continue to conduct planned and scheduled routine dam inspections and monitoring

### BMA General Manager / SSE

- Nil

### BMA Manager Mining Production and/or BMA Manager Mining Pre-strip

- Nil

- Provides all operational support including manning and machinery for repair works

### BMA General Manager

- Nil

- Ensures support is provided to the Engineering Manager

- Provides all operational support including manning and machinery as required

- Provides all operational support including manning and machinery as required

- Notify all relevant Coal Mine Workers and if required manage mine evacuation in accordance with BWM IMT process
## BMA Manager Community (Bowen Basin South)
- Nil
- Advise downstream landowners of the emerging situation
- Notify downstream landowners
- Control distribution of information to the media and public
- Update CHRC with progress of the emergency

## Land Owners
- Nil
- Liaise with emergency services and evacuate as required
- Liaise with emergency services and evacuate as required

## Central Highlands Regional Council & Disaster Management Group
- Review and Approve yearly EAP
- Communicate with BMA community representatives regarding progress of the situation
- Communicate with BMA community representatives around the progress

## Regulator (DNRME)
- Review and Approve EAP yearly, provide feedback when required
- Undertake site inspections when needed.
- Provide advice and support as required to BWM
- Provide advice and support as required to BWM

## RPEQ Dams Engineer
- Nil
- Conduct dam inspection and condition assessment and recommend remediation strategy
- Advise Engineering Manager of any available short-term remediation solutions to minimise the likelihood of dam failure

### Legend
- SSE – Site Senior Executive
- BWM – Blackwater Mine
- IMT – Incident Management Team
- TARP – Trigger Action Response Plan
- RPEQ – Registered Professional Engineer Queensland
- EAP – Emergency Action Plan
- CHRC – Central Highlands Regional Council
- BMA – BHP Billiton Mitsubishi Alliance
- GM – General Manager
- HSE – Health, Safety & Environment
- DNRME – Department of Natural Resources, Mines and Energy
- DES – Department of Environment and Science

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Appendix E has been redacted