IN THE MATTER OF
THE QUEENSLAND FLOODS COMMISSION OF INQUIRY

A COMMISSION OF INQUIRY UNDER THE COMMISSIONS OF INQUIRY ACT 1950

AND PURSUANT TO COMMISSIONS OF INQUIRY ORDER (NO. 1) 2011

STATEMENT OF STUART JOHN RITCHIE

I, **Stuart John Ritchie**, of [redacted] Bellbowrie, Queensland, do solemnly, sincerely and truly affirm and declare:

1. I am currently employed by Rio Tinto Coal Australia Pty Ltd (***RTCA***) as Manager, Environmental Services.

2. I make this statement in response to the requirement of the Queensland Floods Commission of Inquiry (***Commission***) dated 1 September 2011 (the ***Statement***).

3. I have been permitted additional time to submit this statement prior to 5.00pm on 13 September 2011, confirmed by email correspondence from the Commission) dated 6 September 2011 and 8 September 2011.

4. RTCA's submission to the Commission dated 11 March 2011 was signed by Rory Gordon, General Manager – Health, Safety and Environment (**Annexure SJR1**). I aided in the preparation of the submission and I agree with its content.

Qualifications and Experience

5. I hold the following qualifications:

   (a) Bachelor of Engineering (Agricultural); and

   (b) Masters of Environmental Management.

6. A copy of my curriculum vitae is provided in **Annexure SJR2**.

7. From 1 February 2011 to the present time, I have been employed by RTCA in the capacity of Manager – Environmental Services. This role involves:

   (a) establishing and communicating the environmental strategic direction for RTCA;

   (b) ensuring the environmental and compliance performance of RTCA operations; and

   (c) supporting RTCA operations and functions through providing environmental advice and services.

8. As my present role commenced on and from 1 February 2011, the views expressed in this Statement in relation to matters or events preceding the commencement of my employment are made on the basis of a review of documents available to me that I have identified in the limited time available since the receipt of the notice from the Commission.

Matter 1: Rio Tinto Coal Australia's Mines

9. RTCA operates coal mines in New South Wales and Queensland.

10. Relevantly with respect to my statement to the Commission, RTCA operates the Blair Athol, Clermont, Hail Creek and Kestrel joint venture mines in Queensland. Each mine can be briefly described as follows:

    (a) Blair Athol – located near Clermont, operations at the mine commenced in 1984;

    (b) Clermont – located near Clermont, delivered its first shipment of coal in 2010;

    (c) Hail Creek – located near Mackay, commenced operation in 2003; and

    (d) Kestrel – located near Emerald, commenced operation in 1999 and is RTCA's only underground coal mine in Queensland.

11. Water management is a critical aspect of coal mining operations. An effective water management system is required to ensure a reliable water supply, to maximise water value through re-use and recycling, and to manage water contamination that may occur in an environmentally acceptable manner. Mining pits are not considered water storages within the system, as production capacity would be displaced, however water management systems must take into account water accumulating in pit.

12. The management of water/tailings storages and the discharge procedures to remove excess water from these storages are different at each site. This is because each site is unique in respect of:

    (a) the number, location, size and design criteria of its water storages;

    (b) the water use needs and recycling opportunities that exist; and

    (c) the environmental context in which discharges can occur (for example how frequently discharges may occur and the nature of the receiving environment downstream of the discharge point).

13. The management of water at RTCA's Queensland coal operations has been significantly altered in recent years; specifically:

(a) from around 2009 the 'Fitzroy Basin model conditions' (***Model Conditions***) have been incorporated into the environmental authorities (***EAs***) relating to each site; and

(b) in the case of RTCA's Hail Creek Mine (***HCM***), by the implementation of the approved Transitional Environmental Program (***TEP***) for the discharge of excess water arising from the 2010/2011 wet season.

14. This Statement is focused on RTCA's experiences at the HCM over the period of the 2010/2011 wet season, as a means of demonstrating the impact of the wet season and subsequent responses by the Department of Environment and Resource Management (***DERM***). This approach was adopted in RTCA's submission to the Commission dated 11 March 2011; and has been confirmed verbally with the Commission.

15. A summary of the water and tailings storage and discharge procedures for HCM is provided in Table SJR-1, **Annexure SJR3**.

Matter 2: Different Approaches for Water Discharges

16. From 4 March 2004 until 27 November 2009, the discharge of mine affected water at HCM was regulated under Schedule C of the then current EA (Reference No.M2295) (***EA M2295***).

17. On 27 November 2009, EA No.M2295 was replaced by the grant of an amended EA (Reference No.MIN100913309) (***EA MIN100913309***), which incorporated the Model Conditions. A significant feature of this amendment was the substantial reworking of the water discharge conditions for HCM and in effect, the imposition of a new regime for the control of mine water discharges.

18. There are a number of fundamental differences between the conditions in Schedule C of EA M2295 and the new Model Conditions imposed in EA MIN100913309 which are worthy of note. These include:

(a) Flow restriction: HCM is located in an area where the creeks to which the site discharges are strongly ephemeral (i.e. they flow only during and briefly following significant rain events (refer also to Matter 4)). The different approach in the Model Conditions inhibits HCM's ability to discharge offsite, as outlined below:

(i) EA M2295 authorised discharge at any time to Middle Creek while it was flowing (i.e. no minimum flow rates for receiving waters were prescribed). In contrast, the conditions of EA MIN100913309 require a flow of greater than 2.0m^3/sec at the monitoring station in Bee Creek before discharge can occur.

RTCA has conducted hydrological modelling of the impact of this change. The modelling was based on long-term, simulated streamflows generated using catchment yield models calibrated against historical streamflow records. The model predicted that a flow of 2.0m^3/s or more would be observed on an average of 15 days every year under the discharge regime of EA MIN100913309. This compares with a predicted annual average of 115 days on which discharges could be made under EA M2295, where the only requirement for discharge was that a flow greater than 0m^3/s was observed. A graphical representation of this model is provided in Figure SJR-1, **Annexure SJR4**.

It should be noted that this model calculated flows at Bee Creek (Suttor Road) as this is the only available gauging station, but is considered representative of actual flows likely at Middle Creek.

(ii) Condition W9 of EA MIN100913309 restricts the release of water from site to no more than 20% of the flows in Middle Creek. For example, if Middle Creek is flowing at a rate of 2.0m^3/sec, HCM would only be able to discharge at a rate of 0.4m^3/sec. EA M2295 had no such restriction.

(b) Water quality: while there are no significant differences between EA M2295 and EA MIN100913309 in terms of water quality conditions, the substantial decrease in discharge opportunities (discussed above) has made it more difficult to comply with certain contaminant release limits prescribed in EA MIN100913309. Based on my review of available data, the quality of water impounded in mines, particularly the electrical conductivity (***EC***) of the water, will deteriorate the longer the water is impounded. The deterioration of impounded water further limits discharge opportunities due to the imposition of a water quality limit on EC.

(c) Monitoring: I am aware generally that, prior to the introduction of the Model Conditions, the water management system monitoring regime was prepared by the EA holder who would nominate the monitoring requirements in the Plan of Operations (a plan required for all mining lease holders which describes all of the activities on site and how they are to be carried out). The Plan of Operations could therefore be tailored by a proponent to a specific site in light of its location, environmental setting and water management system constraints.

In contrast, the application of the Model Conditions across all sites in the Fitzroy Basin is more prescriptive. While it is acknowledged that the Model Conditions do allow for amendments in certain circumstances, I understand that

EA MIN100913309 incorporated the Model Conditions without detailed consideration of the environmental setting of the mine on the basis of the:

(i) relative haste with which the Model Conditions were introduced following the findings of the review conducted by Professor Barry Hart in respect of the discharge of significant quantities of mine affected water from the Ensham Coal Mine in 2008;

(ii) the State government's policy position that the incorporation of the Model Conditions may be enforced on HCM if not voluntarily incorporated (as outlined in the Queensland Resources Council's (***QRC***) submission to the Commission dated 11 March 2011); and

(iii) given that HCM has only operated in a period predominantly characterised by drought conditions, there is a relative absence of historical monitoring data to support an application by HCM to amend the Model Conditions.

As a result, EA MIN100913309 has conditions that require a significant investment in time and resources, and in some situations result in conditions that may be impossible or unsafe to implement ion extreme conditions (refer also to Matter 8). Examples of such conditions include:

(i) regular sampling during discharge events (Table W2);

(ii) monitoring of an additional 18 water quality parameters with the potential to trigger further investigations (Table W3); and

(iii) the requirement to prepare and implement the Receiving Environment Monitoring Program for the Bee Creek catchment (Conditions W20 and W21).

19. Relevant parts of EA M2295 and EA MIN100913309 have been extracted in Table SJR-2, **Annexure SJR4** to demonstrate the key differences described above.

Matter 3: RTCA's Role in Negotiating the Model Conditions Prior to the 2010/2011 Wet Season

20. As noted in paragraph 7, I commenced employment with RTCA on 1 February 2011. For that reason, I was not involved in any negotiations or activities on behalf of RTCA with any other party about the Model Conditions in the lead up to the 2010/2011 wet season.

21. To the best of my knowledge, there were no meetings attended solely by DERM and any RTCA representative in relation to the negotiation of the Model Conditions in the lead up to the 2010/2011 wet season.

22. With the benefit of hindsight, RTCA could have engaged directly with DERM earlier in the lead up to the 2010/2011 wet season.

23. However, it is my understanding that RTCA participated in the QRC Environment Committee in relation to the QRC's consideration of, and advocacy activities relating to, the Model Conditions on behalf of the mining industry.

24. I am aware that the QRC was endeavouring during this period to draw the attention of the regulator to significant industry concerns about mines carrying surplus water from the previous wet season, and therefore the consequent diminished storage capacity of these mines coming into the 2010/2011 wet season.

Matter 4: Particular Issues Relating to the HCM Example

25. HCM is located at the upper reaches of the Fitzroy Basin catchment. The creeks surrounding the site are ephemeral and flow only during and briefly following significant rain events. As noted in paragraph 18(a)(i) above, the linkage of water discharges from the HCM site to the stream flow criteria introduced by the Model Conditions, has reduced the ability of HCM to discharge in accordance with its EA from an estimated 115 days to 15 days per year, on average.

26. Further particulars of the site and the experiences drawn from the 2010/2011 wet season are outlined below.

Nature of Ephemeral Watercourses Near the Mine

27. HCM is located in the upper reaches of the Isaac/Connors sub-catchment of the Fitzroy Basin. HCM is situated within 10 km of the Fitzroy Basin catchment boundary highlighting its location within the very upper reaches of the catchment.

28. Given this upper catchment position, the land area of HCM is drained by a number of small stream systems, each supporting relatively small catchment areas before feeding into larger catchments. All of these streams are strongly ephemeral, flowing only after periods of rain. All of the surrounding tributaries are also characterised as being subject to high flow events immediately following heavy rainfall, followed by very low or zero flows and dry creek beds.

29. HCM has an established discharge point to Middle Creek (RP1), which flows to Absent Creek, and then into Hail Creek. Hail Creek flows to Bee Creek, and then to the Isaac and Fitzroy rivers, entering the sea at Rockhampton, approximately 300 km downstream.

30. Middle Creek is a minor stream system, with a small catchment (3,020 ha). However, Bee and Hail Creeks support larger catchments (19,600 ha and 10,500 ha, respectively),

which extend both upstream and downstream of HCM, and receive water from a range of sources that may be subject to influence from grazing and agricultural activities.

31. Figure SJR-2, **Annexure SJR5** shows the location of HCM in relation to the Isaac/Connors catchment, which is a sub-catchment of the Fitzroy Basin. HCM is located in north western part of the catchment.

Amount of Water in the Pit at 26 December 2011

32. Table SJR-3 in **Annexure SJR6** indicates the volumes of water impounded both in-pit and within water management system storages for the period from end November 2010 to end May 2011. The measurements are taken approximately at the end of each month. The estimates for December 2010 provided in Table SJR-3, are likely to have been determined prior to heavy rains experienced at the end of December 2010.

33. At the end of December 2010, water management system storages were calculated to be around 98% full. By the end of January 2011, these storages were approximately 105% full. These storages can fill to above 100% capacity as each storage has a limited "freeboard" (or safety margin) that can be temporarily consumed.

34. Constraints on discharges from the water management system storages due to the EA conditions, meant that there was no capacity to remove water accumulating in the pits as the system is designed to perform. As a consequence, the quantity of water stored in the pits increased significantly from late December 2010 until the end of April 2011.

Details on the Process by which DERM Approved the TEP

35. RTCA's submission dated 11 March 2011 included a sequence of events describing the period from late December 2010 until March 2011.

36. The process by which the TEP and amendments were applied for and obtained (including a summary of negotiations, discussions and relevant correspondence), is set out in Table SJR-4 in **Annexure SJR7**.

Details of RTCA's Continuing Attempts (as at 11 March 2011) to Amend the TEP to Authorise Further Discharge Locations and an Update on those Attempts

37. The details of continuing attempts from 11 March 2011 are also set out in Table SJR-4 in **Annexure SJR7**.

Matter 5: Emergency Direction Powers

38. To the best of my knowledge, RTCA was not directly involved in approaches to DERM to seek the exercise of the Minister's emergency direction powers during or in the aftermath of the 2010/2011 wet season.

Matter 6: Statement on the TEP Process

39. I have been asked to elaborate on the following statement (including by reference to specific examples):

> "...the TEP process...is a bureaucratic process, unsuited, both in intention and in process, to dealing with extreme climatic events such as those faced in 2010/2011"

40. Since the introduction of the Model Conditions and the increased restrictions on off-site water discharges, the management of water by mine operators has become increasingly difficult, as evidenced by the substantial number of TEPs granted by DERM.

41. Generally, over the last two wet seasons, to meet their respective water discharge requirements under the Model Conditions, mine operators have had no option but to use productive mining areas as emergency water storages (i.e. a decision is made to stop mining in these areas such that water on site can be temporarily stored to ensure no non-compliant releases occur).

42. Once the water storages are full and any further rainfall would result in storage commencing in the mining pits, the ability to make additional discharges at a time when the streams in the receiving catchments are flowing (to take advantage of natural dilution in the receiving waters) is of crucial importance. Consequently the speed at which authorisation to discharge is approved is critical.

43. Any administrative delay in granting authorisation to discharge, and potentially any limitation imposed by conditions of approval, is likely to contribute to the accumulation of water in pit.

44. DERM has advocated the use of TEPs as a means to provide a temporary relaxation of the discharge requirements of the Model Conditions.

45. TEPs are administered under Part 3 Division 1 of the *Environmental Protection Act 1994* (the ***Act***). TEPs are intended to be a mechanism to bring an activity into compliance with the Act where there is a continuing non-compliance.

46. However, the TEP regime does not accommodate applications being made to authorise future discharges in circumstances where inclement weather would otherwise imminently result in non-compliance with EA conditions.

47. The use of voluntary TEPs requires the preparation of an application meeting the requirements of Section 331 of the Act. DERM then has 20 days within which to consider the TEP.

48. RTCA acknowledged in its submission that DERM allocated additional resources to speed up its assessment and approval of TEPs during the 2010/2011 wet season.

49. In my experience the timeframe for the assessment and approval of TEPs generally uses the full period permitted under the Act.

50. In relation to HCM's situation, given its upper catchment location and the short flow duration experienced in the surrounding ephemeral creeks, the use of TEPs as a means of authorising discharges is problematic. As receiving creeks near HCM respond to rainfall events within time periods measured in hours, and flow for time periods measured in days, a regulatory system that provides an assessment and approval period measured in weeks is clearly unsuited.

Matter 7: Particular Examples of Additional Hazards Created by the TEP Conditions

51. The question posed by the Commission relates to hazards created by conditions imposed under a TEP, and references 2 statements in RTCA's submission (subparagraphs (a) and (b) are drawn from the submission).

52. By way of clarification to those comments in RTCA's submission, the relevant hazards or risks that arise in circumstances where constraints on lawful discharge restrict the ability to reduce water inventories, are considered to include:

    (a) Where a mine pit is allowed to accumulate water, potential risks might include:

        (i) geotechnical failure of pit faces. Such a failure may involve slumping of the high-walls or low-walls into the base of the pit; and

        (ii) uncontrolled releases where a pit fills and overtops. Should that occur mine affected water would be discharged from the pit at the rate of inflow into the pit. While those pit outflows would have no water quality control measures, impacts on water quality might be expected to be minimal given the large flows in the receiving environment.

    (b) In relation to overfilling water storages (being an out-of-pit water management structure), it is only in the unlikely event that the magnitude of the inflows exceed the design capacity of the storage spillway that there is a risk that the wall of a storage dam might fail. This is considered a remote risk and is common to any engineered structure.

53. While the submission refers to hazards associated with TEPs, the comments made in the submission are primarily applicable to the implementation of the Model Conditions. The hazards noted above may arise where an EA imposes the Model Conditions, and the TEP does not provide adequate flexibility to increase discharges.

Matter 8: Examples of TEP Conditions that were Impossible for RTCA to Meet

54. RTCA's TEP, in a technical sense, does not contain "conditions" of approval as none were imposed by DERM. It is the commitments and actions proposed by RTCA and outlined in the TEP that set up the framework under which RTCA must operate.

55. In practice the process by which the TEP is finally approved is informed by pre-application discussions and negotiations with DERM. The form of the TEP as initially contemplated, differed from its form as finally approved. At HCM for example, the TEP finally approved in January proved ineffective in addressing the volumes of water HCM was forced to store on site, thus necessitating a series of amendment applications.

56. Further, the collection of monitoring data as required by TEPs in extreme events can be impossible to meet, such as in the following examples:

(a) Access to monitoring locations: Condition W3 of EA MIN100913309, for example, requires the monitoring of parameters and the use of methods specifically requiring samples to be taken. These samples must be taken daily during release, with the first sample to be taken within 2 hours of commencement of release.

However, one of the first impacts arising from localised flooding is the loss of access to surrounding areas. Conditions requiring personnel to access remote locations under such circumstances can be physically impossible to implement and would be counter to RTCA's safety policies.

(b) Sampling integrity: Water quality parameters such as turbidity, total suspended solids and sulphate are required to be determined from physical sampling. While remote sampling devices are available, the duration of wet weather events commonly results in sample preservation and storage requirements not being met and analytical results being called into question.

57. These two examples demonstrate that conditions relating to sampling need to consider the practical constraints on sample location accessibility. As a possible solution, conditions should default to robust non-sampling technologies and telemetry as recognised proxies for sample-based analytes. Conditions should also accommodate the failure of such equipment which will occur from time to time.

Matter 9: Details Regarding RTCA's Reduced Ability to Achieve Business Recovery

58. The following factors reduced RTCA's ability to achieve business recovery by returning the pits to full production:

(a) ongoing restrictions on discharge rates imposed by TEPs due, from time to time, to some or all of:

(i) the inability to have additional release points authorised;

(ii) insufficient base flows in the receiving environment;

(iii) the discharge rate limits applied to release points;

(b) requests by the regulator to cease discharges (refer to the chronology in Table SJR-4 in **Annexure SJR7**); and

(c) cessations effected by HCM due to water quality concerns following the failure of equipment on site (in particular, failure of the flocculating pumps used in clarifying water being transferred to the polishing pond, prior to discharge).

Matter 10: Use of the TEP Mechanism in Emergencies and Environmental Risk

59. I have been asked to elaborate on the following statement:

> "...the use of the TEP mechanism in emergency circumstances shows no consideration of the significant safety and environmental risks that exists during extreme climatic events"

60. There are two issues to draw from the statement above:

(a) the monitoring requirements imposed under the Model Conditions and typically repeated in TEPs do not take account of the issues associated with inaccessibility of monitoring locations or sampling integrity (as noted above at paragraph 56); and

(b) the administrative time required under the TEP process to obtain authorisation to make additional mine water discharges leads to a deterioration in water quality on site.

61. It is RTCA's experience that the quality of water stored in-pit will deteriorate over time, primarily due to the extended contact time with spoil and other disturbed materials.

62. There is evidence that the water quality of the Fitzroy Basin naturally deteriorates markedly as the catchment transitions from the wet season to the dry season.

63. I am of the opinion that "extending" the flow of ephemeral streams well into the dry season as a result of drawn-out, mine-affected water discharges is far less desirable than releasing better quality water during and following flow events to those same ephemeral water courses.

Matter 11: Details on the Recovery of RTCA Mines

Time Taken to Dewater and Become Operational

64. HCM can be considered to have been affected due to rainfall since 24 December 2010 when a wet weather Force Majeure event was declared. That Force Majeure was lifted on

12 May 2011, some four and a half months after being declared. At the time of swearing this Statement, HCM was not yet at full production on a sustained basis.

Impediments to Faster Dewatering and Recovery

65. As indicated at Matter 9 above, the key impediment to faster de-watering and recovery has been the flow and Electrical Conductivity (EC) limits applied through the TEP. These restrictions are referred to at Matter 2 above.

66. By way of comparison, during May 2011, HCM discharged water at an average rate of 90 ML/day, and for the period from June 2011 to August 2011, at an average rate of 33 ML/day.

67. HCM has the capacity to discharge water from the licensed release point at 150 ML/day or greater if pumping capacity is also utilised. Even utilising the more conservative rate of 150 ML/day, if the restrictions referred to above had not applied, the HCM pits should have been fully dewatered by around mid-May 2011.

Specific Provisions of the TEP which Impeded Dewatering and Recovery

68. Refer to Matter 9 above.

Matter 12: Elaboration of RTCA's Suggestion that Provisions for Emergency Response During Rainfall/Runoff Events and Cyclones should be Included in the EA

Type of Provisions Envisioned by RTCA

69. The ability to manage rainwater events as they occur, should be by way of an EA establishing a clear understanding between the regulator and the licensee that incorporates:

(a) clear discharge provisions – since the 2010/2011 wet season DERM has undertaken a review of the Model Conditions. The approach now contained within the revised model conditions provides a more flexible approach that better takes into account local conditions (refer to **Annexure SJR8**). However, this approach is untested in application and relies substantially on a negotiation process with DERM for which the requirements to demonstrate the level of environmental harm are as yet undetermined;

(b) a practical and safe monitoring approach - monitoring conditions wherever they occur should incorporate an exemption from requirements applying where conditions are unsafe to do so. A second tier of monitoring requirements based on remote monitoring technologies could be included in the EA that only become applicable in the event that normal monitoring conditions become unsafe.

Furthermore, the EA provisions should recognise that in extreme conditions such equipment may fail or may not be able to be attended to, and that the holder should not be in non-compliance in such circumstances; and

(c) acceptance of agreed system design limits - it is standard engineering practice in developing the water management system of a project such as an open-cut coal mine, to first identify the level of risk of spillway overtopping likely to be deemed acceptable by the community in view of the consequent downstream impacts, and then to provide a system design to meet that agreed level of risk.

70. For water management systems that risk of system failure referred to above is most commonly represented as an Average Recurrence Interval (ARI) of some defined event (e.g. a rainfall event or a stream flow event). Another way to consider this is referred to as the expected "return period" defined as the probability that the event will be exceeded in any one year.

71. For HCM this level of risk is reflected to a minor degree in EA MIN100913309 (refer Condition W42), where the design storm and target particle size performance are specified for just two key water management structures. EAs should include conditions that reflect the design parameters of the site's water management system as whole, and allowing releases via spillways or other engineered release mechanisms in the event that the design storm parameters are exceeded. It is my understanding that the HCM water management system as a whole was designed to withstand a design storm event having an ARI of 1 in 10 years (i.e. the average time interval between design storm events is 10 years); equivalent to a 10% chance that the design storm will occur in any one year. As is normal engineering practice, the HCM structures are designed to spill when the system capacity is exceeded. For HCM, the water management system does not consider the operational mine pits as water storages.

72. In most cases, the design parameters for a water management system are reflected within development application and environmental impact assessment documentation and the key design parameters in their final approved form should simply be transferred to the EA for the project, including a statement that recognises that releases arising from events in excess of the design event would not constitute a non-compliance of the EA.

73. An alternative means of regulation that takes into account water management system design parameters could be by requiring the inclusion of design parameters within a Water Management Plan called for by EA conditioning, and incorporating conditions that indicate that operation in conformance with the Water Management Plan would be regarded as compliant operation. The Water Management Plan could be required to be updated at regular intervals and be subject to inspection by the regulating authority.

How Such Provisions would be Adjusted from Normal EA Provisions

74. The process of incorporating such provisions would be in accordance with existing EA amendment processes provided for in the Act.

How Local Conditions should be Taken into Account

75. Holders of EAs subject to the Model Conditions should apply to amend those provisions which restrict mine water discharges to take account of the items noted in paragraph 12 above. Further DERM should demonstrate a preparedness to negotiate amendments to the Model Conditions that take account of such items.

76. Matter 13 below describes RTCA's involvement in the review of the Model Conditions (which has been brought forward by DERM in order to allow industry to prepare for the 2011/2012 wet season). The review process is intended to bring greater clarity to EAs. While RTCA supports the framework adopted in the Model Conditions, RTCA does hold concerns about the ability of the regime to accommodate above average wet seasons.

Appropriate Threshold Triggers

77. Threshold triggers that should apply are key conditioning parameters that should be determined with consideration of local conditions and circumstances. In principle, threshold triggers relating to mine-affected water releases need to take account of catchment position, downstream environmental values and downstream flow characteristics.

How such Provisions would Assist in Business Recovery, Reduced Environmental Impacts and No Additional Safety Risks

78. If EA discharge conditions are approved that contemplate the likelihood of occurrence of the range of weather conditions that can be experienced in Central Queensland, and that set out clear discharge provisions, with a safe and practical obligations for monitoring, there will be a reduced likelihood of the need for a TEP as a consequence of such weather events.

79. The approach that is suggested would recognise the already approved design storage capacities of the water management system such that overtopping of built structures during storm events is authorised by the EA where the relevant trigger thresholds are satisfied.

80. In relation to business recovery, such provisions would assist to avoid the accumulation of water in pits and to support the prompt dewatering of pits.

81. In relation to the environmental impacts associated with such provisions, the ability to immediately discharge once the trigger criteria are satisfied would enable the timely release of mine water to take advantage of dilution in the receiving environment.

82. Safety risks would be avoided by the utilisation of remote technologies for sampling of mine water releases where ordinary sampling procedures are determined to pose a risk to persons, or where monitoring locations are inaccessible.

Matter 13: Relevant Discussions with DERM following the 2010/2011 Floods

83. RTCA has been actively involved in discussions relating to the review of the Model Conditions since the 2010/2011 wet season, primarily as participants in various industry and industry / DERM meetings. The chronology in Table SJR-5 in **Annexure SJR9** lists the key meetings and workshops attended with respect to the Model Conditions review.

84. There have been no negotiations with the DERM regarding emergency directions (as noted above).

Signed by **Stuart John Ritchie** in the presence of:

[redacted] [redacted]

Witness Signature Signature

PAUL BORG

Print Name

14/9/14

Date

Annexures

Annexure SJR1

Submission of Rio Tinto Coal Australia Pty Ltd to the Queensland Floods Commission of Inquiry (dated 11 March 2011)

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11 March 2011

Subject: Rio Tinto Coal Australia submission to the Queensland Floods Commission of Inquiry

Rio Tinto Coal Australia Pty Limited ("RTCA") is one of Australia's leading mining organisations with a successful record in the development and management of world-class open cut and underground coal operations located in Queensland and New South Wales.

In Queensland, RTCA operates the Blair Athol, Clermont, Hail Creek and Kestrel joint venture mines at locations near Clermont, Mackay and Emerald in Central Queensland. RTCA's Queensland operations produce approximately 24 Mtpa of coking and thermal coal for export markets.

All of RTCA's Queensland operations are located in the upper regions of subcatchments of the Fitzroy River Basin; with all licensed water discharge points discharging to ephemeral (as distinct from perennial) watercourses.

RTCA appreciates the opportunity to provide this submission to the Queensland Floods Commission of Inquiry ("the Inquiry"). This submission is relevant to the following elements of the Inquiry's Terms of Reference:

" c) all aspects of the response to the 2010/2011 flood events, particularly measures taken to inform the community and measures to protect life and private and public property, including:

- *immediate management, response and recovery*
- *resourcing, overall coordination and deployment of personnel and equipment*
- *adequacy of equipment and communications systems; and*
- *the adequacy of the community's response.*

f) implementation of the systems operation plans for dams across the state ……. and an assessment of compliance with, and the suitability of the operational procedures relating to flood mitigation and dam safety,

g) all aspects of land use planning through local and regional planning systems to minimise infrastructure and property impacts from floods,"

RTCA wholly supports the submission to be made by the Queensland Resources Council ("QRC"), of which RTCA is a member, and makes this submission to provide additional detail relating specifically to RTCA's experiences at its operations during the 2010/11 flood events.

The circumstances surrounding the wet weather event of 2010/2011 at RTCA's Hail Creek operation are presented below as a case study. The Hail Creek operation received significant rainfall during this period and faced a number of additional hazards as a result of water discharge restrictions in place at the time. Hail Creek is an open-cut mining operation employing 969 employees and contractors and located in close proximity to a number of ephemeral watercourses.

The following sequence of events describes the period from late December 2010 until March 2011 at Hail Creek:

23 Dec 2010	• Heavy rain commences.
24 Dec 2010	• Pre-strip operations cease due to roads too wet to operate. • Water levels in access areas rise such that planning for evacuation at 7am begins. • Dragline, coaling equipment and washery cease operating and personnel evacuated. • Railing of coal ceases.
26 Dec 2010	• All operations recommence after Christmas at scheduled time but productivity at reduced rates due to wet mine roads and water in pit.
29 Dec 2010	• Force majeure declared on sales contracts, effective 24 December.
31 Dec 2010	• Explosives supplies cease when water reaches Rockhampton and cuts road access.
13 Jan 2011	• Explosives supply recommences, although deliveries are not at normal levels; lack of blasted inventory will have a long term impact on production.
27 Jan 2011	• Ground continues to be waterlogged and site water storage facilities are full (approximately 7GL stored in dams and the pits). • Flooded pits prevent access to uncovered coal. • Pumping continues to transfer water from higher priority to lower priority areas. • Close to normal operations resume in parts of the pit for the short term. • Impact of pit flooding, deployment of resources to address water in pit, lack of explosives and consequent reduced pre-strip result in continuing loss of production and sales.
29 Jan 2011	• Transitional Environmental Program (TEP) approved in part, allowing discharge into Bee Creek from two agreed discharge points. TEP valid until May 2011. • TEP to discharge from a further two points continues to be sought. If not approved, continued transfer of water based on access priority is required causing further impact on production. • As at the time of writing, force majeure has not been lifted.

Production interruptions were experienced by all RTCA Queensland operations as evidenced by weather-related force majeure declarations at Hail Creek, Kestrel, Blair Athol and Clermont mines. This has resulted in a significant financial impact for RTCA. As at the time of writing (10 March) one of the four weather-related force majeure declarations remains in force (Hail Creek Mine).

QRC's submission provides a chronology of recent history relating to the licensing of water discharges from Queensland mine sites. In summary; prior to 2008, discharges of water from Queensland mine sites were managed on a site-by-site basis. Following the 2008 Central Queensland floods, a number of reviews and studies resulted in the wholesale tightening of water discharge conditions via the introduction of "model conditions" which took effect on 1 January 2010. These "model conditions" effectively required Queensland mine sites to operate under near-zero discharge conditions, and made no consideration for the next inevitable extreme rainfall or cyclone event. In the

lead up to the 2010 wet season, the industry agitated for a review of discharge conditions with some minor concessions forthcoming; but too late to take effect before the 2010/2011 wet season.

As is evidenced by the circumstances of the Hail Creek mine above, the 2010/2011 wet season, along with cyclones Anthony and Yasi resulted in significant water management pressures on mine sites. With the refusal of the Department of Environment and Resource Management ("DERM") to invoke the Minister's Emergency Direction powers, Transitional Environmental Programs ("TEPs") became the only remaining mechanism able to provide some relief for mine sites.

While RTCA acknowledges that DERM allocated additional resources to speed up its assessment and approval of TEPs during the 2010/2011 flood period, the TEP process outlined within the Environmental Protection Act 1994 ("the Act") is a bureaucratic process unsuited, both in intent and in process, to dealing with extreme climatic events such as those faced in 2010/2011.

Critical to RTCA is that the use of TEPs, and the conditions imposed thereby created additional hazards, or (given the extreme circumstances in place) conditions that could not be met; both issues that need to be additionally managed at a time of severe wet weather/cyclonic conditions. Those hazards and/or conditions include:

- Requirements for monitoring at specific and remote locations and at specific points in time that cannot be met when roads are flooded and impassable.
- A significant risk of failure and subsequent downstream damage where the capacity of a mine pit or other disturbed landform is required to hold water when such a feature was never designed to do so.
- A risk of downstream damage from uncontrolled overflows where water storages exceed their design capacity, and controlled discharge is disallowed.
- Cumulatively from the above, a reduced ability to achieve business recovery once the extreme climate event has passed.

Of most concern to RTCA is that the use of the TEP mechanism in emergency circumstances shows no consideration of the significant safety and environmental risks that exist during extreme climatic events.

RTCA is of the view that extreme rainfall/runoff events and cyclones are not a completely unexpected part of operating in Central Queensland. As such, the Environmental Authorities issued by DERM to mining operations need to accommodate these circumstances in a realistic and practicable manner and with due consideration of the escalated human and environmental risks that exist during such events and the local conditions and circumstances inherent at individual mine operations.

The inclusion of clear threshold triggers and agreed and practicable management responses to flooded mine sites Environmental Authorities, will provide clear direction to mine operators that will result in no additional safety risks, a net reduced environmental impact, and contribute to a substantially more efficient business recovery.

Any inquiries in relation to this matter can be addressed to the undersigned.

Yours faithfully

Rory Gordon
General Manager, Health, Safety and Environment

Annexure SJR2

Curriculum Vitae of Stuart John Ritchie

Curriculum Vitae

Stuart John Ritchie

Manager, Environmental Services, Rio Tinto Coal Australia

Date/Place of Birth	[redacted] Australia
Nationality	Australian

ACADEMIC INFORMATION:

Academic Background:

- Master of Environmental Management, 1996, University of Queensland.
- Open Cut Coal Mining Examiners Certificate, 1989, NSW TAFE.
- Bachelor of Engineering (Agriculture), 1983, University of Melbourne.

Professional Affiliations:

- Member, The Environment Institute of Australia

ADDITIONAL INFORMATION:

Personal Recognition

- 2009: Cement Australia internal Excellence Award for Commitment to Partnerships in establishing the trade-exposed status of the cement industry.
- 2001: QCL Group Excellence Award for development and implementation of a company-wide incident reporting system.

Corporate Recognition

- 2010: Cement Australia won the Corporate ClimateSmart Award of the Queensland Premier's ClimateSmart Sustainability Awards.
- 2010: Geocycle (a Cement Australia subsidiary) won the Services Category of the Victorian Premier's Sustainability Awards.

Curriculum Vitae

Stuart John Ritchie

EMPLOYMENT HISTORY:

2011 – current:	**RIO TINTO COAL AUSTRALIA**, 123 Albert St., Brisbane
Title:	**Manager, Environmental Services**
Responsibilities:	• Reporting to the General Manager, Health, Safety Environment, and responsible for leading the strategic direction of environmental management across the RTCA business. • Implementation of the Rio Tinto Environmental Performance Standards across RTCA's Queensland based operations. • Management of RTCA's corporate environmental reporting programmes, and supporting the management of RTCA's performance against internal Rio Tinto environmental performance targets. • Facilitate a common approach to the implementation of Environmental Management Systems (EMS) across RTCA. • Ensuring that all RTCA's operational sites maintain certification of their EMS's to ISO 14001. • Providing leadership to RTCA's QLD sites in the implementation and maintenance of the HSEQ MS through: promoting the HSEQ Management System as the driver for all HSE activities; ensuring that the HSEQ Management System is applied in area of accountability and in alignment with RTCA requirements; and, facilitating the HSEQ Management System requirements with operational General Managers and senior leaders • Management of relationships with external government agencies in Queensland and to some extent in NSW. • Responsible for coordinating a common approach to environmental management across environmental personnel within RTCA. • Management of environmental information for RTCA's public Sustainable Development Report. • Represent RTCA's environmental interests on the relevant committees of the Queensland Resources Council.

Curriculum Vitae

Stuart John Ritchie

2007 – 2011:	**CEMENT AUSTRALIA LIMITED**, 40 McDougall St., Milton

Title: **National Sustainability Manager**

Responsibilities:

- Reporting to the CEO; the provision of policy, strategic and operational support and advice to the Executive and Board of Cement Australia on all matters relating to sustainability and climate change. Cement Australia is the largest cement manufacturer in Australia holding approximately 47% of the Australian cement market.
- Establish a WBCSD and NGERS compliant carbon dioxide reporting system integrated with Cement Australia's business enterprise management system.
- Undertaking both Australian and State Government relations in respect to sustainability and climate change issues.
- Working with the Asia-Pacific Partnership on Clean Development and Climate and the World Business Council for Sustainable Development to train leaders from the Chinese cement industry in establishing and reporting their carbon footprint using the WBCSD's greenhouse gas protocol.
- Developing strategic stakeholder communications plans and managing implementation across a number of regional areas with varying risks and issues
- Administering Cement Australia's industry's Greenhouse Challenge Plus aggregate agreement including member liaison and training.
- Monitor climate change and sustainability trends.

2005 – 2007:	**Secondment to the CEMENT INDUSTRY FEDERATION**, 16 Bougainville St., Manuka, ACT

Title: **Sustainable Development Policy Manager**

Responsibilities:

- Provision of policy, strategic and operational support and advice to the Chief Executive Officer and Board of the CIF on all matters relating to environment and sustainability within the Australian cement industry.
- Manage CIF Sustainability Task Force.
- Administer the industry's Greenhouse Challenge Plus aggregate agreement including member liaison and training.
- Monitor environment and sustainability trends.
- Drafting of the CIF bi-annual sustainability report.
- Draft industry position statements and submissions in relation to State and Federal government policy and legislative proposals

Curriculum Vitae

Stuart John Ritchie

2003 – Current:	**CEMENT AUSTRALIA LIMITED**, 40 McDougall St., Milton

Title: **National Environmental Manager**

Responsibilities:

- Provision of strategic and operational support and advice to the executive management, Board and Board committees, as well as all company operations in relation to environmental management issues.
- Assist company operations perform in accordance with company environmental policies and standards, shareholder and stakeholder requirements and national and state legislative requirements.
- Develop, implement and maintain strategies and systems appropriate to minimising business risk and maximising external reputation.
- To review company environmental policies and standards, interpret shareholder/stakeholder and legislative environmental requirements, and identify and assess environmental trends relevant to the company.
- Assist, advise and coach operational managers to achieve a culture of good environmental management and continuous improvement.
- Monitor company environmental performance and recommendation of remedial action(s) through a program of internal and external audits.
- Principal responsibility for various corporate projects including final closure/remediation of the Townsville cement manufacturing and Calcium limestone mining operations.
- Facilitation and assistance with various Group community engagement projects including site-based liaison groups.

1997 – 2003:	**QCL GROUP OF COMPANIES**, 40 McDougall St., Milton

Title: **Group Environmental Coordinator**

Responsibilities:

- Provision of strategic advice in relation to environmental policies and standards, legal compliance and environmental communications.
- Promotion of environmental awareness within the QCL Group.
- Development and implementation of QCL environmental policy, procedures and programs.
- Monitoring of Group environmental performance and recommendation of remedial action(s) through a program of internal and external audits
- Monitoring of environmental trends through liaison with parent company - Holcim, and various industry and government

bodies.

- Principal responsibility for various corporate projects including final closure/remediation of the Townsville cement manufacturing and Calcium limestone mining operations.
- Provision of specialist technical and communications advices for various corporate projects including alternative fuels projects, corporate acquisitions (Teris), and the Darra closure.
- Facilitation and assistance with various Group community engagement projects including liaison groups at Gladstone and East End.
- Trained Holcim Project Management Approach (PMA) facilitator

Key Achievements:

- Co-drafting/drafting and public release of 1998, 1999 and 2000 public environmental/sustainability reports for the QCL Group.
- Design and implementation of an all-risks, intranet–based incident reporting system subsequently adopted by Holcim companies in Vietnam, Sri Lanka, and Thailand.
- Implementation of a group-wide intranet-based documentation and environmental monitoring data collection system.
- Recipient of 2001 QCL Group Excellence Award for development and implementation of the incident reporting and document/data collection systems developed.
- Instrumental in lobbying for, and development of, the Environmental Protection (Waste Management) Amendment Regulation (No.1) of 2002 that introduced a 'Beneficial Use' approval mechanism, allowing clear legalisation of beneficial re-use of acceptable waste materials in Queensland such as fly ash, solvent-based fuels, and cement kiln dust.
- Managed the remediation and contaminated land issues associated with the successful closure of the Darra plant and Moreton Bay dredging operations.
- Project managed the successful final closure of the NACL Townsville cement plant and Ironstone mining operations and sale of lands.
- Enhancement of environmental awareness through senior management briefings, involvement in various Group conferences, workplace training utilising creative and innovative adult-learning methods including mock trials, community simulations and other educational 'games'.
- Key involvement in community liaison development at operational sites.
- Implementation of domestic greenhouse management response.

1995 – 1997:	**QUEENSLAND CEMENT LIMITED**, 4 Station Ave., Darra
Title:	**Environmental Superintendent**
Responsibilities:	• Management of the environmental and community aspects of QCL's Brisbane operations including the Darra and Bulwer Island plants and dredging operations. Aspects included licensing, compliance, community relations, greenhouse management, training, and reporting. • QCL Group-wide Environmental Management System development and implementation. • Management of the environmental and contamination aspects of the Darra plant closure and cessation of the Moreton Bay dredging operation. • Monitoring, assessment and provision of strategic advice on external legislative and social issues.

1990 - 1995:	**DAMES & MOORE** - Consulting Geotechnical and Environmental Engineers
Title:	**Senior Environmental Engineer**
Areas of Consulting Expertise:	• Hydrology and Water Quality. • Mine Rehabilitation. • Environmental Auditing and Impact Assessment.
Project Experience:	• Final Plan of Operations - Tick Hill Gold Mine located southeast of Mt. Isa, addressing the rehabilitation and decommissioning of waste rock and tailings emplacements, the open pit and infrastructure facilities. • Undertook water quality studies associated with the proposed Eastern Corridor highway route between Brisbane and the Gold Coast. • Conducted mine rehabilitation, hydrological and water quality investigations for the Century Project and port site in northwest Queensland. • Water quality investigations and impact assessment for the Amoco Chemicals PTA plant in Kuantan, Malaysia. • Managed detailed rehabilitation design studies and associated water management design for the proposed Ensham open cut coal mine in central Queensland including SOPs for environmental monitoring. • Rehabilitation earthworks optimisation and landscape design for Callide Coal Mine including design of hydraulic drop structures. • Managed Preliminary Impact Assessment for a proposed comprehensive pig farming area near Segamat in Johor, Malaysia addressing waste treatment, water management, odour, and socio-political impact assessment.

- EMOS preparation for the Yongala Coal Mine in central Queensland.
- Conducted hydrological and water quality investigations for the McArthur River lead, silver and zinc mine located in the Northern Territory.
- Managed environmental assessments covering aspects such as water quality, hydrology, vegetation, soils characterisation and fauna for a number of mining, industrial, agricultural and residential projects, including recreational lake developments. Projects included the Boyne Smelter Expansion, Stuart Oil Shale, Yongala Mine.
- Preliminary and conceptual designs for a series of urban stormwater treatment wetlands for Lake Illawarra, NSW.

1983 - 1990:	**COAL & ALLIED OPERATIONS PTY LTD**, Hunter Valley Mine, Singleton, NSW
Title:	**Environmental Officer**
Duties:	• Provided technical advice and assistance to mine management and engineering staff on environmental, hydrology, water quality and mine rehabilitation issues. • Managed all aspects of environmental monitoring including air, water and noise monitoring. • Responsible for land rehabilitation planning and implementation. Involved in pioneering direct seeding techniques utilising coal rejects media.

PUBLICATIONS:

- Conference Speaker, Informa, Flood Mitigation Strategies in Mining, Brisbane, Aug 2011
- Conference Speaker, IQPC, Water Management in Mining, Brisbane, Aug 2011
- Guest Lecturer, University of Queensland, School of Geography, Planning and Environmental Management, 2009, 2010
- Conference Speaker, Marcus Evans, Sustainability Reporting, May 2008
- Conference Speaker, Terrapin, Queensland Power and Gas, October 2008
- Conference Speaker, IEAust, Gladstone Division, Oct 2008
- Conference Speaker, EIANZ National Conference, Melbourrne, Oct 2008
- Conference Speaker, NSW Minerals Council Sustainable Development Conference, Terrigal, Aug 2007
- Study guide author for Chifley Business School's Environmental Management and Sustainability Unit for the APESMA Technology

Management MBA, 2007

- Coauthor, "Establishment of a Progressive Rehabilitation Programme at Hunter Valley No.1 Mine - Lemington, NSW". Australian Coal Association Seminar, Brisbane 1985.
- Coauthor, "Management of Rehabilitated Mine Lands: Experience at Hunter Valley No.1 Mine". Australian Coal Association Seminar, Sydney 1987.
- Coauthor, "Collecting and Interpreting Land Information for Mine Rehabilitation Planning – The Geologist's Role":
- Author; "Learning from the past to ensure the future: An industry approach to achieving environmental performance"
- Coauthor; " A managed approach to exiting coral dredging operations in Moreton Bay"
- Author; "The QCL Group Environmental Management System", Holderbank ECC2, 1996
- Author; "Cement Kiln Dust Management In Australia", Masters thesis publication, University of Queensland, 1995

Annexure SJR3

Summary of RTCA Queensland Mine Water and Tailings Storage and Discharge Procedure

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Table SJR-1: Summary of RTCA Queensland Mine Water and Tailings Storage and Discharge Procedure

Hail Creek Mine	HCM-10-E10-PLN-001 Water Management Plan	Describes and provides guidance for the management of both surface and groundwater at HCM to ensure compliance with regulatory and Rio Tinto requirements.
	HCM-10-E10-PRO-001 Water Management	Promotes the efficient and sustainable use of water resources and to manage and protect surface water and ground water.
	HCM-10-E10-PRO-003 Polishing Pond Discharge Procedure	Describes the rules and procedures for discharging water from the Polishing Pond to meet environmental regulatory requirements.
	HCM-10-E10-SOP-001 Water Management	Describes the rules and procedures for HCM personnel to operate the site water management system in accordance with the most recent site water balance model and HCM's EA.
	HCM-10-E10-WI-001 Notification	Outlines the requirements for notification to the Department of Environment and Resource Management (DERM) un the event of a release of mine-affected water to the receiving environment or in the event of an exceedence of release limits.
Kestrel Mine	20110317 KC-P_ Water Management Plan	The water Management plan outlines the operating philosophy and strategy, regulatory conditions and reporting, and accountability for compliance
	KC-WI_ Environmental Dam Controlled Release	Describes the rules to ensure that all requirements for a controlled release of water are in compliance with Kestrel's EA.
	KC-SWP _ Environmental Non Conformance	Outlines the procedures, defines responsibilities and authorities to ensure that non-conformances are identified, appropriately handled investigated, reported and corrective and preventive actions implemented.
Clermont Region (Blair Athol)	CRBA-0000-GU-OC-0003_1 Water Management Plan Guideline	Blair Athol Coal (BA) Water Management Plan ensures environmentally safe and effective management of water within and around BA. The plan describes management of water resources which includes both surface and ground water and management of on site and off site impacts.
	BA HSE WI 028	The work instruction ensures that clean, mine affected and raw water management structures located on the Blair Athol Coal leases, including dams, drains, diversions, transfer ponds, culverts and ancillary works, are maintained and operational at all times.
	BA PLAN 0005	This plan provides guidance that personnel might follow if confronted with an emergency that has the potential to cause significant harm to the environment or an adverse impact to the community.
	CRBA-0000-GU-OC-0001_2 TARP for Incident Management	Trigger Action Response Plan for Incident Management
Clermont	CCMP-0000-WP-OC-	The Clermont Mine Water Management Plan collates knowledge

Region (Clermont)	0133_1 Site Water Management Plan	relating to water resources and site water management, which addresses all requirements of the Rio Tinto Standards, and regulatory requirements, and requirements of Clermont Mine's EA.
	CCMP-0000-WP-0141_0 Northern Mine Water Pit Operational Procedure	This operational procedure describes the Northern Mine Water Pit, the transfer of mine water in and out of the Northern Mine Water Pit, any other environments that are affected by the transfer/spillage of water in and out of the Northern Mine Water Pit.
	CCMP-0000-WP-OC-0145_0 Clermont/Blair Athol Water Transfer Pipeline	This procedure outlines the operational controls associated with the Clermont/Blair Athol Water Transfer Pipeline including the pumping out of Clermont Mine Water Storages.
	CRCM-0000-GU-OC-0012_2 TARP for Incident Management	Trigger Action Response Plan for Incident Management
	CCMP-0000-WI-OC-0081_0 Mine Water Dam Discharge	This document sets the rules for release of water form the Clermont site. It also indefinites, risks, equipment and details the process to conduct a release.

Annexure SJR4

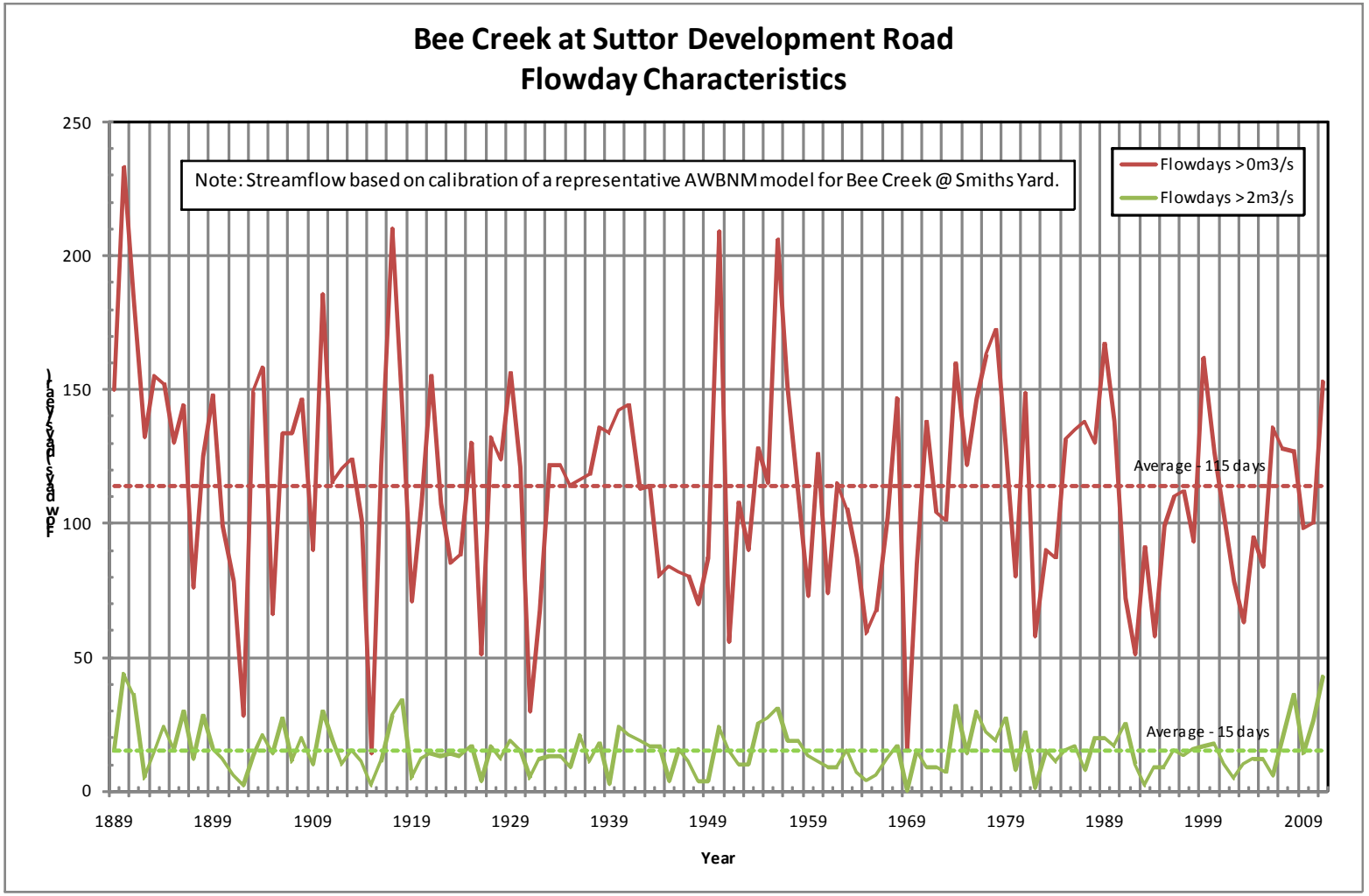
Conditions of EA M2295 and EA MIN100913309

Index to Annexure 4

Ref.	Date	Document
4.1	N/A	Figure SR-1: Modelled Streamflows Predicted for EA M2295 and EA MIN100913309
4.2	N/A	Table SR-2: Extract of Relevant Conditions from EA M2295 and EA MIN100913309
4.3	4 March 2004	EA M2295
4.4	27 November 2009	EA MIN100913309

Annexure Item 4.1

Figure SJR-1: Modelled Streamflows Predicted for EA M2295 and EA MIN100913309



Annexure Item 4.2

Table SJR-2: Extract of Relevant Conditions from EA M2295 and EA MIN100913309

<table>
<tr><th>Issue E</th><th>A M2295</th><th>EA MIN100913309</th></tr>
<tr><td rowspan="2">Flow restriction</td><td>C4 Mine affected water must only be released to Middle Creek. This release must only occur when Middle Creek is flowing.</td><td>W8 Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table W4 for the contaminant release point specified in Table W1.

Table W4
<table>
<tr><th>Receiving water description</th><th>Release Point</th><th>Gauging station description</th><th>Northing (GDA94)</th><th>Easting (GDA94)</th><th>Minimum Flow in Receiving Water Required for a Release Event</th><th>Flow recording Frequency</th></tr>
<tr><td>Middle Creek</td><td>RP 1
Polishing Point</td><td>Bee Creek Monitoring Station</td><td>7615596</td><td>650715</td><td>>or=2.0m³/sec</td><td>Continuous (minimum daily)</td></tr>
</table></td></tr>
<tr><td>No limit on proportion of discharge according to base flow.</td><td>W9 Contaminant release flow rate must not exceed twenty percent (20 %) of receiving water flow rate.</td></tr>
<tr><td>Water quality</td><td>No comparison drawn in Statement.</td><td>No comparison drawn in Statement.</td></tr>
<tr><td>Monitoring</td><td>No requirements.</td><td>W5 If quality characteristics of the release exceed any of the trigger levels specified in Table W3 during a release event, the environmental authority holder must compare the down stream results in the receiving waters to the trigger values specified in Table W3 and:

1. where the trigger values are not exceeded then no action is to be taken; or</td></tr>
</table>

<table>
<tr>
<td></td>
<td></td>
<td>2. where the down stream results exceed the trigger values specified Table W3 for any quality characteristic, compare the results of the down stream site to the data from background monitoring sites and:

(a) if the result is less than the background monitoring site data, then no action is to be taken; or

(b) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

(i) details of the investigations carried out; and

(ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W5 (2)(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.</td>
</tr>
<tr>
<td></td>
<td>(C1) The Plan of Operations must include water management strategies which, as a minimum must address the following:

a) a detailed water monitoring program including techniques, locations, frequencies parameters being monitored; and

b) a program to investigate potential impacts of mine development on groundwater levels; and

c) sediment and erosion control techniques, and

d) processes for the capture of runoff and mine affected waters; and</td>
<td>W4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table W1 for each quality characteristic and at the frequency specified in Table W2 and Table W3.

Table W2 (details extracted)

<table>
<tr>
<th>Quality Characteristic</th>
<th>Interim Release Limits for all mines (limits to apply from the date of Issue)</th>
<th>Future Release limits from 31 Dec 2011

Note: These future limits will apply from a yet to be negotiated date using alternative numbers that will be derived from the information gathered by any combination of the following:
(1) The results of near field monitoring.
(2) Any studies or investigations carried out in accordance with recommendations 2 & 3 of the Cumulative impact Study on water quality in the</th>
</tr>
</table>
</td>
</tr>
</table>

	e) details of planned mine water releases; and f) details of a research program into the water-related impacts of creek diversions on downstream riparian ecosystems; and g) an emergency plan for spillage to surface waters or unplanned discharge; and h) staff training program for proper management of the water management system and handling of hazardous materials; and i) methods of performance review.	<table><tr><td></td><td></td><td>***Fitzroy River Basin.*** ***(3) Any review of the Qld Water Quality Guidelines.*** ***(4) Other relevant information*** ***Note: This information should be available for the end of 2011 if not before and when it becomes available limits will be determined for each mine site based on the environmental values to be protected and in accordance with criteria below***</td></tr><tr><td>***Electrical conductivity (µS/cm)***</td><td>***1500***</td><td>*Future limit to be determined to achieve aquatic ecosystem protection (no drinking water value):* *An end-of-pipe limit to achieve in the range of 0 to 1000 EC in the receiving waters – for mines in the upper catchments must have natural flow i.e. the 20th percentile flow trigger.*</td></tr><tr><td>***pH (pH Unit)***</td><td>***6.5 (minimum)*** ***9.0 (maximum)***</td><td>*6.5 (minimum)* *9.0 (maximum)*</td></tr></table> **Table W3** (details extracted) Water quality characteristic: Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury (inorganic), Nickel, Zinc, Molybdenum, Selenium, Silver, Uranium, Vanadium, Nitrate, Petroleum hydrocarbons (C6-C9) and Petroleum hydrocarbons (C10-C36). Trigger Level: [various depending on water quality characteristic] Comment on Trigger: trigger levels based on for aquatic ecosystem protection with regard had either to the degree to which the receiving environment is already disturbed or on limitations of analytical equipment. Frequency: Commencement of release and thereafter weekly during release
	No requirements.	**W20** A REMP must be developed and implemented by 27 February 2010 to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst

		contaminants are being discharged fro the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority. For the purposes of the REMP, the receiving environment is the waters of the Bee Creek catchment and connected waterways within twelve (12) kilometres downstream of the release.
	No requirements.	**W21** The REMP must address (but not necessarily be limited to) the following: a) Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality); b) Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant *to the Environmental Protection (Water) Policy 1997)*; c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed; d) Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels Indicating adverse environmental impacts during the REMP; e) Monitoring for any potential adverse environmental impacts caused by the release; f) Monitoring of stream flow and hydrology; g) Monitoring of toxicants should consider the indicators specified in Table W3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems; h) Monitoring of physical chemical parameters as a minimum those specified in Table W2 (in addition to dissolved oxygen saturation and temperature);

		i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids In sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of *AS56671 Guidance on Sampling of Bottom Sediments)* for permanent, semi-permanent water holes and water storages; j) The locations of monitoring points (including the locations specified in Table W8 which are background and downstream impacted sites for each release point); k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines 2006*. For ephemeral streams, this should Include periods of flow irrespective of mine or other discharges; l) Specify sampling and analysis methods and quality assurance and control; m) Any historical datasets to be relied upon; n) Description of the statistical basis on which conclusions are drawn; and o) Any spatial and temporal controls to exclude potential confounding factors.
	No requirements.	**W22** A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with W20 must be prepared and submitted in writing to the administering authority by 1 October 2011. This should include an assessment of background water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Annexure Item 4.3

EA M2295

Queensland Government
Environmental Protection Agency
Queensland **Parks and Wildlife Service**

Mackay District Office
PO Box 632, Mackay Qld 4740
Tel: (07) 4944 7812 Fax: (07) 4944 7811
www.epa.qld.gov.au ABN: 87221158786

Environmental Authority No. M2295 (mining activities)

Section 155 *Environmental Protection Act 1994*

This environmental authority is granted under the Environmental Protection Act 1994 *and includes conditions to minimise environmental harm caused, or likely to be caused, by the authorised mining activities. An environmental authority (mining activities) may be for mining activities authorised (under the* Mineral Resources Act 1989*) to occur under one of the following mining tenements: a prospecting permit; mining claim; exploration permit; mineral development licence; or mining lease. In general, a mining activity means: prospecting, exploring, mining; or processing minerals; remediation; rehabilitation; and includes facilitation and supporting activities and any action taken to prevent environmental harm.*

Under the provisions of the *Environmental Protection Act 1994* this environmental authority is issued to:

Queensland Coal Pty Ltd	Principal Holder
Marubeni Coal Pty Ltd	Joint Holder
Sumisho Coal Development Queensland Pty Ltd	Joint Holder

C/- Queensland Coal Pty Ltd
GPO Box 391
Brisbane QLD 4001

in respect of carrying out activities as part of the following mining project:

Type of environmental authority (mining activities)	Authorised mining tenements	Location
Mining Lease	**ML 4738**	**Approx. 85 west of Mackay, 35 km north-west of Nebo, QLD**

This environmental authority is subject to the conditions set out in the attached schedules.

The anniversary date of this environmental authority is 24 September.

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

This environmental authority takes effect from 5 March 2004.

[redacted]

Signed

5/3/04
Date

Ms Ricci Churchill
Acting District Manager
Delegate of Administering Authority
Environmental Protection Act 1994

Note: This environmental authority document is not proof of the current status of the environmental authority. The current status of the environmental authority may be ascertained by contacting the Environmental Protection Agency.

Schedule of conditions

This environmental authority consists of the following schedules of conditions relevant to various issues:

- Schedule A - General conditions
- Schedule B - Air Quality
- Schedule C - Water Management
- Schedule D - Land Management
- Schedule E - Noise and Vibration
- Schedule F - Waste Management
- Schedule G - Nature Conservation
- Schedule H - Cultural Heritage
- Schedule I - Community
- Schedule J - Continuous Improvement - no conditions prescribed in this schedule
- Schedule K - Monitoring and Reporting
- Schedule L - Staff Training- no conditions prescribed in this schedule
- Schedule M - Environmental Auditing- no conditions prescribed in this schedule

Schedule A - General conditions

(A1) The conditions of this environmental authority are in force until a surrender of the authority is accepted pursuant to the *Environmental Protection Act 1994*.

(A2) The environmental authority holder must give the administering authority a financial assurance in the amount and form and at a time required by the administering authority.

(A3) The environmental authority holder must develop and implement during the continuation of this authority, and prior to the commencement of construction activities, a program to ensure that all employees and contractors on site are aware of and comply with the relevant requirements of this authority.

END OF CONDITIONS FOR SCHEDULE A

Schedule B - Air Quality

(B1) Dust monitoring must be undertaken on a monthly basis for the first 12 month period after the commencement date of this environmental authority and thereafter at intervals not exceeding 5 years at the monitoring locations detailed in the Plan of Operations.

(B2) The environmental authority holder will respond within 28 days to complaints with a dust monitoring campaign, that demonstrate that concentrations do not exceed 150 $\mu g/m^3$ (PM_{10}, 24 hour average) at the lease boundary monitoring points.

(B3) Dust mitigation measures that detail how the risk of dust exceedances will be reduced must be detailed in the Plan of Operations.

END OF CONDITIONS FOR SCHEDULE B

Schedule C - Water Management

(C1) The Plan of Operations must include water management strategies which, as a minimum must address the following:

(a) a detailed water monitoring program including techniques, locations, frequencies, parameters being monitored; and
(b) a program to investigate potential impacts of mine development on groundwater levels; and
(c) sediment and erosion control techniques, and
(d) processes for the capture of runoff and mine affected waters; and
(e) details of planned mine water releases; and
(f) details of a research program into the water-related impacts of creek diversions on downstream riparian ecosystems; and
(g) an emergency plan for spillage to surface waters or unplanned discharge; and
(h) staff training program for proper management of the water management system and handling of hazardous materials; and
(i) methods of performance review

(C2) Any non-seasonal decreases in groundwater levels greater than 2.5 meters from the previous 6 monthly monitoring period, not resulting from the pumping of licensed bores, must be reported immediately in writing to the administering authority.

(C3) All process and runoff water from disturbed areas must be captured and managed on site.

(C4) Mine affected water must only be released to Middle Creek. This release must only occur when Middle Creek is flowing.

(C5) The discharge of all mine affected water must be demonstrated to comply with the following criteria:

Parameter	Type (instantaneous)	Criteria	Location
pH	Range	6.4 - 9.5 or background *1	Suttor Development Road Bridge at Bee Creek
EC	Maximum	1,500 µS/cm	Suttor Development Road Bridge at Bee Creek
Sulphate *2	Maximum	1,000 mg/L	Suttor Development Road Bridge at Bee Creek

*1 *Background is the value for pH at Upper Hail Creek or Upper Bee Creek at the time of the event*

*2 *The calculation of SO4 concentration must be based on the most recent previous laboratory test results for water quality monitoring*

(C6) The water quality of treated sewerage effluent used for dust suppression or irrigation must be demonstrated to comply with the following criteria:

Parameter	Type	Criteria	Monitoring Frequency
5-day Biological oxygen demand	Maximum	20 mg/L	Every 3 months
Suspended solids	Maximum	30 mg/L	Every 3 months
pH	Maximum	6.5 - 8.0	Every 3 months
Free residual chlorine	Maximum	1 mg/L	Every 3 months
Faecal coliforms	Maximum	1000 thermotolerant coliforms/100 ml	Every 3 months

(C7) All treated sewerage effluent used for dust suppression or irrigation must be contained on site.

(C8) All water retention dams must be constructed to the following design criteria:

Retention Dam	Design Storm	Target Particle Size for Settlement
Polishing Pond	1 in 10 ARI *(Average Recurrence Interval)*	0.02 mm (medium silt)
All other retention dams	1 in 10 ARI	0.06 mm (coarse silt)

(C9) An investigation into final void water quality must be completed prior to mine decommissioning. Details must be provided in the Plan of Operations.

END OF CONDITIONS FOR SCHEDULE C

Schedule D - Land Management

(D1) Standard Operating Procedures for environmental management during and after exploration must be prepared before commencement of, and implemented during operations.

Rehabilitation

(D2) Disturbed land must be progressively rehabilitated. Rehabilitation must commence no later than 18 months after areas greater than 5 hectares are deemed to be excluded from future mining development. These areas must be detailed in the Plan of Operations.

(D3) Investigations and progressive reporting must be undertaken on:
(a) landform design criteria including slope length, angles and drainage structures and drainage patterns; and
(b) landform stability criteria; and
(c) appropriate rehabilitation monitoring and maintenance requirements; and
(d) rehabilitation success criteria;
(e) revegetation on-site using native trees, grasses and shrubs; and
(f) impacts of creek diversions on species of conservation significance in downstream riparian ecosystems

within 5 years of overburden removal commencing.

(D4) The maximum slope angle of rehabilitated disturbed land will not exceed 17% and the maximum slope lengths between graded banks will conform to the following criteria:

Slope	Maximum distance between graded banks
> 0 - 5%	150 m
≥ 5 - 10%	100 m
≥ 10 - 17%	50 m

(D5) The construction of any drainage structures on disturbed land will conform to the following design criteria:

Drainage Structure	Design Storm	Grade of Drain
Graded banks on < 10% slopes	5 year ARI	0.5 - 1%
Graded banks on ≥ 10% slopes	20 year ARI	0.5 - 1%
Collector drains on < 10% slopes	20 year ARI	0.5 - 1%
Collector drains on ≥ 10% slopes	20 year ARI	>1%

(D6) An annual overburden and rejects monitoring program must be developed to test for EC, pH, NAPP and ESP in order to identify potential non-benign material.

(D7) All disturbed areas must be rehabilitated to a final land use consisting of habitat for native flora and fauna.

Coal Washery Wastes

(D8) A Co-disposal Dump Design Plan must be developed, detailed in the Plan of Operations and implemented during the continuation of the environmental authority. The Co-disposal Dump Design Plan must include as a minimum:
(a) control strategies for assessment and management of the codisposal wastes; and
(b) construction design of the co-disposal dump including the nominated area in hectares to be disturbed by the dump; and
(c) staged landform design specifications including slope lengths, angles, drainage structures and patterns; and
(d) final landform design specifications.

(D9) Coal washery wastes and spoil with ESP greater than 20% will be covered with at least 1 m of benign material prior to rehabilitation commencing.

(D10) A perimeter bund must be maintained around the area in which coal washery wastes are to be deposited. Coal washery wastes are not to be deposited in any other location.

Topsoil

(D11) A topsoil inventory which identifies the topsoil requirements for the project and the availability of suitable topsoil on site, must be detailed in the Plan of Operations.

(D12) Topsoil must be stripped ahead of any areas where the topsoil resource would otherwise be lost or permanently destroyed and stored if not able to be immediately used.

(D13) Topsoil that is stockpiled for greater than six months must be managed to minimise erosion.

Contaminated Land

(D14) A register of all chemicals stored on site must be developed and maintained.

(D15) The storage and handling of flammable and combustible liquids must be in accordance with AS 1940 - Storage and Handling of Flammable and Combustible Liquids.

END OF CONDITIONS FOR SCHEDULE D

Schedule E - Noise and Vibration

(E1) Noise monitoring must be carried out in accordance with the requirements of the *Environmental Protection (Noise) Policy 1997* at the commencement of the operational phase of the mining project.

(E2) All blasting must be restricted to daylight hours.

(E3) Noise monitoring locations must be detailed in the Plan of Operations.

END OF CONDITIONS FOR SCHEDULE E

Schedule F - Waste Management

No conditions prescribed for this schedule.

END OF CONDITIONS FOR SCHEDULE F

Schedule G - Nature Conservation

(G1) A Weed Management Plan must be developed and implemented during the continuation of this authority, and prior to the commencement of construction activities. The Weed Management Plan must describe how the weeds are to be managed in accordance with the *Rural Lands Protection Act 1985.*

(G2) Management Strategies for each of *Eucalyptus raveretiana (*Black Ironbox), *Chalinobolobus pictatus* (Little Pied Bat) and *Denisonia maculata (*Ornamental Snake), must be developed and implemented prior to any construction activities; and during the continuation of the authority and must detail:
(a) the current distribution and population structure of the species; and
(b) the means by which threatening mining activities will be minimised; and
(c) strategies to monitor and maintain the long term survival of species within the mining lease.

(G3) On an annual basis, areas of vegetation within the project to be cleared, (including Endangered Remnant Ecosystem 11.5.9.), must be identified and detailed with maps, in the Plan of Operations.

(G4) The Plan of Operations must include strategies to manage the impact of mining on Endangered Remnant Ecosystem 11.5.9. The strategies must be developed and implemented during the continuation of this authority, and prior to the commencement of construction activities.

END OF CONDITIONS FOR SCHEDULE G

Schedule H - Cultural Heritage

(H1) Cultural heritage matters must be managed in accordance with the site Cultural Heritage Management Plan.

(H2) The site Cultural Heritage Management Plan must map cultural heritage areas that have access restrictions.

(H3) Workplace procedures that respond to the discovery of previously unrecorded cultural, heritage or indigenous sites located during mining operations must be developed and implemented during the continuation of this authority and prior to the commencement of construction activities.

END OF CONDITIONS FOR SCHEDULE H

Schedule I - Community

(I1) All complaints received, must be registered and any relevant nuisance complaint to be reported to the administering authority, investigated, and any necessary remedial actions taken and reported to the administering authority and the complainant.

END OF CONDITIONS FOR SCHEDULE I

Schedule J - Continuous Improvement

No conditions prescribed for this schedule.

END OF CONDITIONS FOR SCHEDULE J

Schedule K - Monitoring and reporting

(K1) All monitoring and research data , collected for the purposes of demonstrating compliance with this environmental authority, must be maintained and catalogued in a central location such that it is accessible on request by the administering authority.

(K2) A monitoring program that includes monitoring locations, frequency, parameters, monitoring techniques and quality assurance protocols, must be detailed in the Plan of Operations.

END OF CONDITIONS FOR SCHEDULE K

Schedule L - Staff Training

No conditions prescribed for this schedule.

END OF CONDITIONS FOR SCHEDULE L

Schedule M - Environmental Auditing

No conditions prescribed for this schedule.

END OF CONDITIONS FOR SCHEDULE M

END OF ENVIRONMENTAL AUTHORITY

Definitions

"Administering Authority" means the Environmental Protection Agency or its successor.

"Anniversary day" means the anniversary day the authority is issued, whether or not it has been amended or transferred.

"ARI" means the average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.

"Contaminated Land" has the meaning provided in schedule 3 of the *Environmental Protection Act 1994*.

"Endangered Remnant Ecosystem 11.5.9" means Regional Ecosystem 11.5.9 defined in Sattler, P. and Williams, R. (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*. pp 11/29. Environmental Protection Agency, Queensland Government, Australia.

"Environment" has the meaning provided in section 8 of the *Environmental Protection Act 1994.*

"Environmental Authority (mining lease)" has a meaning provided in section 148(e) of the *Environmental Protection Act*.

"ESP" means Exchangeable Sodium Percentage

"Financial Assurance" means a security deposit, either cash or a bank guarantee, that is held by the administering authority to cover the:
(a) potential costs to rehabilitate areas disturbed by mining activities; or
(a) costs or expenses, or likely costs or expenses, mentioned in section 367 of the *Environmental Protection Act 1994*.

"Mine" has the meaning defined in the *Mineral Resources Act 1989*.

"NAPP" means Net Acid Producing Potential

"Plan of Operations" means a planning document required under the *Environmental Protection Act 1994* for a mining lease project.

"Relevant nuisance complaint" has the meaning provided in section 6D of the *Environmental Protection Regulation 1998*.

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RTCA BR LEGAL REC'D
16 MAR 2010

Notice of Decision – Amendment Application

This notice is issued by the Department of Environment and Resource Management (the department) to advise of a statutory decision made under section 299 of the Environmental Protection Act 1994.

Mr Rob Light
Director
Rio Tinto Coal Australia
GPO Box 391
BRISBANE QLD 4001

C/c Mining Registrar
Department of Employment, Economic Development and Innovation
PO Box 245
EMERALD QLD 4720

Martine Goldner
Environmental Specialist
Hail Creek Mine
PO Box 3097
NORTH MACKAY QLD 4740

Our Reference: 173053

Dear Mr Light

Re: Amendment of environmental authority MIN100913309 – Hail Creek Mine

The Department of Environment and Resource Management (the department) refers to the environmental authority amendment requested by Queensland Coal Pty Ltd for Hail Creek Mine on 15 January 2010.

Pursuant to the *Notice of Correction* forwarded to your office on 17 February 2010, please find attached the final amended environmental authority.

This *Notice of Decision* and the attached amended environmental authority constitute the permit documentation. Included with this Notice is advice on review and appeal processes available to you. Should you wish to seek a review or appeal, the department advises that you seek independent advice before taking such action.

Queensland Government

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Notice of Decision – Amendment Application

If you require more information please contact Vanessa Boettcher, the Project Manager, on telephone number (07) 4944 7816.

Yours sincerely

[redacted] 9/3/10

Michael Rodgerson
Manager (Environmental Services – Mining)

Enquiries:
Environmental Services - Mining
Central West Region - Mackay
30 Tennyson St
PO Box 623
MACKAY QLD 4740
Ph: (07) 4944 7812
Fax: (07) 4944 7836

Attached:
EA number MIN100913309
Review and appeal guidelines.

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Environmental Authority (Mining Activities) Non Code Compliant Level 1 Mining Project
Permit[1] Number: MIN100913309 – Hail Creek Mine

Section 299 — *Environmental Protection Act 1994*

Takes Effect From: *3 March 2010*

Details

Permit Holder(s)	Name	Address
Principal Holder	Queensland Coal Pty Ltd	AMP Place, Level 19, 10 Eagle Street, Brisbane 4000
Joint Holder	Marubeni Coal Pty Ltd	Level 7, Comalco Place, 12 Creek Street Brisbane 4000
Joint Holder	Sumisho Coal Development Queensland Pty Ltd	Level 7, Comalco Place, 12 Creek Street Brisbane 4000
Joint Holder	Nippon Steel Australia Pty Ltd	Level 7, Comalco Place, 12 Creek Street Brisbane 4000

Activity(s)	Location(s)
Mining Lease	ML4738

The anniversary date of the environmental authority is **24 September.**

The environmental authority is subject to the attached conditions of approval.

[redacted]
Michael Rodgerson
Delegate
Environmental Protection Act 1994
3 March 2010

[1] Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation administered by the Department of Environment and Resource Management.

Queensland Government

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Departmental Interest: General

G1 The conditions of this environmental authority are in force until a surrender of the authority is accepted pursuant to the *Environmental Protection Act 1994.*

G2 The environmental authority holder must give the administering authority a financial assurance in the amount and form and at a time required by the administering authority.

G3 The environmental authority holder must develop and implement during the continuation of this authority, and prior to the commencement of construction activities, a program to ensure that all employees and contractors on site are aware of and comply with the relevant requirements of this authority.

Departmental Interest: Air

A1 Dust monitoring must be undertaken on a monthly basis for the first twelve (12) month period after the commencement date of this environmental authority and thereafter at intervals not exceeding five (5) years at the monitoring locations detailed in the Plan of Operations

A2 The environmental authority holder will respond within twenty-eight (28) days to complaints with a dust monitoring campaign, that demonstrate that concentrations do not exceed one hundred and fifty (150) micrograms per cubic metre ($\mu g/m^3$) (PM_{10}, twenty-four (24) hour average) at the lease boundary monitoring points

A3 Dust mitigation measures that detail how the risk of dust exceedances will be reduced must be detailed in the Plan of Operations

Departmental Interest: Land

L1 Standard Operating Procedures for environmental management during and after exploration must be prepared before commencement of, and implemented during operations.

Rehabilitation

L2 Disturbed land must be progressively rehabilitated. Rehabilitation must commence no later than eighteen (18) months after areas greater than five (5) hectares are deemed to be excluded from future mining development. These areas must be detailed in the Plan of Operations.

L3 Investigations and progressive reporting must be undertaken within five (5) years of commencement of overburden removal on:

(a) landform design criteria including slope length, angles and drainage structures and drainage patterns; and
(b) landform stability criteria; and
(c) appropriate rehabilitation monitoring and maintenance requirements; and
(d) rehabilitation success criteria;
(e) revegetation on-site using native trees, grasses and shrubs; and
(f) impacts of creek diversions on species of conservation significance in downstream riparian ecosystems.

L4 The maximum slope angle of rehabilitated disturbed land will not exceed seventeen percent (17%) and the maximum slope lengths between graded banks will conform to the criteria in Table L1.

Table L1 (Design Criteria for Rehabilitated Disturbed Land)

Slope	Maximum distance between graded banks
> 0 - 5%	150 m
≥ 5 - 10%	100 m
≥ 10 - 17%	50 m

L5 The construction of any drainage structures on disturbed land will conform to the design criteria in Table L2.

Table L2 (Design Criteria for Drainage Structures)

Drainage Structure	Design Storm	Grade of Drain
Graded banks on < 10% slopes	5 year ARI	0.5 - 1%
Graded banks on ≥ 10% slopes	20 year ARI	0.5 - 1%
Collector drains on < 10% slopes	20 year ARI	0.5 - 1%
Collector drains on ≥ 10% slopes	20 year ARI	>1%

L6 An annual overburden and rejects monitoring program must be developed to test for electrical conductivity (EC), pH, Net Acid Producing Potential (NAPP) and Exchangeable Sodium Percentage (ESP) in order to identify potential non-benign material.

L7 All disturbed areas must be rehabilitated to a final land use consisting of habitat for native flora and fauna.

Coal Washery Wastes

L8 A Co-disposal Dump Design Plan must be developed, detailed in the Plan of Operations and implemented during the continuation of the environmental authority. The Co-disposal Dump Design Plan must include as a minimum:

(a) control strategies for assessment and management of the codisposal wastes; and
(b) construction design of the co-disposal dump including the nominated area in hectares to be disturbed by the dump; and
(c) staged landform design specifications including slope lengths, angles, drainage structures and patterns; and
(d) final landform design specifications.

L9 Coal washery wastes and spoil with ESP greater than twenty percent (20%) will be covered with at least one (1) metre of benign material prior to rehabilitation commencing.

L10 A perimeter bund must be maintained around the area in which coal washery wastes are to be deposited. Coal washery wastes are not to be deposited in any other location.

Topsoil

L11 A topsoil inventory which identifies the topsoil requirements for the project and the availability of suitable topsoil on site, must be detailed in the Plan of Operations.

L12 Topsoil must be stripped ahead of any areas where the topsoil resource would otherwise be lost or permanently destroyed and stored if not able to be immediately used.

L13 Topsoil that is stockpiled for greater than six (6) months must be managed to minimise erosion.

Contaminated Land

L14 A register of all chemicals stored on site must be developed and maintained.

L15 The storage and handling of flammable and combustible liquids must be in accordance with *AS 1940 - Storage and Handling of Flammable and Combustible Liquids.*

Departmental Interest: Noise

N1 Noise monitoring must be carried out in accordance with the requirements of the *Environmental Protection (Noise) Policy 1997* at the commencement of the operational phase of the mining project.

N2 All blasting must be restricted to daylight hours.

N3 Noise monitoring locations must be detailed in the Plan of Operations.

Departmental Interest: Nature Conservation

NC1 A Weed Management Plan must be developed and implemented during the continuation of this authority, and prior to the commencement of construction activities. The Weed Management Plan must describe how the weeds are to be managed in accordance with the *Rural Lands Protection Act 1985.*

NC2 Management Strategies for each of *Eucalyptus raveretiana (*Black Ironbox), *Chalinobolobus pictatus* (Little Pied Bat) and *Denisonia maculata (*Ornamental Snake), must be developed and implemented prior to any construction activities; and during the continuation of the authority and must detail:

(a) the current distribution and population structure of the species; and
(b) the means by which threatening mining activities will be minimised; and
(c) strategies to monitor and maintain the long term survival of species within the mining lease

NC3 On an annual basis, areas of vegetation within the project to be cleared, (including Endangered Remnant Ecosystem 11.9.5), must be identified and detailed with maps, in the Plan of Operations.

NC4 The Plan of Operations must include strategies to manage the impact of mining on Endangered Remnant Ecosystem 11.9.5. The strategies must be developed and implemented during the continuation of this authority, and prior to the commencement of construction activities.

Departmental Interest: Cultural Heritage

CH1 Cultural heritage matters must be managed in accordance with the site Cultural Heritage Management Plan

CH2 The site Cultural Heritage Management Plan must map cultural heritage areas that have access restrictions.

CH3 Workplace procedures that respond to the discovery of previously unrecorded cultural, heritage or indigenous sites located during mining operations must be developed and implemented during the continuation of this authority and prior to the commencement of construction activities.

Departmental Interest: Community

C1 All complaints received, must be registered and any relevant nuisance complaint to be reported to the administering authority, investigated, and any necessary remedial actions taken and reported to the administering authority and the complainant

Departmental Interest: Monitoring and Reporting

M1 All monitoring and research data, collected for the purposes of demonstrating compliance with this environmental authority, must be maintained and catalogued in a central location such that it is accessible on request by the administering authority.

M2 A monitoring program that includes monitoring locations, frequency, parameters, monitoring techniques and quality assurance protocols, must be detailed in the Plan of Operations.

Departmental Interest: Water

Contaminant Release

W1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under the conditions of this environmental authority.

W2 The release of contaminants to waters must only occur from the release points specified in Table W1 and depicted in Figure 1 attached to this environmental authority.

Table W1 (Contaminant Release Points, Sources and Receiving Waters)

Release Point (RP)	Northing (AGD84)	Easting (AGD84)	Contaminant Source and Location	Monitoring Point	Receiving waters description
RP 1 (Polishing Pond)	7620504	643937	Water impounded in the Hail Creek mine water storage system. Including water used in processing, dewatering from pits and rainfall entering catchment	Pontoon on southern side of dam, next to spillway	Middle Creek, a small tributary feeding into Absent Creek then Hail Creek, then Bee Creek (~13 000ha catchment)

W3 The release of contaminants to waters must not exceed the release limits stated in Table W2 when measured at the monitoring points specified in Table W1 for each quality characteristic.

Table W2 (Contaminant Release Limits)

Quality Characteristic	Interim Release Limits for all mines (limits to apply from the date of issue)	Future Release Limits from 31 DEC 2011 *Note: These future limits will apply from a yet to be negotiated date using alternative numbers that will be derived from the information gathered by any combination of the following:* *(1) the results of near field monitoring,* *(2) any studies or investigations carried out in accordance with recommendations 2 & 3 of the Cumulative Impact Study on water quality in the Fitzroy River Basin.* *(3) any review of the QLD Water Quality Guidelines.* *(4) other relevant information* *Note: This information should be available by the end of 2011 if not before and when it becomes available limits will be determined for each mine site based on the environmental values to be protected and in accordance with criteria below*	Monitoring frequency	Comment
Electrical conductivity (uS/cm)	1500	Future limit to be determined to achieve aquatic ecosystem protection (no drinking water value): An end-of-pipe limit to achieve in the range 0 to 1000 EC in the receiving waters - for mines in the upper catchments must have natural flow i.e. the 20th percentile flow trigger.	Daily during release (first sample must be taken within 2 hours of the commencement of release)	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	6.5 (minimum) 9.0 (maximum)	Daily during release (first sample must be taken within 2 hours of the commencement of release)	
Turbidity (NTU)	NA*	Turbidity data will be collected, with an appropriate local trigger value set as the release limit, to be agreed with DERM and applied from the end of 2011.	Daily during release (first sample must be taken within 2 hours of the commencement of release)	Turbidity is required to assess ecosystems impacts and can provide instantaneous results.
Suspended Solids (mg/L)	NA	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment	Daily during release (first sample must be taken within 2 hours of the commencement of release)	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	1000 (Maximum)	1000 (Maximum) (Protection of irrigation environmental value)	Daily during release (first sample must be taken within 2 hours of the commencement of release)	

*Note: NA – not available, * local trigger values need to be developed*

W4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table W1 for each quality characteristic and at the frequency specified in Table W2 and Table W3.

Table W3 (Release Contaminant Trigger Investigation Levels)

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Aluminium	100	*For aquatic ecosystem protection, based on LOR for ICPMS*	Commencement of release and thereafter weekly during release
Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Mercury (inorganic)	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Selenium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Silver	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Uranium	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Vanadium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		

Notes:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

2. The list of quality characteristics required to be monitored as per Table W3 will be reviewed once the results of the monitoring data is gathered for the interim period until 31 December 2011 or an earlier date if the data is, or becomes, available and if its is determined that there is no need to monitor for certain individual quality characteristics these can be removed from Table W3.

3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).

4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

W5 If quality characteristics of the release exceed any of the trigger levels specified in Table W3 during a release event, the environmental authority holder must compare the down stream results in the receiving waters to the trigger values specified in Table W3 and:

1. where the trigger values are not exceeded then no action is to be taken; or
2. where the down stream results exceed the trigger values specified Table W3 for any quality characteristic, compare the results of the down stream site to the data from background monitoring sites and;
   (a) if the result is less than the background monitoring site data, then no action is to be taken; or
   (b) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
      (i) details of the investigations carried out; and
      (ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W5 (2)(b)(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

W6 If an exceedance in accordance with condition W5 2(b)(ii) is identified, the holder of the authority must notify the administering authority within fourteen (14) days of receiving the result.

Contaminant Release Events

W7 The holder must install, operate and maintain a stream flow gauging station to determine and record stream flows at the locations upstream of each Release Point as specified in Table W4 for any receiving water into which a release occurs.

W8 Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table W4 for the contaminant release point specified in Table W1.

Table 4 (Contaminant Release During Flow Events)

Receiving water description	Release Point	Gauging station description	Northing (GDA94)	Easting (GDA94)	Minimum Flow in Receiving Water Required for a Release Event	Flow recording Frequency
Middle Creek	RP 1 Polishing Pont	Bee Creek Monitoring Station	7615596	650715	> or = 2.0m^3/sec	Continuous (minimum daily)

W9 Contaminant release flow rate must not exceed **twenty percent (20%)** of receiving water flow rate.

W10 The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in Table W1.

W11 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Notification of Release Event

W12 The authority holder must notify the administering authority as soon as practicable (no later than six (6) hours of having commenced releasing mine affected water to the receiving environment). Notification must include the submission of written verification to the administering authority of the following information:

(a) release commencement date/time;

(b) expected release cessation date/time;

(c) release point/s;

(d) release volume (estimated);

(e) receiving water/s including the natural flow rate; and

(f) any details (including available data) regarding likely impacts on the receiving water(s).

Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local administering authority via email or facsimile.

W13 The authority holder must notify the administering authority as soon as practicable, (nominally within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under condition **W12** and within twenty-eight (28) days provide the following information in writing:

(a) release cessation date/time;

(b) natural flow volume in receiving water;

(c) volume of water released;

(d) details regarding the compliance of the release with the conditions of Department Interest: Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);

(e) all in-situ water quality monitoring results; and

(f) any other matters pertinent to the water release event.

Notification of Release Event Exceedance

W14 If the release limits defined in Table W2 are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.

W15 The authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

(a) the reason for the release;

(b) the location of the release;

(c) all water quality monitoring results;

(d) any general observations;

(e) all calculations; and

(f) any other matters pertinent to the water release event.

Monitoring of Water Storage Quality

W16 Water storages stated in Table W5 which are associated with the release points must be monitored for the water quality characteristics specified in Table W6 at the monitoring locations and at the monitoring frequency specified in Table W5.

Table W5 (Water Storage Monitoring)

Water Storage Description	Northing (AGD84)	Easting (AGD84)	Monitoring Location	Frequency of Monitoring
Polishing Pond	7620504	643937	Sampling to be conducted from pontoon on southern side of dam, next to spillway and release point	Quarterly

W17 In the event that waters storages defined in Table W5 exceed the contaminant limits defined in Table W6, the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Table W6 (Onsite Water Storage Contaminant Limits)

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9[2]
EC (µS/cm)	Maximum	5970[1]
Sulphate (mg/L)	Maximum	1000[1]
Fluoride (mg/L)	Maximum	2[1]
Aluminium (mg/L)	Maximum	5[1]
Arsenic (mg/L)	Maximum	0.5[1]
Cadmium (mg/L)	Maximum	0.01[1]
Cobalt (mg/L)	Maximum	1[1]
Copper (mg/L)	Maximum	1[1]
Lead (mg/L)	Maximum	0.1[1]
Nickel (mg/L)	Maximum	1[1]
Zinc (mg/L)	Maximum	20[1]

Note:

Total measurements (unfiltered) must be taken and analysed

[1] Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

[2] Page 4.2-15 of ANZECC & ARMCANZ (2000) "Soil and animal health will not generally be affected by water with pH in the range of 4–9".

Receiving Environment Monitoring and Contaminant Trigger Levels

W18 The quality of the receiving waters must be monitored at the locations specified in Table W8 for each quality characteristic and at the monitoring frequency stated in Table W7.

Table W7 (Receiving Waters Contaminant Trigger Levels)

Quality Characteristic	Trigger Level	Monitoring Frequency	Comments
pH	6.5 – 8.0	Daily during the release	**See Table 2 comments**
Electrical Conductivity (µS/cm)	1000		
Suspended solids (mg/L)	950mg/L		
Sulphate (SO_4^{2-}) (mg/L)	1000		

Table W8 (Receiving Water Upstream Background Sites and Down Stream Monitoring Points)

Monitoring Points	Receiving Waters Location Description	Northing (AGD84)	Easting (AGD84)
Upstream Background Monitoring Points			
Middle Creek - upstream	Middle Creek 4km upstream of RP1 (polishing pond)	7622145	640925
Bee Creek - upstream	Bee Creek 15km upstream of point where release waters enter Bee Creek	7616700	639000
Hail Creek – upstream*	Hail Creek 5km upstream of confluence with Absent Creek	7621990	646869
Downstream Monitoring Points			
Bee Creek - downstream	Bee Creek 10km downstream of RP1 (polishing pond)	7615596	650715

Note:

The data from background monitoring points must not be used where they are affected by releases from other mines.

* *"Hail Creek – upstream" monitoring point is located in an area where periodic access difficulties may be experienced during heavy and extended rainfall. Whilst monitoring should aim to be undertaken at the frequency identified in Table W7, it is only required when access is available.*

W19 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table W7 during a release event the environmental authority holder must compare the down stream results to the upstream results in the receiving waters and:

1. where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or
2. where the down stream results exceed the upstream results complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
    (i) details of the investigations carried out; and
    (ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W19 2(ii) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

Receiving Environment Monitoring Program (REMP)

W20 A REMP must be developed and implemented by **27 February 2010** to monitor and record the effects of the release of contaminants on the receiving environment periodically and whilst contaminants are being discharged from the site, with the aims of identifying and describing the extent of any adverse impacts to local environmental values, and monitoring any changes in the receiving water. A copy of the REMP must be provided to the administering authority prior to its implementation and due consideration given to any comments made on the REMP by the administering authority.

For the purposes of the REMP, the receiving environment is the waters of the Bee Creek catchment and connected waterways within twelve (12) kilometres downstream of the release.

W21 The REMP must address (but not necessarily be limited to) the following:

(a) Description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);

(b) Description of applicable environmental values and water quality objectives to be achieved (i.e. as scheduled pursuant to the *Environmental Protection (Water) Policy 1997*);

(c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;

(d) Water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;

(e) Monitoring for any potential adverse environmental impacts caused by the release;

(f) Monitoring of stream flow and hydrology;

(g) Monitoring of toxicants should consider the indicators specified in Table W3 to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;

(h) Monitoring of physical chemical parameters as a minimum those specified in Table W2 (in addition to dissolved oxygen saturation and temperature);

(i) Monitoring biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of *AS5667.1 Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;

(j) The locations of monitoring points (including the locations specified in Table W8 which are background and downstream impacted sites for each release point);

(k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines* 2006. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;

(l) Specify sampling and analysis methods and quality assurance and control;

(m) Any historical datasets to be relied upon;

(n) Description of the statistical basis on which conclusions are drawn; and

(o) Any spatial and temporal controls to exclude potential confounding factors.

W22 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with condition **W20** must be prepared and submitted in writing to the administering authority by **1 October 2011**. This should include an assessment of background water quality, any assimilative capacity for those contaminants monitored and the suitability of current discharge limits to protect downstream environment values.

Water Reuse

W23 Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying stock water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with the quality release limits specified in Table W9.

Table W9 (Stock Water Release Limits)

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	5000

W24 Water contaminated by mining activity may be piped or trucked or transferred by some other means that does not contravene the conditions of this authority during periods of dry weather for the purpose of supplying irrigation water to properties directly adjoining properties owned by the environmental authority holder or a third party and subject to compliance with quality release limits in Table W10.

Table W10 (Irrigation Water Release Limits)

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines and provided through an amendment process.

W25 Water contaminated by mining activity may be piped or trucked off the mining lease for the purpose of supplying water to a third party for purpose of construction and/or road maintenance in accordance with the conditions of this environmental authority.

W26 If the responsibility of water contaminated by mining activities (the water) is given or transferred to another person in accordance with conditions **W23, W24 or W25:**

(a) the responsibility of the water must only be given or transferred in accordance with a written agreement (the third party agreement); and

(b) include in the third party agreement a commitment from the person utilising the water to use water in such a way as to prevent environmental harm or public health incidences and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994,* environmental sustainability of the water disposal and protection of environmental values of waters.

Water General

W27 All determinations of water quality must be:

(a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;

(b) made in accordance with methods prescribed in the latest edition of the administering authority's Water Quality Sampling Manual;

*Note: Condition **W27** requires the Water Quality Manual to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.*

(c) collected from the monitoring locations identified within this environmental authority, within ten (10) hours of each other where possible;

(d) carried out on representative samples; and

(e) laboratory testing must be undertaken using a laboratory accredited (e.g. NATA) for the method of analysis being used.

W28 The release of contaminants directly or indirectly to waters:

(a) must not produce any visible discolouration of receiving waters; nor

(b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Annual Water Monitoring Reporting

W29 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:

(a) the date on which the sample was taken;

(b) the time at which the sample was taken;

(c) the monitoring point at which the sample was taken;

(d) the measured or estimated daily quantity of the contaminants released from all release points;

(e) the release flow rate at the time of sampling for each release point;

(f) the results of all monitoring and details of any exceedences with the conditions of this environmental authority; and

(g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Temporary Interference with waterways

W30 Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Environment and Resource Management *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.*

Water Management Plan

W31 A Water Management Plan must be developed and implemented by **27 February 2010** that provides for the proper and effective management of the actual and potential environmental impacts resulting from the mining activity and to ensure compliance with the conditions of this environmental authority.

W32 The Water Management Plan must be developed in accordance with DERM Guideline for Preparing a Water Management Plan 2009 (to be developed by 1 October) or any updates that become available from time to time and must include at least the following components:

(a) Contaminant Source Study;

(b) Site Water Balance and Model;

(c) Water Management System;

(d) Saline Drainage Prevention and Management Measures;

(e) Acid Rock Drainage Prevention and Management Measures (if applicable);

(f) Emergency and Contingency Planning;

(g) Monitoring and Review.

W33 Each year the holder of the environmental authority must undertake a review of the Water Management Plan prior to the wet season (i.e. by **1 November**) and a further review following the wet season (i.e. by **1 May** the following year) to ensure that proper and effective measures, practices or procedures are in place so that the mine is operated in accordance with the conditions of this environmental authority and that environmental harm is prevented or minimised.

W34 A copy of the Water Management Plan and/or a review of the Water Management Plan must be provided to the administering authority on request.

Saline Drainage

W35 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

Acid Rock Drainage

W36 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

Stormwater and Water sediment controls

W37 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of storm water.

W38 The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.

W39 Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.

All Dams

W40 The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two (2) year period.

W41 Dams having a hazard category determined to be significant or high, must be specifically authorised by an environmental authority.

W42 All water retention dams must be constructed to the design criteria outlined in Table W11.

Table W11 (Retention dams design criteria)

Retention Dam	Design Storm	Target Particle Size for Settlement
Polishing Pond	1 in 10 ARI *(Average Recurrence Interval)*	0.02 mm (medium silt)
All other retention dams	1 in 10 ARI	0.06 mm (coarse silt)

Fitzroy River Basin Study

W43 The administering authority and the holder of this environmental authority both acknowledge that the conditions for release of contaminants to the Bee Creek catchment in this environmental authority have been calculated without the benefit of the findings of projects proposed to be undertaken as per recommendations 2 and 3 of the *Study of cumulative impacts on water quality of mining activities in the Fitzroy River Basin* (April 2009). The administering authority may, based on the information provided in the study report when it becomes available, all relevant information available at the time and the regulatory framework applicable at that time, consult with the holder of this environmental authority about the conditions in the environmental authority concerning the treatment and disposal of waste water.

The aim of the consultation shall be the meaningful review of the contaminant release limits imposed in this authority having regard to:

(a) the study results;

(b) near field monitoring results;

(c) QLD Water Quality Guidelines; and

(d) best practice environmental management.

If this review leads to a change in the requirements on this environmental authority holder, this shall be advanced by way of an authority amendment or a Transitional Environmental Program and as is necessary or desirable.

Sewage Effluent

W44 The quality of treated sewage effluent used for dust suppression or irrigation must be demonstrated to comply with Table W12.

Table W12 (Sewage effluent quality limits)

Parameter	Type	Criteria	Monitoring Frequency
5-day Biological oxygen demand	Maximum	20 mg/L	Every 3 months
Suspended solids	Maximum	30 mg/L	Every 3 months
pH	Maximum	6.5 - 8.0	Every 3 months
Free residual chlorine	Maximum	1 mg/L	Every 3 months
Faecal coliforms	Maximum	1000 thermotolerant coliforms/100 ml	Every 3 months

W45 All treated sewerage effluent used for dust suppression or irrigation must be contained on site.

Groundwater

W46 Any non seasonal decreases in groundwater levels greater than 2.5 metres from the previous six (6) monthly monitoring period, not resulting from the pumping of licensed bores, must be reported immediately in writing to the administering authority.

Queensland Government

Department of Environment and Resource Management
www.derm.qld.gov.au ABN: 46 640 294 485

Definitions:

"20th percentile flow" means the 20th percentile of all daily flow measurements (or estimations) of daily flow over a 10 year period for a particular site. The 20th percentile calculation should only include days where flow has been measured (or estimated), i.e. not dry weather days.

"Acid rock drainage" means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.

"Administering authority" means the Department of Environment and Resource Management or its successor.

"Anniversary day" means the anniversary day the authority is issued, whether or not it has been amended or transferred.

"Appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

"ARI" means the average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.

"Contaminated Land" has the meaning provided in schedule 3 of the *Environmental Protection Act 1994.*

"Dam" means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However; a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

"Endangered Remnant Ecosystem 11.9.5" means Regional Ecosystem 11.9.5 defined in Sattler, P. and Williams, R. (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*. pp 11/29. Environmental Protection Agency, Queensland Government, Australia.

"Environment" has the meaning provided in section 8 of the *Environmental Protection Act 1994.*

"Environmental authority" means an environmental authority granted in relation to an environmentally relevant activity under the *Environmental Protection Act 1994.*

"Environmental authority holder" means the holder of this environmental authority.

"ESP" means Exchangeable Sodium Percentage

"Financial Assurance" means a security deposit, either cash or a bank guarantee, that is held by the administering authority to cover the:

(a) potential costs to rehabilitate areas disturbed by mining activities; or
(b) costs or expenses, or likely costs or expenses, mentioned in section 367 of the *Environmental Protection Act 1994*.

"Flowable substance" means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

"Hazard" in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

"hazard category" means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland* (DME 1995).

"Mine" has the meaning defined in the *Mineral Resources Act 1989*.

"NAPP" means Net Acid Producing Potential.

"Natural flow" means the flow of water through waters caused by nature.

"Plan of Operations" means a planning document required under the *Environmental Protection Act 1994* for a mining lease project.

"Receiving environment" means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

"Receiving waters" means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

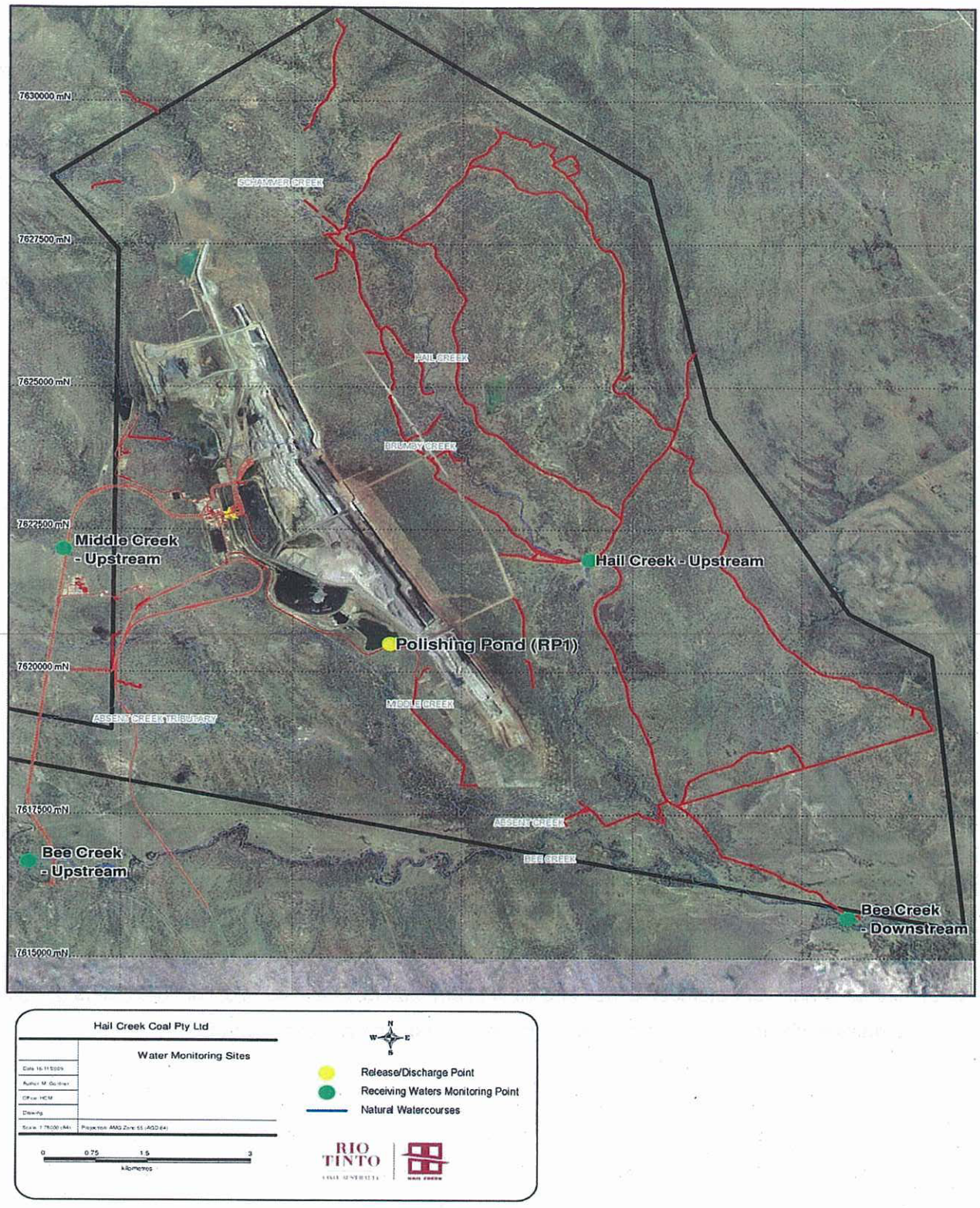
"Relevant nuisance complaint" has the meaning provided in section 6D of the *Environmental Protection Regulation 2008*.

"Representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

"Saline drainage" The movement of waters, contaminated with salt(s), as a result of the mining activity.

"Waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater and any part thereof.

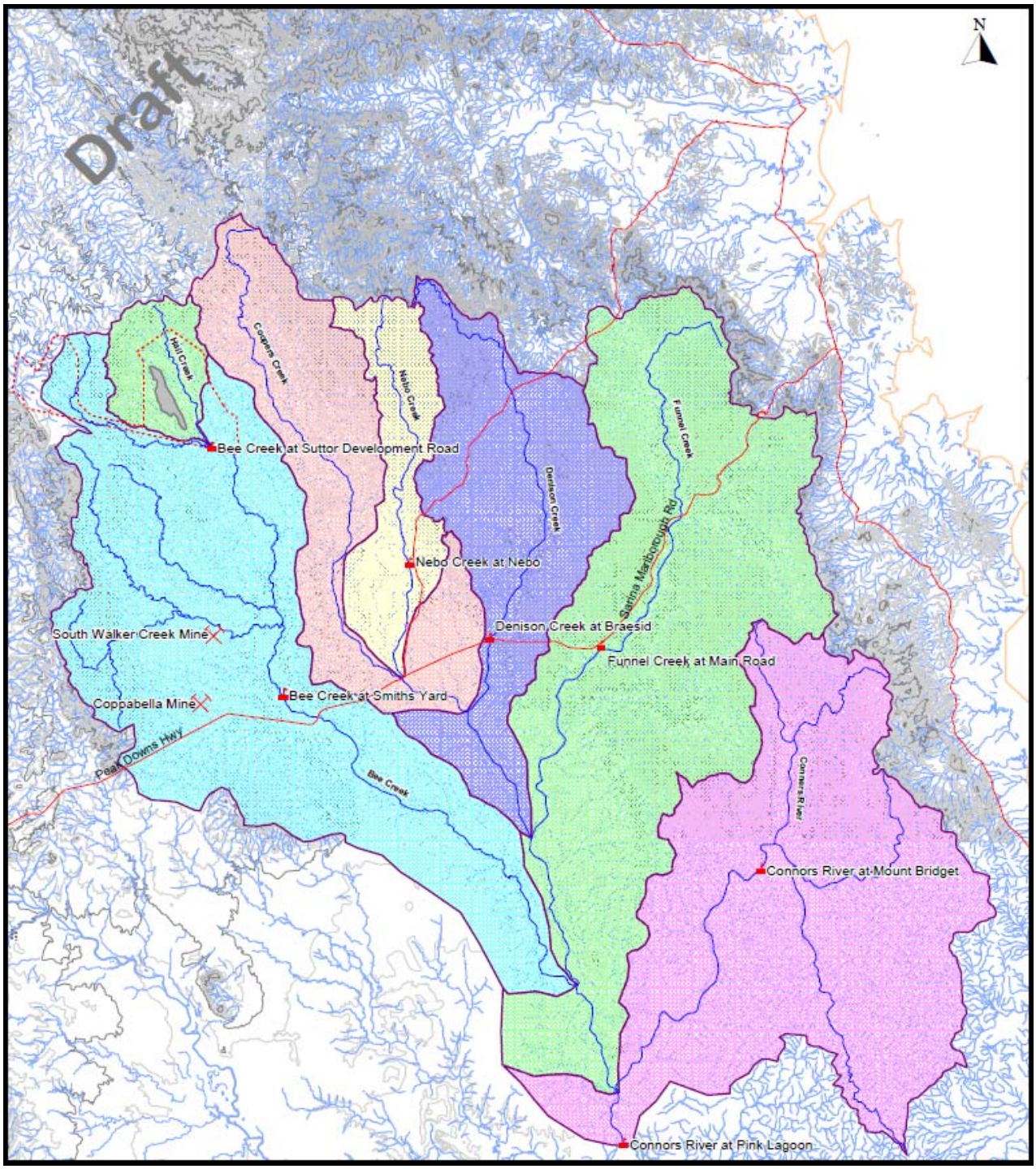
Figure 1: Authorised Release Point



Annexure SJR5

Isaac/Connors Catchment

Figure SJR-2: Isaac/Connors Catchment



Annexure SJR6

Water Volumes Impounded In-Pit and with Water Management System Storages

Table SJR-3: Water Volumes Impounded In-Pit and with Water Management System Storages

In-pit locations	Nov-10	Dec-10[1]	Jan-11	Feb-11	Mar-11	Apr-11	May-11
Ramp 6 Boxcut	0	0	1185	1322	832	100	10
R3S Hynds	0	0	150	150	150	300	375
R3N Hynds	400	400	678	871	830	1075	400
R5N Elph	0	0	100	130	130	130	130
R5S Elph	0	0	338	358	300	350	200
R3S Elph	0	0	?	50	20	300	100
R1N Hynds	0	0	100	150	200	300	650
Misc other pits	400	600	50	100	50	100	100
Total Vol. In Pit (for 6N, 3N & 3S)	**800**	**1000**	**2601**	**3131**	**2512**	**2655**	**1965**
Water Storages	**Nov-10**	**Dec-10[1]**	**Jan-11**	**Feb-11**	**Mar-11**	**Apr-11**	**May-11**
North Dam	145	298	178.2	390.4	193.72	320	116.6
Central Dam	925	956	906.6	1060.6	785.87	990	878.92
Polishing Pond	295	385	523.7	260	514	240	389.57
Ramp 0	2750	2764	2798	3050	2609	2525	2572
Brumby	307	467	478	526	384	490	415.16
Total in Mine Storages (excl. Brumby)	**4115**	**4403**	**4407**	**4761**	**4103**	**4075**	**3957**
Total Site Inventory (ML) *(Dams and In Pit))*	**4915**	**5403**	**7008**	**7892**	**6615**	**6730**	**5922**
Percentage Full *(Dams only)*	***91.44%***	***97.85%***	***97.92%***	***105.80%***	***91.17%***	***90.56%***	***87.94%***

Note (1): I understand that this estimate was likely taken prior to the significant rainfall events of late December 2010.

Annexure SJR7

Description of Process by which DERM Approved the TEP with Supporting Evidence

Index to Annexure 7

Ref.	Date	Document
7.1	N/A	Table SR-2: Timeline of TEP Process for HCM
7.2	18 January 2011	Transitional Environmental Program
7.3	25 January 2011	Evidence of correspondence with DERM
7.4	29 January 2011	Approval of Transitional Environmental Program MAN11801
7.5	18 April 2011	Amendment application to Transitional Environmental Program
7.6	19 May 2011	DERM directive to cease discharge
7.7	24 May 2011	Evidence of meeting with DERM to discuss the directive to cease discharge
7.8	2 June 2011	Amendment application to Transitional Environmental Program
7.9	8 June 2010	Water Solutions report on environmental impact downstream of HCM
7.10	10 June 2011	Approval of Transitional Environmental Program MAN13001
7.11	11 July 2011	Amendment application to Transitional Environmental Program
7.12	29 July 2011	DERM directive to cease discharge
7.13	2 September 2011	Evidence of advice from DERM that discharge can recommence

Annexure Item 7.1

Table SJR-4: Timeline of TEP Process for HCM

18 Jan 2011	Voluntary TEP submitted to DERM for approval. The TEP was drafted for the purposes of releasing mine-affected water outside of the requirements of the EA. At the time of submission, all water management system storage dams were at or above full supply volumes and rainwater was being allowed to accumulate in-pit. In addition concerns were held about probable significant rainfall for the remainder of the wet season; as well as water balance modelling indicating a high risk of uncontrolled release from the Polishing Pond storage. The TEP submitted proposed additional release points, a discharge flow proposal to mimic natural flows over a 14 day cycle (i.e. rising, peak and falling discharge flow rates with a short period of no flow prior to repeating the discharge sequence. Each cycle discharging approximately 2,500 ML. EC limits to be relaxed to a maximum of 2,000 µS/cm at RP1 and no greater than 1,000 µS/cm at the proposed additional release (intended as direct pit pump-out points with some requiring overland flow to reach a natural drainage line). An end date of 30 June 2011 was proposed.
25 Jan 2011	DERM expressed concerns in relation to overland flow proposals and EC limits.
29 Jan 2011	TEP certificate of approval Number MAN11801 granted with conditions - in-pit release points to be less than 800 µS/cm (effectively excluding two of the proposed additional release points).
29 Jan 2011	Discharge under TEP commenced.
18 Apr 2011	TEP amendment application submitted to DERM proposing a relaxation of EC limits to address observed increasing EC levels and to extend the expiration date until 30 September 2011 (continuing rain throughout January to April had meant that stored volumes had not altered significantly despite discharge under the TEP).
19 May 2011	DERM directive issued to cease discharge by 20 May 20111 due to elevated downstream (Connors River) EC levels.
24 May 2011	Meeting with DERM at Mackay to discuss directive to cease discharge. DERM indicated that TEP amendment application of 18 April 2011 was now considered a deemed refusal due to elapsed time. DERM willing to accept a modified TEP amendment application at a low discharge rate with a view to allowing HCM to achieve 90% of production capacity.
2 Jun 2011	New TEP amendment application submitted to DERM proposing a reduced flow, bio-mimicked discharge strategy from one release point (RP1), and with a maximum volume and/or expiration date of 30 September 2011.
8 Jun 2011	Consultant's report received assessing the net impact of HCM discharges on downstream watercourses.
10 Jun 2011	Receipt of TEP certificate of approval of TEP MAN13001 for a modified TEP based on a dilution flow of 10% of the flow in Funnel Creek at gauging station 130406A (located downstream of HCM), with a maximum allowable EC of 2,000 µS/cm and expiration date of 30 September 2011.
12 Jun 2011	Discharge under amended TEP commenced with a diluting flow of raw water to maintain EC levels within limits. Bee Creek upstream monitoring point recording background EC levels around 3,000 µS/cm, which was higher than the EC levels being discharged by HCM.
29 Jun 2011	TEP amendment application submitted to DERM proposing increase in flow to 25% of the flow in Funnel Creek and a relaxation of EC limits to 3,000 µS/cm including dilution of water using raw water supply and a post release flush of raw water. Application revised and resubmitted on 11 July 2011.
11 Jul 2011	TEP amended with discharge rate based on 7.25% of the flow in the Isaac at gauging station 130401A at Yatton; or 10% of the combined flow in Funnel Creek at gauging station 130406A plus the flow in Dennison Creek at gauging station 130413A plus the flow in the Connors River at Mount Bridget at gauging station 130403A, whichever is the greater. EC limit increased to 2,050 µS/cm.
29 Jul 2011	DERM directive issued to cease discharge by 30 July 2011 due to elevated downstream (Connors River) EC levels.
2 Sep 2011	DERM advised that discharge could recommence due to rainfall in the catchment and increased streamflows in the region.

Annexure Item 7.2

Transitional Environmental Program

Hail Creek Mine

Transitional Environmental Programme under Section 333 of the *Environmental Protection Act 1994*

Environmental Authority MIN100913309

Principal Holder: Queensland Coal Pty Ltd

Joint Holder: Marubeni Coal Pty Ltd.
Sumisho Coal Development Queensland Pty Ltd.
Nippon Steel Australia Pty Ltd

24th January 2011 – 30th June 2010

Approvals

N	ame	Position	Signed	Date
Originator		Environmental specialist		
Checked		HSEC Manager		
Authorised		General Manager		

Revisions

Date	Description	By	Check	Authorised
17/1/2011	Issued for internal review	MG		
	Issued for use			

Contents Page

1. Background

1.1 Reason for TEP

This Transitional Environmental Programme (TEP) has been voluntarily submitted to the Queensland Department of Environment and Resource Management (DERM) in accordance with the *Environmental Protection Act 1994* (EP Act) and the Environmental Authority (EA) MIN100913309 under which Hail Creek Mine (HCM) operates.

The 2010-2011 wet season has been characterised by prolonged and above average rainfall events and is forecast to continue into 2011. Based on onsite rain gauges, the area has received consistently above average rainfall since August 2010, as shown in **Figure 1** below. Further it is noted that, historically, the high rainfall months of the year which comprise the wet season are January through to March, indicating the wettest months are yet to be experienced.

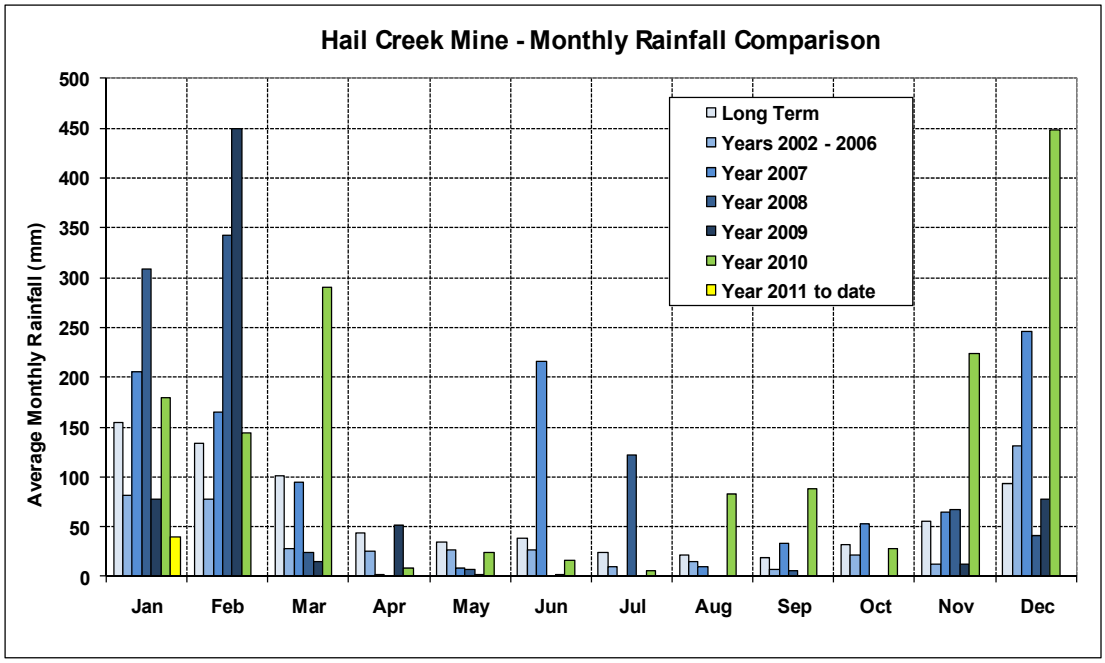


Figure 1. Monthly Rainfall Comparison

The months of August, September, November and December 2010 have all recorded approximately four times the long term monthly average rainfall. Further, a total of around 700mm of rain has fallen in the period of October to December 2010, which is the highest historical rainfall for this period on record (by around 200mm), and around 525mm greater than the long term average for these months. Refer to **Figure 2** for details.

Exceptionally heavy rainfall experienced in late December has meant Hail Creek Mine can no longer accommodate the water impounded it is system.

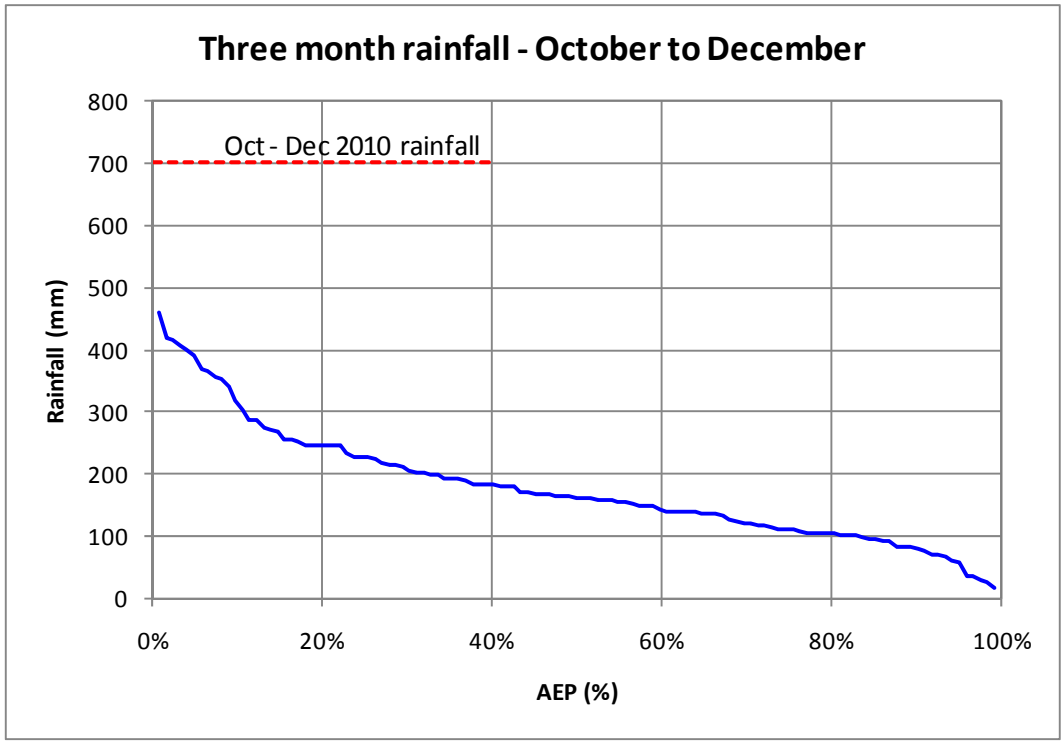


Figure 2. Annual Exceedence Probability of Oct-Dec Rainfall

A total of six controlled releases events have been conducted thus far for the 2010/11 wet season, discharging water for a total period of 16 days. A total volume of approximately 2,919 ML has been discharged from the Polishing Pond (RP1) in compliance with the Hail Creek EA (MIN100913309) with respect to both water quality and stream flow.

The status of the HCM water balance at the time of submitting the TEP is as follows:

- There is currently one licensed discharge point, the Polishing Pond (RP1);
- A significant volume of water is currently being impounded in pit, restricting access to coal reserves (as per Table 1). This is having a severe operational impact and is contributing to Hail Creek being unable to maintain required coal production levels;
- Each of the four main dams are over the full supply volume (FSV), with the exception of Polishing Pond which is kept drawn down to protect against uncontrolled release, as detailed in Table 1 below. Therefore, there is little opportunity to manage water impounded in pit by transferring to the water storage network, simply because there is no free volume available in the dams;
- The current water quality in the key dams is within normal discharge limits as specified by the EA, as shown in Table 1. Similarly, water impounded in pit is also of good quality and meets the discharge release limits specified by the EA (MIN100913309);
- Flow volume and frequency of flows in the receiving waterways limit the opportunities to discharge water in compliance with the EA (MIN100913309) and subsequently restricts the total volume of mine water than has been released.

Table 1. Latest Dam and Pit Storage Capacity and Water Quality readings

Dam Storage/ Pit Name	Water Volume Impounded (ML)	Percentage of Full Supply Volume
Polishing Pond *(Release Point 1)*	275 ML	36% full (495 ML available)
Central Dam	855 ML	107% full (spills to Polishing Pond via Low Wall Drainage Channel)
Northern Dam	300 ML	91% full (30 ML available)
Ramp 0 *(This disused pit is now used as a water storage)*	2791 ML	107% full (contained by spoil dumps, but FSV based on geotechnical risk)
Ramp 1	100 ML	N/A
Ramp 2	250 ML	N/A
Ramp 3	568 ML	N/A
Ramp 5	468 ML	N/A
Ramp 6	959 ML	N/A

Therefore, at the time of writing, Hail Creek have 2345 ML impounded in pit, and can only accommodate approximately 279 ML in the water storage network (assuming overflows from Ramp 0 and Central report to Polishing Pond).

Further, it is expected that significant further volumes of rainfall will be experienced as the wet season continues. Should this rainfall occur and the opportunities to conduct a controlled release are restricted by stream flow in the receiving waters (as has been the case to date), there is a high risk of uncontrolled spillway release from the Polishing Pond. It is expected that once this spillway release begins, it will continue for an extended period of time.

Figure 3 below shows modelling completed to forecast the time period that uncontrolled release is expected, given the volumes of water currently impounded, and shows extended uncontrolled spillway release.

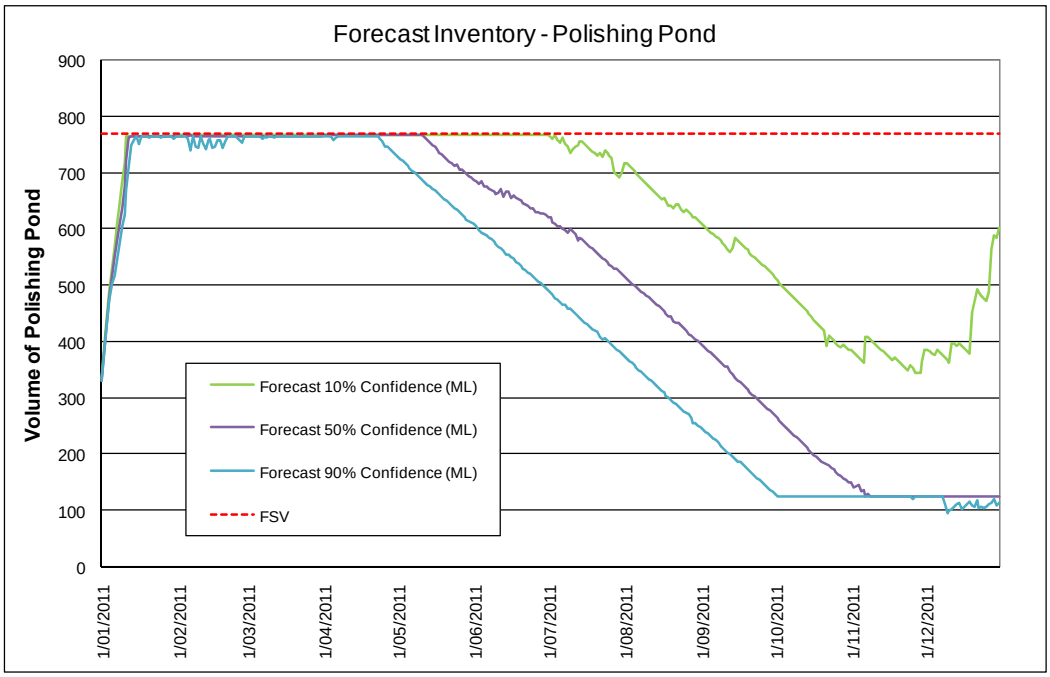


Figure 3. Current Site Forecast Inventory of Polishing Pond – RP1

This graph shows a high probability of continuous uncontrolled spillway release (based on the 121 years of data in our water balance model – OPSIM) until May 2011. Essentially, this forecast indicates that, without a TEP in place to release water outside of the current EA conditions, Hail Creek expect to be unable to maintain controlled release of water over the remainder of the wet season.

Site rainfall for the period Oct-Dec 2010 is the highest on record and as such represents a nominal wet season AEP of around 1% (ie. 1 in 100). Forecast modelling for the 2010/11 water year (Oct-Sep) based on the historical rainfall records, suggests that an additional volume of around 5000ML could be potentially captured within the Hail Creek water management system. **Table 1** above indicates that Hail Creek are currently impounding a total of around 6500ML on site.

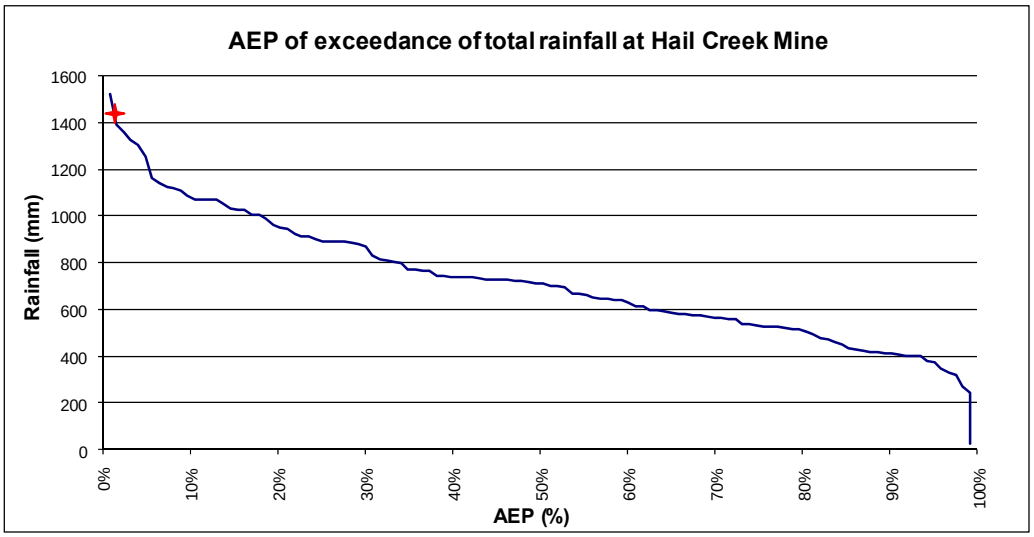


Figure 4. Annual Exceedence Probability of current wet season

The containment standard of the Hail Creek water management system has been designed to satisfy a 10% AEO, meaning that normal operation of the water management system would result in risk of uncontrolled spillway release in any year of 10%

This TEP has been prepared to outline the proposed control strategies to manage the excess mine water currently contained by Hail Creek Mine, and that expected to be impounded throughout the remainder of the 2010/11 wet season. The objective of this TEP is to effectively manage mine water during the 2010 – 2011 wet season to ensure that an uncontrolled spillway discharge does not occur, and to reduce site inventories to ensure Hail Creek can contain water into the future.

This TEP will be effective from the date of approval until 30 June 2011.

1.2 Receivi ng Environment

Hail Creek Mine is surrounded by a number of small ephemeral stream systems, which support small catchments, and feed into larger catchments. HCM's current active mining area is located to the west of Hail Creek, which is an upper tributary of the Fitzroy River drainage system. Hail Creek flows into Bee Creek, thence into the Isaac and Fitzroy rivers, entering the sea at Rockhampton, 300 km downstream. See **Figure 5** below.

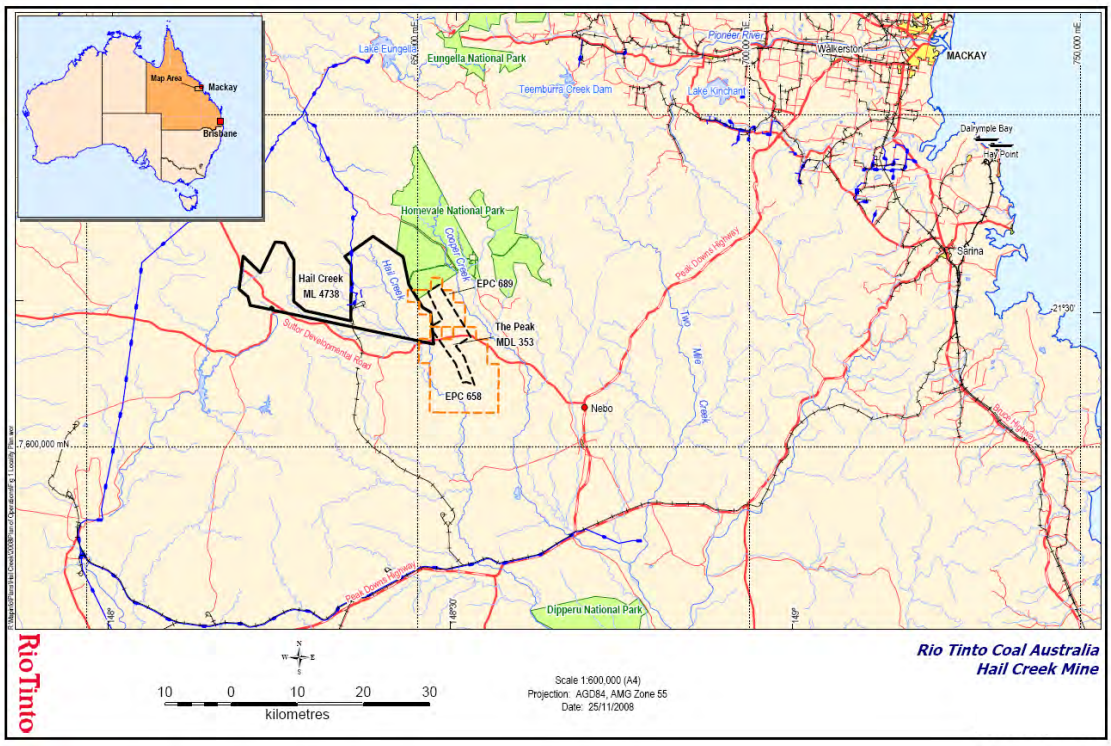


Figure 5. Locality Plan

Within the HCM catchment area of interest, all creeks are strongly ephemeral streams which flow only after periods of rain, and dry to a few isolated pools which remain briefly into the drier periods of the year. The receiving environments of the Bee Creek catchment, including all tributaries, are characterised as having high flow events immediately following heavy rainfall, which are then followed by very low or zero flows and dry creek beds.

HCM discharges water to Middle Creek, which then flows to Absent Creek, then into Hail Creek and finally, Bee Creek catchment. HCM discharge mine affected water from one on-site water storage location, Polishing Pond (RP1).

Middle Creek is a minor stream system, with a small catchment (3020 ha), and HCM is positioned so as to divert much of the water that historically entered the Middle Creek system now enters the mine water storage system. Absent Creek also supports a small relatively undisturbed catchment (1,790 ha), and again the activities of Hail Creek would represent the primary external influence to waters in the catchment.

In contrast, both Bee and Hail Creek support large catchments (19,600 ha and 10,500 ha, respectively), that extend both upstream and downstream of HCM, and receive water from a range of sources that may be subject to influence from grazing and agricultural activities.

Other stream systems of note include Schammer Creek, which supports a small size undisturbed catchment (2,100 ha) to the north of HCM, and feeds into Hail Creek. There is also Brumby Creek, which historically feed into Hail Creek but has now been diverted by HCM's operations to feed into Middle Creek.

1.2.1 Receiving Water Quality

Background water quality has been routinely collected since 2005, and has been summarised in the most recent Water Management Plan (HCM-10-E10-PLN-001), which has been previously supplied to DERM. A further synopsis of the information contained within this Plan is reproduced below, as **Table 2**. Further information on water quality within the receiving environment is also collected annually as part of the Regional Environmental Monitoring Programme (REMP) for Hail Creek Mine.

Table 2. Historic water quality results for Receiving Waters & Polishing Pond (RP1)

		Hail Creek Upstream	Middle Creek Upstream	Bee Creek Upstream	Polishing Pond (April to Nov- Dry Season)	Polishing Pond (Dec to Mar- Wet Season)	Bee Creek Downstream
Site ID		**HCU**	**MCU**	**BCU**	**RP1**	**RP1 BCD**	
Electrical Conductivity (EC) (µS/cm)	Min – Max	124 – **1395**	81 – 696	96 – **1660**	1265 – **1947**	783 – **2262**	119 – **1610**
	Ave	529	350	750	**1562**	1348	886
pH	Min – Max	7.2 – **8.9**	7.1 – **8.7**	6.6 – **8.9**	7.7 – **9.3**	7.3 – **9.3**	**7.0 – 8.6**
	Ave	**8.1**	7.1	7.9	8.6	8.4	**8.2**
Sulphate (SO4 2) (mg/L)	Min – Max	1 – 206	1 – 40	1 – 300	1 – 777	6 – 627	1 – 54
	Ave	39.9	6.5	98.0	436.0	262.2	18.5
Suspended Solids (mg/L)	Min – Max	4 – 1630	1 – 3200	1 – 8400	1 – 183	1 – 391	1 – 6800
	Ave	103.0	244.4	821.2	18.5	54.0	554.4
Turbidity (NTU)**	Min – Max	16 – 1156	22 – 284	45 – 920	14 - 936		44 – 1362
	Ave	319	129	246	144		440

** Records of turbidity have only been collected since 2010.
Note: Cells in red bold are above the EA Table W7 Receiving Water Trigger Limits (for HCU, MCU, BCU & BCD), or above the W2 Contaminant Release Limits for Polishing Pond (RP1). No limits have been set for Suspended Solids or Turbidity.

1.2.2 Flow Rates & Volumes

An assessment of the volumes and frequency of creek flows for the Hail Creek Mine area was completed in 2009, to support the identification of the minimum flow trigger in the amended EA, and to understand the flow characteristics of the receiving Bee Creek catchment.

The flow rates were modelled using available site data, long-term rainfall records and the Hail Creek OPSIM model, and calibrating back to the Smith's Yard gauging station (130411A) maintained by DERM. This gauging station has data records for Bee Creek for a 16 year period (between 1972 and 1987), but is considered too far downstream to use directly.

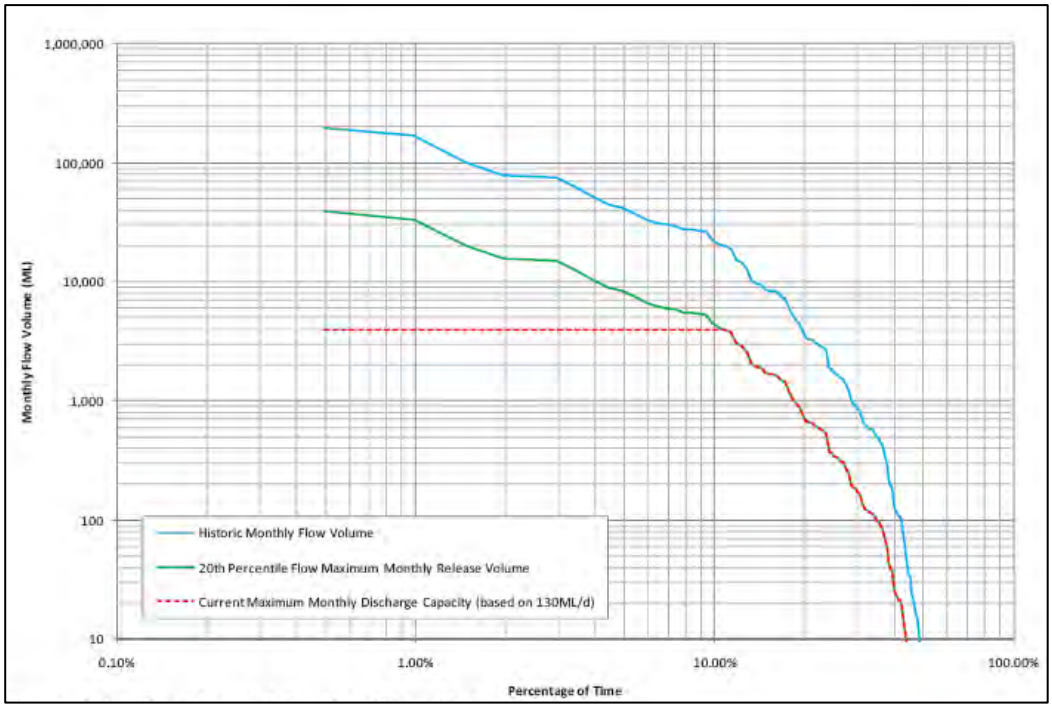
A minimum flow trigger for the Bee Creek Downstream location (at the crossing with the Suttor Developmental Road) of 1.6m^3/s was modelled, representing the 20th percentile flow event. However, in the EA, a minimum flow trigger of 2m^3/s was agreed, to compensate for the fact that a downstream stream gauge is being used. This modelling indicated an average flow rate of 14.0 m^3/s in the receiving Bee Creek waterway, and an average of 17 potential release days per year (when the minimum flow trigger has been reached) for Hail Creek Mine.

Already this year Hail Creek has released for 16 days with the peak wet season yet to begin. This again indicates that this wet season is an extreme year, which the Hail Creek water management system was not designed to cope with.

Further modelling has also investigated expected monthly flow volumes (according to probabilities corresponding with expected wet season conditions), as shown in **Figure 6**. These graphs show that for a 1 in 100 year wet season, the expected monthly total flow volume would be just under 200,000 ML, and the 20th percentile monthly flow volume (equivalent to the potential release volume) would be approximately 30,000 ML. The graph also shows that, only using existing infrastructure and the release points approved in the EA (RP1 - Polishing Pond), Hail Creek cannot achieve peak discharge volumes during periods of flow.

Therefore, during a 1 in 100 year wet season, the Bee Creek catchment would naturally receive very significant flow volumes over the course of a month.

Figure 6. Bee Creek – Modelled Monthly Flow Volume (ML)

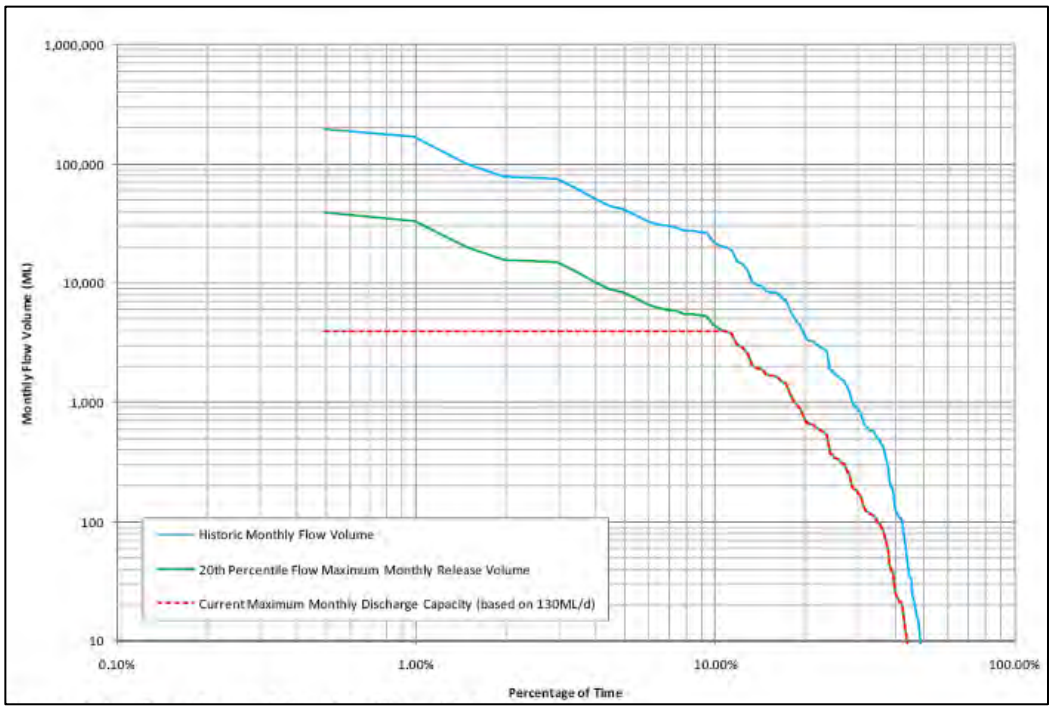


Considering the expected peak flow rate experienced during a month, **Figure 7** below, shows that for a 1 in 100 year wet season, the expected monthly peak flow rate would be approximately 800m^3/s (or 800,000L/s), and the 20th percentile monthly peak flow rate would be approximately 150m^3/s (or 150,000L/s).

Therefore, during a 1 in 100 year wet season, the Bee Creek catchment would naturally receive very large monthly peak flow rates, associated with very heavy and rapid natural flows.

Figure 7. Bee Creek – Modelled Monthly Peak Flow Rate (m^3/s)

It is therefore proposed to temporarily remove the minimum flow trigger on Bee Creek, and instead establish a system under this TEP of mimicked natural flow events. Hail Creek will



release water in a defined pattern of creating a peak flow event and then tapering the flow rate.

1.3 Min e Water Quality

The most recent mine water quality data is presented in **Electrical** conductivity levels within some of the mining pits, Polishing Pond and Ramp 0 are sitting close to the currently the compliance limit (1500 µS/cm) specified in Table W2 of the EA. It is expected that this EC value will continue to deteriorate the longer that the water continues to remain in pit without further dilution. Review of historic data (**Table 3 and Appendix B**) shows that over the course of a year, the poorest quality EC reading is approximately 2000 µS/cm. Generally, EC within the Polishing Pond can be quite variable, depending on where water has been transferred from.

Table 3**3** and is compared against the current compliance limits in Table W2 of the EA.

Electrical conductivity levels within some of the mining pits, Polishing Pond and Ramp 0 are sitting close to the currently the compliance limit (1500 µS/cm) specified in Table W2 of the EA. It is expected that this EC value will continue to deteriorate the longer that the water

continues to remain in pit without further dilution. Review of historic data (**Table 3 and Appendix B**) shows that over the course of a year, the poorest quality EC reading is approximately 2000 µS/cm. Generally, EC within the Polishing Pond can be quite variable, depending on where water has been transferred from.

Table 3. Recent water quality results for Mine Water Storages & Pits

Dam Storage/ Pit Name	Electrical Conductivity (µS/cm)	pH	Turbidity (NTU)	Sulphate (SO_4^{2-}) (mg/L)	Suspended Solids (SS) (mg/L)
	Field readings taken 11/01/2011			*Lab analysis dating 09/12/2010*	
Polishing Pond *(Release Point 1)*	**1574**	8.57	49.4	130	8
Central Dam	768	8.87	30.2	73	9
Northern Dam	332	8.73	53.1	16	8
Ramp 0 *(This disused pit is now used as a water storage)*	**1490**	8.85	184.5	196	11
Ramp 1 (S)	**1907**	8.41	321	N/A	N/A
Ramp 2 (N)	**1625**	8.27	120.5	N/A	N/A
Ramp 3 (N)	675	8.50	151.8	N/A	N/A
Ramp 5 (N)	985	**8.95**	10.0	N/A	N/A
Ramp 6	574	8.14	150	N/A	N/A
EA Compliance Limits	**1500**	**6.5 – 9.0**	**N/A**	**1000**	**N/A**

Note: Cells in red bold are above (or very close to) the EA Table W2 Contaminant Release Limits for Polishing Pond (RP1). No limits have been set for Suspended Solids or Turbidity.

It is noted that, to date for the 2010/11 wet season, all release events have been within normal compliance limits, as specified by the contaminant release limits in Table W3 of the EA. Appendix B contains graphs representing the trends for EC, pH, and Turbidity across 2010 for the four (4) main water storages listed below. Further, **Table 2** summarised longer term records for the release point (Polishing Pond) and receiving environment monitoring points.

2. Hail Creek TEP Strategy

2.1 Plan for the Release of Mine Affected Water

Hail Creek propose the following plan to manage the excess mine water currently contained, and expected to be impounded during the remainder of the 2010/11 wet season:

- Immediately commence a system of mimicked natural flow, entirely independent of the former flow dilution system under the EA. A structure of tiered release will be established with each release point operating for differing time periods, with the total flow rate being scaled back to mimic a natural flow event. All approved release locations (i.e. the existing RP1 and all ARPs specified by this TEP) will commence releasing as per this pattern;
- Ensure no more than 4 release points are being utilised at any one time;
- Ensure a minimum of 3 days of rest between the commencement and cessation of each discharge flow event, to allow each release location along the receiving waterway to rest (some locations will be allowed to rest for longer than 3 days);
- Ensure water quality at each release point (end-of-pipe) meets the quality criteria outlined under this TEP (as per **Table 7**);
- Utilise more release points initially to get mine affected water off site rapidly to ensure water is released at the peak of the wet season, and before water quality deteriorates;
- Continue to follow this system of mimicked natural flow events until a total volume of 10,000 ML has been discharged, or 30 June 2011 when this TEP expires; and
- After the end of this TEP, if required, recommence releasing water as per the approved EA (MIN100913309) requirements (i.e. requiring 2m^3/s minimum flow and 20% dilution to the Bee Creek Downstream location, and meeting release limits as per Table W2).

2.1.1 Total Volume of Mine Affected Water to be Released

As detailed in the Introduction (Section 1), site modelling indicates that if the wet season continues to follow its current pattern in terms of extremity, a conservative estimate of 5,000ML additional water will be contained between January and June 2011. This estimate is based on 121 years of data in the OPSIM water balance model, assuming the volume associated with an 80th percentile net rainfall yield year. Further, Hail Creek Mine is currently impounding a total of 6,500ML on site.

Hail Creek need to release the current excess volumes of impounded mine affected water, but also ensure the TEP plans for the remainder of water expected to be impounded over the course of the 2010/11 wet season. Therefore, a maximum volume of 10,000ML to be discharged under this TEP is proposed as reasonable. If either less or more water continues to be impounded as the wet season progresses, Hail Creek will approach DERM to discuss required amendments to this TEP.

Considering expected monthly flow volumes for the coming wet season, presented in Section 1.2.2, it is again highlighted that a monthly total flow of approximately 200,000 ML is expected to pass through Bee Creek (at the crossing with the Suttor Developmental Road), with a 20th percentile monthly flow volume of approximately 30,000 ML. In this context, the total volume of water intended to be released under this TEP by Hail Creek Mine is insignificant (approximately 4,977 ML per month with a peak flow rate of just 4.0m^3/s).

2.1.2 TEP Release Event Flow Pattern

Hail Creek propose the following standard pattern for a typical flow event to be undertaken under this TEP. The flow pattern has been designed to mimic a natural flow, ensuring minimal environmental harm and erosion, and providing for period of time where the receiving waterway can experience no flow conditions (assuming the absence of rainfall).

Table 4. Typical Release Flow Event to be followed under this TEP

Time/Duration of Flow Event (Day/hours)	Release Points Active	Pump Rate (L/s)	Mimicked Flow Rate (m^3/s)	Volume released (ML)
Day 1 - 3 (0 – 72hrs)	x4	4000	4.0	1036.8
Day 4 - 6 (72 – 144hrs)	x3	3200	3.2	829.4
Day 7 - 9 (144 – 216hrs)	x2	1600	1.6	414.7
Day 10 - 12 (216 – 288 hrs)	x1	800	0.8	207.4
Days 13 (288 – 312hrs) *Rest Days*	-	-	-	-
		Peak Flow Rate	4.0 m^3/s	-
		Average Flow Rate	2.4 m^3/s	-
		Total Volume Released per Flow Event		2488.3 ML

Hail Creek intend to operate each of the release points for differing periods of time (for example RP1 operating for 3 days, ARP3/4 operating for 6 days, ARP2/3 operating for 9 days and ARP1 operating for 12 days). In this way, a natural flow event will be mimicked with flow being injected into the receiving waterway system for differing time periods, and at different locations. Thus, for a single 13 day period, a maximum of 2,488.3 ML will be released.

As water storages and pit areas are emptied of water (and assuming no further rainfall), they will no longer be used as release points, and other release points will be operated longer. Similarly, if logistic issues are experienced for release points, others will be substituted. The maximum pumping rates, and therefore peak flow rates, will be maintained as per **Table 4**.

Considering the expected peak flow rate, presented in Section 1.2.2, it is again highlighted that a monthly peak flow rate of approximately $800 m^3/s$ (or 800,000L/s) is expected at Bee Creek

(at the crossing with the Suttor Developmental Road), with a 20th percentile flow rate of approximately 150m^3/s (or 150,000L/s).

Assuming the maximum pump rate of 4000L/s for a mimicked release flow event, this equates to a peak flow rate of just 4.0m^3/s. In this context, the anticipated peak flow rates to be achieved under this TEP by Hail Creek mine represents very minor flow events compared to that typically experienced within this catchment, less than the 1st percentile flow rate.

2.1.3 TEP Release Water Quality Criteria

As shown in Section 1.3, the water within both Hail Creek's dam storage areas and pits is of relatively good quality. Water quality records presented in this document are typical of that generally observed for Hail Creek. The current water quality within the dams and pits would (with some mixing), meet the existing contaminant release limits for discharged water (as per Table W2 of the EA -MIN100933109). It is noted that these criteria have been developed in accordance with the ANZECC guidelines for aquatic ecosystem protection (2000), and are intended to ensure water quality supports and protects the natural ecology of the receiving waterways, and more than meets the quality requirements for livestock drinking water.

Current average pit EC is 974us/cm, and the average EC within the dams is 1041 us/cm. It is of note that Ramp 0 water is elevated as there have been significant volumes stored for over a year, and evaporators/atomisers have been in place over this storage in an attempt to draw down total site inventory during 2010. Polishing Pond is also believed to be elevated due to recent transfers from Ramp 0 to sustain compliant release. Current average pit pH is 8.76, and the average pH within the dams is 8.45 us/cm. These pH ranges are typically observed for the region, and often upstream receiving environment monitoring points are elevated above 9.0.

It is however, noted that EC & pH levels within some of the individual mining pits, as well as Polishing Pond and Ramp 0 are sitting close to, or slightly over, the currently the compliance limits specified in the EA, if left unmixed. It is further appreciated that these values are likely to continue to deteriorate the longer that the water continues to remain in pit without further dilution. As previously mentioned, Hail Creek wish to release excess water under this TEP as soon as possible, and therefore propose a slight relaxation of the EC & pH quality criteria to ensure this can happen in a timely manner, as detailed in **Table 5** below.

Relaxing these criteria slightly will allow Hail Creek to release water without prior mixing (which will be time consuming and will therefore delay release), and is not expected to result in any negative impact on the receiving environment.

Table 5. Contaminant Release Limits under this TEP

Quality characteristic	Release Limit
Electrical conductivity (µS/cm)	2000 µS/cm
pH (pH Unit)	6.5 (minimum) - 9.5 (maximum)
Turbidity (NTU)	Background plus 10%
Total Suspended Solids (mg/L)	Background plus 10%
Sulphate (SO42-) (mg/L)	1000mg/L

2.2 Add itional Release Points

In order to release water in a timely manner, Hail Creek propose to establish a network of Additional Release Points (ARPs) to distribute water towards the east and over the mining highwall. Water will be released into Hail Creek (either via overland flow or through injection into various smaller tributaries), which then flows into Bee Creek. The existing downstream monitoring point specified in the EA (Bee Creek Monitoring Station at the Suttor Development Road) is downstream of all additional release points.

A map (provided as **Appendix A**) has been prepared with shows each of the additional release points, and **Table 6** below provided a summary of information for each ARP.

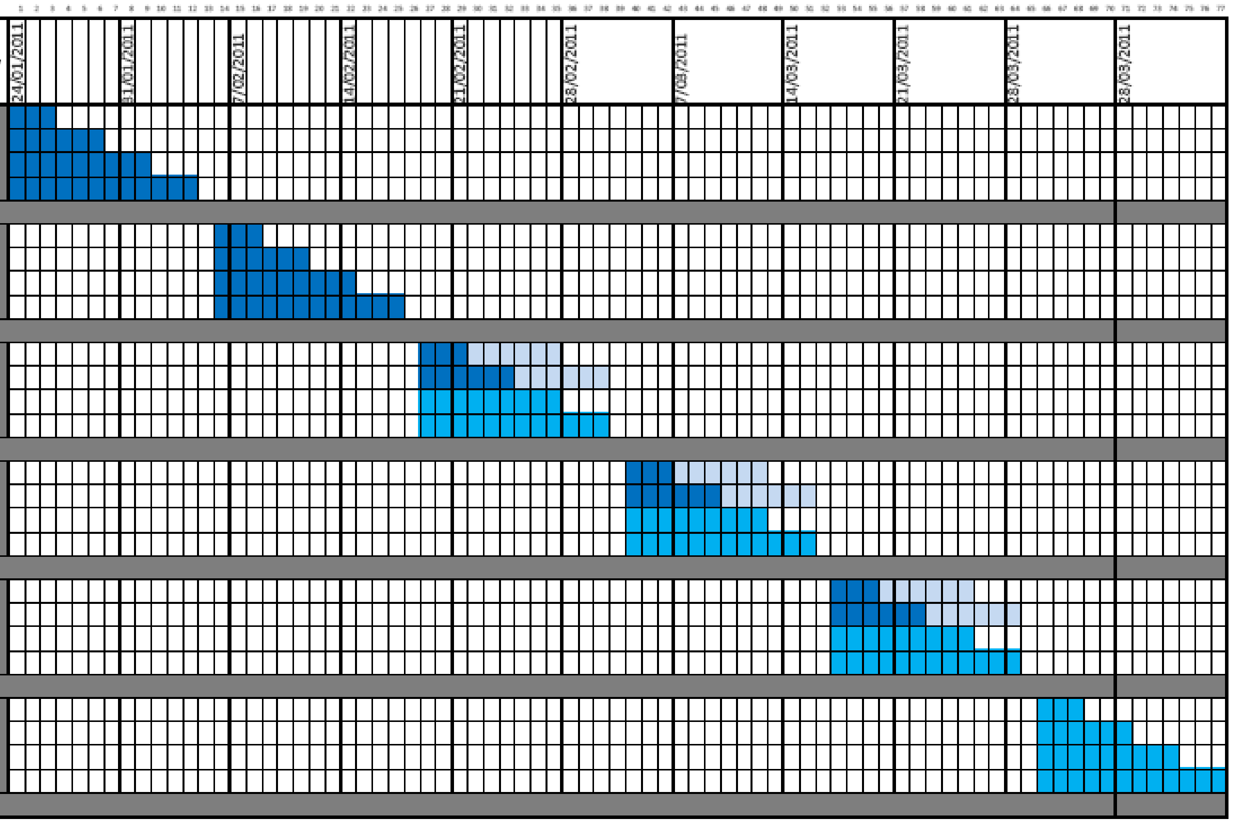
Table 6. Contaminant release points, sources and receiving waters

Release point (RP)	Northing (AGD84)	Easting (AGD84)	Contaminant source and location	Monitoring point location	Receiving waters description
RP 1 (Polishing Pond)	7620504	643937	Polishing Pond, including Central & North Dams. Also water from Ramp 2 pit, Ramp 3 pit, Ramp 5 pit	End of pipe	Middle Creek via grassed channel
ARP1*	7628010	642570	Ramp 6 pit	End of pipe	Hail Creek via overland flow to Schammer Creek
ARP2	7626240	644220	Ramp 5 pit, Ramp 3 pit	End of pipe	Hail Creek via unnamed tributary
ARP3	7621450	646680	Ramp 0 (water storage), Ramp 1 pit	End of pipe	Hail Creek via overland flow
ARP4	7619290	646650	Ramp 0 (water storage), Ramp 1 pit	End of pipe	Hail Creek via overland flow

* Two potential locations may be utilised for ARP1. This will consist of that shown in Appendix A, or an alternative slightly to the north. This alternative may be used if logistic issues arise.

2.3 TE P Timeframe

	Release Point	Releasing to	Week/ Day
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - north (ARP3)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - north (ARP3)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - north (ARP3)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - north (ARP3)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - north (ARP3)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	
1	Polishing Pond (RP1)	Bee Creek via Middle Creek	
2	Ramp 0 - south (ARP4)	Hail Creek via overland flow (from highwall)	
3	Ramp 5 (ARP2)	Hail Creek via unnamed tributary (from highwall)	
4	Ramp 6 (ARP1)	Hail Creek via overland flow (from highwall)	



Currently need to pump due to existing impounded volume

Will only need to pump if more water is impounded during wet season, or when other release points have been emptied.

Pumping time from this location will be extended when other release points have been emptied.

Note: Order and use of release points are an example only and may vary depending on volumes impounded, and logistics.

2.4 Monitoring under the TEP

The following outlines the monitoring requirements to be met under this TEP. This information, and in particular the tables, have been designed to be incorporated into the conditions attached to the TEP (as provided in Section 5).

2.4.1 Monitoring Mine Affected Water Released

As outlined in Section 2.1.3., contaminant release limits will be specified for all water released under this TEP. Monitoring of these release limits will occur at the frequency and locations outlined in **Table 7**.

Table 7. Monitoring of Water Quality - Contaminant release limits

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Release Point and Monitoring Location
Electrical conductivity (µS/cm)	2000 µS/cm	Daily whilst releasing	In situ water quality reading[1]	As per map showing each release point, monitoring from end of pipe. If discrepancies, monitor pit/dam prior to discharge to Hail Creek/ Middle Creek.
pH (pH Unit)	6.5 (minimum) - 9.5 (maximum)	Daily whilst releasing	In situ water quality reading[1]	As per map showing each release point, monitoring from end of pipe. If discrepancies, monitor pit/dam prior to discharge to Hail Creek/ Middle Creek.
Turbidity (NTU)	Background plus 10%	Daily whilst releasing (the first sample must be taken within 2 hours of commencement of release)	In situ water quality reading[1] and laboratory analysis[2]	As per map showing each release point, monitoring from end of pipe. If discrepancies, monitor pit/dam prior to discharge to Hail Creek/ Middle Creek.
Total Suspended Solids (mg/L)	Background plus 10%	Weekly whilst releasing	Laboratory analysis[2]	As per map showing each release point, monitoring from end of pipe. If discrepancies, monitor pit/dam prior to discharge to Hail Creek/ Middle Creek.
Sulphate (SO_4^{2-}) (mg/L)	1000mg/L	Weekly whilst releasing	Laboratory analysis[2]	As per map showing each release point, monitoring from end of pipe. If discrepancies, monitor pit/dam prior to discharge to Hail Creek/ Middle Creek.

1 In situ samples can be taken using electronic sampling equipment available on site.

2 Samples are required to be analysed at a NATA accredited facility in accordance with this Transitional Environmental Program.

2.4.2 Monitoring Background Water Quality

In addition to monitoring the water quality of mine affected water being released, Hail Creek will also monitor the background water quality in the receiving waterways, to provide a reference point for comparison. Monitoring of the receiving environment proposed under this TEP will be similar to that routinely conducted under the Ea (MIN100913309).

The quality of the receiving water will be monitored at the locations specified in **Table 8** for each quality characteristic and at the monitoring frequency stated in **Table 9**.

Table 8. Receiving Waterway monitoring points

Monitoring points		Receiving waters location description	Northing (AGD84)	Easting (AGD84)
Upstream Background Monitoring Points				
MCU	Middle Creek - Upstream	Middle Creek, 4km upstream of all release points (RP1 (Polishing Pond) and all ARPs).	7622145	640925
BCU	Bee Creek – Upstream	Bee Creek, 15km upstream of point where release waters enter Bee Creek from Middle Creek, and all release points. (RP1 & all ARPs).	7616700	639000
HCU	Hail Creek – Upstream*	Hail Creek, 5km upstream of the confluence with Absent Creek, downstream of ARP1 & ARP2all release points, upstream of RP1, ARP3 & ARP4.	7621990	646869
SCU	Schammer Creek – Upstream*	Schammer Creek, 10km upstream of HCU monitoring point. Upstream of all release points, including all ARPs.	7628710	641020
Downstream Monitoring Points				
BCU	Bee Creek - Downstream	Bee Creek, 10km downstream of all release points (including RP1 and all ARPs)	7615596	650716

* 'Hail Creek – Upstream' and 'Schammer Creek – Upstream' monitoring point are both located in areas where periodic access difficulties may be experienced during heavy and extended rainfall. Whilst monitoring should aim to be undertaken at the frequency identified in Table 8, it is only required when access is available.

Table 9 Receiving Waters Contaminant Trigger Levels

Quality characteristic	Trigger level	Monitoring frequency
Electrical Conductivity (µS/cm)	2000	Daily during the release
pH (pH Unit)	6.5 – 9.5	
Suspended solids (mg/L)	Background at BCU plus 10% Turbidity will also be recorded as an instantaneous reading	
Sulphate (SO_4^{2-}) (mg/L)	1000	
Aluminium	100 µg/L	Commencement of release and thereafter weekly during the release
Arsenic	13 µg/L	
Cadmium	0.2 µg/L	
Chromium	1 µg/L	
Copper	2 µg/L	
Iron	300 µg/L	

Lead	10 µg/L	Commencement of release and thereafter weekly during the release
Mercury (inorganic)	0.2 µg/L	
Nickel	11 µg/L	
Zinc	8 µg/L	
Molybdenum	34 µg/L	
Selenium	10 µg/L	
Silver	1 µg/L	
Uranium	1 µg/L	
Vanadium	10 µg/L	
Nitrate	1100 µg/L	
Petroleum hydrocarbons (C6-C9)	20 µg/L	
Petroleum hydrocarbons (C10-C36)	100 µg/L	

2.5 Reporting under the TEP

Notification and reporting will be conducted in accordance with TEP conditions (Section 5). The following table provides a summary of what information will be reported to DERM, and at what frequencies, during the term of this TEP.

Table 10. Reporting Requirements

Report	Frequency	Content	Timing	Format
Weekly Water Quality and Flow Report	Weekly	Weekly monitoring results from monitoring locations Notification of flow releases including flow rates and durations – commencement and cessation of releases included.	By close of business of the following Monday.	Email or Fax
Water Quality and Flow Exceedence Report	As required under this TEP	Details of any exceedence and actions taken as per the requirements of this TEP	Within 24 hours of confirmation of exceedence	Verbal Notification and Email or Fax
Monthly Progress Report	Monthly	Progress and compliance against the TEP in relation to release activities.	Submitted 5th working day of the month for the previous calendar month	Email or Fax
Final Completion Report	Completion of TEP	Detailed report providing compliance statistics and commentary against all conditions of the TEP and resultant environmental outcomes.	Submitted by the 31 July 2011	Email or Fax

2.6 Stakeholder Management Strategy

It is recognised that this TEP is likely to have an impact on downstream users of the receiving waterways, and the following strategies will be employed to minimise impact to our stakeholders:

- Supply downstream neighbours with a schedule showing timing of release events of the next 6 months;
- Establish a regular weekly communication to provide neighbours with the opportunity to raise queries and concerns;
- Commit to ceasing or scaling back release events if a neighbour has a particular time or date where they need access to the receiving waterways (if this can practically be done by Hail Creek);
- Supply monthly reports on water quality, flow and total volume of water released under this TEP (aligned with monthly reporting to DERM); and
- Investigate whether stakeholder would be interested in participating in a forum for the sharing of ideas, communication of constraints, and brain-storming for allow neighbours the opportunity to input into future changes to the Hail Creek water management system.

3. Further Supporting Information

3.1 Environmental Values and Water Quality Objectives

Water quality results from the Hail Creek Mine as presented in this document and in the Water Management Plan and the results of the 2009 & 2010 REMPs indicate significant variability in receiving water quality and habitat values. Water quality is influenced by other activities within the upstream and surrounding catchment, flow rates, rainfall intensity and in turn erosion rates, and evaporative losses. Water flows are infrequent and unreliable, reflecting district rainfall patterns. Downstream water is utilised for stock watering purposes.

The area surrounding Hail Creek Mine is characterised by the following environmental attributes:

- Significantly impacted ecosystems due to historic clearing of native vegetation for agricultural activities.
- Agricultural land uses - predominantly grazing and associated improved pasture, although some cropping is also undertaken.
- Degraded riparian environment from stock grazing, though more ecologically diverse than surrounding grazing and cropping areas.
- Consistent and moderate water quality across the Hail Creek Mine area, with some minor differences between upstream and downstream sampling locations. Further sampling (as part of the REMP program) is seeking to understand the contribution of HCM discharges to this trend in water quality in the receiving environment.
- Good sediment quality, and generally similar across the sites, with no trends observed between upstream and downstream sampling locations.
- Aquatic habitat of moderate condition, moderately stable banks, and substrates dominated by finer sediments such as sand and silt.
- A diversity of aquatic fauna species within the receiving environment waterways that is typical of central Queensland inland with no rare or endangered species recorded.
- Macroinvertebrate communities of moderate condition, and indicative of moderate water and/or habitat quality.

The following is a summary of the water quality objectives for the region based on the Draft *Establishing Environmental Values, Water Quality Guidelines and Water Quality Objectives for Fitzroy Basin Waters* (DERM, 2010) for the Isaac/Connors catchment, within which Hail Creek Mine is located (discharging into Bee Creek).

For the protection of aquatic ecosystems in the Fitzroy Basin lowland freshlands, the following guidelines apply for the Upper Isaac Creek catchment:

- A pH range of between 6.5 and 8.5 has been proposed for the sub-region.
- A sub-regional guideline of 835 µs/cm for EC.
- A sub-regional guideline of 55 mg/L for TSS.
- A sub-regional guideline of 25 mg/L sulphate (SO_4^{2-}).

- There is insufficient data to derive a guideline for total nitrogen. The regional guideline of 500mg/L for total nitrogen has been proposed from QWQG based on moderately disturbed upland freshwater systems.
- There is insufficient data to derive a guideline for total phosphorus. The guideline of 50mg/L for total phosphorus has been proposed from the QWQG based on moderately disturbed upland freshwater systems.

Guidelines for irrigation, farm use and stock watering are based on the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000).

The Bee Creek catchment also contains a specific waterway valued ecological characteristic known as the Pink Lily Lagoon, in the Oxbow Lake of Bee Creek. This feature is located next to South Walker Mine and is a significant distance downstream (~50km) of Hail Creek.

3.2 Impact Assessment Relating to the Release

Table 11 considers the potential impacts on downstream receivers associated with proposed short term changes to operating conditions, an assessment of risks of these impacts and measures to be implemented to minimise each potential impact.

Table 11 Impact Assessment & Control Summary

Potential Impact	Assessment of Risk	Management Measures
Aspect: Decrease in water quality		
Decrease in biodiversity Reduced use of water to downstream users Sedimentation	Already low to moderate environmental values. Receiving environment significantly impacted ecosystems due to historic clearing of native vegetation for agricultural activities. Degraded riparian environment from stock grazing. Local downstream users limited to stock. Sediment level in dams negligible in comparison to expected sediment levels of receiving waters. Discharge water EC will be lower than the livestock tolerance level specified in Table 4.3.1 of *ANZECC for fresh and Marine Water Quality 2000*. Based on existing stream water quality there will be sufficient mixing of discharge water to allow the EC to be lower than the livestock watering and crop irrigation salinity threshold tolerance levels specified in Table 4.3.1 of *ANZECC for fresh and Marine Water Quality 2000*.	Monitor discharge and receiving water quality in accordance with EA and TEP. Discharge procedure. Monitor water quality in dams and at end-of-pipe. Monitor discharge and receiving water flow in accordance with EA and TEP. Reduced discharge where appropriate. Stakeholder management strategy.

Potential Impact	Assessment of Risk	Management Measures
Aspect: Increase in flows		
Erosion/ scouring Increase in downstream flood levels Potential to restrict access to properties	Discharge flows will be contained within the existing downstream channel. The direct downstream access roads crossing channels have sufficient capacity to convey additional flow. Water will be preferentially released as soon as possible, minimising environmental harm by releasing when water is still in creek systems	Reduced discharge where appropriate/possible. Monitor discharge and receiving water flow in accordance with EA and TEP. Try to mimic a natural flow event with a high volume/flow discharge surge followed by low volume/flow extended discharge Stakeholder management strategy.

4. TEP Objectives

In accordance with section 331 of the EP Act, **Table 12** sets out the objectives of this TEP and provides actions, timeframe and performance indicators to measure progress in returning to normal operating conditions before the expiry of this TEP.

The objectives of this TEP is to prescribe operating parameters from approval to 30 June 2011 for Hail Creek Mine to implement temporary infrastructure and procedures in order to draw down site water inventories to return to compliance by 30 June 2011.

Rainfall in Central Queensland has been above average between August to December 2010, filling all holding facilities on site. Hail Creek has not been able to discharge the required volumes required to maintain a functioning water management system. This TEP is aimed at finding a temporary solution that allows Hail Creek to discharge water being impounded in pit as a result of the extreme wet season.

In any confounding event transpire to alter the actions or timeframes set out in **Table 12**, for example as a result of equipment failure, incidents, lack of physical access to discharge site or unexpected events relating to this TEP, DERM will be notified as soon as possible after becoming aware of the issue. The findings of investigations will provide the basis for submitting an amendment to this TEP to DERM in accordance with section 344 of the EP Act.

The objective of this TEP is to effectively manage mine water during the 2010 – 2011 wet season to ensure that an uncontrolled spillway discharge does not occur.

Table 12. TEP Objectives

Objective A	ction	Accountable	Time frame	Performance indicator
Effectively manage mine water during the 2010 – 2011 wet season to ensure that an uncontrolled spillway discharge does not occur	Conduct controlled discharges from mine storages under proposed TEP conditions (as per conditions W1 through W9).	Liam Wilson (HSEC Manager)	From approval to 30 June 2011	Compliance with TEP conditions. Water levels in mine storages reduced to below MRL.
	Maximise mine water consumption (i.e. dust suppression, construction, etc.) activities with immediately available resources (as per conditions within existing EA).	Tim Squance (CHPP Manager) Bill Hall (Mining Manager)	From approval to 30 June 2011	Increase in mine water usage/reuse.
Environmental Monitoring Procedures	Amend environmental monitoring procedures to include additional monitoring requirements during release events and in emergency situations.	Liam Wilson (HSEC Manager)	Within 2 weeks of TEP approval granted	Procedures in place and available to relevant site personnel.

Review Water Management System	Review water management system and associated documents to ensure preparedness for wetter seasons than previously modelled.	Liam Wilson (HSEC Manager)	From approval to 30 June 2011	Water Management Plan and associated site documentation reviewed. Use of OPSIM model to forecast future rainfall scenarios and ensure site meets required containment standard HCM to engage with DERM to ensure agreement on site containment standard Action plan developed and implemented to address infrastructure requirements.

5. Proposed TEP Conditions

In carrying out this TEP, Hail Creek Mine will undertake all activities in accordance with the following conditions.

If any inconsistencies occur between this TEP and the current EA, this TEP document will prevail over the extent of the inconsistency. On approval by DERM, Hail Creek is to be authorised to undertake the actions specified in this TEP document.

Release of Mine Affected Water

W1. Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this *Transitional Environmental Approval – Certificate of Approval*, unless otherwise authorised to under the *Environmental Protection Act 1994*.

W2. The release of contaminants to waters must only occur from the release points specified in **Table 6** and depicted in **Figure 1** (Appendix A) of this TEP.

W3. The release of contaminants to waters must not exceed the release limits stated in **Table 5** at the monitoring points specified in **Table 6** of this TEP.

W4. The release of contaminants to waters from the release points must be monitored at the locations specified in **Table 6** for each quality characteristic and at the frequency specified in **Table 7** of this TEP.

W5. If quality characteristics of the release exceed any of the trigger levels in **Table 9** during a release event, the TEP holder must compare the downstream results for the receiving waters monitoring point identified in **Table 8** to the trigger values in **Table 9**; and

a) where the trigger values are not exceeded then no action is to be taken;

b) where the downstream results exceed the trigger values specified **Table 9** for any quality characteristic, compare the results of the downstream site to the data from background (upstream) monitoring sites; and

(i) if the result is less than the background (upstream) monitoring site data, then no action is to be taken; or

(ii) if the result is greater than the background (upstream) monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

1. details of the investigations carried out

2. actions taken to prevent environmental harm

W6. If an exceedence in accordance with condition W5(a)(ii)(2) is identified, the holder of the TEP must notify the administering authority within fourteen (14) days of receiving the result. The notification must include written verification of the exceedence forwarded to the administering authority either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au

Contaminant Release Events

W7. The TEP holder must follow a mimicked flow event pattern (in terms of modifying release flow rate) as outlined in Section 2.1.2 of this document (and **Table 4**) where:

a) peak flow rate to be achieved is no greater than (4000L/s), followed by a scaling back of the pumped flow rate;

b) maximum volume released during a release event is to be no greater than 2500 ML;

c) no more than 4 release points will be operating at any one time; and

d) each release flow event is to be followed by no less than 3 days without flow.

W8. The time period, flow rates and volumes discharged for the time that each additional release point is operating must be monitored and follow the pattern outlined in Section 2.1.2 of this document (outlined in **Table 4**).

W9. The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in **Table 6**.

Requirements to Cease the Release of Mine Affected Water

W10. The release of mine affected waters must cease immediately if any water quality limit as specified in **Table 5** is exceeded.

W11. The release of mine affected waters must cease immediately if identified that the release of mine affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

W12. The release of mine affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

W13. The release of mine affected waters authorised under this Transitional Environmental Program must cease by 30/06/2011 (i.e. the last action date for discharges in Table 1).

Erosion and Sediment Control

W14. Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

W15. If W10 cannot be met, erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:

a) be designed and constructed by a suitably qualified and experienced person, and

b) be inspected by a suitably qualified and experienced person prior to the commencement of dewatering operations; and

c) be inspected by a suitably qualified and experienced person following the cessation of release in accordance with the conditions of this *Transitional Environmental Program – Certificate of Approval.*

W16. The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine

affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:

a) identification of erosion, slumping and scour impacts to vegetation,

b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm, and

c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

W17. The Transitional Environmental Program holder must notify the administering authority within twelve (12) hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) release commencement date/time;

b) expected release cessation date/time;

c) release point/s;

d) release volume (estimated); and

e) any details (including available data) regarding likely impacts on the receiving water(s).

W18. The Transitional Environmental Program holder must provide the administering authority weekly during the release of mine affected water, in writing (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) all in situ monitoring data for the preceding week;

b) the receiving water flow rate for the preceding week; and

c) the release flow rate for the preceding week.

W19. The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under W14 and within twenty-eight (28) days provide the following information in writing:

a) release cessation date/time;

b) natural flow volume in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results; and

f) any other matters pertinent to the water release event.

Notification of Release Event Exceedence

W20. If the release limits defined in **Table 5** are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within eighteen (18) hours of receiving the results.

W21. The Transitional Environmental Program holder must, within twenty-eight (28) days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) all water quality monitoring results;

d) any general observations;

e) all calculations; and

f) any other matters pertinent to the water release event.

Monitoring Requirements

W22. Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

W23. All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

W24. As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

W25. The notification of emergencies or incidents must include but not be limited to the following information:

a) the holder of the Transitional Environmental Program;

b) the location of the emergency or incident;

c) the number of the Transitional Environmental Program;

d) the name and telephone number of the designated contact person;

e) the time of the release;

f) the time the holder of the Transitional Environmental Program became aware of the release;

g) the suspected cause of the release;

h) the environmental harm caused, threatened, or suspected to be caused by the release; and

i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

W26. Not more than fourteen (14) days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:

a) proposed actions to prevent a recurrence of the emergency or incident, and

b) outcomes of actions taken at the time to prevent or minimise environmental harm.

Reporting

W27. The holder of this Transitional Environmental Program will provide weekly monitoring reports to the administering authority, detailing in-situ water quality parameters monitoring during release, as outlined in **Table 10**.

W28. The holder of this Transitional Environmental Program will also submit a report to the administering authority by the fifth (5) business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program;

b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity.

c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

W29. The holder of this Transitional Environmental Program must also submit a report to the administering authority by 31st July 2011 including:

a) details of the completion of the Transitional Environmental Program,

b) details on all activities undertaken under the Transitional Environmental Program,

c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

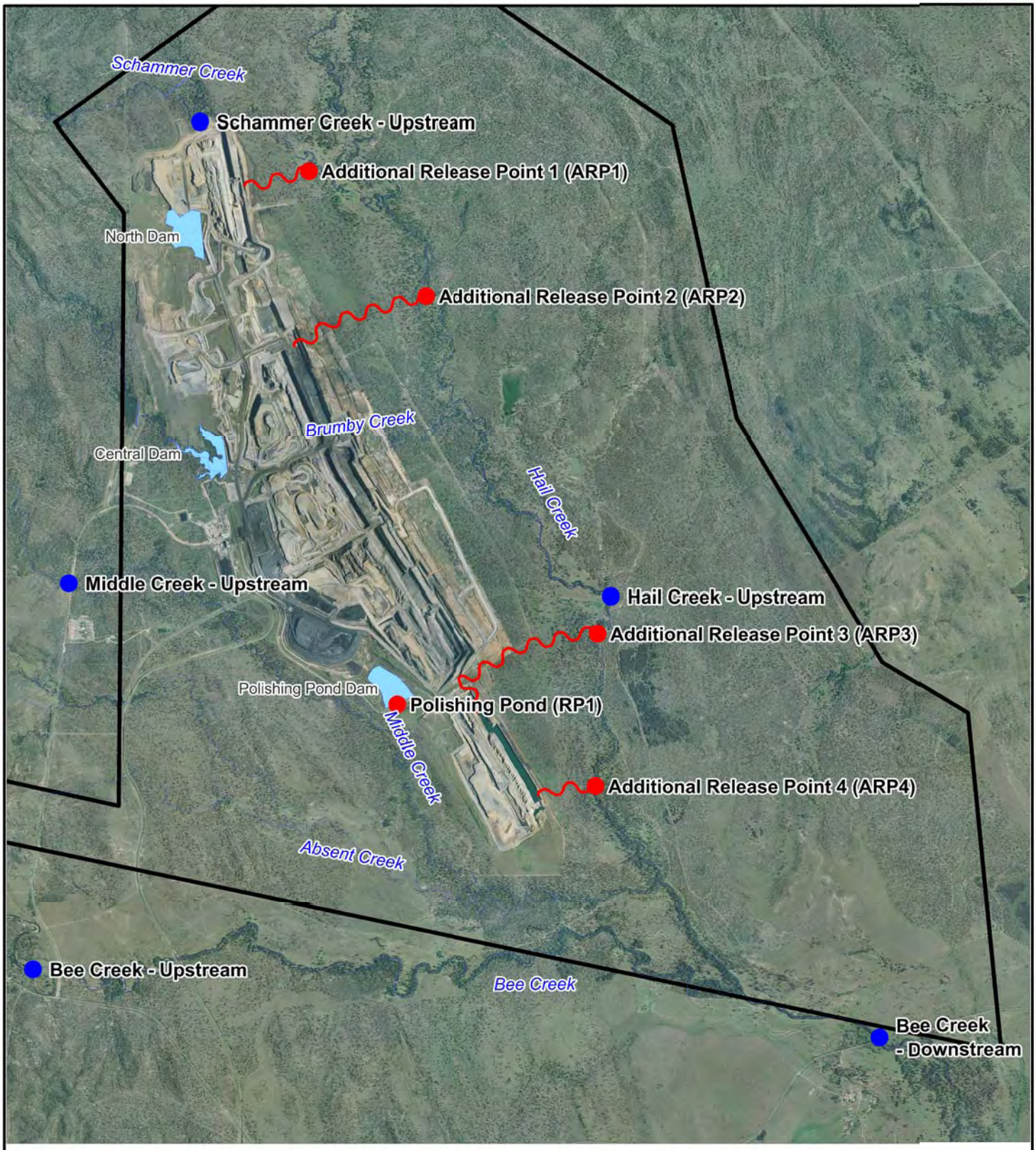
(iii) the best practice environmental management for the activity, and

(iv) the risks of environmental harm being caused by the activity,

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program; and

e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority for Hail Creek Mine, (MIN100913309) and the *Environmental Protection Act 1994*.

Appendix A – Map showing Additional Release Points and Monitoring Locations



N
W E
S

Contaminant Release Points (RP1 & ARPs)

Receiving Environment Monitoring Points

RioTinto

Rio Tinto Coal Australia - Hail Creek Mine

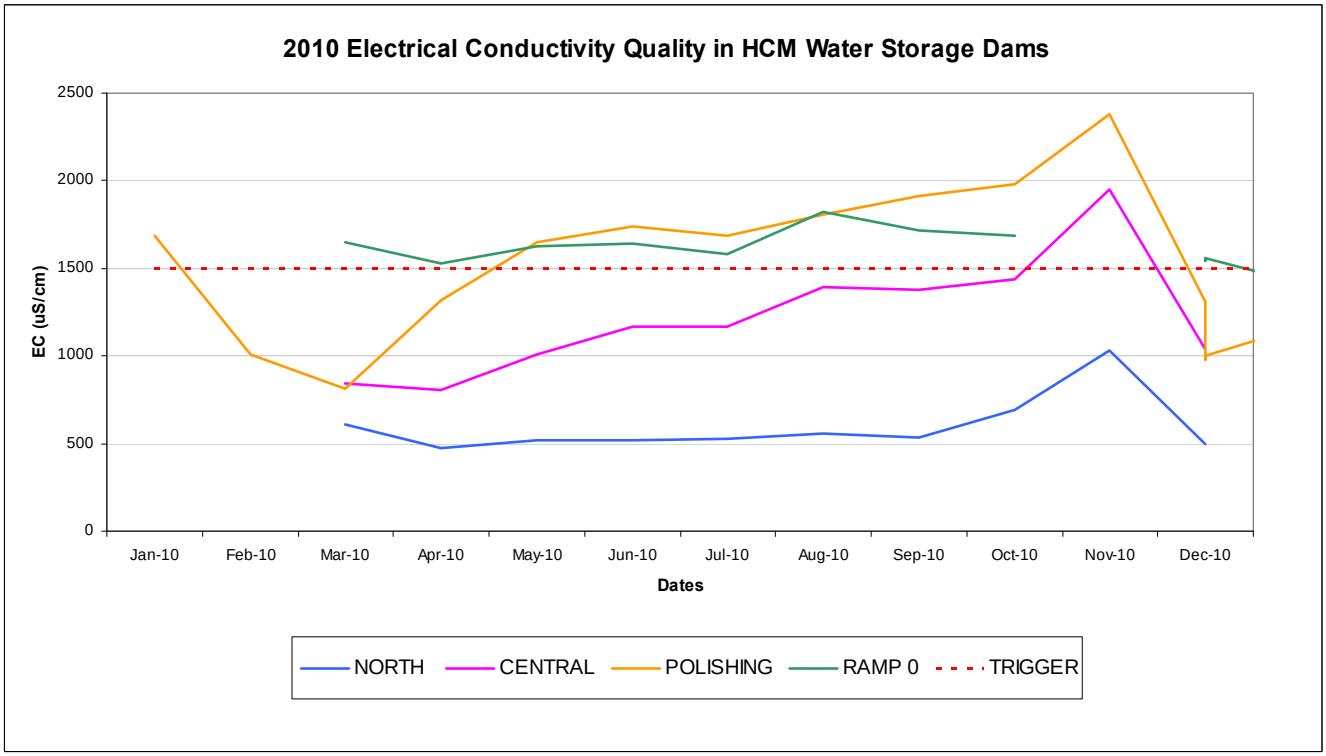
Appendix A - Map showing Additional Release Points and Monitoring Points

Author: Martine Goldner	Date: 14/01/2011
Scale: 1:75,010	Datum/Projection: AMG Zone 55, AGD84

Plan: Z:\Mapinfo\Plans\Hail Creek\2011\Hail Creek TEP_2011

Appendix B – Water Quality Trends over 2010

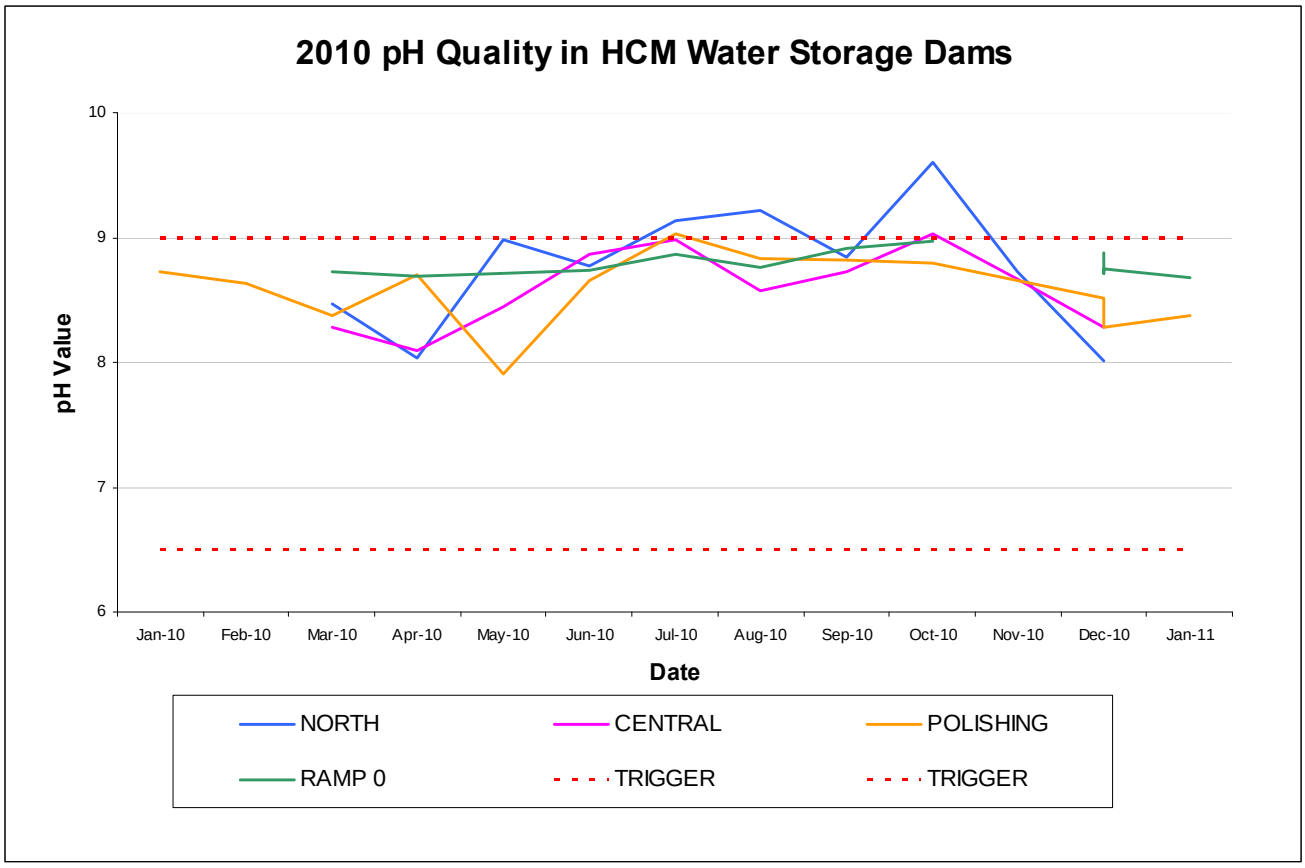
Graph 1 - Electrical Conductivity Trends within HCM Water Storage Dams for 2010



Comments:

- The graph above displays a trigger limit of 1500 µS/cm in accordance with table W2 in EA MIN100913309 – Hail Creek Mine.
- This graph represents four (4) main water storage dams on site including: Polishing Pond (RP1), North Dam, Central Dam and Ramp 0 (disused mining pit).
- First discharge for the 2010/11 wet season commenced on November 21st, at the time of commencement EC for Polishing Pond was 1485 as stated in the Notification of Commencement document submitted to DERM.
- Polishing Pond tends to fluctuate throughout the year with a minimum EC level in March of 811 µS/cm and a maximum in early November of 2380 µS/cm.
- Discharge events have occurred throughout December and early January to date. EC for Polishing Pond has remained relatively stable, below the trigger limit, over this period.
- Ramp 0 has continued to demonstrate EC levels above the trigger limit consistently throughout 2010. However, due to increased rainfall, EC for Ramp 0 has fallen to at or near the trigger limit in December.
- North Dam has remained below the trigger limit consistently throughout 2010, while Central Dam during mid October rose above 1500 µS/cm and peaked in November to 1950 µS/cm.

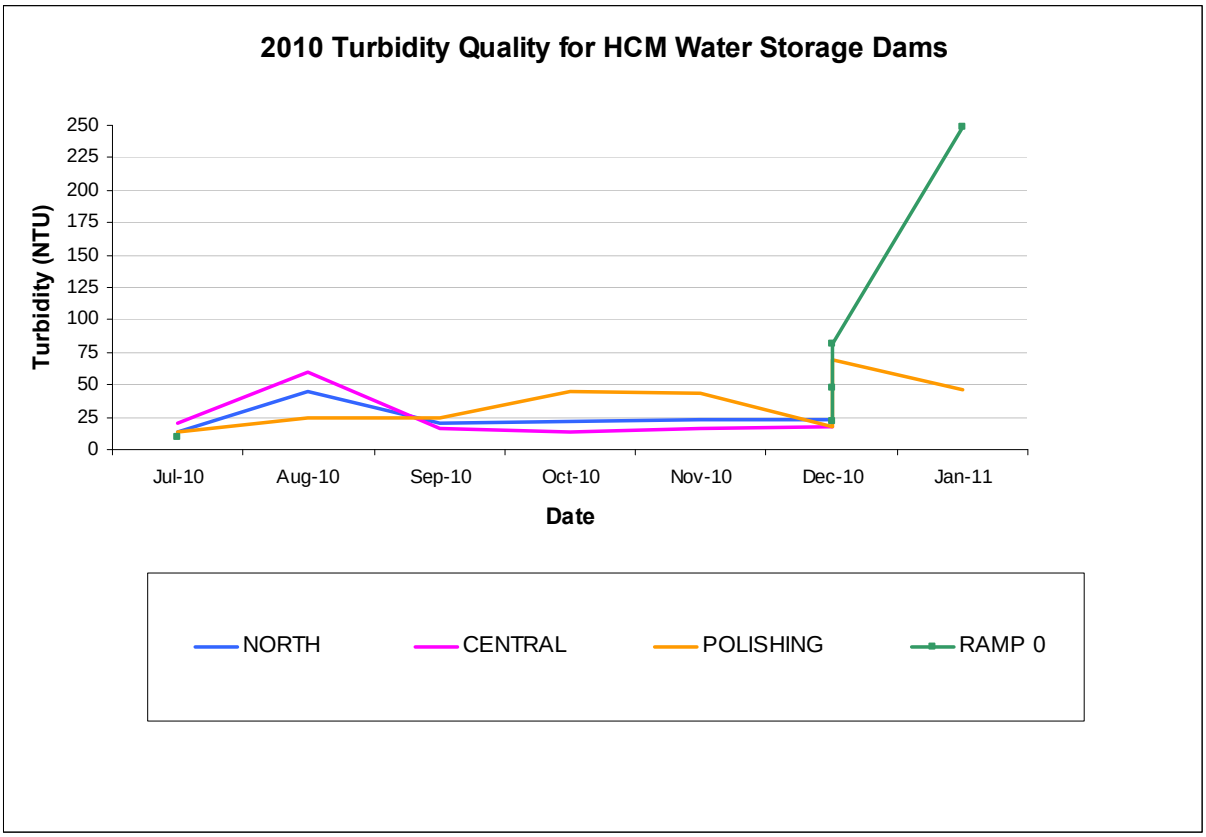
Graph 2 - pH Trends within HCM Water Storage Dams for 2010



Comments:

- The graph above displays a trigger limit range of 6.5- 9.0 pH, in accordance with table W2 in EA MIN100913309 – Hail Creek Mine.
- This graph represents four (4) main water storage dams on site including: Polishing Pond (RP1), North Dam, Central Dam and Ramp 0 (disused mining pit).
- The pH for Polishing Pond has varied throughout 2010, with a minimum of 7.91 recorded in May and a peak of 9.03 recorded in July. pH has stabilised somewhat between the months of August and November.
- Ramp 0 has consistently remained within the trigger limit range for pH throughout 2010.
- For Central Dam pH peaked twice above the trigger limit, once in July and October. From October onwards trends suggest there has been a decline in pH value towards neutral.
- North Dam data can be seen to be consistently and commonly above the maximum trigger limit of 9.0. Peaking in October, perhaps as a result of changing seasons, an increase in temperature and photosynthetic productivity within this dam. North Dam is a fresh water dam and contains large amounts of aquatic macrophytes and various algae species.

Graph 3 - Turbidity (NTU) Trends within HCM Water Storage Dams for 2010



Comments:

- Data for Turbidity has only been collected from July 2010 onwards for North Dam, Central Dam and Polishing Pond.
- Fewer records exist for turbidity for Ramp 0, as this parameter has only recently been incorporated into current monitoring programs.
- As there is currently no trigger limit set for Turbidity, the collected data cannot be compared for compliance purposes. However, general trends can be observed.
- All sites typically lie below 75 NTU with central dam representing the lowest value of Turbidity.
- Polishing Pond results shows an increase during December, along with values for Ramp 0. This may be due to the use of evaporators/atomisers within the Ramp 0 water storage, or perhaps as a result of mixing of water between within these water bodies, along with the impact of discharging and rain fall.

Annexure Item 7.3

Evidence of correspondence with DERM

Ritchie, Stuart (RTCA)

From: Gordon, Rory (RTCA)
Sent: Wednesday, 2 February 2011 4:35 PM
To: Ritchie, Stuart (RTCA)
Subject: FW: Hail Creek Coal Mine TEP Comments

FYI

Regards

Rory Gordon
General manager – Health Safety and Environment, Coal Australia

Rio Tinto
Level 3 – West Tower 410 Ann Street Brisbane 4000 Australia

T: +61 (0) 7 3361 4261 M: [redacted] F: +61 (0) 7 3361 4290
[redacted] http://www.riotintocoalaustralia.com.au

From: Wilson, Liam (RTCA)
Sent: Thursday, 27 January 2011 11:59 AM
To: Woodley, Andrew (RTCA); Gordon, Rory (RTCA)
Subject: Fw: Hail Creek Coal Mine TEP Comments

Comments from DERM. Sent Tues afternoon but didn't come through to us. Initially looks like a bit of work. We will commence. They appear to be missing the point of why you apply for a TEP, being that you can't comply. We will commence addressing each comment. Liam

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From: Loveday Chris [redacted]
Sent: Thursday, January 27, 2011 12:37 PM
To: Goldner, Martine (RTCA)
Cc: Wilson, Liam (RTCA)
Subject: FW: Hail Creek Coal Mine TEP Comments

Martine

Not sure why these didn't come through but here they are

Regards

Chris

From: Blades Rebecca
Sent: Tuesday, 25 January 2011 4:43 PM
To: [redacted]
Cc: Loveday Chris; Roberts Tristan
Subject: Hail Creek Coal Mine TEP Comments

Hi Martine,

Please find below the departments initial comments on the draft TEP submitted by the Hail Creek Coal Mine (HCCM). In general, the department recommends that the overland discharge strategy be changed and that piping be used to deliver waters to the discharge points in the creeks thereby eliminating further and avoidable environmental harm to terrestrial and aquatic environments. Considerable tracts of land may be affected by this proposed discharge mechanism as the pits and dams are from 1.7-2km+ from the watercourses. If the use of pipes is not possible due to logistical reasons, every alternative should be explored, such as dewatering storm waters in best quality coal pits into lesser quality pits first and using a reduced number of discharge points, constructing a discharge channel to help prevent potential uncontrolled erosion associated with multiple overland discharges, etc. The alternatives need to be discussed within the TEP with justifications as to why different methods were not utilised.

The department recommends some form of natural flow exist within the receiving waters. In order of preference, alternatives would be for HCCM to:

- propose a lowering of the existing natural flow trigger limit to increase the opportunities for discharge and remain within the existing EA discharge limits for contaminants;
- propose a lowering of the existing natural flow trigger limit to increase the opportunities for discharge but also propose slightly increase discharge limits for contaminants;
- propose near to (or continue with) dry weather releases, however have a contaminated water mixing strategy to manage EC – the currently proposed EC limit of 2000 µS/cm is highly undesirable and really should be regarded as non-permissible (the client makes reference to this being similar to the EA limit however the EA limit presumes mixing with uncontaminated natural waters at a 1:4 ratio) – a contaminated waters mixing strategy would incorporate mixing cleaner waters with more contaminated waters to achieve the best overall EC outcome and total discharge volume over the course of the dewatering operation. Applying this strategy would minimise the impact on downstream EV's, including water quality not only for aquatic ecosystem protection but also for the downstream stakeholder who has human drinking and livestock watering concerns.

A receiving environment compliance point (Bee Creek Downstream) should be introduced whilst discharges are occurring - compliance limit for EC should ideally be set at the Isaac sub-regional guideline objective level of 835µS/cm but allowance up to 1000µS/cm should be considered. Should a BCD EC compliance limit above 1000 µS/cm be considered, there would be a need to assess that WQ limit against downstream EV's as mentioned above. Note exceeding limits downstream would require the site to cease discharging.

I can also provide the following specific comments/requests on the TEP document:

Page 9 – please provide the 80th percentile figures for EC, pH and SO4 2.

Page 13 - This approach to managing flow patterns is admirable however it would be equally appropriate to manage elevated water quality parameters. To that end, and to help reduce medium level risk to low level risk associated with near-to-dry weather discharges, the department recommends the following inclusions to the TEP dewatering proposal:

An initial discharge of clean water only – this will provide a base upon which in-stream fauna can begin to acclimate to upcoming changes in physicochemical water quality. It is not often the concentration of EC/sulfate/pH that is harmful to aquatic biota but the rate of change. Aquatic biota in ephemeral reaches can withstand these levels of water quality but they do require some time for their metabolism to adjust. To help alleviate the impact of the rate of change in water quality, it is recommended that **an initial discharge of clean water** only occur - the discharge rate should be equivalent to the discharge rate of combined clean+contaminated water to come for the duration of the TEP – for example, if the Hail Creek Coal Mine (HCCM) propose to discharge a total 20ML/day of clean+contaminated water, then that discharge should be preceded by 1 day of 20ML/day or equivalent (e.g. 2 days of 10ML/day). If there is still natural flow in the system of a known equivalent daily volume at the time of commencement of dewatering then this condition will not need to be acted upon. (e.g. HCCM propose to discharge 10ML/day of clean+contaminated; creek has 5ML/day of natural water flows; HCCM need only discharge an additional 5ML/day of clean water for 1 day prior to commencing the clean+contaminated water dewatering phase).

A tail flush using clean water only once the discharge of clean+contaminated water has ceased, for as long as possible, to help restore water quality in 'runs' (i.e. sections of the creek that are not pools) to as close to base level water quality and to help reduce contaminated water levels in pools as much as possible. The final volume of the tail flush should be left to the discretion of HCCM so that they retain enough clean water for their operational security however it is recommended that a minimum of 3 equivalent days (of clean water only) of the average

clean+contaminated water discharged over the course of the TEP to occur. If there is still sufficient natural flow in the system of a known equivalent daily volume at the time of cessation of dewatering operations then this condition will not need to be acted upon.

Page 14 – paragraph 2 (& Page 15, paragraph 5) - The discharge strategy must also consider water quality - blending of high EC waters with low EC waters must take place so that the overall downstream (mixed) water quality EC remains at a near-consistent concentration - this strategy needs to be reviewed considering WQ. Please include these considerations within the draft TEP.

Page 15 – Proposed release limit of 2000uS/cm - This limit is too high - the current EA limits rely on a 1:4 dilution ratio with uncontaminated receiving waters - in the absence of those waters the department requires Hail Creek attempt to achieve the lowest EC possible using cleaner water stored onsite - blending of cleaner and more contaminated wastewaters should be able to achieve a much lower maximum EC - the client should be asked to review the dewatering strategy with this objective in mind and propose a new maximum EC limit.

Page 15 – Proposed release limits for Turbidity and TSS of background + 10% - This limit is not appropriate when there is no background flow

Page 16 – proposal of end of pipe monitoring locations - How can there be an end-of-pipe monitoring point if there is no pipe - which overland releases, water entering the watercourse will be affected by terrestrial environment, most probably including contributions from soil erosion such as increased TSS and EC.

The department strongly recommends that overland flow not be considered - overland flow discharges over prolonged periods causes saturated soils to become mobile, leading to heavy erosion, particularly at the high discharge rates proposed in this TEP (refer to Table 4 Section 2.12) - the flooding of pits should not be considered as just cause to allow further environmental harm to occur in the form of eroding topsoils and gullying of surrounding lands with subsequent deposition of those soil-derived sediments in streambeds and pools - pipes must be put in place if multiple discharge points are to be permitted so that the wastewater is delivered directly to the stream thereby protecting terrestrial soils - stream armouring/erosion control must be put in place to prevent erosion of stream bed and banks where discharge rates and discharge energy is likely to cause erosion

Note also that an overland flow discharge strategy is also likely to contribute higher salt loading to the discharge and potentially cause exceedance of EC triggers and limits in the receiving environment.

Note also that any permitted overland discharge dewatering strategy would also trigger a requirement for receiving environment sediment sampling program.

Page 18 - No metals/metalloids sampling is proposed - metals/metalloids monitoring from each pit or dam must take place end-of-pipe on a weekly basis whilst those waters are directly or indirectly contributing to discharges - measures to be taken as both total and dissolved concentrations and otherwise as per the EA - this is to ensure that is deterioration of pit or dam water quality begins to take place then appropriate management actions can take place in regards to downstream environmental values and stakeholders requirements.

Page 19, Table 9 – Monitoring Frequency – the department recommends twice daily - morning and afternoon - for pH and EC, whilst discharge is occurring, at each discharge point.

If you have any further questions, Tristan should hopefully be back in the office on Thursday and be able to assist you further.

Regards,

Rebecca Blades
Principal Environmental Officer, Environmental Services - Mining
Telephone: 07 4980 6200 **Facsimile:** 07 4982 2568 **Email:** [redacted]
www.derm.qld.gov.au
Department of Environment and Resource Management
99 Hospital Road, Emerald, Q 4720
PO Box 19, Emerald Q 4720

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Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO2 in the atmosphere

3 sheets of A4 paper = 1 litre of water

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Annexure Item 7.4

Approval of Transitional Environmental Program MAN11801

Department of Environment and Resource Management

Environmental Protection Act

Transitional environmental program certificate of approval number MAN11801

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. *A transitional environmental program is a specific program that, when approved, achieves compliance with the* Environmental Protection Act 1994 *for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Queensland Coal Pty Ltd
Level 3 – West Tower
410 Ann Street
Brisbane Qld 4000

C/c: Ms Martine Goldner
Environmental Specialist
Rio Tinto Hail Creek Mine
PO Box 3097
Mackay Qld 4740

approving the draft transitional environmental program; titled *Hail Creek Mine - Transitional Environmental Program Under Section 333 of the Environmental Protection Act 1994* for management of on-site water at Hail Creek Mine ML4738.

The draft transitional environmental program, dated 28 January 2011, was originally received by this office on 18 January 2011. The transitional environmental program remains in force until 30 June 2011.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, Tristan Roberts of the Department of Environment and Resource Management on telephone 49671490 would be happy to assist you.

[redacted]
Signature

29 January 2011
Date

Christopher Loveday
Manager (Environmental Services - Mining)
Department of Environment and Resource Management

Enquiries:
Department of Environment and Resource Management
PO Box 19
Emerald Qld 4720
Phone: 4980 6200
Fax: 4982 2568

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Queensland Government

HAIL CR TEP

Department of Environment and Resource Management

Notice

Environmental Protection Act

Decision to grant an approval for a draft transitional environmental program

This statutory notice is issued by the administering authority pursuant to section 340 of the Environmental Protection Act 1994, *to advise you of a decision or action.*

Your reference : EA MIN100913309 :ML4738
Our reference : MAN11801: MKY:

Queensland Coal Pty Ltd
Level 3 – West Tower
410 Ann Street
Brisbane Qld 4000

C/c: Ms Martine Goldner
Environmental Specialist
Rio Tinto Hail Creek Mine
PO Box 3097
Mackay Qld 4740

Attention: Ms Martine Goldner

Re: Application for an approval for a transitional environmental program for discharge of mine affected water at Hail Creek Mine, ML4738.

Thank you for your application for an approval for a transitional environmental program.

Your application, which was originally received by this office on 18 January 2011, has been approved.

A copy of the certificate of approval (MAN 11801) is attached.

Fees apply for the assessment of a draft transitional environmental program and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees.*

A fee of $3258.40 is payable.

Should you have any queries in relation to this notice, Tristan Roberts of the Department of Environment and Resource Management on telephone 49671490 would be happy to assist you.

[redacted]
SIGNATURE

29/01/2011
DATE

Christopher Loveday
Manager (Environmental Services – Mining)
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Department of Environment and Resource Management
PO Box 19
Emerald Qld 4720
Phone: 4980 6200
Fax: 4982 2568

Department of Environment and Resource Management
www.derm.qld.gov.au ABN 46 640 294 485

Queensland Government

Annexure Item 7.5

Amendment application to Transitional Environmental Program

Hail Creek Mine

Amendment

Transitional Environmental Programme under Section 333 of the *Environmental Protection Act 1994*

Environmental Authority MIN100913309

Principal Holder: Queensland Coal Pty Ltd

Joint Holder: Marubeni Coal Pty Ltd.
Sumisho Coal Development Queensland Pty Ltd.
Nippon Steel Australia Pty Ltd

18th January 2011 – 30th September 2010

Approvals

N ame	Position	Signed	Date
Originator	Environmental Specialist	-	-
Checked	HSEC Manager	-	-
Authorised	General Manager	-	-

Revisions

Date	Description	By	Check	Authorised
18.04.2011	Issued for use	MG	LW	GS

Contents Page

1. Background

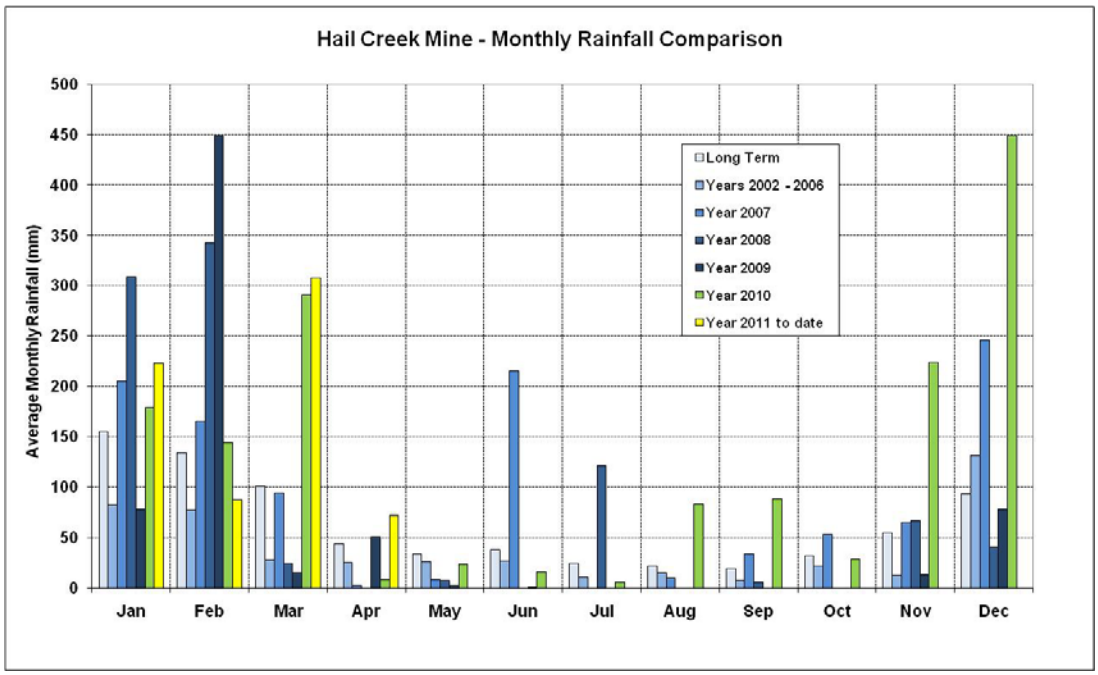
1.1 Reason for TEP Amendment

This document is intended to complement and update the current Transitional Environmental Programme (TEP) currently in force for Hail Creek Mine (MAN11801). This TEP was voluntarily submitted to DERM in accordance with the *Environmental Protection Act 1994*.

As detailed in the initial TEP document, the 2010-2011 wet season has been characterised by prolonged and above average rainfall events. This has continued since the approval of the TEP, which has impacted on Hail Creeks ability to release water as per the TEP timeframes.

Figure 1, below, provides an update of rainfall received in February and March 2011.

Figure 1. Monthly Rainfall Comparison



The months of January, February, March (as well as April to date) have all recorded significantly above average rainfall, with March in particular recording extremely large rain volumes. A total of around 619mm of rain has fallen in the period of January to March 2011, which is around 230 mm greater than the long term average for these months.

This additional rainfall has had a two-fold effect on the ability of Hail Creek to release water. Firstly, it has continued to replace volumes of water discharged with fresh volumes impounded in the catchment. Secondly, it has caused significant delays in upgrading infrastructure in order for HCM to achieve the approved release rates under the TEP, due to access and transport problems.

An update of the status of the HCM water balance at the time of submitting this TEP amendment is as follows:

- Water has been released from 2 of the approved licensed discharge point, Polishing Pond (RP1) and Ramp 6 (ARP1);
- Progress has been made with dewatering of the Ramp 6 area through consistent and continued operation of ARP1 release point (as per Table 1);
- Significant volumes of water continue to be impounded in most other pits, with less progress on dewatering these areas (as per Table 1);
- Of the four main dams, three continue to site at close to or over the full supply volume (FSV), with the exception of the Polishing Pond which is kept drawn down to protect against uncontrolled release, again as detailed in Table 1 below;
- In pit water quality has increased, with EC being the key parameter of concern. However, a similar phenomenon has been observed with the background water quality in the area. Therefore, overall water impounded in pit continues to be representative of the background water quality.

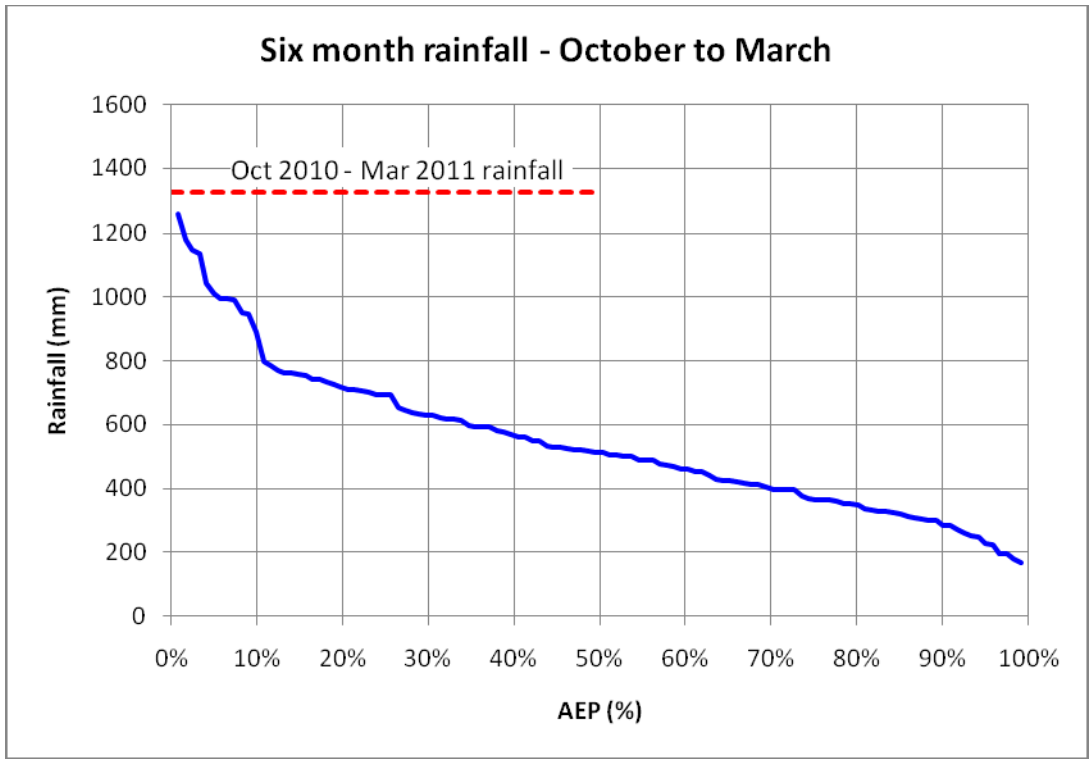
Table 1. Latest Dam and Pit Storage Capacity and Water Quality readings (April 2011)

Dam Storage/ Pit Name	Water Volume Impounded (ML)	Percentage of Full Supply Volume
Polishing Pond *(Release Point 1)*	240 ML	31% full (530 ML available)
Central Dam	990 ML	124% full (spills to Polishing Pond via Low Wall Drainage Channel)
Northern Dam	320 ML	97% full (10 ML available)
Ramp 0 *(This disused pit is now used as a water storage)*	2525 ML	97% full (contained by spoil dumps, but FSV based on geotechnical risk)
Ramp 1	300 ML	N/A
Ramp 2	100 ML	N/A
Ramp 3	1675 ML	N/A
Ramp 5	480 ML	N/A
Ramp 6	100 ML	N/A

Therefore, at the time of writing, Hail Creek has an estimate of 2655 ML still impounded in pit, which is actually more than when the TEP commenced. However, approximately 425 ML can be accommodated in the water storage network (again assuming overflows from Central report to the Polishing Pond).

Site rainfall for the period Oct-Dec 2010 continued to be well above average and continues to represent a nominal wet season AEP of around 1% (i.e. 1 in 100), as shown in **Figure 2** below. Forecast modelling for the 2010/11 water year (Oct-Sep) based on the historical rainfall records, suggests that an additional volume of around 2,000ML may potentially be captured within the Hail Creek water management system for the remainder of the water year. **Table 1** above indicates that Hail Creek is currently impounding a total of around 6730ML on site.

Figure 2. Rainfall Annual Exceedance Probability



This TEP amendment has been prepared to outline changes that have occurred to HCM's water management situation since the commencement of the TEP, and to seek amendments to the TEP in response.

1.2 Receiving Water Quality

Detailed background water quality information was presented in the initial TEP document. Since the commencement of this approval, a number of phenomenon have been observed in the receiving waterways, which have become relevant to Hail Creek Mine's TEP approval.

In particular, Electrical Conductivity (EC) is a key water quality parameter for which recent records have been outside of the normal range of historical results for the area. Recent EC observations have demonstrated rapid increases in normal background levels, across all upstream receiving environment monitoring locations. This pattern has also occurred with pit water, with escalations of the EC values of released water observed.

Table 2, below, summarises the trends observed over the long-term and in the last few months, for the parameter of EC.

Table 2. Historic & recent water quality results for Electrical Conductivity (EC) (µS/cm)

		Hail Creek Upstream	Middle Creek Upstream	Bee Creek Upstream	Schammer Creek Upstream	Polishing Pond (April to Nov- Dry Season)	Polishing Pond (Dec to Mar- Wet Season)	Bee Creek Downstream
		HCU	MCU	BCU	SCU	RP1	RP1 BCD	
Long-term results (µS/cm)	Min – Max	124 – **1395**	81 – 696	96 – **1660**	71 – **1000**	1265 – 1947	783 – **2262**	119 – **1610**
	Ave	529	350	750	282	1562	1348	886
	80th %	**1001**	504	**1411**	247	1781	1692	**1338**
2011 TEP results (µS/cm)	Min – Max	348 – 899	217 – **1160**	216 – **2630**	145 – **1390**		721 – 1749	131 – **1671**
	Ave	725	552	**1676**	**1023**	N/A	1353	**1003**
	80th %	820	644	**2368**	**1302**		1635	**1376**

Note: Cells in red bold are above the TEP Table 5 Electrical Conductivity Release Limits Receiving Water Trigger Limits (for RP1), or above the Table 10 Receiving Waters Downstream Contaminant Trigger Levels (for BCD, although this table also highlights when other locations (BCU, HCU, MCU and SCU are above the trigger level).

The highest historical long-term maximum for EC in the background receiving waterways is 1660 µs/cm at the Bee Creek Upstream location, with an 80th percentile value of 1411 µs/cm, based on a background data set collected since 2005. Since the commencement of the TEP, the maximum EC record for this same location has reached 2630 µs/cm, with an 80th percentile value of 2368 µs/cm.

It can be seen from **Table 2** that background EC has been elevated recently, which is believed to be related to heavy rainfall recorded for the 2010/11 wet season, and that this trend appears to be continuing.

Figure 3. Recent Electrical Conductivity & Rainfall Records at Hail Creek Mine

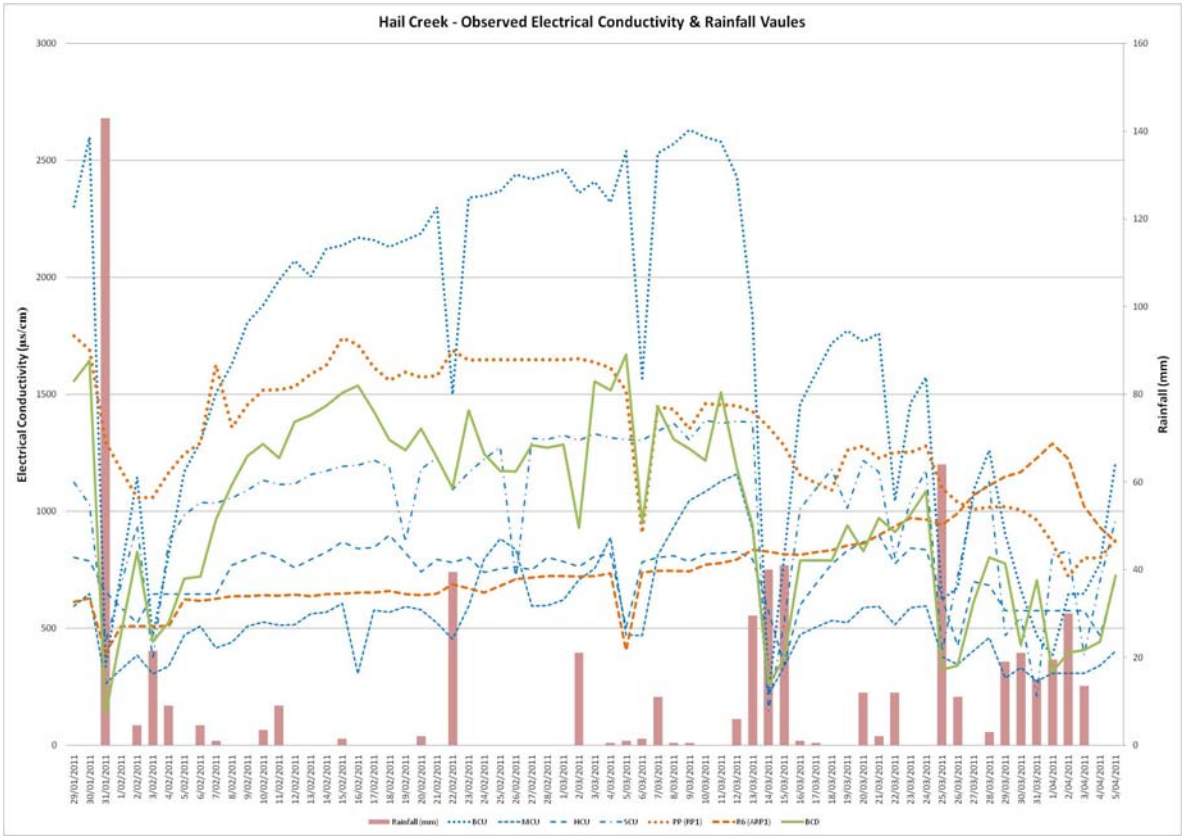


Figure 3 also shows that, in particular, the Bee Creek Upstream monitoring location has been elevated significantly above the downstream trigger value, which would be causing exceedences of the downstream EC trigger value independently of any release from Hail Creek Mine. As such, the downstream trigger value of 1000µs/cm is not considered to be appropriate for the current conditions, and is not reflective of the current natural environment.

Anecdotal evidence suggests that the surface creek systems experiences significant interaction with the underlying ground water reserves and this interaction is resulting in the elevated EC values. Indeed, the relationship between EC & rainfall can be seen in Figure 3, where rainfall causes EC to fall as this fresh water reaches the waterway systems, and a continued elevation of EC is observed when less or no rainfall is observed. It is also noted that all waterways have continued to flow since December, which is unusual for this region, given the strongly ephemeral nature of the area. It is postulated that the groundwater reserves, which are known to be more saline than the surface systems, are recharging into the creeks.

Hail Creek Mine undertake 6 monthly monitoring of the groundwater levels and quality, and when access can be arranged to the bore network, standing groundwater levels will reveal whether artesian bore conditions, with recharge to the surface, is indeed occurring.

1.3 Min e Water Quality

Since the commencement of the TEP, electrical conductivity levels within most of the mining pits has elevated. It is expected that this EC value will continue to deteriorate the longer the water remains in pit without further dilution, and as warmer weather is experienced. It is suspected that part of the higher EC water may be due to additional groundwater flow into the pits, or perhaps due to leaving of water from spoil/dump areas.

In contrast, Polishing Pond and Ramp 0 have remained fairly stable or have decreased EC levels, most likely due to dilution with incoming rainfall runoff. Generally, EC within the Polishing Pond can be quite variable, depending from where water has been transferred. Recent EC water quality results from all pit and dam storage areas are presented below, in **Table 3,** which shows the concentration since the commencement of the TEP.

Table 3. Recent EC water quality results for Mine Water Storages & Pits

Dam Storage/ Pit Name	**Electrical Conductivity (µS/cm)**		
	Field readings taken Jan 2011	*Field readings taken Mar 2011*	*Current TEP release limit*
Polishing Pond *(Release Point 1)*	1574	1227	2000 (RP1)
Central Dam	768	790	
Northern Dam	332	449	
Ramp 0 *(This old pit is used for water storage)*	**1490 1482**		1000 (ARP 3/4)
Ramp 1 (S)	**1907 Not**	**accessible**	800 (ARP2)
Ramp 2 (N)	**1625 Not**	**accessible**	
Ramp 3 (N)	675	**1329**	
Ramp 5 (N)	**985 951**		
Ramp 6	574	**1004**	800 (ARP1)

Note: Cells in red bold are above the TEP Contaminant Release Limits.

2. Alterations to Hail Creek TEP Strategy

2.1 Plan for the Release of Mine Affected Water

Alterations to the TEP approval (MAN11801) sought in this amendment are as specified below.

2.1.1 Total Volume of Mine Affected Water to be Released

The TEP approved to release a maximum volume of 10,000ML. Over the last three months since the TEP commencement, a volume of 5,522ML has been released (to the 10th April 2011).

Site modelling completed in early January predicted that if the wet season continues to follow its current pattern in terms of extremity, a conservative estimate of 5,000ML additional water would be contained between January and June 2011. This estimate assumed the volume to be contained would be consistent with that associated with an 80th percentile net rainfall yield year. However, between January and March 2011, an actual total of 5,472ML was impounded, which is over the initial estimate.

Revised site modelling now predict an additional volume of approximately 2,000ML to be impounded between April and September 2011, again assuming the 80th percentile net rainfall yield year. Further, a volume of 6,730ML is still currently contained on site.

Hail Creek propose to amend the upper maximum release volume to 12,000ML, inclusive of the water volume already released.

It is again noted that this total volume is conservative given that the 20th percentile monthly flow volume is approximately 30,000 ML for the Bee Creek catchment.

2.1.2 TEP Release Water Quality Criteria

As shown in **Section 1.3** and **Table 3**, the water within Hail Creek's pit areas have deteriorated in quality since the commencement of the TEP approval, to the extent that HCM can no longer comply with the EC release limits specified in the TEP.

However, as shown in **Table 2** and **Figure 3**, all background upstream receiving environment monitoring points have been elevated above normal (both maximum values and 80th percentile). A theory has been postulated relating to groundwater recharge to explain this phenomenon, however Hail Creek cannot predict how high the EC levels will get. Recent water quality analysis from Hail Creek Mine's network of groundwater monitoring bores (December 2010) indicate a maximum of 2267 µs/cm, and an 80th percentile value of 2032 µs/cm. Previous monitoring shows greater variation in EC levels, with records up to 6000 µs/cm.

Currently, the quality of mine affected pit water currently impounded by Hail Creek Mine, and required to be released, is of better quality than the surrounding upstream background locations. Therefore, discharge of this pit water is diluting the natural waterway systems, and reducing the concentration of salts in the waterways. This situation would mean that discharge from HCM would actually be ameliorating the higher EC discharge occurring naturally.

Hail Creek propose to amend the upper maximum release limit for EC to 2,400µs/cm, for all release points specified in the TEP.

This limit aligns to the recent 80th percentile value for the Bee Creek Upstream (BCU) location. HCM also propose to adapt to a potential future case scenario where the mine affected water may elevate over this limit by proposing a secondary release limit of the EC value recorded at BCU + 10%, as has been adopted for the contaminant of Turbidity. DERM will be notified prior to this secondary release limit being applied.

An amended **Table 4** has been provided below, with the intention that this TEP amendment document will supercede the equivalent detail (**Table 5**) in the initial TEP document. All other contaminant release limits are as previously specified in the TEP (in Table 6).

The strategy of mimicking a natural flow event will be continued as previously outlined in the initial TEP approval, by staggering the time period whereby release of differing sources and quality of water occurs to acclimate the receiving waters to higher salinity water.

Table 4. Electrical Conductivity Release Limits to be followed under this TEP

Release point (RP)	Contaminant source and location		Quality Characteristic - Electrical Conductivity (µS/cm)
RP 1 (Polishing Pond)	Polishing Pond, including Central & North Dams. Also water from Ramp 2 pit, Ramp 3 pit, Ramp 5 pit		2400 µs/cm at end of pipe. Assume 250L/s release from Brumby Dam into Middle Creek.
ARP1	Ramp 6 pit		2400 µs/cm at end of pipe.
ARP2	Ramp 5 pit, Ramp 3 pit		
ARP3	Ramp 0 (water storage), Ramp 1 pit		
ARP4	Ramp 0 (water storage), Ramp 1 pit		

2.2 Requirements to Cease the Release of Mine Affected Water

In the initial TEP approval, there was a requirement for the release of mine affected waters to cease immediately if any downstream water quality trigger criteria. As detailed in Section 1.2, this has consistently occurred as a result of upstream water quality being above the trigger limit.

Hail Creek propose to modify the wording of this condition, stating that release of mine affected water will cease if the EC water quality at the downstream receiving environment monitoring point elevates above any of the upstream receiving environment monitoring locations.

2.3 Additional Release Points

The initial TEP approved a network of Additional Release Points (ARPs) to distribute water towards the east and over the mining highwall. A map was provided as Appendix A of the initial TEP document, showing each of the additional release points.

In the initial TEP approval, Hail Creek committed not to release water from ARP3 or ARP4, due to concerns surrounding receiving environment water quality. As outlined in Section 1.2 above, the context of the receiving environment water quality has now changed, and alterations to the release limits is now sought to adapt to these altered circumstances.

Hail Creek are seeking approval to operate all specified release points for the remainder of the TEP approval period, without any further restriction beyond the conditions already contained in the TEP and this amendment.

2.4 TEP Approval Timeframe

The timeframe of the initial TEP approval was developed to ensure Hail Creek could dewater its operation in a timely manner whilst still aiming to avoid release of mine affected water during the dry season. Historical data indicates that the wet season normally occurs between December and March, thus the initial end date of the TEP, 17th June 2011, assumed and planned for a period of release during low to no receiving environment base flow.

However, as shown in **Figure 1**, continued above average rainfall towards of what is normally the end of the wet season (March and April) and the resulting catchment inflows, has meant that Hail Creek have been unable to dewater in the timeframe expected, and still contain a significant volume of water in our dam and pit areas.

In addition, as most mines in the Bowen Basin have been experiencing similar conditions and operational problems, securing infrastructure to achieve the dewatering has been difficult. The on-going wet weather has also caused delays and issues with the logistics of actually installing and commissioning pumps.

Hail Creek propose to modify the end of the approved TEP to 30th September 2011.

3. Alterations to TEP Conditions

As per the initial TEP approval, this set of conditions will be adhered to. In carrying out this TEP, Hail Creek Mine will undertake all activities in accordance with the following conditions.

Those conditions which have been altered or modified for this amendment have been highlighted in darker test. For completeness and ease of ensuring compliance, the entire set of conditions have been reproduced herein, and where no changes have been made, the text of the condition has been greyed out.

If any inconsistencies occur between this TEP amendment and the current TEP, this TEP amendment document will prevail over the extent of the inconsistency. On approval by DERM, Hail Creek is to be authorised to undertake the actions specified in this TEP amendment.

Release of Mine Affected Water

W1. Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this *Transitional Environmental Approval – Certificate of Approval*, unless otherwise authorised to under the *Environmental Protection Act 1994*.

W2. The release of contaminants to waters must only occur from the release points specified in **Table 7** and depicted in **Figure 1** (Appendix A) of this TEP.

W3. The release of contaminants to waters must not exceed the release limits stated in **Table 6** of the TEP, and **Table 4** of this TEP amendment at the monitoring points specified in **Table 7** of the TEP.

W4. The release of contaminants to waters from the release points must be monitored at the locations specified in **Table 7** for each quality characteristic and at the frequency specified in **Table 8** of this TEP.

W5. If quality characteristics of the release exceed any of the trigger levels in **Table 10** or **11** during a release event, the TEP holder must compare the downstream results for the receiving waters monitoring point identified in **Table 9** to the trigger values in **Table 10** or **11**; and

a) where the trigger values are not exceeded then no action is to be taken;

b) where the downstream results exceed the trigger values specified **Table 10** or **11** for any quality characteristic, compare the results of the downstream site to the data from background (upstream) monitoring sites; and

(i) if the result is less than the background (upstream) monitoring site data, then no action is to be taken; or

(ii) if the result is greater than the background (upstream) monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

1. details of the investigations carried out;

2. actions taken to prevent environmental harm.

W6. If an exceedence in accordance with condition W5(a)(ii)(2) is identified, the holder of the TEP must notify the administering authority within fourteen (14) days of receiving the result. The notification must include written verification of the exceedence forwarded to the administering authority either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au

Contaminant Release Events

W7. The TEP holder must follow a mimicked flow event pattern (in terms of modifying release flow rate) as outlined in Section 2.1.2 of this document (and **Table 4**) where:

a) peak flow rate to be achieved is no greater than (4000L/s), followed by a scaling back of the pumped flow rate;

b) maximum volume released during a release event is to be no greater than 2500 ML;

c) no more than 4 release points will be operating at any one time; and

d) each release flow event is to be followed by no less than 1 day without flow.

W8. The period, flow rates and volumes discharged for the time that each additional release point is operating must be monitored and follow the pattern outlined in Section 2.1.2 of this document (outlined in **Table 4**).

W9. The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in **Table 7**.

Requirements to Cease the Release of Mine Affected Water

W10. The release of mine-affected waters must cease immediately if any water quality limit as specified in **Table 6** of the TEP or **Table 4** of this TEP amendment are exceeded.

W11. If quality characteristics at the downstream receiving environment monitoring point exceed any of the trigger levels specified in **Table 10**, release of water must cease immediately and DERM must be immediately notified, unless it can be demonstrated the upstream receiving monitoring points are also elevated above the specified trigger limits.

W12. The release of mine-affected waters must cease immediately if identified that the release of mine-affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

W13. The release of mine-affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

W14. The release of mine-affected waters authorised under this Transitional Environmental Program must cease by 30/09/2011.

Erosion and Sediment Control

W15. Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters. Treatment of additional release points must be in accordance with Section 2.2.1 of this TEP.

W16. If W14 cannot be met, erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:

a) be designed and constructed by a suitably qualified and experienced person; and

b) be inspected by a suitably qualified and experienced person prior to the commencement of dewatering operations; and

c) be inspected by a suitably qualified and experienced person following the cessation of release in accordance with the conditions of this *Transitional Environmental Program – Certificate of Approval*.

W17. The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine-affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:

a) identification of erosion, slumping and scour impacts to vegetation;

b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm; and

c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

W18. The Transitional Environmental Program holder must notify the administering authority within twelve (12) hours of having commenced releasing mine-affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) release commencement date/time;

b) expected release cessation date/time;

c) release point/s;

d) release volume (estimated); and

e) any details (including available data) regarding likely impacts on the receiving water(s).

W19. The Transitional Environmental Program holder must provide the administering authority weekly during the release of mine affected water, in writing (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) all in situ monitoring data for the preceding week;

b) the receiving water flow rate for the preceding week; and

c) the release flow rate for the preceding week.

W20. The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under W14 and within twenty-eight (28) days provide the following information in writing:

a) release cessation date/time;

b) natural flow volume in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results; and

f) any other matters pertinent to the water release event.

Notification of Release Event Exceedence

W21. If the release limits defined in **Table 5** are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within eighteen (18) hours of receiving the results.

W22. The Transitional Environmental Program holder must, within twenty-eight (28) days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) all water quality monitoring results;

d) any general observations;

e) all calculations; and

f) any other matters pertinent to the water release event.

Monitoring Requirements

W23. Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

W24. All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

W25. As soon as practicable after becoming aware of any emergency or incident that results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

W26. The notification of emergencies or incidents must include but not be limited to the following information:

a) the holder of the Transitional Environmental Program;

b) the location of the emergency or incident;

c) the number of the Transitional Environmental Program;

d) the name and telephone number of the designated contact person;

e) the time of the release;

f) the time the holder of the Transitional Environmental Program became aware of the release;

g) the suspected cause of the release;

h) the environmental harm caused, threatened, or suspected to be caused by the release; and

i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

W27. Not more than fourteen (14) days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:

a) proposed actions to prevent a recurrence of the emergency or incident; and

b) outcomes of actions taken at the time to prevent or minimise environmental harm.

Reporting

W28. The holder of this Transitional Environmental Program will provide weekly monitoring reports to the administering authority, detailing in-situ water quality parameters monitoring during release, as outlined in **Table 12**.

W29. The holder of this Transitional Environmental Program will also submit a report to the administering authority by the fifth (5) business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program;

b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity.

c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

W30. The holder of this Transitional Environmental Program must also submit a report to the administering authority by 31st October 2011 including:

a) details of the completion of the Transitional Environmental Program;

b) details on all activities undertaken under the Transitional Environmental Program;

c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(iii) the best practice environmental management for the activity; and

(iv) the risks of environmental harm being caused by the activity.

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program; and

e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority for Hail Creek Mine, (MIN100913309) and the *Environmental Protection Act 1994*.

Annexure Item 7.6

DERM directive to cease discharge

Ritchie, Stuart (RTCA)

From: Wilson, Liam (RTCA)
Sent: Thursday, 19 May 2011 11:25 AM
To: Munro, Rowan (RTCA)
Cc: Gordon, Rory (RTCA); Ritchie, Stuart (RTCA)
Subject: FW: Directive from DERM to cease release.

Rowan, we will need to discuss and impact on mine ability to meet plan and what we will have to change, will you be in Mackay office this afternoon? I gather Tech Services are already looking at this? Thanks,

Liam

-----Original Message-----
From: Chetcuti, Deleeze (RTCA)
Sent: Thursday, 19 May 2011 11:20 AM
To: Wilson, Liam (RTCA)
Cc: Goldner, Martine (RTCA); Kruger, Fiona (RTCA)
Subject: Directive from DERM to cease release.

Liam,

See below for directive from Chris.

I reiterated that this is a critical issue for Hail Creek and we need to arrange a time with him and Tristan next week to discuss options.

Deleeze Chetcuti
Environmental advisor – Hail Creek Mine

Rio Tinto
Hail Creek Mine PO Box 3097 North Mackay 4740 Australia

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[redacted] http://www.riotintocoalaustralia.com.au

-----Original Message-----
From: Loveday Chris [redacted]
Sent: Thursday, 19 May 2011 11:13 AM
To: Chetcuti, Deleeze (RTCA)
Cc: Donohue Ed; Roberts Tristan
Subject:

Deleeze

Thanks for the email

With regard to our discussion about the cessation of releases from RTCA Hail Creek under the approved TEP I provide the following direction:

RTCA Hail Creek mine must cease all TEP releases as of COB (5:00pm) Friday 20 May 2011. Releases authorised by conditions of the RTCA Hail Creek mine Environmental Authority may continue should conditions permit release.

In addition, the rate of release from any point must not increase prior to the cessation.

The cessation of releases is required as a result of rising electrical conductivity in the Connors River and downstream in the Isaac River.

The department will consider further TEP releases should electrical conductivity levels decrease in receiving waters.

Regards

Christopher Loveday
Manager - Environmental Services Mining
Department of Environment and Resource Management
Ph: (07) 49806200 Mob: [redacted]

Annexure Item 7.7

Evidence of meeting with DERM to discuss the directive to cease discharge

Ritchie, Stuart (RTCA)

From: Ritchie, Stuart (RTCA)
Sent: Tuesday, 24 May 2011 5:56 PM
To: Gordon, Rory (RTCA)
Cc: Wilson, Liam (RTCA); Munro, Rowan (RTCA)
Subject: Hail Creek Cessation of Discharge - Meeting with DERM 24 May 2011

Rory, my notes following the meeting with DERM in relation to the Hail Creek cessation of discharge issue (Rowan, Liam if I've missed anything out please feel free to update):

- Present from DERM were Chris Loveday, Ed Donohue and Tristan ?
- Present from RTCA were Rowan Munro, Liam Wilson, Martine Goldner, Deleeze Chetcutti and Stuart Ritchie
- DERM indicated that the reason for DERM ceasing discharges were EC limits in the Connors River at Pink Lagoon and the Lower Isaac at Yatton approaching 750 uS/cm. Currently only HC and South Walker are discharging into this system with HC having the most significant flow (South Walker have been allowed to continue discharging at 90L/s give the low discharge flow rate).
- DERM stated that EC levels across the river systems appeared to be remaining higher than usual – assumed to be related to higher groundwater levels contributing higher EC base flows.
- DERM were keen to understand the water storage and quality situation at HC and stated that they wanted to see HC move from the current ¾ production capacity to above a "90%" production capacity; and were interested to know what volume discharge would be required to achieve this position. In outlining the current storage/quality situation at HC, RM emphasised that spoil pore space volumes may not have been included in the current volume estimates and could mean that provided estimates may be conservative by a factor of perhaps 20%.
- [redacted]
- The discussion then centred on options to achieve discharge given the constraints that both DERM and HC face. Options discussed included use of HC's take or pay water supply to either dilute minewater to a level suitable for discharge or as a post discharge clean water flush. DERM appear to be constrained by a 750 uS/cm limit in lower reaches of the Connors/Isaac system to meet water supply quality requirements. There was an indication that DERM held some level of comfort with a discharge EC of 1,300 uS/cm.
- In terms of process, DERM stated that the current TEP amendment application would be considered as a deemed refusal given that they had not responded within the required timeframe. HC should submit a new TEP application highlighting the current situation at Hail Creek; providing a proposed model (or models) for discharge; and outlining what system or infrastructure changes would be committed to by HC. Suggestion for the latter include HC installing a flow gauge for the upper Bee Creek sufficient to quantify the salt load being contributed upstream of HC, any further options for minimising disturbed catchment areas reporting to minewater system, and how HC proposes to address the issues highlighted by our neighbours.
- DERM appears to be genuine in assisting HC to resolve their water quality issues but clearly have their own internal constraints within which they need to operate. It will be necessary to provide DERM with a defensible rationale for allowing further minewater discharge from HC.
- HC are to draft a new TEP application with a target of presenting to DERM next week. DERM indicated that they would provide water quality data for Pink Lagoon and Yatton following the next round of water samples due this coming Thursday. [redacted]
- SR to coordinate a day workshop at Hail creek to consolidate the best approach to future EA conditioning given the current progress of DERMs review of the Fitzroy model conditions.

Best regards

Stuart Ritchie
Manager Environmental Services – Health Safety and Environment, Coal Australia

Rio Tinto
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Annexure Item 7.8

Amendment application to Transitional Environmental Program

Hail Creek Mine

Amendment

Transitional Environmental Programme under Section 333 of the *Environmental Protection Act 1994*

Environmental Authority MIN100913309

Principal Holder: Queensland Coal Pty Ltd

Joint Holder: Marubeni Coal Pty Ltd.
Sumisho Coal Development Queensland Pty Ltd.
Nippon Steel Australia Pty Ltd

6th June 2011 – 30th September 2010

Approvals

Name	Position	Signed	Date
Originator	Environmental Specialist	-	-
Checked	HSEC Manager	-	-
Authorised	General Manager	-	-

Revisions

Date	Description	By	Check	Authorised
02.06.2011	Issued for use	MG	LW	RM

Contents Page

1. Background

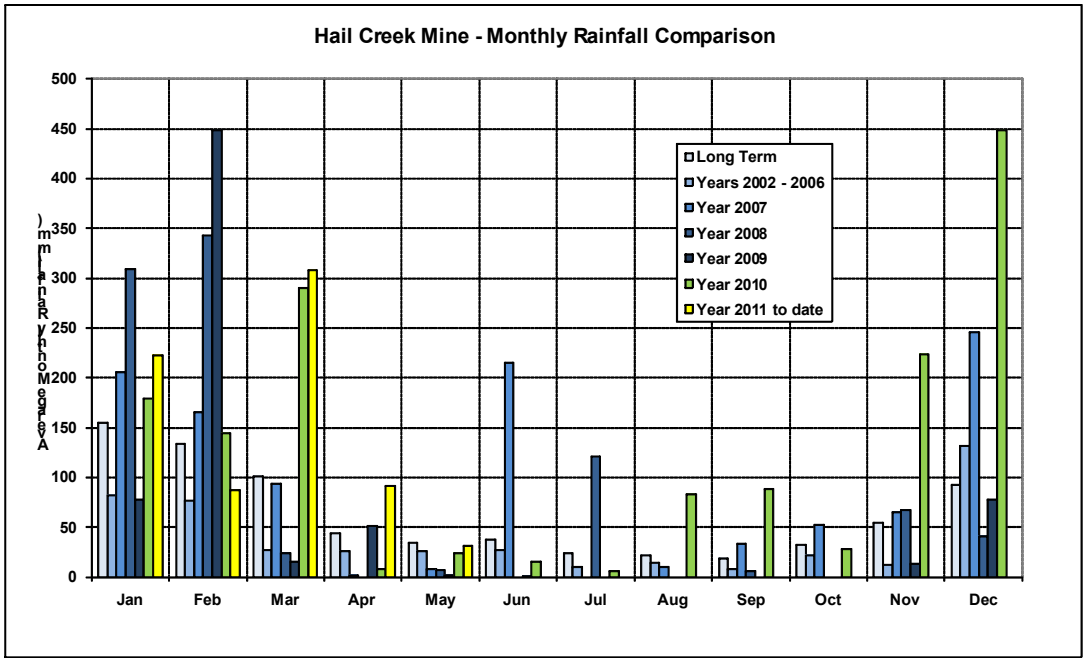
This document has been prepared to supercede and update the Transitional Environmental Programme (TEP) currently in force for Hail Creek Mine (HCM) (MAN11801). This TEP has been voluntarily submitted to DERM in accordance with the *Environmental Protection Act 1994*. A directive was issued by DERM for Hail Creek to cease discharge under this TEP, effective 20/05/2011. This amendment outlines a strategy to recommence release under this TEP.

1.1 2010-2011 Wet Season

As detailed in the initial TEP document, the 2010-2011 wet season has been characterised by prolonged and above average rainfall events. This has continued since the approval of the TEP, impacting upon HCM's ability to release water as per the TEP timeframes.

Figure 1, below, provides an update of rainfall received to May 2011.

Figure 1. Monthly Rainfall Comparison



The months of January, February, March and April 2011 have all recorded significantly above average rainfall, with March in particular recording extremely large rain volumes. A total of 742 mm of rain has fallen in the period of January to May 2011, which is 274 mm more than the long-term average for these months.

This additional rainfall has had a two-fold effect on the ability of HCM to release water. Firstly, it has continued to replace water discharged with fresh volumes impounded in the catchment, effectively meaning that dewatering has continued without any net reductions in site inventory. Secondly, it has caused significant delays in upgrading infrastructure to achieve the approved release rates under the TEP as a result of access, transport and installation constraints.

1.2 Current Hail Creek Water Management Status

An update of the status of the HCM water balance at the time of submitting this TEP amendment is as follows:

- Water has been released from 3 of the initial approved licensed discharge points, Polishing Pond (RP1), Ramp 6 (ARP1) and Ramp 5 (ARP2);
- Ramp 6 area has been dewatered through consistent and continued operation of ARP1 release point (as per **Table 1**);
- However, significant volumes of water continue to be impounded in most other pits, with less progress on dewatering these areas (as per **Table 1**);
- Of the four main dams/water storages, one continues to sit close to the full supply volume (FSV), again as per **Table 1** below;
- In pit water quality has deteriorated, with EC being the key parameter of concern. However, a similar phenomenon has been observed with the background water quality in the area. Overall, water impounded in pit is representative of current background water quality.

Table 1. Latest Dam and Pit Storage Capacity and Water Quality readings (May 2011)

Dam Storage/ Pit Name	Water Volume Impounded (ML)	Percentage of Full Supply Volume
Polishing Pond *(Release Point 1)*	362.5 ML	47% full (407.5 ML available)
Central Dam	750.4 ML	94% full (spills to Polishing Pond via Low Wall Drainage Channel, 49.6 ML available)
Northern Dam	89.9 ML	27% full (240.1 ML available)
Ramp 0 *(This disused pit is now used as a water storage)*	2082 ML	80% full (FSV based on geotechnical risk, 518 ML available)
Ramp 1	521 ML	N/A
Ramp 2	100 ML	N/A
Ramp 3	470 ML	N/A
Ramp 5	350 ML	N/A
Ramp 6	negligible	N/A

Therefore, HCM have a volume of 1441 ML free water impounded in operational pit areas. In addition, an estimated 1000ML additional volume will recharge into pit from adjacent spoil areas as dewatering continues. Further to this, HCM are also seeking to draw down the Ramp 0 storage area to provide further capacity for the next wet season, and thus ensure 2012 production levels can. In order to restore HCM to 90% production levels, and prepare for the next wet season, an approximate volume of **4,000ML**, is considered to be critical for release.

1.3 Impact to Hail Creek Mine Operations

Since the commencement of the 2010/11 wet season, HCM has experienced significant operational impact due to the volumes of water impounded within pit and water storage areas. The constraint of the HCM EA discharge conditions have allowed limited opportunities to release mine affected water, with the result that all operational pits were flooded in late January. Rio Tinto Coal Australia declared *force majeure* over our contractual arrangements in late December 2010, which remained in place until May 2011. The TEP has provided flexible dewatering options, which has effectively allowed HCM to re-establish coaling operations within higher priority pit areas, however HCM are still operating at reduced capacity.

As detailed in Section 1.2, many pit areas still contain large volumes of water, which will limit future production capacity in the 2011 and 2012 calendar years unless further opportunities for release are provided. Continuing to dewater an additional volume of approximately **4,000ML** will be critical to simply re-establishing normal operations for 2011 & 2012, as detailed in **Table 1** above. With the strategy outlined by this TEP amendment, Hail Creek are seeking to re-establish its operations to 90% capacity, and will then re-engage with DERM to address long term underlying issues, which are expected to arise in future wet seasons.

Key areas of operational impact are summarised below:-

- Water has been impounded from December 2010 onwards within the Ramp 6, Ramp 5S, Ramps 3s & 3N and Ramp 1 pits with some pit areas completely flooded;
- Inability to access exposed coal in both the Ramp 6 and Ramp 3S areas, with previous operational plans to access these areas being significantly delayed;
- Operational delays for both draglines due to ongoing wet and muddy conditions;
- Time delays with dewatering as a result of logistical constraints and infrastructure limitations with dewatering areas under the TEP;
- Unforseen costs associated with pump hire and operating costs;
- Other damages and increased costs associated with:-
    - Haul truck tyre early failure / damage from operating on wet roads and ramp areas;
    - Damage to equipment from free digging impact;
    - Pump damage following submersion;
    - Materials to restore roads and ramp areas to operational conditions;
    - Take or pay penalties on QR National rail contract; and
    - Demurrage.

1.4 Background Water Quality & Stream Flow

Detailed background water quality information was presented in the initial TEP document.

Since the commencement of this approval, a number of phenomenon have been observed in the receiving waterways. In particular, Electrical Conductivity (EC) is a key water quality parameter for which recent records have been outside of the normal range of historical results for the area. EC levels at all upstream receiving environment monitoring locations, and Bee Creek Upstream in particular, has been elevated above the normal background range since January 2011. **Table 2**, below, summarises the trends observed over the long-term and in the last few months.

Table 2. Historic & recent water quality results for Electrical Conductivity (EC) (µS/cm)

		Hail Creek Upstream	Middle Creek Upstream	Bee Creek Upstream	Schammer Creek Upstream	Bee Creek Downstream
		HCU	MCU	BCU	SCU	BCD
Long-term results (µS/cm)	Min – Max	124 – **1395**	81 – 696	96 – **1660**	71 – **1000**	119 – **1610**
	Ave	529	350	750	282	886
	80th %	**1001**	504	**1411**	247	**1338**
2011 TEP results (µS/cm)	Min – Max	348 – **1946**	217 – **1350**	216 – **3210**	145 – **1833**	131 – **2260**
	Ave	**1005**	718	**2114**	**1267**	**1321**
	80th %	**1331**	**1035**	**2758**	**1631**	**1752**

Note: Cells in red bold are above Table 10 Receiving Waters Downstream Contaminant Trigger Levels (for BCD, although this table also highlights when other locations (BCU, HCU, MCU, SCU) are above the trigger level.

Anecdotal evidence suggests that the surface creek systems experience significant interaction with the underlying groundwater reserves and this interaction has resulted in the elevated EC values. Indeed, the relationship between EC & rainfall can be seen in **Figure 2**, where rainfall causes EC to fall as this fresh water reaches the waterway systems as surface runoff, and a continued elevation of EC is observed when less or no rainfall is observed.

It is also noted that all waterways have continued to flow since December 2010, which is unusual for this region, given the strongly ephemeral nature of the area. It is postulated that the groundwater reserves, which are known to be more saline than the surface systems, are recharging into the creeks. Standing groundwater levels collected as part of Hail Creek Mine biannual monitoring of the groundwater levels and quality show some parts of the aquifer are as close as 2 metres from the surface, and confirm the saline nature of the aquifer.

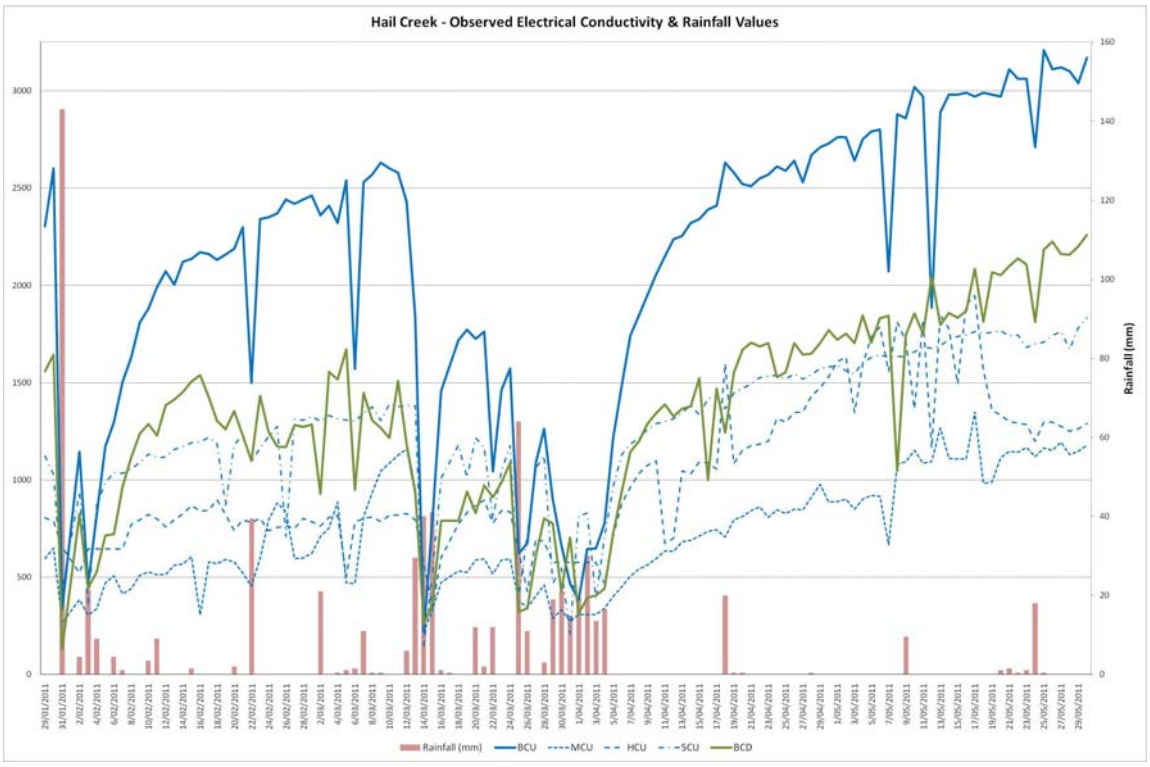


Figure 2. Recent Electrical Conductivity & Rainfall Records at Hail Creek Mine

At a recent meeting between DERM & HCM personnel, DERM expressed concern that mine affected water being released with elevated EC levels, at HCM among others, is contributing to elevated EC observed within downstream sensitive areas, and in particular, there is concern around recorded EC levels at the Pink Lagoon. In order to understand the relative contribution of water released by Hail Creek Mine, and saline water recharging from groundwater, details of upstream base stream flow has been collected to understand the relative contribution of this water to the stream flow downstream in the catchment.

This data (provided as **Table 3**)confirms that only small volumes of elevated EC water is recharging to the surface at the Bee Creek Upstream location (in the order of ~0.2m^3/s), but also shows poor correlation between stream flow the Bee Creek Upstream and Downstream locations. This suggests that groundwater recharge/ sub-surface flow may be occurring between the two locations (which are approximately 20km apart), to result in the downstream flow observed.

Table 3. Stream Flow (m^3/s) and Electrical Conductivity (EC) (µS/cm) in Bee Creek Catchment

			25 May 11	26 May 11	27 May 11	28 May 11	29 May 11	30 May 11	31 May 11	1 June 11
Stream Flow	Bee Creek Upstream	m^3/s	0.01	0.13	0.18	0.23	0.23	0.13	0.13	0.13
		Ml/day	0.4	10.9	15.8	19.7	19.7	10.9	10.9	10.9
	Bee Creek Downstream	m^3/s	4.00	1.60	0.70	0.70	0.70	0.70	0.00	0.00
		Ml/day	345.6	138.2	60.5	60.5	60.5	60.5	0.00	0.00

Electrical Conductivity/ Salinity	Bee Creek Upstream	µs/cm^2	3210	3110	3120	3100	3040	3170	3190	3090
		ppm TDS	2189	2121	2128	2114	2073	2162	2176	2107
	Bee Creek Downstream	µs/cm^2	2182	2225	2160	2158	2200	2260	2230	2251
		ppm TDS	1488	1517	1473	1472	1500	1541	1521	1535

It is noted that approximately 20km distance separates BCU and BCD. The relationship between EC & TDS have been determined from site specific water quality records to be TDS (ppm) = 0.682 x EC (µs/cm)

1.5 Mine affected Water Quality

Since the commencement of the TEP in January 2011, electrical conductivity levels within most of the mining pits have elevated. It is expected that this EC value will continue to deteriorate the longer the water remains in pit without further dilution, and as warmer and drier weather is experienced. Higher than normal EC water may be due to additional groundwater flow into the pits, as well as water recharging from spoil/dump areas. Recent EC water quality results from all pit and dam storage areas are presented below, in **Table 4,** which shows EC elevation since the commencement of the TEP.

Table 4. Recent EC water quality results for Mine Water Storages & Pits

Dam Storage/ Pit Name	Electrical Conductivity (µS/cm)		
	Field readings taken Jan 2011	*Field readings taken Mar 2011*	*Field readings taken May 2011*
Polishing Pond *(Release Point 1)*	1574	1227	1739
Central Dam	768	790	1094
Northern Dam	332	449	1031
Ramp 0 *(This old pit is used for water storage)*	**1490 1482**		**1608**
Brumby Dam (clean water diversion)	315	385	746
Raw Water Dam (water allocation from Eungella/Burdekin Dam)	100	125	152
Ramp 1 (S)	**1907 Not**	**accessible**	**1762**
Ramp 2 (N)	**1625**	**Not accessible**	**Not accessible**
Ramp 3 (N)	675	**1329 1956**	
Ramp 5 (N)	**985 951**		**1838**
Ramp 6	574	**1004**	**1526**

Note: Cells in red bold are above the TEP Contaminant Release Limits.

2. Amended Hail Creek TEP Strategy

It is understood that DERM are seeking to maintain and protect downstream water quality, with the aim to return EC levels in the Connors River (at the Pink Lagoon) to historical readings close to 400µs/cm^2. However, it is of note that despite HCM ceasing water discharge on 16/5/2011, water quality observations at the Pink Lagoon have remained elevated at close to 700µs/cm^2.this suggests that natural processes are ongoing which may be resulting in elevated EC.

As outlined, HCM are still in a position of impaired operational capacity, due to flood waters impounded during the wet season, and must release further volumes of water in order to run the mine within 90% of normal operational capacity.

This amended TEP strategy seeks to recommence release of mine-affected water from HCM whilst also injecting volumes of fresh water into the receiving waterway, in an attempt to stabilise and reduce the current EC levels in the downstream catchment. HCM have some limited capacity to control the quality and volume of released water to ensure end-of-pipe EC limits as specified in the document meet required water quality limits, and the proposed strategy will achieve the most dilution of mine-affected waters possible given infrastructure constraints.

The strategy also aims to dewater the required volumes in as timely a manner as possible, not only for operational reasons, but also in recognition of potential downstream environmental and community issues that may arise with extended release.

2.1 Plan for the Release of Mine Affected Water

The TEP release strategy (MAN11801) sought in this amendment is summarised in **Table 5**.

Table 5. TEP Strategy Details

Total Release Volume		4500 ML (consisting of 4000ML mine affected water & 500ML raw water)
Approval Timeframe		Effective immediately (6/6/11) to 30th September 2011
Release Point		RP1 – Polishing Pond with release via permanent rock/grass lined release channel
Release Strategy	**- Dilution**	Dilute mine affected water with Raw water (from Eungella/Burdekin Dam) in a 8:1 ratio *(unless otherwise agreed with DERM to establish alternating release 'events with varied dilution)*
	- Release Rate	1400-1600 L/s mine affected water; 200L/s raw water *(unless otherwise agreed with DERM to establish alternating release 'events', or to increase flow rate depending on water quality (EC))*
-	**Water Quality Criteria**	Upper release limit of 2000 µs/cm for EC *(unless agreed with DERM to establish alternating release events)* Ensure EC @ BCU is greater than BCD All other parameters as per previous TEP (pH, Turbidity, TSS)
-	**Rest Days**	Nil proposed.
	- Clean Water	HCM will release a volume of approximately 280 ML (to be confirmed) from an available clean water diversion dam (Brumby

Flushing	Dam) at 250L/s after dewatering is complete.

2.2 Stakeholder Management Strategy

It is recognised that this TEP amendment is likely to have an impact on downstream users of the receiving waterways, and that release under the TEP has already resulted in some unrest amongst the neighbouring community. As such, the following key strategies have been and will continue to be employed to minimise impact on our stakeholders:

- Supply downstream neighbours with a fortnightly schedule showing timing and volumes of release events;
- Establish a regular weekly communication to provide neighbours with the opportunity to raise queries and concerns; and
- Commit to ceasing or scaling back release events if a neighbour has a particular time or date where they need access to the receiving waterways (if this can practically be done by HCM).

Under the existing TEP, HCM have already undertaken a range of actions to address and resolve the concerns of our neighbouring property owners, and further action is on-going with some neighbours. These actions have consisted of the following:

- Construction of a low-level rock crossing on St Albans, after site inspection and review. The Bee Creek crossing at this location was very soft due to being inundated with released water, preventing the safe crossing of cattle during mustering;
- Upgrades of lengths of unsealed track on the agisted eastern part of the HCM mining lease (and adjacent parts of Fort Cooper station) to ensure access to cattle yards to the north (Bar X yard), for the neighbour at Fort Cooper. This has involved remedial work to the low gully where pit release from ARP2 was reporting;
- Pre-feasibility work to investigate a permanent creek crossing for the landholders of the Strathfield property. This permanent crossing will need to be designed and approved as per relevant legislation, and HCM have engaged with Isaac Regional Council to understand the pathway forward. Monitoring equipment is also being arranged to better correlate between HCM release and impact on access to this neighbours property; and
- Engagement with the landholder for the Oxford Downs and Mt Flora properties, which is approximately 80km downstream of HCM. Legal representation has now been involved for both the landholder and HCM, in order to resolve the landholders concerns. Discussions are on-going considering the potential relationship between HCM's activities and access to these properties, as well as understanding the relative contribution of HCM compared to other mine's water release, and the natural fluctuations of the Bee Creek system. HCM are strongly committed to resolving this landholders concerns, and will continue to progress the matter.

3. Hail Creek Water Management System

HCM recognise that DERM are seeking to gain commitment from HCM to improving water management practices on site, by identification and resolution of long-term issues resulting in adverse water management decisions. HCM consider water management as a key tenet of operational site management, and perhaps the primary area of environmental risk.

In the past few years, extensive work has occurred, and is on-going to improve site practices with the aim of ultimately improving management of water on site, and primarily during the wet season. Briefly, this past work consists of the following:-

- Altered pumping arrangements to reduce time lags for transfers between storages;
- Procuring and hiring additional pumping infrastructure for flexibility of transfers;
- Targeted upgrades of pumps and transfer points to reduce bottle-necks and improve compliance with the containment standard;
- Implementation of water atomisers to draw down total inventory;
- Improved cross-site awareness and communication of water management issues, with regular meetings and workshops;
- Extensive modelling of the site water balance to forecast expected volumes to be impounded, and to understand the impact of proposed alterations to the system;
- Completion of a pre-feasibility assessment into constructing new dam storage areas, and upgrading existing release infrastructure for enhanced peak release flow capacity;
- Completion of feasibility studies to retrofit infrastructure to allow for raw water to be substituted with mine affected water (which considered introducing a reverse osmosis plant and retrofitting the existing plant to cope with mine water);
- Completion of a geotechnical risk assessment to consider allowing for further volumes of water to be stored within one of the available water storage areas (Ramp 0 - a old mining pit area now used for water storage);
- Review of annual operating and long-term mine planning to assess the sites ability to sacrifice pit capacity for peak wet season water storage;
- Automation of permanent release infrastructure to ensure rapid and accurate control over release valves;
- Upgrades of metering network within Coal Handling & Processing Plant (CHPP) to better understand key water processes for primary site water user;
- Engaging with near neighbours to respond to and address concerns around water release volumes and qualities, with numerous meetings and discussions, and agreed outcomes being progressed;
- Review and upgrade of the environmental water sampling and analysis/monitoring program to enhance the water quality information being collected;
- Repair and upgrade of existing remote environmental monitoring stations (located at Bee Creek Downstream (BCD) and Middle Creek Upstream (MCU));

- Planned installation of a number of new remote environmental monitoring stations to continue to collect real-time high quality data from upstream background monitoring locations (located at Hail Creek Upstream (HCU), Bee Creek Upstream (BCU); and
- Planned installation of a real-time environmental monitoring infrastructure on the key dam storages, to ensure continuous high quality data of quality within the HCM water management system.

Essentially, HCM have followed a number of avenues to improve water management practices, and will continue to do so.

However, an avenue not yet pursued is approaching DERM to modify our EA approval to better address the environmental context around which the water management system was approved and constructed. The HCM Water Management System was designed to have a containment standard of 1 in 10 AEP (Annual Exceedence Probability). This was approved and accepted as DERM as an appropriate containment standard to address potential environmental harm, but in essence means that in any given year, HCM are exposed to a 10% risk of not being able to contain the volumes of water being impounded.

The water management system, and the available storage capacity, is not designed to contain water for all expected volumes of water to be impounded, rather it is designed to contain and control water 90% of the time. When an extreme wet season occurs (as in 2010/11), the system design response should be to allow out release point spillway to simply overtop, and for uncontrolled release to occur until site inventory is reduced.

However, the Environmental Authority (EA) does not reflect this containment standard. This means for HCM to allow the water management system to do what it is designed to do will represent a non-compliance with our Environmental Authority. Modification to the EA in 2009 to transition to the model water conditions further restricted HCM's ability to release water compliantly, with the effect that HCM could no longer achieve a 1 in 10 containment standard.

Therefore, independent of this TEP amendment, HCM will seek to engage with DERM to review the EA and revise the model water conditions to reflect the constraint posed by the containment standard, and provide guidance as to what water management response should be progressed in situations beyond the capacity of the system. This disconnect between the site containment standard and the EA means that, without modification to the EA or extensive re-design of the water management system, the situation that has occurred during the 2010/11 wet season will continue to occur for all extreme wet seasons beyond the 1 in 10 containment standard. Due to these reasons, Hail Creek Mine cannot operate a compliant water management system during extreme wet seasons.

4. Proposed TEP Conditions

As per the initial TEP approval, this set of conditions will be adhered to. In carrying out this TEP, Hail Creek Mine will undertake all activities in accordance with the following conditions.

Those conditions which have been altered or modified for this amendment have been highlighted in darker test. For completeness and ease of ensuring compliance, the entire set of conditions have been reproduced herein, and where no changes have been made, the text of the condition has been greyed out.

If any inconsistencies occur between this TEP amendment and the current TEP, this TEP amendment document will prevail over the extent of the inconsistency. On approval by DERM, Hail Creek is to be authorised to undertake the actions specified in this TEP amendment.

Release of Mine Affected Water

W1. Contaminants that will, or have the potential to cause environmental harm, must not be released directly or indirectly to any waters except as permitted under this *Transitional Environmental Approval – Certificate of Approval*, unless otherwise authorised to under the *Environmental Protection Act 1994*.

W2. The release of contaminants to waters must only occur from the release point specified in **Table 5** of this TEP Amendment, and depicted in **Figure 1** of the EA (MIN100913309).

W3. The release of contaminants to waters must not exceed the release limits stated in **Table 5** of this TEP amendment at the release points also specified in **Table 5** of the TEP amendment.

W4. The release of contaminants to waters from the release points must be monitored at the locations specified in **Table 5** for each quality characteristic and at the frequency specified in **Table 8** of the TEP.

W5. If quality characteristics of the release exceed any of the applicable trigger levels in the TEP or TEP amendment, the TEP holder must compare the downstream results for the receiving waters monitoring point identified in **Table 9** to the trigger values in **Table 10** or **11**; and

a) where the trigger values are not exceeded then no action is to be taken;

b) where the downstream results exceed the trigger values specified **Table 10** or **11** for any quality characteristic, compare the results of the downstream site to the data from background (upstream) monitoring sites; and

(i) if the result is less than the background (upstream) monitoring site data, then no action is to be taken; or

(ii) if the result is greater than the background (upstream) monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

1. details of the investigations carried out;

2. actions taken to prevent environmental harm.

W6. If an exceedence in accordance with condition W5(a)(ii)(2) is identified, the holder of the TEP must notify the administering authority within fourteen (14) days of receiving the result. The

notification must include written verification of the exceedence forwarded to the administering authority either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au

Contaminant Release Events

W7. The TEP holder must follow a mimicked flow event pattern by ensuring :

a) peak flow rate to be achieved is no greater than 1000L/s total, consisting of 800L/s mine water and 200L/s clean (raw) water as dilution (or as otherwise agreed with DERM);

b) only 1 release point to operate (RP1).

c) release is only to occur up to the maximum volume approved by the TEP amendment (as specified in **Table 5**).

W8. The period, flow rates and volumes discharged for the time that each additional release point is operating must be monitored and follow the pattern outlined above in W7.

W9. The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in **Table 7** of the TEP **and Table 5** of the amendment.

Requirements to Cease the Release of Mine Affected Water

W10. The release of mine-affected waters must cease immediately if any water quality limit as specified in **Table 6** of the TEP or **Table 5** of this TEP amendment are exceeded, unless direction can be sought from DERM to the contrary.

W11. The release of mine-affected waters must cease immediately if identified that the release of mine-affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

W12. The release of mine-affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

W13. The release of mine-affected waters authorised under this Transitional Environmental Program must cease by **30/09/2011**.

Erosion and Sediment Control

W14. Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

W15. If W14 cannot be met, erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:

a) be designed and constructed by a suitably qualified and experienced person; and

b) be inspected by a suitably qualified and experienced person prior to the commencement of dewatering operations; and

c) be inspected by a suitably qualified and experienced person following the cessation of release in accordance with the conditions of this *Transitional Environmental Program – Certificate of Approval*.

W16. The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine-

affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:

a) identification of erosion, slumping and scour impacts to vegetation;

b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm; and

c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

W17. The Transitional Environmental Program holder must notify the administering authority within twelve (12) hours of having commenced releasing mine-affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) release commencement date/time;

b) expected release cessation date/time;

c) release point/s;

d) release volume (estimated); and

e) any details (including available data) regarding likely impacts on the receiving water(s).

W18. The Transitional Environmental Program holder must provide the administering authority weekly during the release of mine affected water, in writing (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) all in situ monitoring data for the preceding week;

b) the receiving water flow rate for the preceding week; and

c) the release flow rate for the preceding week.

W19. The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under W14 and within twenty-eight (28) days provide the following information in writing:

a) release cessation date/time;

b) natural flow volume in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results; and

f) any other matters pertinent to the water release event.

Notification of Release Event Exceedence

W20. If the release limits defined in **Table 5** of the TEP or **Table 5** of the TEP amendment are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within eighteen (18) hours of receiving the results.

W21. The Transitional Environmental Program holder must, within twenty-eight (28) days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) all water quality monitoring results;

d) any general observations;

e) all calculations; and

f) any other matters pertinent to the water release event.

Monitoring Requirements

W22. Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

W23. All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

W24. As soon as practicable after becoming aware of any emergency or incident that results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

W25. The notification of emergencies or incidents must include but not be limited to the following information:

a) the holder of the Transitional Environmental Program;

b) the location of the emergency or incident;

c) the number of the Transitional Environmental Program;

d) the name and telephone number of the designated contact person;

e) the time of the release;

f) the time the holder of the Transitional Environmental Program became aware of the release;

g) the suspected cause of the release;

h) the environmental harm caused, threatened, or suspected to be caused by the release; and

i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

W26. Not more than fourteen (14) days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:

a) proposed actions to prevent a recurrence of the emergency or incident; and

b) outcomes of actions taken at the time to prevent or minimise environmental harm.

Reporting

W27. The holder of this Transitional Environmental Program will provide weekly monitoring reports to the administering authority, detailing in-situ water quality parameters monitoring during release, as outlined in **Table 12**.

W28. The holder of this Transitional Environmental Program will also submit a report to the administering authority by the fifth (5) business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program;

b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity.

c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

W29. The holder of this Transitional Environmental Program must also submit a report to the administering authority by 31st October 2011 including:

a) details of the completion of the Transitional Environmental Program;

b) details on all activities undertaken under the Transitional Environmental Program;

c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(iii) the best practice environmental management for the activity; and

(iv) the risks of environmental harm being caused by the activity.

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program; and

e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority for Hail Creek Mine, (MIN100913309) and the *Environmental Protection Act 1994*.

Annexure Item 7.9

Water Solutions report on environmental impact downstream of HCM

Water Solutions Pty Ltd
ACN 070 875 553

Unit 16, Level 1, 18 Brookfield Road, Kenmore, QLD, 4069
PO Box 1031, Kenmore, QLD, 4069
Phone: (07) 3378 7955 Facsimile: (07) 3378 7966

eMAIL TRANSMISSION

Attention: Martine Goldner
Company: Hail Creek Mine
eMail: [redacted]
From: Scott Diggles
Copy: Jim Heaslop (WSPL)

Date: 8 June 2011
Pages: 7 (including this page)
Your Ref:
Our Ref: WS110265
File No: WS0562.1101.006

Re: Hail Creek Mine - TEP Amendment
Initial Review of Site Release and Streamflow Data

Dear Martine,

We have completed our initial review of the currently available historic waterway flow and quality data for the Connors River and Isaac River and are pleased to present following our observations and outcomes for your consideration.

BACKGROUND

Hail Creek Mine (HCM) applied for and were granted a Transitional Environmental Programme (TEP) MIN 100913309. Approved release under the TEP was commenced from site in 29 January 2011 and continued through till mid-May 2011.

For the purposes of this initial review, corresponding streamflow and quality data for the downstream Connors River (Pink Lagoon) and Isaac River (Yatton) DERM monitoring sites have also been sourced for comparison.

A locality plan showing the relative locations of HCM, the downstream Connors River and Isaac River stations is presented in Figure 1.

STREAMFLOW DATA

DERM currently operate two monitoring stations downstream of HCM. Details of the stations are provided below:

Table 1 – DERM Streamflow Stations

Station No	Title	Site Commenced	Catchment Area (km^2)
130404A	Connors River at Pink Lagoon	Dec 1965	8,721
130401A	Isaac River at Yatton Oct	1962	19,719

Historical annual streamflow volume and salt load for the Connors River station is presented in Figure 2. Note that this data is presented on a water year (ie. July-June) basis.

This data has also been processed to give the historical streamflow volume and salt load for the period June-September. Outcomes are presented in Figure 3.

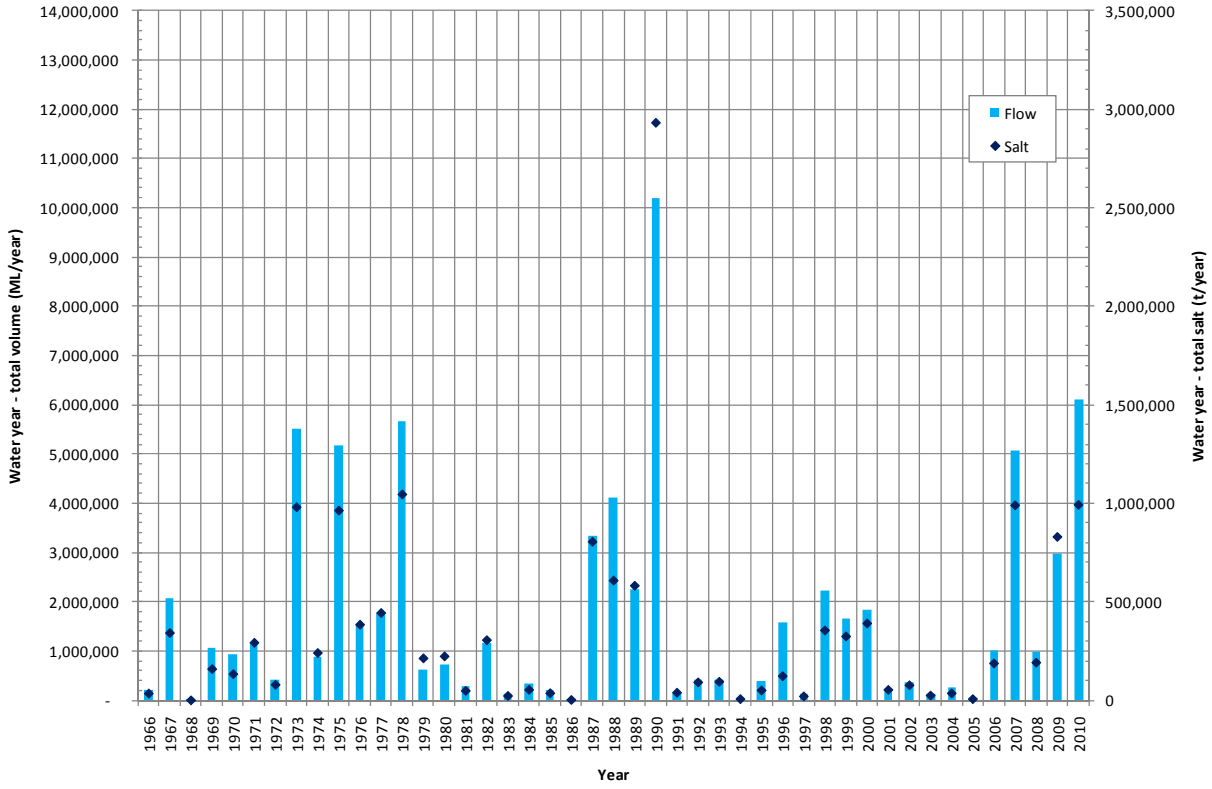


Figure 2 – Connors River at Pink Lagoon – Annual Streamflow Volume and Salt Load

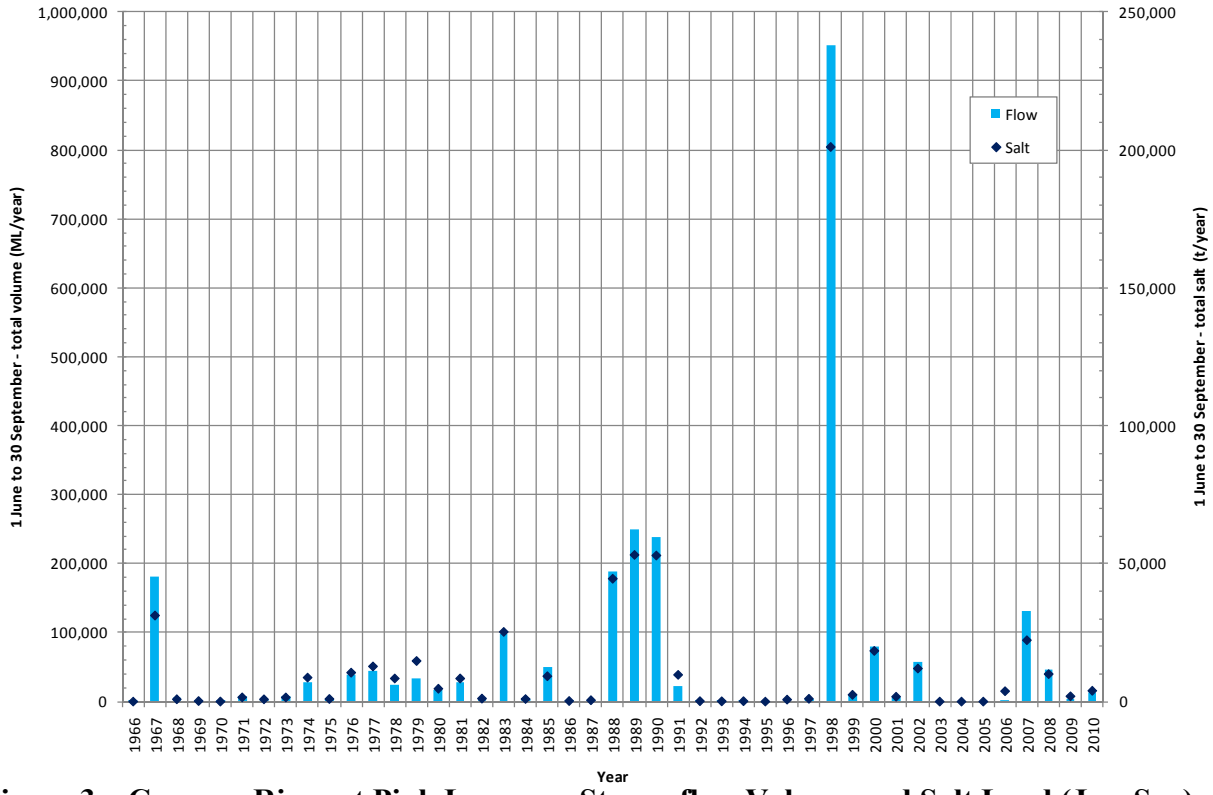


Figure 3 – Connors River at Pink Lagoon – Streamflow Volume and Salt Load (Jun-Sep)

Associated statistics from detailed review of the monitoring data are provided below:

- Annual Flow Statistics
  - Average Flow 1,685,800 ML/year
  - Average Salt Load 353,300 t/year
- 4 Month Flow Statistics (Jun-Sep)
  - Average Flow 57,570 ML/4 months (14,400ML/month)
  - Average Salt Load 12,900 t/4 months (3,200 t/month)

Recent streamflow data (daily discharge volume and electrical conductivity) for both DERM sites is presented in Figure 4 for the period December 2010 to June 2011. Also shown is the period of site release under the TEP. Review of this data shows the following:

- Comparable discharge between both sites even though the catchment area for Isaac River station is around double the Connors River station catchment. This suggests that rainfall during this time may have been centered over the Connors catchment rather than the entire Isaac River catchment.
- Similar trends for streamflow electrical conductivity response for both stations with an apparent post wet season value of around 700µS/cm observed.

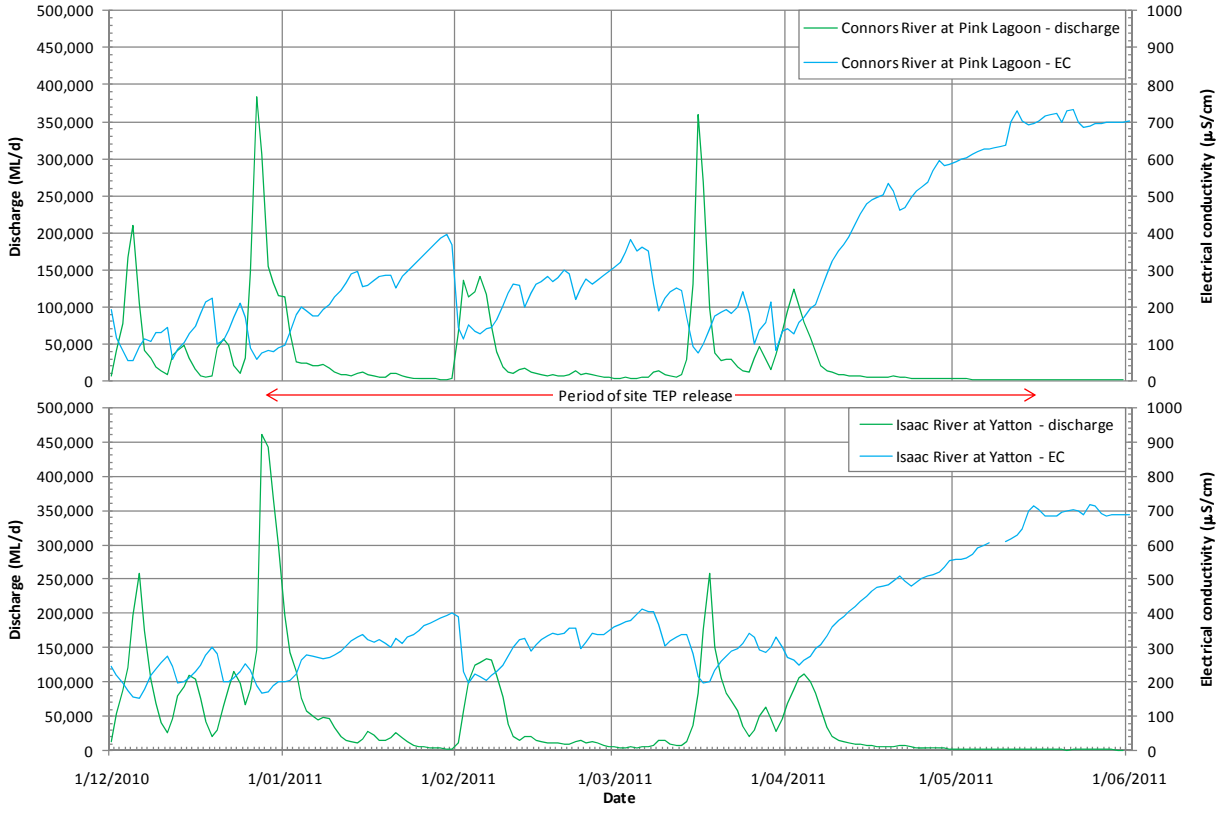


Figure 4 – Regional Waterway Streamflow and Quality Data

SITE RELEASE

In order to gain an appreciation of the m agnitude of the HCM site re leases upon the regional downstream waterways, corres ponding weekly discharge volum e and salt load have been collated and are summarised in Tables 2 and 3.

Table 2 – Site Release and Regional Waterway Discharges

Week Ending	Discharge (ML/week)		
	Isaac River at Yatton	Connors River at Pink Lagoon	HCM TEP Site Releases
23/01/2011 1	29,765	52,249	*no release*
30/01/2011 3	3,964	21,278	259
6/02/2011 5	58,410	695,483	442
13/02/2011 4	17,691	186,355	517
20/02/2011 9	3,479	58,955	234
27/02/2011 8	3,717	61,716	523
6/03/2011 3	7,830	29,156	610
13/03/2011 6	8,831	57,870	337
20/03/2011 8	26,570	950,925	1,078
27/03/2011 3	52,995	181,455	224
3/04/2011 4	49,666	467,528	936
10/04/2011 4	26,976	231,565	448
17/04/2011 6	5,611	43,029	625
24/04/2011 4	4,959	33,620	199
1/05/2011 2	4,610	21,707	364
8/05/2011 1	6,263	16,782	430
15/05/2011 1	3,612	14,717	882
22/05/2011 9	,835	12,038	300
29/05/2011 9	,729	12,136	*no release*

Table 3 – Site Release and Regional Waterway Salt Load

Week Ending	Salt Load (tonne/week)		
	Isaac River at Yatton	Connors River at Pink Lagoon	HCM TEP Site Releases
23/01/2011 2	8,133	9,867	*no release*
30/01/2011 8	,402	5,077	278
6/02/2011 8	3,063	64,014	545
13/02/2011 7	0,391	23,072	472
20/02/2011 2	0,424	10,762	181
27/02/2011 1	9,035	10,953	423
6/03/2011 9	,716	6,733	588
13/03/2011 1	6,285	9,517	178
20/03/2011 1	25,047	66,464	774
27/03/2011 7	1,578	20,206	148
3/04/2011 8	5,046	44,417	643
10/04/2011 8	5,696	33,531	314
17/04/2011 1	9,162	12,747	501
24/04/2011 1	5,091	11,392	165
1/05/2011 8	,797	8,389	388
8/05/2011 6	,446	7,041	*not available*
15/05/2011 5	,972	6,861	*not available*
22/05/2011 4	,649	5,888	*not available*
29/05/2011 4	,620	5,737	*no release*

Review of the data presented in Tables 2 and 3 shows the following:

- HCM TEP release volumes represented around 1% of the observed streamflow volume over the corresponding period at the Connors River and Isaac River downstream stations.
- HCM TEP release volumes represented around 3% of the observed streamflow salt load over the corresponding period at the Connors River and Isaac River downstream stations.

PROPOSED TEP AMENDMENT

It is understood that HCM have prepared a proposed TEP amendment to continue site releases through to September 2011.

During this period of time (nominally 4 months, June to September), it is estimated that around 4,000ML of mine water release would occur with a maximum electrical conductivity of 2,000 µS/cm. To put the proposed release in context against historical stream flow records, it represents the following:

- Less than 0.5% of the historical average annual streamflow.
- Less than 2% of the historical average annual salt load.
- Around 7% of the historical average Jun-Sep streamflow.
- Around 42% of the historical average Jun-Sep salt load.

It is recognised that this proposed release may not be while there is a background flow in the regional waterways, as has occurred over the 2010/11 wet season. As such, the impact of non-seasonal flow and associated salt loading over the downstream Bee Creek and Connors River may include:

- Extended periods of downstream waterway flow (the extent of downstream impact not currently able to be defined).
- Potential elevated salt concentrations (electrical conductivity) in the streamflow.

For the purposes of assessing potential impact, estimation of resulting downstream electrical conductivity has been undertaken. Key assumptions associated with this preliminary assessment are detailed below:

- Connor River background flow conditions are variable. Sensitivity has been undertaken ranging back from current stream flow value (1,250 ML/day, as of 8 June 2011) to zero streamflow.
- Releases from HCM are conveyed to Connors River without any attenuation or loss. Given the distance that the Connors River station is located downstream of HCM (greater than 100km), this is considered to be a conservative assumption.
- Maximum daily HCM release volume of 130 ML/day at 2,000 µS/cm.
- Background Connor River electrical conductivity remains at 735 µS/cm (as at 8 June 2011), compared with a historical average value for the period Jun-Sep of around 330 µS/cm.

Outcomes from this preliminary assessment are provided in Table 4.

Table 4 – Connor River Station – Estimated HCM Release Impact

Connor River (without HCM Release)			Connor River (with HCM Release)		
Streamflow (ML/day)	**Salt Load (t/day)**	**EC (µS/cm)**	**Streamflow (ML/day)**	**Salt Load (t/day)**	**EC (µS/cm)**
1,250 6	30	735	1,380 8	10	850
940 (75% current)	470 7	35	1,070	650 8	90
470 (50% current)	240	735 6	00 4	10	1,010
120 (25% current)	60	735 2	50 2	40	1,400
0 (no flow)	0	735 1	30 1	80	2,000

Review of the estimated impact outcomes presented in Table 4 show:

- Estimated increase in electrical conductivity at the Connors River station.
- The magnitude of the increase reduces with increased background streamflow (ie. catchment runoff).
- Estimated maximum electrical conductivity of 2,000 µS/cm, consistent with the proposed maximum TEP release limit.

Whilst the above assessment indicates an apparent increase in Connor River streamflow and associated electrical conductivity, it is important to acknowledge the conservatism of the associated assessment assumptions outlined previously.

There remains considerable uncertainty with regard to the conveyance of the proposed HCM TEP releases being carried through without attenuation or loss to the Connors River station and potentially further downstream to the Isaac River station. The introduction of attenuation and loss to the assessment undertaken, would result in an associated reduction in the estimated Connor River (with HCM Release) electrical conductivity estimates.

In summary, proposed HCM releases over the winter period (Jun-September) will increase salt load in the downstream waterway compared against natural background condition. However, given the magnitude of the increase when considered against historical flow and salt load over this period and annually, long term impact is not expected.

We trust this initial advice satisfies your immediate requirements. Should any aspect require clarification, please contact the undersigned in the first instance.

Yours sincerely,

[redacted]

Scott Diggles
Water Solutions Pty Ltd

WS ACN 070 875 553	**Hail Creek Mine**		
	Engineering Assistance 2011 TEP Addendum Initial Advice **Locality Plan**		
	Job No. WS0562.1101	Revision: 0	**Figure 1**

File Name: WS110265_Fig1.cdr

Annexure Item 7.10

Approval of Transitional Environmental Program MAN13001

Department of Environment and Resource Management

Notice

Environmental Protection Act

Decision to grant amendment of an approval of a transitional environmental program

This statutory notice is issued by the administering authority pursuant to sections 340 and 344 of the Environmental Protection Act 1994*, to advise you of a decision or action.*

Your reference : MAN11801, EA MIN100913309
Our reference : MAN13001

Queensland Coal Pty Ltd
Level 3 – West Tower
410 Ann Street
Brisbane QLD 4000

C/c: Ms Martine Goldner
Environmental Specialist
Rio Tinto Hail Creek Mine
PO Box 3097
Mackay QLD 4740

Attention: Ms Martine Goldner

Re: Application for an amendment of approved transitional environmental program titled '*Hail Creek Mine – Amendment Transitional Environmental Programme under Section 333 of the Environmental Protection Act 1994*', for discharge of mine affected water at Hail Creek Mine, ML4738.

Thank you for your application to amend the approved transitional environmental program for Hail Creek Mine.

Your application dated 10 June 2011, which was originally received by this office on 2 June 2011, has been approved.

A copy of the amended certificate of approval (MAN13001) is attached (previously MAN11801).

Fees apply for the assessment of a draft transitional environmental program and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) Fees.*

A fee of $185.80 is payable.

You may apply to the Department of Environment and Resource Management for a review of this decision within 10 business days of receiving this notice. You may also appeal against this decision to the Planning and Environment Court.

Information outlining the review and appeal processes under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Department of Environment and Resource Management
www.derm.qld.gov.au **ABN 46 640 294 485**

Queensland Government

Notice

Should you have any queries in relation to this notice, Tristan Roberts of the Department of Environment and Resource Management on telephone (07) 4999 6890 would be happy to assist you.

[redacted]

SIGNATURE

10 June 2011

DATE

Melissa Wells
Regional Manager, Environmental Services (Mining)
Department of Environment and Resource Management
Delegate of the *Environmental Protection Act 1994*

Enquiries:
Department of Environment and Resource Management
PO Box 19
Emerald Qld 4720
Phone: (07) 4987 9320
Fax: (07) 4987 9399

Department of Environment and Resource Management

Environmental Protection Act

Transitional environmental program certificate of approval number MAN13001

This certificate of approval is issued by the administering authority pursuant to sections 339 and 344 of the Environmental Protection Act 1994. *A transitional environmental program is a specific program that, when approved, achieves compliance with the* Environmental Protection Act 1994 *for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.*

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Queensland Coal Pty Ltd
Level 3 – West Tower
410 Ann Street
Brisbane QLD 4000

C/c: Ms Martine Goldner
Environmental Specialist
Rio Tinto Hail Creek Mine
PO Box 3097
Mackay QLD 4740

approving the draft transitional environmental program, titled '*Hail Creek Mine – Amendment Transitional Environmental Programme under Section 333 of the Environmental Protection Act 1994*', for management of on-site water at Hail Creek Mine, ML4738.

The draft transitional environmental program, dated 10 June 2011, was originally received by this office on 2 June 2011. The transitional environmental program remains in force until 30 September 2011.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, Tristan Roberts of the Department of Environment and Resource Management on telephone (07) 4999 6890 would be happy to assist you.

[redacted]

Signature

10 June 2011

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Annexure Item 7.11

Amendment application to Transitional Environmental Program

Hail Creek Mine

Modification to Amendment

Transitional Environmental Programme under Section 333 of the *Environmental Protection Act 1994*

Environmental Authority MIN100913309

Principal Holder: Queensland Coal Pty Ltd

Joint Holder: Marubeni Coal Pty Ltd.
Sumisho Coal Development Queensland Pty Ltd.
Nippon Steel Australia Pty Ltd

27th June 2011 – 31st September 2011

Approvals

Name	Position	Signed	Date
Originator	Environmental Specialist	-	-
Checked	HSEC Manager	-	-
Authorised	General Manager	-	-

Revisions

Date	Description	By	Check	Authorised
10.06.2011	Issued for use	MG	LW	RM
8.07.2011	Amendments per DERM discussions	SR		

Contents Page

1. Background

This document has been prepared as a supplement to justify a modified release strategy for the Transitional Environmental Programme (TEP) currently in force for Hail Creek Mine (HCM) (MAN13001). This TEP modification has been voluntarily submitted to DERM in accordance with the *Environmental Protection Act* 1994.

It is understood that DERM are seeking to maintain and protect downstream water quality and flows, with the aim to return EC levels in the Connors River (at the Pink Lagoon) to 400µs/cm². However, it is again highlighted that neither the Pink Lagoon or Yatton (Isaac River) locations have shown any sensitivity to change as a result of either the cessation or recommencement of HCM water discharge, as detailed in Section 1.1. This suggests that natural processes may be ongoing which are resulting in elevated EC, and the volumes and quality of water being released by HCM does not represent a significant influence on the downstream waterways.

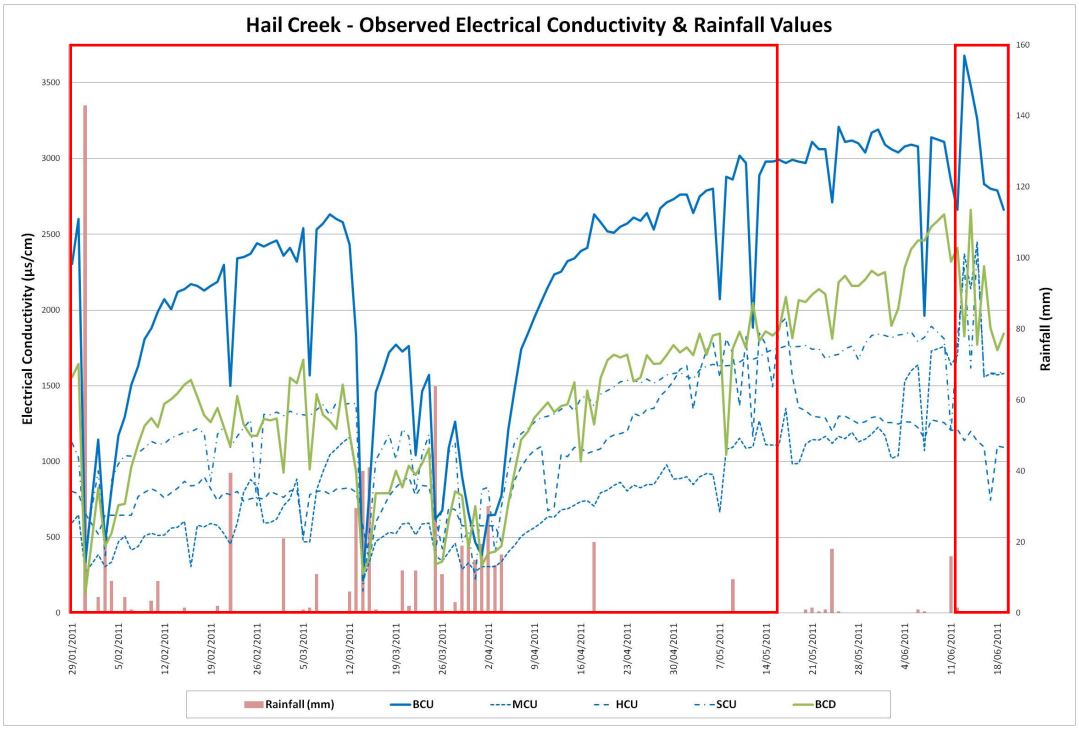
As outlined, HCM are still in a position of impaired operational capacity, and wish to shorten the time period that further release will be undertaken by releasing at higher flow rates. This will have the benefits of ensuring minimal deterioration of release water quality, confine the impact to downstream catchment users, and will also ensure HCM can return to within 90% of normal operational capacity in a timely manner.

This modified TEP strategy seeks to increase release flow rates by altering the required dilution with background flow, as well as increasing the release limit for EC, on appreciation of the water quality deterioration that is occurring. As a further ameliorating measure, further post-release flushes with clean water are planned.

1.1 Water Quality Trends

As seen in **Figure 1**. below, Electrical Conductivity has continued to be elevated upstream of the HCM release point, although the most recent EC observations appear to be decreasing. The two red boxes indicate the time periods over which HCM have been releasing mine affected water, both under the initial TEP (MAN11801) and under the new TEP (MAN13001).

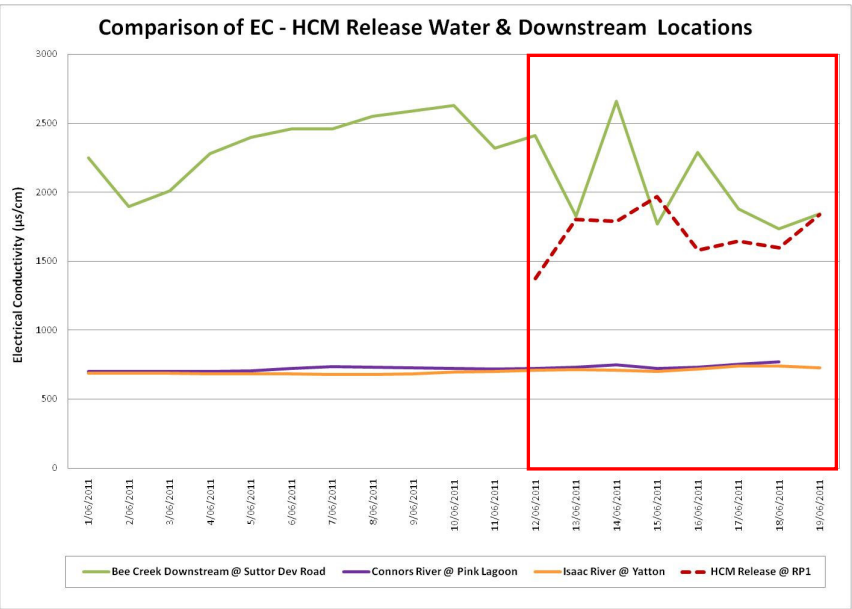
Figure 1. Local Electrical Conductivity & Rainfall Records at Hail Creek Mine



It can be seen from **Figure 1.** that similar EC trends between the Bee Creek Upstream (BCU) and Downstream (BCD) locations have been preserved irrespective of whether HCM has been releasing or not. Since the commencement of the new TEP (MAN13001), EC appears to decrease at both Bee Creek Upstream and Downstream locations, which may simply be a natural change in the waterway, or for the Downstream location may be a dilution effect related to HCM release.

Further considering the contribution of HCM release water to the regional catchment salt load, EC observations for a number of downstream locations are presented, below, in **Figure 2.** Data has been presented for the two downstream locations of concern to DERM, Pink Lagoon and Yatton, as well as corresponding data from HCM monitoring locations and available data from a number of monitoring locations between the release point and the Yatton monitoring station.

Figure 2. Regional Electrical Conductivity between HCM & Yatton



The red box in Figure 2. highlights the time period since the commencement of the new TEP (MAN13001). It can be seen that the EC of water released from the HCM release point (RP1), has fluctuated at close to the release limit of 2000µs/cm². Also clear is a trend of decreasing EC at the Bee Creek Downstream location, likely to be related to a dilution effect from HCM release. However, despite these local fluctuations, it is clear that the downstream EC at the regional level does not show any sensitivity to these local fluctuations, and remains stable at 700 µs/cm², both on the Connors River at the Pink Lagoon and on the Isaac River at Yatton.

These field observations reinforce the findings outlined by Water Solutions, in the report titled "*Hail Creek TEP Amendment - Initial Review of Site Release and Streamflow Data, dated 8th June 2011*". This report reviewed HCM release volumes and salt loads to two downstream locations of concern to DERM, the Connors River at Pink Lagoon and the Isaac River at Yatton.

The Water Solutions report concludes that further release volumes (assumed to be at a release rate of 1600L/s) and salt loads are not expected to significantly affect downstream water quality, as continued release will only represent less than 0.5% and 2% of expected annual volumes and salt loads respectively at these downstream points. However, the report does conclude the planned release volumes and salt loads represent a greater proportion of quarterly volumes and salt loads.

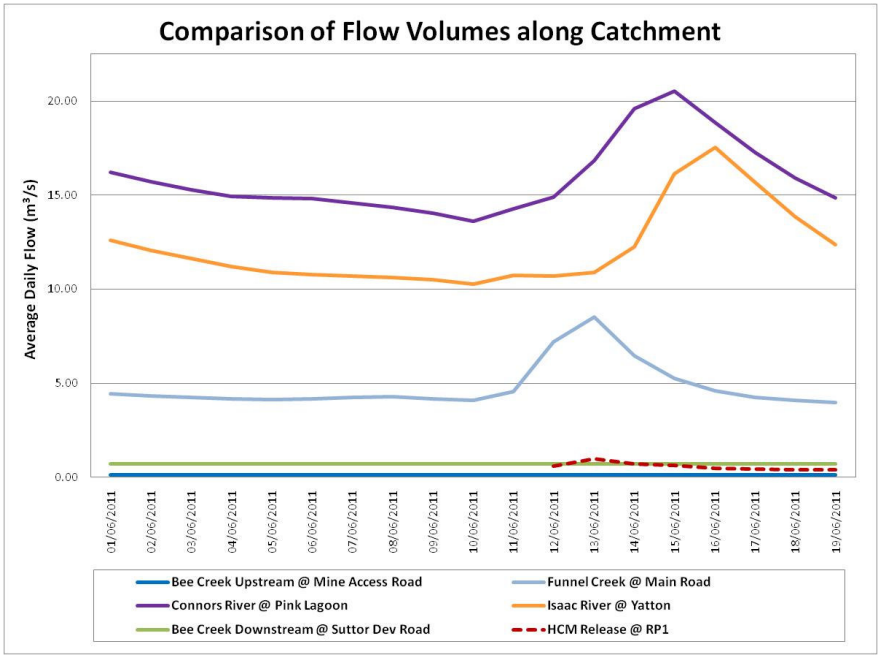
The Water Solutions report also shows that the further volumes and salt concentrations to be discharged are entirely consistent with the volumes and salt loads normally experienced during the course of any given year. Although it is accepted that the report indicates the release volumes and salt loads would be significant during a normal dry season, it is argued that this year has been very unusual, and continued natural baseflow suggests it is not truly a 'dry' season as typically experienced between June & September. Thus, further release volumes and higher flow rates are considered to be justified as within the normal range of conditions currently being experienced by the waterway.

Further, the preliminary findings of the Receiving Environment Monitoring Program (REMP) for 2011 indicates the local catchment area is in good condition, and does not appear to be suffering despite the extreme wet season experienced and the increased volumes and flow rates of release water. The preliminary report completed by ALS and detailing these findings has been provided to DERM, titled "*Rio Tinto Hail Creek Mine – Receiving Environment Monitoring Program – Preliminary Findings, dated June 2011*".

1.2 Background Flow

Figure 3. shows stream flow (in cumecs) at a number of different locations along the catchment, in the Bee Creek catchment, as well as Funnel Creek, Connors River and Isaac River. It can be seen that the upstream and immediate downstream flow volumes in Bee Creek are similar to the flow volumes being released by HCM. It can also be seen that the flow volume at the Funnel Creek location is an order of magnitude higher than being released by HCM, or at either the Bee Creek Upstream or Downstream locations. The flow volumes in the Connors and Isaac River are also 2-3 times greater again than the Funnel Creek flow. This shows the small contribution of HCM release water to the total volume in the downstream catchment, and the high potential for dilution of HCM water into the regional catchment.

Figure 3. Comparison of Release & Background Catchment Flows



In addition, data for another downstream location on Bee Creek was interrogated, that of the Bee Creek Monitoring Station at the Peak Downs Highway. This station collects water level data only, as a measure of height above the stream bed. As no flow rating curve has yet been completed for this location, the data could not be converted to cumecs.

However, this location is of interest as it is close to a neighbour of concern. Daily average water level records have shown that since HCM have recommenced release under MAN13001, the water level has remained essentially stable, as shown in **Table 1.** This clearly indicates that HCM release water does not represent a significant portion of current total downstream flow in the Bee Creek catchment, or alternatively that HCM flows under the new TEP are not reaching this location.

Table 1. Water level (m) - Bee Creek Station @ Peak Downs Highway

	12 June 11	13 June 11	14 June 11	15 June 11	16 June 11	17 June 11	18 June 11	19 June 11	20 June 11	21 June 11
Bee Creek @ Peak Downs Hwy	0.56	0.56	0.59	0.60	0.58	0.53	0.55	0.54	0.53	0.49

1.3 Update to HCM Water Balance

As at 7 July, a total of over 822ML has been released under the amended TEP (MAN13001).

An update of the status of the HCM water balance is as follows:

- Water has been continually released from Polishing Pond since the date of the TEP approval, 12th June 2011, at a rate equivalent to 10% of Funnel Creek flow (which has ranged between approximately 1000L/s & 400 L/s);
- Ramp 1 and Ramp 3 Hynds pit areas are close to being dewatered with largely nuisance water remaining, whilst significant volumes of water remain in Ramp 3 and 5 Elph pits;
- The most recent total site water inventory (for June) shows a net loss of 440ML overall from the previous month (May), indicating that some spoil recharge is occurring; and
- All main dams/water storages sit close to the full supply volume (FSV).

1.4 Continued Impact to HCM Operations

Although the TEP approval does allow for further release of water off site, the release rates are well below the rates which can be achieved by HCM. This means that, in order to maintain compliance, HCM must slow water transfers out of pit, or must transfer water multiple times between storages. These activities are continuing to impact on HCMs ability to operate efficiently, and at full capacity, and have a detrimental impact on stored water quality.

The constraint of release no more than 10% of Funnel Creek flows is limiting the opportunity for HCM to dewater in a timely manner, and also increasing the potential for water quality to deteriorate the longer it remains in pit. The initial TEP release strategy proposed to DERM argued for release rates up to 1600L/s, which was intended to restore operations to 90% capacity. The approved TEP has only provided opportunity to achieve approximately ¼ of these flow rates, with the effect that operational limitations are continuing.

1.5 Mine affected Water Quality

Over the course of the last few months, Electrical Conductivity levels of water impounded by HCM has been elevating. It is expected that this EC value will continue to deteriorate the longer the

water remains in pit without further dilution, and as warmer and drier weather is experienced. Spoil recharge, which is expected to be occurring, is also likely to cause significant EC elevation.

Figure 4. Projected EC elevation from HCM release

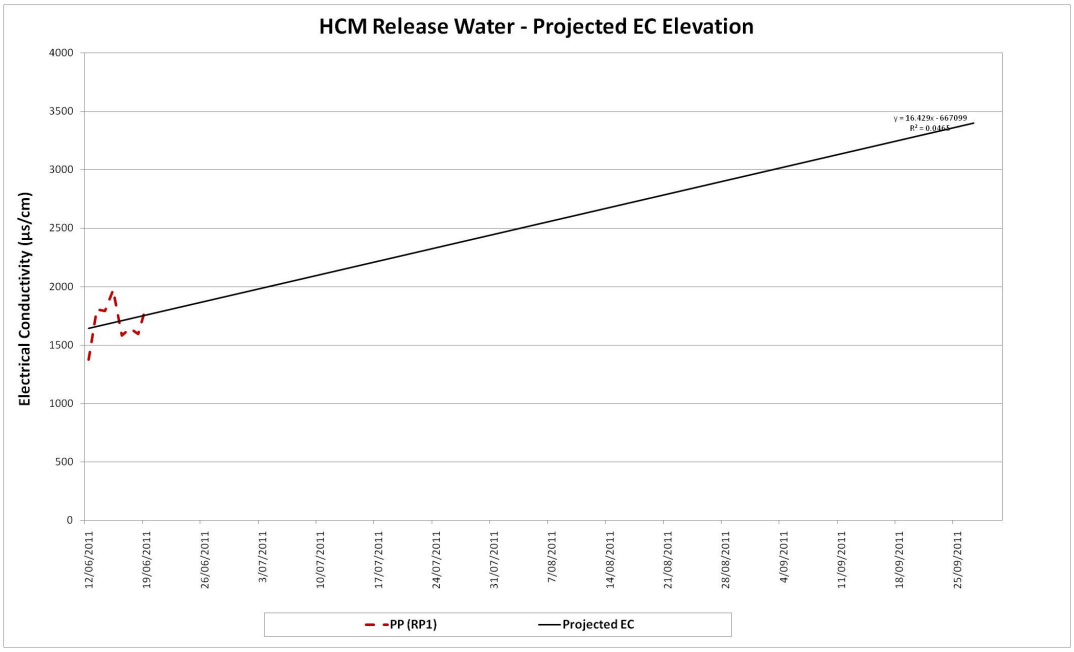


Figure 4. shows a projection of EC which is expected to occur, based on the daily water quality records which have been recorded since the commencement of the new TEP (MAN13001). From the figure, it can be seen that EC is expected to continue to elevate sharply as time continues, with levels expected to reach ~ 2500µs/cm by the end of July 2011, and 3500µs/cm by the current approved end date for the TEP of 30th September 2011. Currently, HCM have been able to continue releasing water, but water quality of discharged water has remained close to the current release limit of 2000µs/cm.

In the interest of addressing this issue now, HCM are seeking to increase flow rates to bring the end date of the TEP forward. As an additional ameliorative measure, HCM plan to undertake further flushing of raw water after release of mine affected water has ceased under the TEP. Thus, data presented herein indicates that current water quality and EC results being discharged are causing minimal downstream impact to either flow or quality, and as such, HCM believe rapid release would capitalise on both the existing quality and volumes of other water within the catchment.

2. Modified Hail Creek TEP Strategy

HCM believe the proposed modifications to the TEP, as outlined below, provide the optimal balance between economic, environmental and social needs for both HCM and other catchment users, for the following key reasons:-

- Predictive data has been provided which illustrates that the relative contribution of HCM water to downstream volumes and total salt load is insignificant, and that HCM release water is at most a nominal influence on downstream water quality and flows.

- Actual data has confirmed that, since the commencement of the amended TEP, little change has been experienced for either flow volumes or EC concentration at downstream locations of concern, also supporting the argument that HCM release water is at most a nominal influence on downstream water quality and flows.

- The modified strategy will achieve dewatering faster than allowed by the current TEP, which is beneficial for both minimising impact to downstream catchment users and ensuring protection of environment values, as well as providing an early cessation to minewater releases.

- More rapid dewatering initially will prevent longer-term compliance problems potentially caused by further deterioration of water quality (particularly for EC) and high site water inventory.

- Preliminary REMP monitoring results indicate that the immediate downstream areas are in good condition, despite extensive water release during the 2010/11 wet season and the current TEP, supporting the conclusion that the proposed release strategy can be tolerated by the system.

2.1 Plan for the Release of Mine Affected Water

The TEP release strategy (MAN13001) sought in this amendment is summarised in **Table 5**.

Table 5. TEP Strategy Details

Total Release Volume		4000ML mine affected water *(with dilution up to 500ML raw water, for a total of 4500 ML)*
Approval Timeframe		Effective immediately (8/7/11) to 31st August 2011
Release Point		RP1 – Polishing Pond with release via permanent rock/grass lined release channel
Release Strategy	**- Flow trigger/ release rate**	Either: **- 7.25%** of the flow in the Isaac River at the Departments gauging station **130401A** at Yatton: or **- 10%** of the combined flow in Funnel Creek at the departments gauging station **130406A** plus the flow in Dennison Creek at the departments gauging station **130413A** plus the flow in the Connors River at Mount Bridget at the departments gauging station **130403A**, whichever is the larger. If flow in Funnel Creek falls below 1.5 cumecs, maintain release at a maximum of 150**L/s**
	- Dilution	Dilute mine affected water as required with raw water (from Eungella/Burdekin Dam) at a maximum rate of 40L/s
	- Water Quality Criteria	Upper release limit of 2050 **µs/cm** for EC. Should EC levels approach tis release limit, it is proposed to hold further discussions with DERM with a view to managing total release salt loads All other parameters as per previous TEP (pH, Turbidity, TSS)
	- Rest Days	Nil proposed.
	- Clean Water Flushing	HCM will release a volume of approximately **300 ML** (to be confirmed) from an available clean water diversion dam (Brumby Dam) at 250L/s after dewatering program is complete. HCM will also continue to release raw water as a flush from the Polishing Pond release point (RP1) for up to **10 days** after release of mine affected water has ceased, at the maximum allowable rate.

3. Modified TEP Conditions

As per the initial TEP approval, this set of conditions will be adhered to. In carrying out this TEP, Hail Creek Mine will undertake all activities in accordance with the following conditions.

Those conditions which have been altered or modified for this amendment have been highlighted. For completeness and ease of ensuring compliance, the entire set of conditions have been reproduced herein, and where no changes have been made, the text of the condition has been greyed out.

If any inconsistencies occur between this TEP amendment and the current TEP, this TEP amendment document will prevail over the extent of the inconsistency. On approval by DERM, Hail Creek is to be authorised to undertake the actions specified in this TEP amendment.

Release of Mine Affected Water

W1. Contaminants that will, or have the potential to cause environmental harm, must not be released directly or indirectly to any waters except as permitted under this *Transitional Environmental Approval – Certificate of Approval*, unless otherwise authorised to under the *Environmental Protection Act 1994*.

W2. The release of contaminants to waters must only occur from release point RP1 (Polishing Pond) and depicted in **Figure 1** of the EA (MIN100913309).

W3. The release of contaminants to waters must not exceed an electrical conductivity (EC) of 2050 µS/cm at the release point.

W4. The release of contaminants to waters from the release points must be monitored at the locations specified in **Table 5** of the TEP for each quality characteristic and at the frequency specified in **Table 8** of the TEP.

W5. If quality characteristics of the release exceed any of the applicable trigger levels in the TEP, the TEP holder must compare the downstream results for the receiving waters monitoring point identified in **Table 9** to the trigger values in **Table 10** or **11**; and

a) where the trigger values are not exceeded then no action is to be taken;

b) where the downstream results exceed the trigger values specified **Table 10** or **11** for any quality characteristic, compare the results of the downstream site to the data from background (upstream) monitoring sites; and

(i) if the result is less than the background (upstream) monitoring site data, then no action is to be taken; or

(ii) if the result is greater than the background (upstream) monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:

1. details of the investigations carried out;

2. actions taken to prevent environmental harm.

W6. If an exceedence in accordance with condition W5(a)(ii)(2) is identified, the holder of the TEP must notify the administering authority within fourteen (14) days of receiving the result. The notification must include written verification of the exceedence forwarded to the

administering authority either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au

Contaminant Release Events

W7. The TEP holder must only release water, from RP1 only, according to the mixing/dilution regime as follows:-

a) Releasing at a rate equal to either:

- **- 7.25%** of the flow in the Isaac River at the Departments gauging station **130401A** at Yatton: or

- **- 10%** of the combined flow in Funnel Creek at the departments gauging station **130406A** plus the flow in Dennison Creek at the departments gauging station **130413A** plus the flow in the Connors River at Mount Bridget at the departments gauging station **130403A**, whichever is the larger; or

- At maximum rate of 400L/s if flow in Funnel Creek falls below1.5 cumecs.

W8. Monitoring of the flow rate in Funnel Creek must be undertaken no less than twice daily whilst release is being occurring.

W9. The period, flow rates and volumes discharged for the time that each release point is operating must be monitored and follow the pattern outlined above in W7.

W10. The daily quantity of contaminants released from each release point must be measured and recorded at the monitoring points in **Table 7** of the TEP **and Table 5** of the amendment.

Requirements to Cease the Release of Mine Affected Water

W11. The release of mine-affected waters must cease immediately if any water quality limit as specified in **Table 6** of the TEP or condition W3 of this TEP amendment are exceeded, unless direction can be sought from DERM to the contrary.

W12. The release of mine-affected waters must cease immediately if identified that the release of mine-affected waters is causing erosion of the bed and banks of the receiving waters, or is causing a material build up of sediment in such waters.

W13. The release of mine-affected waters must cease immediately if the holder of this Transitional Environmental Program is directed to do so by the administering authority.

W14. The release of mine-affected waters authorised under this Transitional Environmental Program must cease by **31/09/2011**.

Erosion and Sediment Control

W15. Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

W16. If W14 cannot be met, erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:

a) be designed and constructed by a suitably qualified and experienced person; and

b) be inspected by a suitably qualified and experienced person prior to the commencement of dewatering operations; and

c) be inspected by a suitably qualified and experienced person following the cessation of release in accordance with the conditions of this *Transitional Environmental Program – Certificate of Approval*.

W17. The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine-affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:

a) identification of erosion, slumping and scour impacts to vegetation;

b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm; and

c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

W18. The Transitional Environmental Program holder must notify the administering authority within twelve (12) hours of having commenced releasing mine-affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) release commencement date/time;

b) expected release cessation date/time;

c) release point/s;

d) release volume (estimated); and

e) any details (including available data) regarding likely impacts on the receiving water(s).

W19. The Transitional Environmental Program holder must provide the administering authority weekly during the release of mine affected water, in writing (either via facsimile or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:

a) all in situ monitoring data for the preceding week;

b) the receiving water flow rate for the preceding week; and

c) the release flow rate for the preceding week.

W20. The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within twenty-four (24) hours after cessation of a release) of the cessation of a release notified under W14 and within twenty-eight (28) days provide the following information in writing:

a) release cessation date/time;

b) natural flow volume in receiving water;

c) volume of water released;

d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume);

e) all in-situ water quality monitoring results; and

f) any other matters pertinent to the water release event.

Notification of Release Event Exceedence

W21. If the release limits defined in **Table 5** of the TEP or **Table 5** of the TEP amendment are exceeded, the holder of the Transitional Environmental Program must notify the administering authority within eighteen (18) hours of receiving the results.

W22. The Transitional Environmental Program holder must, within twenty-eight (28) days of a release that exceeds the conditions of this Transitional Environmental Program, provide a report to the administering authority detailing:

a) the reason for the release;

b) the location of the release;

c) all water quality monitoring results;

d) any general observations;

e) all calculations; and

f) any other matters pertinent to the water release event.

Monitoring Requirements

W23. Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.

W24. All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

W25. As soon as practicable after becoming aware of any emergency or incident that results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.

W26. The notification of emergencies or incidents must include but not be limited to the following information:

a) the holder of the Transitional Environmental Program;

b) the location of the emergency or incident;

c) the number of the Transitional Environmental Program;

d) the name and telephone number of the designated contact person;

e) the time of the release;

f) the time the holder of the Transitional Environmental Program became aware of the release;

g) the suspected cause of the release;

h) the environmental harm caused, threatened, or suspected to be caused by the release; and

i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.

W27. Not more than fourteen (14) days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:

a) proposed actions to prevent a recurrence of the emergency or incident; and

b) outcomes of actions taken at the time to prevent or minimise environmental harm.

Reporting

W28. The holder of this Transitional Environmental Program will provide weekly monitoring reports to the administering authority, detailing in-situ water quality parameters monitoring during release, as outlined in **Table 12**.

W29. The holder of this Transitional Environmental Program will also submit a report to the administering authority by the fifth (5) business day of each month detailing:

a) all activities undertaken under the Transitional Environmental Program;

b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(i) the best practice environmental management for the activity; and

(ii) the risks of environmental harm being caused by the activity.

c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.

W30. The holder of this Transitional Environmental Program must also submit a report to the administering authority by **31st October 2011** including:

a) details of the completion of the Transitional Environmental Program;

b) details on all activities undertaken under the Transitional Environmental Program;

c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:

(iii) the best practice environmental management for the activity; and

(iv) the risks of environmental harm being caused by the activity.

d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program; and

e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority for Hail Creek Mine, (MIN100913309) and the *Environmental Protection Act 1994*.

W31. The holder of this Transitional Environmental Program will engage with downstream landholders in relation to demonstrated impacts arising from the discharge of mine affected water to mitigate any such impacts.

Annexure Item 7.12

DERM directive to cease discharge

Ritchie, Stuart (RTCA)

From: Loveday Chris [redacted]
Sent: Friday, 29 July 2011 5:07 PM
To: Goldner, Martine (RTCA)
Cc: Ritchie, Stuart (RTCA)
Subject: RE: Hail Creek TEP

Martine

I have been trying to call with no luck. Hail Creek will be required to cease TEP releases as of 5pm 30 July 2011 as a result of rising EC downstream.

Releases may be able to recommence during the currency period of your TEP however this will be at the discretion of the department taking into account downstream EC and river conditions.

Please give me a call or an email if you have any issues or need to discuss further.

Regards

Christopher Loveday

Manager, Environmental Services – Mining
Telephone: 07 4987 9340 **Facsimile:** 07 4982 2568
Mobile: [redacted]
www.derm.qld.gov.au

Department of Environment and Resource Management

99 Hospital Road, Emerald QLD 4720
PO Box 19, Emerald QLD 4720

Annexure Item 7.13

Evidence of advice from DERM that discharge can recommence

Ritchie, Stuart (RTCA)

From: Ritchie, Stuart (RTCA)
Sent: Friday, 2 September 2011 3:20 PM
To: Munro, Rowan (RTCA); Goldner, Martine (RTCA); Kruger, Fiona (RTCA)
Cc: Gordon, Rory (RTCA)
Subject: HCM Discharge Recommencement notification

All. I spoke to Chris Loveday at 2:45 pm today who indicated that following a discussion with Ed Donohue (also of DERM), that they were prepared to allow HCM to recommence discharge under the existing TEP.

Chris indicated that they were concerned that the current TEP may allow an excessive discharge rate given current downstream flow volumes (4 ML/s by my calcs but falling) and that they were concerned about the potential impacts of a significant discharge volume on downstream landholders. I indicated that an appropriate discharge rate might be 40-50ML/day which is approximately the rate prior to the last cessation of discharge and Chris indicated that he would be happy with that rate.

I have been unable to contact anyone other than Rowan at this point.

Regards

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Annexure SJR8

Working draft of revised Fitzroy Model Conditions

Final Model Water Conditions for Coal Mines in the Fitzroy Basin

Note:

Explanatory notes are in green. DELETE prior to issue of EA.

Insertions required by applicants and or the administering authority are in blue. DELETE prior to issue.

Contaminant Release

W1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters as a result of the authorised mining activities, except as permitted under the conditions of this environmental authority.

W2 Unless otherwise permitted under the conditions of this environmental authority, the release of mine affected water to waters must only occur from the release points specified in Table 1 and depicted in Figure 1 <this would be a plan or plans locating all monitoring (water quality and flow) and release points> attached to this environmental authority.

W3 The release of mine affected water to internal water management infrastructure that is installed and operated in accordance with a water management plan that complies with conditions W33 to W38 inclusive is permitted.

Table 1 (Mine Affected Water Release Points, Sources and Receiving Waters)

EXPLANATORY NOTES – Determining Mine Affected Water Release Points:

Mine affected water release points should be specified in Table 1 where they represent a potential source of water contaminated by the mining activity. Release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage run-off containing sediment only that is not likely to contain contaminants or have properties that would cause environmental harm, do not need to be separately identified in Table 1.

Release Point (RP)	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Mine Affected Water Source and Location	Monitoring Point	Receiving waters description
RP 1	XXXX	XXXX	e.g. Stormwater Dam Spillway Overflow	Dam Spillway	Wet Creek
RP 2	XXXX	XXXX	e.g. Dam overflow pipe	Sampling Tap on pipe where the pipe enters Sandy Creek	Sandy Creek

W4 The release of mine affected water to waters in accordance with condition W2 must not exceed the release limits stated in Table 2 when measured at the monitoring points specified in Table 1 for each quality characteristic.

Table 2 (Mine Affected Water Release Limits)

Quality Characteristic	Release Limits	Monitoring frequency	Comment
Electrical conductivity (uS/cm)	Release limits specified in Table 4 for variable flow criteria.	Daily during release (the first sample must be taken within 2 hours of commencement of	

		release)	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
Turbidity (NTU)	Current limit or limit derived from suspended solids limit and demonstrated correlation between turbidity to suspended solids historical monitoring data for dam water*	Daily during release* (first sample within 2 hours of commencement of release)	Turbidity is required to assess ecosystems impacts and can provide instantaneous results.
Suspended Solids (mg/L)	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment*	Daily during release* (first sample within 2 hours of commencement of release)	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	Release limits specified in Table 4 for variable flow criteria.	Daily during release* (first sample within 2 hours of commencement of release)	Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC.

*Note: *Limit for suspended solids can be omitted if turbidity limit is included. Limit for turbidity not required if suspended solids limit included. Both indicators should be measured in all cases.*

W5 The release of mine affected water to waters from the release points must be monitored at the locations specified in Table 1 for each quality characteristics and at the frequency specified in Table 2 and Table 3.

Note: the administering authority will take into consideration any extenuating circumstances prior to determining an appropriate enforcement response in the event condition W5 is contravened due to a temporary lack of safe or practical access. The administering authority expects the environmental authority holder to take all reasonable and practicable measures to maintain safe and practical access to designated monitoring locations.

Table 3 (Release Contaminant Trigger Investigation Levels) Potential Contaminants

EXPLANATORY NOTES – Table 3 Potential Contaminants:

The quality characteristics listed below should be assessed on a site by site basis by each mine prior to finalisation of amendment applications. Based on this assessment, the quality characteristic should be either disregarded if below trigger levels; or included as priority contaminants in Table 3 if above trigger levels. Assessment should involve comparison of representative data from dams that have historically been discharged or likely to be discharged from contaminant release points in Table 1. Data may include historical results or sampling undertaken for this specific purpose. The intent here is that not all dams on site would need to be sampled but those that would make up the majority of water in dams with release points. It could also be demonstrated based on existing water quality information that the water source and relative water quality of some dam are the same, in which case such dams may not need to be sampled individually. For metals and metalloids, trigger levels apply if dissolved results exceed trigger levels. However, total (unfiltered) results for metals and metalloids can be used to disregard a characteristic for inclusion in Table 3. Terms include SMD – slightly moderately disturbed level of protection, guideline - refers ANZECC & ARMCANZ (2000), LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical methods required to achieve LOR.

Table 3 (Release Contaminant Trigger Investigation Levels) Potential Contaminants

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	*For aquatic ecosystem protection, based on SMD guideline*	Commencement of release and thereafter

Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	weekly during release
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Copper	2	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Iron	300	*For aquatic ecosystem protection, based on low reliability guideline*	
Lead	4	*For aquatic ecosystem protection, based on SMD guideline*	
Mercury	0.2	*For aquatic ecosystem protection, based on LOR for CV FIMS*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	8	*For aquatic ecosystem protection, based on SMD guideline*	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	90	*For aquatic ecosystem protection, based on low reliability guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on low reliability guideline*	
Selenium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Silver	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Uranium	1	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Vanadium	10	*For aquatic ecosystem protection, based on LOR for ICPMS*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	
Sodium	TBA		
Include additional contaminants as required	Include additional contaminants as required		

Note:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

2. The quality characteristics required to be monitored as per Table 3 can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table 3 by amendment.

3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).

4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

W6 If quality characteristics of the release exceed any of the trigger levels specified in Table 3 during a release event, the environmental authority holder must compare the down stream results in the receiving waters to the trigger values specified in Table 3 and:

1. where the trigger values are not exceeded then no action is to be taken; or
2. where the down stream results exceed the trigger values specified Table 3 for any quality characteristic, compare the results of the down stream site to the data from background monitoring sites and;
   (a) if the result is less than the background monitoring site data, then no action is to be taken; or
   (b) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
      (i) details of the investigations carried out; and
      (ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W6 2(b) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

W7 If an exceedance in accordance with condition W6 2(b) is identified, the holder of the authority must notify the administering authority within 14 days of receiving the result.

Mine Affected Water Release Events

W8 The holder must ensure a stream flow gauging station/s is installed, operated and maintained to determine and record stream flows at the locations and flow recording frequency specified in Table 4.

W9 Notwithstanding any other condition of this environmental authority, the release of mine affected water to waters in accordance with condition W2 must only take place during periods of natural flow events in accordance with the receiving water flow criteria for discharge specified in Table 4 for the release point(s) specified in Table 1.

W10 The release of mine affected water to waters in accordance with condition W2 must not exceed the Electrical Conductivity and Sulphate release limits or the Maximum Release Rate (for all combined release point flows) for each receiving water flow criteria for discharge specified in Table 4 when measured at the monitoring points specified in Table 1.

Table 4 (Mine Affected Water Release during Flow Events)

EXPLANATORY NOTES – Table 4

Gauging station description:

The intent here is that every release point in Table 1 is associated with a gauging station that measures flow upstream of the discharge point. More than one discharge point may be associated with the same gauging station. The gauging station should be at a minimum distance from the discharge point such that water flow under trigger flow events will not significantly diminish by the time it reaches the discharge point. The location of the gauging station should ideally be such that it is not significantly affected by other upstream point source releases or times of discharge are limited to periods of "natural" flow.

Under certain circumstances it may be appropriate to have a downstream gauging station in addition to or in replace of an upstream gauging station. The location should ideally not be affected by the discharge (e.g. be measured off the main waterway). The need for this must be demonstrated on a case by case basis to show why an upstream gauging station is insufficient. This may be the case when mines are located in the upper parts of catchments or near the downstream confluence or a major waterway. Similarly, the gauging station should be at a distance from the discharge point such that water flow during triggered flow events will not significantly diminish between the discharge point and the measuring point (or the confluence with the creek being measured). For downstream flow triggers, some changes to calculation for flow triggers and maximum release flows would typically be required based on the relative sizes of the waterways involved.

Flow Triggers and EC Quality Criteria:

The intent for flow triggers is that the times of discharge are limited to times around natural flow events only. Different flow regime methodologies are used to define mine affected water release opportunities, provide flexibility for site operators and to protect identified environmental values within receiving waters. The expectation

is that where flow gauging data is available, it is used to calculate flow triggers. Where gauging data is not available or is insufficient, flow triggers should be based on runoff/stream flow estimates using appropriate hydrological calculations or models and known catchment area, rainfall estimations etc.

Separate methodologies for discharges which occur to local waterways rather than regional waterways will be applied as part of this revised approach. Due to the increased flexibility of the revised approach and consideration of a wider range of local factors the application of these model conditions to individual sites will require case-by case assessment and require sufficient background information to be provided. For example, it should be noted that discharges upstream of dams or lakes may require special considerations and generally stricter controls. Also, where multiple mines discharge to the same or closely connected waterways consideration of cumulative impacts will be necessary as part of the assessment process.

Model conditions do not preclude applicants from proposing alternative or additional conditions, nor restrict the administering authority from using alternative conditions where the case warrants. However, applications proposing alternative approaches will need to be supported by sufficient environmental risk assessment and contingency planning information to allow the administering authority to adequately consider the proposal.

There may be instances where case-by-case proposals can be considered for conditions to address management of particularly heavy rainfall and flooding that is similar to previous events, where there is sufficient information available based on: previous transitional environmental programs, monitoring and analysis, the environmental values of the receiving environment together with the experience of impacts on those environmental values, rigorous contingency and disaster response planning, and with particular regard to actual and potential cumulative impacts. For example, there may be potential to tailor a schedule of conditions to be triggered upon reaching nominated thresholds of rainfall, flow, flooding (or a combination) based on learning from an event that has occurred in the past; possibly adopting a similar framework to previous discharge permissions granted in similar circumstances, provided the framework was demonstrated to adequately address environmental risk to the satisfaction of the delegate.

No/low flow stream conditions (best quality / low EC mine affected water):

Discharge water quality will need to meet or be better than water quality objectives (or long term background reference 75th / 80th percentile) for EC and will only be permitted for temporary periods after periods of significant flow. The focus of this is to allow "good" quality water to be released when collected rather than having it stored over long durations resulting in deteriorating water quality. Any discharges made under no/low flow stream conditions must not contribute to or cause erosion and due consideration should be given to road/rail access, stock crossings etc (particularly in relation to multiple mines discharging under no/low flow stream conditions on connected waterways). General principles include:

- Release at times when flow is on tail end of flow event only i.e. following a flow above specified event flow trigger and when the flow reduces below the flow trigger again. This trigger will commence a discharge window of 4-6 weeks for good quality water only.
- End of pipe WQ ≤ WQO (or long term background reference 75th/80th percentile). May require assessment of downstream environmental values where WQO is more stringent (e.g. drinking water supply).
- Duration of release is limited (dry ephemeral stream, 4 weeks after flow event ceases, use time after flow trigger for below – add additional time).
- Volume/rate will be considered on a case by case basis.

Medium flow stream conditions (medium quality mine affected water):

A flow trigger for the stream is required and will be set to avoid discharge of medium quality water during periods of no or low flow. General principles include:

- Requires the use of a stream flow trigger above which release can occur. The stream flow trigger must be representative of event flow and be above base/low flow (typically determined from hydrographs, historical flow/water quality data and/or modeling).

- End-of pipe EC <3500uS/cm. Options for either <1500us/cm and <3500uS/cm as maximum limits can be considered which will result in different maximum discharge rates for different quality water. The better the quality of water to be released, the greater the volume that can be permitted.
- The design dilution/maximum discharge rate should be based on a site specific risk assessment. These should be designed to achieve an in-stream EC based on the location – upper (Zone 1), mid (Zone 2) or lower (Zone 3) catchment. The $EC_{WQO\ high\ flow}$ should be adopted as background EC for design calculations.

    - Zone 1, upper catchment mines, approximately <10km from top of waterway catchment.
      $EC_{in\ stream}$ = 1000uS/cm (toxicity guideline).

    - Zone 2, mid catchment mines, zones not within Zone 1 or Zone 3
      $EC_{in\ stream}$ = 700uS/cm

    - Zone 3, lower catchment mines (All regional waterways are considered Zone 3 from distance >50km from top of waterway catchment, refer to Zone 3 map) –
      $EC_{in\ stream} = EC_{high\ flow\ WQO} + multiplier \times (EC_{WQO\ low\ flow} – EC_{WQO\ high\ flow})$

      e.g. multiplier = 0.2 for Isaac, Nogoa, Dawson

- $EC_{in\ stream}$ for calculations may vary according to other locally relevant environmental values that may need to be considered.

High flow stream conditions (poorer quality water):

This option might be used in some cases for mines that need to discharge higher EC wastewater than is allowable under medium flow stream conditions. Any discharge is required to have a higher level of dilution than with medium flow cases but still achieve a maximum incremental increase in the waterway. This option is most feasible for mines situated on regional waterways as the window for discharge is likely to be limited for local waterways. Some additional considerations on management of mixing zones and acute/chronic toxicity may be required in this case. General principles include:

- Requires the use of a stream flow trigger above which release can occur. The stream flow trigger must be representative of high event flow and be above medium flow (typically determined from hydrographs, historical flow/water quality data and/or modeling).
- End-of pipe EC must be > 3500uS/cm (but <10,000uS/cm). The better the quality of water to be released, the greater the volume that can be permitted.
- The design dilution/maximum discharge rate should be based on a site specific risk assessment. These should be designed to achieve an in-stream EC based on the location – upper (Zone 1), mid (Zone 2) or lower (Zone 3) catchment as described above. .
- May need some additional indicators/requirements and requires case by case assessment.
- This option is likely to be less feasible for Zone 1 and 2 mines.

Receiving waters/ stream	Release Point (RP)	Gauging station	Gauging Station Latitude (decimal degree, GDA94)	Gauging Station Longitude (decimal degree, GDA94)	Receiving Water Flow Recording Frequency	Receiving Water Flow Criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical Conductivity and Sulphate Release Limits
e.g. Wet Creek	Insert all release points that will release based on this gauging station flow. e.g. RP1, RP2 & RP3	e.g. Gauging station 1	XXXX	XXXX	Continuous (minimum daily)	**Low Flow** <XX m3/s for a period of <insert number of days> after natural flow events that exceed XX m3/s (where XX is a specified event flow trigger)	Insert < xx ML/day or < xx m3/s Volume/rate to be determined on case by case basis	Electrical conductivity (uS/cm): <insert water quality objective or 75th percentile of long term background reference data> Sulphate (SO_4^{2-}): 250 mg/L
						Medium Flow > XX m3/s (where XX is specified event flow trigger)	< XX m3/s (where XX is the maximum release rate determined on case by case basis)	Electrical conductivity (uS/cm) <insert value determined on case specific basis but typically <1500 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum) >
							< YY m3/s (where YY is the maximum release rate determined on case by case basis)	Electrical conductivity (uS/cm) <insert value determined on case specific basis but typically <3500 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>
						High Flow > ZZ m3/s (where ZZ is a specified high flow event trigger)	< ZZ m3/s (where ZZ is the maximum release rate determined on case by case basis)	Electrical conductivity (uS/cm) <insert value determined on case specific basis but typically within a range of <3500 to <10,000 Sulphate (SO_4^{2-}) (mg/L) <insert limit to be determined based on achieving downstream target of 250 (Maximum)>

W12 The daily quantity of mine affected water released from each release point must be measured and recorded at the monitoring points in Table 1.

W13 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.

Notification of Release Event

W14 The environmental authority holder must notify the administering authority as soon as practicable and no later than 24 hours after commencing to release mine affected water to the receiving environment.

Notification must include the submission of written advice to the administering authority of the following information:

a) release commencement date/time;
b) expected release cessation date/time;
c) release point/s;
d) release volume (estimated);
e) receiving water/s including the natural flow rate; and
f) any details (including available data) regarding likely impacts on the receiving water(s).

Note: Notification to the administering authority must be addressed to the Manager and Project Manager of the local Administering Authority via email or facsimile.

W15 The environmental authority holder must notify the administering authority as soon as practicable (nominally within twenty-four (24) hours after cessation of a release event) of the cessation of a release notified under Condition W14 and within 28 days provide the following information in writing:

a) release cessation date/time;
b) natural flow volume in receiving water;
c) volume of water released;
d) details regarding the compliance of the release with the conditions of Agency Interest: Water of this environmental authority (i.e. contamination limits, natural flow, discharge volume);
e) all in-situ water quality monitoring results; and
f) any other matters pertinent to the water release event.

Note: Successive or intermittent releases occurring within twenty-four (24) hours of the cessation of any individual release can be considered part of a single release event and do not require individual notification for the purpose of compliance with conditions W14 and W15, provided the relevant details of the release are included within the notification provided in accordance with conditions W14 and W15.

Notification of Release Event Exceedance

W16 If the release limits defined in Table 2 are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.

W17 The authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this authority, provide a report to the administering authority detailing:

a) the reason for the release;
b) the location of the release;
c) all water quality monitoring results;
d) any general observations;
e) all calculations; and
f) any other matters pertinent to the water release event.

EXPLANATORY NOTES – Water storage monitoring conditions:

Note: Conditions W18 and W19 can be removed if already conditioned in the authority or in the event that model conditions for regulated dams are finalised and they include relevant replacement conditions.

Monitoring of Water Storage Quality

W18 Water storages stated in Table 5 which are associated with the release points must be monitored for the water quality characteristics specified in Table 6 at the monitoring locations and at the monitoring frequency specified in Table 5.

Table 5 (Water Storage Monitoring)

Water Storage Description	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)	Monitoring Location	Frequency of Monitoring
XXXX	XXXX	XXXX	To be negotiated- will depend on the individual storage structure volume. This will deal with stratification – depth profiles and be appropriate to in situ quality characteristics.	Quarterly

W19 In the event that waters storages defined in Table 5 exceed the contaminant limits defined in Table 6, the holder of the environmental authority must implement measures, where practicable, to prevent access to waters by all livestock.

Table 6 (Onsite Water Storage Contaminant Limits)

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9[2]
EC (µS/cm)	Maximum	5970[1]
Sulphate (mg/L)	Maximum	1000[1]
Fluoride (mg/L)	Maximum	2[1]
Aluminium (mg/L)	Maximum	5[1]
Arsenic (mg/L)	Maximum	0.5[1]
Cadmium (mg/L)	Maximum	0.01[1]
Cobalt (mg/L)	Maximum	1[1]
Copper (mg/L)	Maximum	1[1]
Lead (mg/L)	Maximum	0.1[1]
Nickel (mg/L)	Maximum	1[1]
Zinc (mg/L)	Maximum	20[1]

Note:

[1] *Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.*

[2] *Page 4.2-15 of ANZECC & ARMCANZ (2000) "Soil and animal health will not generally be affected by water with pH in the range of 4–9". Note: Total measurements (unfiltered) must be taken and analysed*

Receiving Environment Monitoring and Contaminant Trigger Levels

W20 The quality of the receiving waters must be monitored at the locations specified in Table 8 for each quality characteristic and at the monitoring frequency stated in Table 7.

Table 7 (Receiving Waters Contaminant Trigger Levels)

Quality Characteristic	Trigger Level	Monitoring Frequency
pH	6.5 – 8.5	Daily during the release
Electrical Conductivity (µS/cm)	1000 Note: for protection against toxicity this may need to be reduced in some circumstances e.g. where in close proximity upstream of a drinking water dam or regional waterway	
Suspended solids (mg/L)	To Be Determined. Turbidity may be required to assess ecosystems impacts and can provide instantaneous results.	
Sulphate (SO_4^{2-}) (mg/L)	250 (Protection of drinking water Environmental Value)	
Sodium (mg/L)	TBA	

Table 8 (Receiving Water Upstream Background Sites and Down Stream Monitoring Points)

EXPLANATORY NOTES – Selection of monitoring sites:

The intent here is that that each discharge point has both an upstream and downstream monitoring point associated with it. These monitoring points should be located as close as practicable to the release point and the distances should be defined in the footnotes in Table 8. The location of flow monitoring points should also be considered in selecting upstream monitoring points. Other considerations include accessibility, particularly during wet weather conditions.

Monitoring Points	Receiving Waters Location Description	Latitude (decimal degree, GDA94)	Longitude (decimal degree, GDA94)
Upstream Background Monitoring Points			
Monitoring Point XX	XXXX Creek XX metres upstream of RP XX	XXXX	XXXX
Monitoring Point XX	XXXX Creek XX metres upstream of RP XX	XXXX	XXXX
Downstream Monitoring Points			
Monitoring Point XX	XXXX Creek XX metres downstream of RP XX	XXXX	XXXX
Monitoring Point XX	XXXX Creek XX metres downstream of RP XX	XXXX	XXXX

Notes:

a) The upstream monitoring point should be within Xkm the release point.

b) the downstream point should not be greater than Xm from the release point.

c) The data from background monitoring points must not be used where they are affected by releases from other mines.

W21 If quality characteristics of the receiving water at the downstream monitoring points exceed any of the trigger levels specified in Table 7 during a release event the environmental authority holder must compare the down stream results to the upstream results in the receiving waters and:

1. where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or

2. where the down stream results exceed the upstream results complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual return, outlining:
    (i) details of the investigations carried out; and
    (ii) actions taken to prevent environmental harm.

Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with W21(2) of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.

Receiving Environment Monitoring Program (REMP)

EXPLANATORY NOTES – Designing a REMP:

Generally the Receiving Environment Monitoring Program (REMP) should be used to assess the local receiving waters for the specified discharge locations. The monitoring should not be specifically designed to assess compliance of the release – this is covered by other conditions. The key purpose of the REMP is to assess the overall condition of the local receiving waters and assessment should be against water quality objectives and relevant guidelines. Note that in some cases where discharge occurs to ephemeral streams, there may be a need to include downstream sensitive receiving waters or environmental values outside of the specified REMP area. An example of this would be where there are no semi-permanent /permanent waterholes in the specific area but one is located further downstream prior to the confluence with the next major waterway. For further guidance on what to include in a REMP, please refer to the Draft DERM REMP Document for Fitzroy Coal Mines and Additional Information.

There is a potential for beneficial linkages of REMP monitoring to regional waterway monitoring programs, such as the Fitzroy Partnership monitoring program. For example DERM intends to maintain monitoring information compiled through individual REMP programs through an internal database under development. Industry has indicated its willingness to see this data shared with the Fitzroy Partnership for the purpose of a regional water monitoring program. Likewise it is possible for environmental authority holders to utilise relevant and available water monitoring information collected by other parties, such as the Fitzroy Partnership, as reference data for the purposes of the REMP required by this section.

W22 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

For the purposes of the REMP, the receiving environment is the waters of the XX and connected or surrounding waterways within XX (e.g. Xkm) downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

W23 The REMP must:

a) Assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality); and
b) Be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected; and
c) Include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release (as a minimum, the locations specified in Table 8); and
d) Specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines* 2006. This should include monitoring during periods of natural flow irrespective of mine or other discharges; and

e) Include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in Table 2 and 3); and
f) Include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667*.1 Guidance on Sampling of Bottom Sediments*); and
g) Include, where appropriate, monitoring of macroinvertebrates in accordance with the AusRivas methodology, and
h) Apply procedures and/or guidelines from ANZECC & ARMCANZ 2000 and other relevant guideline documents; and
i) Describe sampling and analysis methods and quality assurance and control; and
j) Incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

W24 A REMP Design Document that addresses each criterion presented in Conditions W22 and W23 must be prepared and submitted to the administering authority no later than 3 months after the date of issue of this environmental authority [include for new sites or expansion projects, remove for existing mine sites which already have REMP Design Documents]. Due consideration must be given to any comments made by the administering authority on the REMP Design Document and subsequent implementation of the program.

W25 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions W22 and W23 must be prepared annually and made available on request to the administrating authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Water Reuse

EXPLANATORY NOTES – Water reuse conditions

Mine affected water reuse conditions acknowledge that there is beneficial potential for using mine affected water. The conditions below provide examples of how such authorisation can be conditioned. The examples are not exhaustive and there may be valid proposals received to supply water to other industry types, or using different methods of transportation. In such cases it is important to consider any environmental risk associated with a proposal by considering what environmental values may be impacted by a given proposal, using an approach that accords with current criteria for environmental management decisions made by the administering authority, prior to presenting a recommendation to the relevant delegate for the decision.

W26 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third party for the purpose of:

i) supplying stock water subject to compliance with the quality release limits specified in Table 9; or
ii) supplying irrigation water subject to compliance with quality release limits in Table 10; or
iii) supplying water for construction and/or road maintenance in accordance with the conditions of this environmental authority.

Table 9 (Stock Water Release Limits)

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	5000

Table 10 (Irrigation Water Release Limits)

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	Site specific value to be determined in accordance with ANZECC & ARMCANZ (2000) Irrigation Guidelines

W27 Mine affected water may be piped or trucked or transferred by some other means that does not contravene the conditions of this environmental authority and deposited into artificial water storage structures, such as dams or tanks, for the purpose of supplying water to <name adjoining mine>. The volume, pH and electrical conductivity of water transferred to <name adjoining mine> must be monitored and recorded.

W28 If the responsibility for mine affected water is given or transferred to another person in accordance with conditions **W26 or W27:**

a) the responsibility for the mine affected water must only be given or transferred in accordance with a written agreement (the third party agreement); and

b) the third party agreement must include a commitment from the person utilising the mine affected water to use it in such a way as to prevent environmental harm or public health incidents and specifically make the persons aware of the General Environmental Duty (GED) under section 319 of the *Environmental Protection Act 1994,* environmental sustainability of the water disposal and protection of environmental values of waters; and

c) the third party agreement must be signed by both parties to the agreement.

Water General

W29 All determinations of water quality and biological monitoring must be:

a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements;

b) made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management's Monitoring and Sampling Manual;

Note: Condition W29 requires the Monitoring and Sampling Manual to be followed and where it is not followed because of exceptional circumstances this should be explained and reported with the results.

c) collected from the monitoring locations identified within this environmental authority, within XX hour of each other where possible;

d) carried out on representative samples; and

e) analysed at a laboratory accredited (e.g. NATA) for the method of analysis being used.

W30 The release of any contaminants as permitted by this environmental authority, directly or indirectly to waters, other than internal water management infrastructure that is installed and operated in accordance with a water management plan that complies with conditions W33 to W38 inclusive:

a) must not produce any visible discolouration of receiving waters; and

b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.

Annual Water Monitoring Reporting

W31 The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:

a) the date on which the sample was taken;
b) the time at which the sample was taken;
c) the monitoring point at which the sample was taken;
d) the measured or estimated daily quantity of mine affected water released from all release points;
e) the release flow rate at the time of sampling for each release point;
f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and
g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.

Temporary Interference with waterways

W32 Temporarily destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Environment and Resource Management *Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.*

Water Management Plan

W33 A Water Management Plan must be developed by an appropriately qualified person and implemented by XX/XX/XXXX (WITHIN 3 MONTHS OF THE DATE OF ISSUE).

W34 The Water Management Plan must:

a) provide for effective management of actual and potential environmental impacts resulting from water management associated with the mining activity carried out under this environmental authority; and
b) be developed in accordance with Department of Environment and Resource Management guideline *Preparation of water management plans for mining activities* and include:
    i. a study of the source of contaminants;
    ii. a water balance model for the site;
    iii. a water management system for the site;
    iv. measures to manage and prevent saline drainage;
    v. measures to manage and prevent acid rock drainage;
    vi. contingency procedures for emergencies; and
    vii. a program for monitoring and review of the effectiveness of the water management plan.

W35 The Water Management Plan must be reviewed each calendar year and a report prepared by an appropriately qualified person. The report must:

a) assess the plan against the requirements under condition W34;
b) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and
c) identify any amendments made to the water management plan following the review.

W36 The holder of this environmental authority must attach to the review report required by condition W35, a written response to the report and recommended actions, detailing the actions taken or to be taken by the environmental authority holder on stated dates:

a) to ensure compliance with this environmental authority; and
b) to prevent a recurrence of any non-compliance issues identified.

W37 The review report required by condition W35 and the written response to the review report required by condition W36 must be submitted to the administering authority with the subsequent annual return under the signature of the appointed signatory for the annual return.

W38 A copy of the Water Management Plan must be provided to the administering authority on request.

Saline Drainage

W39 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of saline drainage.

Acid Rock Drainage

W40 The holder of this environmental authority must ensure proper and effective measures are taken to avoid or otherwise minimise the generation and/or release of acid rock drainage.

Stormwater and Water sediment controls

W41 An Erosion and Sediment Control Plan must be developed by an appropriately qualified person and implemented for all stages of the mining activities on the site to minimise erosion and the release of sediment to receiving waters and contamination of stormwater.

W42 Stormwater, other than mine affected water, is permitted to be released to waters from:

i) erosion and sediment control structures that are installed and operated in accordance with the Erosion and Sediment Control Plan required by condition W41; and

ii) water management infrastructure that is installed and operated, in accordance with a Water Management Plan that complies with conditions W33 to W38 inclusive, for the purpose of ensuring water does not become mine affected water.

W43 The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters.

W44 Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters.

All Dams

EXPLANATORY NOTES – Dam conditions:

Note: Conditions W45 and W46 to be removed if already conditioned in the authority or in the event that model conditions for regulated dams are finalised and relevant replacement conditions are to be included into the EA.

W45 The hazard category of each dam must be determined by a suitably qualified and experienced person at least once in each two year period.

W46 Dams having a hazard category determined to be significant or high, must be specifically authorised by an environmental authority.

Definitions:

"acid rock drainage" means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture as a result of mining activity.

"administering authority" means the Department of Environment and Resource Management or its successor.

"appropriately qualified person" means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

"dam" means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. However; a dam does *not* mean a fabricated or manufactured tank or container designed to a recognised standard, *nor* does a dam mean a land-based structure where that structure is designed to an Australian Standard. In case there is any doubt, a levee (dyke or bund) is a dam, but (for example) a bund designed for spill containment to AS1940 is *not* a dam.

"environmental authority" means an environmental authority granted in relation to an environmentally relevant activity under the *Environmental Protection Act 1994*.

"environmental authority holder" means the holder of this environmental authority.

"flowable substance" means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

"hazard" in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

"hazard category" means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams", prepared by the Department of Environment and Resource Management, as amended from time to time.

"mine affected water" means the following types of water:

i) pit water, tailings dam water, processing plant water;
ii) water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the *Environmental Protection Regulation 2008* if it had not formed part of the mining activity;
iii) rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage runoff containing sediment only, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
iv) groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
v) groundwater from the mine's dewatering activities;
vi) a mix of mine affected water (under any of paragraphs i)-v)) and other water.

"natural flow" means the flow of water through waters caused by nature.

"receiving environment" means all groundwater, surface water, land, and sediments that are not disturbed areas authorised by this environmental authority.

"receiving waters" means all groundwater and surface water that are not disturbed areas authorised by this environmental authority.

"representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

"saline drainage" The movement of waters, contaminated with salt(s), as a result of the mining activity.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, and groundwater and any part thereof.

Annexure SJR9

Index to Annexure 9

Ref.	Date	Document
9.1	N/A	Timeline of Relevant Discussions with DERM following the 2010/2011 Floods
9.2	10 February 2011	Receiving Environment Management Plan (submitted to DERM on 10 May 2011)

Annexure Item 9.1

Table SJR-5: Timeline of Relevant Discussions with DERM following the 2010/2011 Floods

31 Jan 2011	RTCA called to meeting with DERM to discuss approach to TEPs.
04 Feb 2011	RTCA attended QRC Strategic Advisory Group meeting.
28 Feb 2011	Advised via QRC that DERM have conceded to bring forward the Fitzroy Model Conditions Review targeting completion by end July 2011 to allow time for implementation prior to 2011/12 wet season.
30 Mar 2011	DERM request for early submission (3 May 2011) of REMP (Receiving Environment Monitoring Program) data for Review purposes. The REMP was established by the original Fitzroy Model Conditions requiring a detailed monitoring program to be reported and submitted by 1 October 2011 with the aim of identifying and describing the extent of any adverse impacts to local environmental values and monitoring changes in the receiving water (refer to REMP and Conditions W20, 21 of the EA).
14 Apr 2011	RTCA attended QRC Strategic Advisory Group meeting.
21 Apr 2011	Receipt via QRC of draft Terms of Reference for Fitzroy Model Conditions Review.
10 May 2011	Final RTCA REMP data submitted to DERM.
12 May 2011	Receipt via QRC of final Terms of Reference for Fitzroy Model Conditions Review.
24 May 2011	RTCA attended QRC Fitzroy Model Conditions Review industry pre-meeting.
31 May 2011	RTCA attended Fitzroy Model Conditions Review QRC Workshop 1.
22 Jun 2011	Receipt via QRC of working draft of Fitzroy Model Conditions.
29 Jun 2011	RTCA attended Fitzroy Model Conditions Review QRC Workshop 2.
10 Jul 2011	Further working draft of Fitzroy Model Conditions circulated by QRC.
14 Jul 2011	Further working draft of Fitzroy Model Conditions circulated by QRC.
3 Aug 2011	Final working draft of Fitzroy Model Conditions circulated by QRC.
11 Aug 2011	Confirmation of finalisation of Fitzroy Model Conditions circulated by QRC.
18 Aug 2011	RTCA attended DERM industry/consultants training workshop on Fitzroy Model Conditions.
8 Sep 2011	Pre-application meeting with DERM to discuss initial modelling findings relating to HCM.

Annexure Item 9.2

Receiving Environment Management Plan

Hail Creek Mine

Receiving Environment Monitoring Program (REMP)

Approval

Name		Position	Signed	Date
Originator	Martine Goldner	Environmental Specialist		
Checked by	Liam Wilson	HSEC Manager		
Owner approved	Liam Wilson	HSEC Manager		
Authorised by	Andrew Woodley	GM Operations		

Revisions

Rev	Date	Revision description
1	1.03.2010	Draft submitted to DERM for comment
2	10.02.2011	Report finalised after considering DERM comments

Consultation and communication

Date	Detail
1.03.2010	Draft submitted to DERM for comment

1. Purpose

This document, the Hail Creek Mine Receiving Environment Monitoring Programme (REMP), is intended to periodically monitor and record the potential effects of the release of contaminants on the receiving environment into which Hail Creek Mine (HCM) releases mine affected water. The REMP aims to identify and describe the extent of any adverse impacts to local environmental values, and monitors any changes in the receiving waters.

For the purpose of this document, the receiving environment is the waters of the Bee Creek Catchment and connected waterways within twelve (12) kilometres downstream of the release.

In 2009, Hail Creek Mine (HCM) undertook an Aquatic Stream Health Assessment (ASHA). This study completed many of the activities required by the REMP, with the intent of the study being to gather information regarding the health of the creek systems located around the mine site and gain a better understanding the cumulative demands and impacts being placed on the water resources and ecosystems in the catchment.

If information relevant to the REMP has already been completed as part of this ASHA, reference has been made to this separate document. HCM intend to replicate the study completed in 2009 (with consideration of comments, and recommendations made), and modifications required to satisfy the requirements of the REMP.

2. Document Structure

As per condition W21 of the Hail Creek Environmental Authority, this REMP must contain the following information, where relevant:-

a) A description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);

b) A description of applicable environmental values and water quality objectives to be achieved (i.e. as schedules pursuant to the Environmental Protection (Water) Policy 1997);

c) Any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is located;

d) Water quality targets within the receiving environment to be achieved and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;

e) Monitoring for any potential adverse environmental impacts caused by the release;

f) Monitoring of Stream Flow and Hydrology;

g) Monitoring of toxicants should consider the indicators specified in Table W3 (of the EA) to assess the extent of the compliance of concentrations with water quality objectives and/or the ANZECC & ARMCANZ 2000 guidelines for slightly to moderately disturbed ecosystems;

h) Monitoring of physical chemical parameters as a minimum those specified in Table W2 (in addition to dissolved oxygen saturation and temperature);

i) Monitoring of biological indicators (for macroinvertebrates in accordance with the AusRivas methodology) and metals/metalloids in sediments (in accordance with ANZECC & ANCANZ 2000, BATLEY and/or the most recent version of AS5667.1 *Guidance on Sampling of Bottom Sediments*) for permanent, semi-permanent water holes and water storages;

j) The location of monitoring points (including the locations specified in W8 which are background and downstream impacted sites for each release point);

k) The frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines* 2006. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;

l) Specify sampling and analysis methods and quality assurance and control;

m) Any historical datasets to be relied upon;

n) A description of the statistical basis on which conclusions are drawn; and

o) Any spatial or temporal controls to exclude potential confounding factors.

3. Site Description

3.1 Receiving waters

Hail Creek Mine is surrounded by a number of small, ephemeral stream systems, which support small catchments, and then feed into larger catchments. HCM's current active mining area is located to the west of Hail Creek, which is an upper tributary of the Fitzroy River drainage system. South of HCM, the creek flows into Bee Creek, thence into the Isaac and Fitzroy rivers, entering the sea at Rockhampton, approximately 300 km downstream.

Within the HCM catchment area of interest, all creeks are strongly ephemeral streams which flow only after periods of rain, and dry to a few isolated pools which remain briefly into the drier periods of the year. HCM discharge water to Middle Creek, which then flows to Absent Creek, then into Hail Creek and finally, Bee Creek. HCM discharge mine affected water from one on-site water storage location, Polishing Pond (also known as RP1).

Middle Creek is a minor stream system, with a small catchment (3020 ha), and HCM is positioned so as to divert much of the water that historically entered the Middle Creek system now enters the mine water storage system. Absent Creek is also a small stream with a catchment (1,790 ha), and is similar to Middle Creek in that is it a small relatively undisturbed catchment, where the activities of HCM would represent the primary external influence to waters in the catchment.

In contrast, both Bee and Hail Creek support large catchments (13,600 ha and 10,500 ha, respectively), that extend both upstream and downstream of HCM, and receive water from a range of sources that may be subject to influence from grazing and agricultural activities.

Other stream systems of note include Schammer Creek, which supports a small size undisturbed catchment (2,100 ha) to the north of HCM, and feeds into Hail Creek. There is also Brumby Creek, with a natural catchment area of 1,360 ha, which historically fed into Hail Creek but has now been diverted by HCM's operations to feed into Middle Creek.

A licence for the temporary diversion is held under the provisions of the *Water Act* 2000 (Licence Ref. 172366), which authorises Hail Creek to interfere with the flow of water in Brumby Creek. Brumby Dam and Diversion is subject to monitoring in accordance with the terms of this separate licence. It is also noted that, under the terms of this licence, HCM must 'release' this clean water by pumping the dam down to maintain an established buffer level. It is noted that there are no direct impacts from mining activities on this water, however monitoring is undertaken annually to assess and identify potential indirect impacts that may have occurred through the act of diversion and storage.

Figure 1 shows the spatial location of each of the receiving waters of relevance to HCM.

(MAP = SHOW AERIAL, WATERWAYS, EA RECIEIVING ENVIRO POINTS & REMP LOCATIONS)

Figure 1 Monitoring Locations at Hail Creek

3.2 Environmental Values

As a result of the ephemeral nature of the streams surrounding HCM, the extent of aquatic habitat is small, and rapidly expands and contracts with the availability of water or base-flow in the creeks. The aquatic systems overall are subjected to high levels of disturbance by cattle and infestation by cane toads and feral pigs. A number of habitat types are commonly observed, as detailed:-

- Small water-filled grassy depressions;
- Agricultural dams;
- Upland rock pools; and
- Riverine habitats.

The aquatic ecology of the area is generally low in diversity, and consists primarily of hardy species which are adaptable to long periods of drought.

It is known that the margins of Hail Creek support a fringing community of Black Ironbox (*Eucalyptus raveretiana*) which is a listed protected species under the *Nature Conservation (Wildlife) Regulation* 1994. The health of the Black Ironbox community on Hail Creek is regularly monitored to assess any impacts related to the activities of HCM.

3.3 Monitoring Locations

Monitoring locations identified under the REMP are aligned to those sampled for the 2009 ASHA, to monitor the major watercourses within the Bee Creek Catchment area identified as relevant to HCM (i.e. within twelve (12) kilometres downstream if the release). A total of six (6) sampling sites were selected as either control sites or test sites.

Control sites are those sites that represent 'natural' conditions as if the mine did not exist. Tests sites are those sites located in areas with potential to be impacted by release of water from the mine.

A third category, reference sites, also exists, however no references sites have been selected in this study as no suitable sites are available due to the long history of disturbance in the region. Reference sites are those that represent conditions without any anthropogenic influences (including grazing, vegetation clearing, mining and cropping).

A list of the sites is as detailed below:-

Site #	Site/ Watercourse Name	Control/Test	GPS Co-ordinates
1	Hail Creek – Upstream	Control	21°26'50.5; 148°23'14.5
2	Schammer Creek – Upstream	Control	21°25'58.9; 148°21'07.5
3	Middle Creek – Upstream	Control	21°28'43.9; 148°19'39.7
4	Middle Creek – Downstream	Test	21°31'09.4; 148°23'30.8

5	Bee Creek – Upstream	Control	21°32'44.2; 148°20'44.7
6	Bee Creek – Downstream	Test	21°33'13.8; 148°27'35.

It is noted that some of these locations do not align with the Receiving Environment Monitoring Locations identified in HCM's EA for the same watercourses. The locations above have been selected in 2009 as part of the ASHA, for their suitability for the planned sampling and survey, which is still relevant to the investigations to be completed in 2010. In contrast, the receiving environment monitoring locations have been selected for different reasons.

For this REMP, HCM intend to consider all available water quality analyses from both the sites identified above, and the receiving environment monitoring locations identified in the EA. Although some exact locations vary, they are considered to be in close enough proximity to be representative of the same stream system.

4. Literature Review

As part of the ASHA, Hail Creek Mine completed a literature review in 2009. No previous studies were identified for either the Hail Creek or Bee Creek Catchments. However, a number of documents were identified which provide information on water quality, fish and/or macro invertebrate populations within the Fitzroy catchment, as detailed below:

- Australia Coal Association Research Program (ACARP) – Water Management in the Coal Industry: Scoping Study (ACARP, 2004);
- A Study of the Cumulative Impacts on Water Quality of Mining Activities in the Fitzroy River Basin (EPA, 2009);
- ACARP – Impacts of Coal Mining on Aquatic Ecosystems in Central Queensland (ACARP 2005);
- National Action Plan For Salinity and Water Quality – Water Quality Information Summary for the Fitzroy Region (Negus, 2007);
- State of the Rivers – Fitzroy and Isaac Rivers and Capricorn Coastal Tributaries (State of the Rivers, 2005);
- The Fitzroy River Catchment: An assessment of the condition of the riverine system (Noble et al , 1996);
- Environmental Impact Statements for other mines in the area. Mines include, but are not limited to, the:
    - Daunia Coal Mine EIS;
    - Coppabella Coal Mine EIS;
    - Poitrel Coal Mine EIS;
    - South Walker Creek Coal Mine EIS;
- Review of the Fitzroy River Water Quality Issues (Hart, 2008); and
- Developing a Rigorous Aquatic Ecological Monitoring Program at a Central Queensland Mine (Thorburn and Conacher, 2008).

The REMP will complete an annual review of literature to identify if any further studies have been conducted, with relevance to HCM. The findings of these studies will be summarised in an annual monitoring report.

5. Water Quality Objectives

In 2009, Hail Creek Mine (HCM) commenced undertaking what was termed an Aquatic Stream Health Assessment (ASHA). The aim of this study was to gather information regarding the health of the creeks located around the mine site. Further, the objective of collecting this information was to assist HCM in understanding the cumulative demands and impacts being placed on the water resources and ecosystems in the catchment.

This REMP will continue to build on the knowledge base commenced by the ASHA, with the following key objectives:-

- To better understand the natural dynamics of the ephemeral stream systems within which HCM operates;
- To establish a baseline for 'health' within the system, with reference to upstream and downstream sampling locations, and describe local environmental values;
- To identify key drivers and processes in the region with the potential to contribute to quality and quantity of water and contaminants entering the stream systems; and
- To understand how HCM contributes to the overall health of the catchment, as a result of potential effects that release of mine affected water may have on the surrounding catchment.

Relevant water quality targets for the receiving environment as outlined in the EA, and all available literature and background information, such as the ANZECC guidelines or the recent Fitzroy Basin Environmental Values study, will be referred to in analysing results. This will provide a reference or trigger point against which contaminant concentrations or levels will be compared to in order to determine the potential for adverse environmental impacts.

6. Monitoring Programme

6.1 Site Selection

The sites identified for full study as per the detail of this REMP are those sampled in 2009 for the ASHA. Prior to undertaking the study in 2009, HCM inspected potential sample sites and selected sites on the basis of a number of criteria, including the amount of water available (sufficient water needed to be present for all required analysis), proximity to road access, proximity to possible mine/pipeline/discharge impacts, future probability of water presence (local geography), aquatic habitats present and local knowledge from HCM personnel as to the location of possible water holes.

In general, each site location was visually assessed for approximately 400 m in either direction of the road access before the most suitable site was selected.

6.2 Sampling Frequencies

The sampling and analyses outlined in this REMP will be conducted annually, from monitoring locations outlined in Section 3.3. In addition, all water quality and stream flow data collected for all relevant water courses (at locations specified in the EA) for the remainder of the calendar year will be incorporated into the scope of this REMP, and included as part of the comparisons made between sites.

This includes quality readings for all release events as well as standard monthly monitoring at our upstream and downstream locations (See section 3.3, 6.3.1). It is noted that all water quality data collected for the purposes of compliance with EA conditions W3 (Table W2), through to W19 throughout the calendar year will be analysed as part of the REMP.

Continuous information on receiving environment stream flow will also be included in the REMP reporting, as outlined by Section 6.3.2.

In summary, it is anticipated that a detailed record of water quality will be available to cover the period when flow occurs in these ephemeral waterways, and will be subject to analysis in the REMP. In addition to this, more detailed sampling including sediment and biological sampling will also be undertaken, as described in Sections 6.3.4 and 6.3.5, respectively. Due to the ephemeral nature of the receiving waterways, an annual sampling event is planned for these more detailed investigations, at the end of the wet season. This generally provides the best and safest opportunity to conduct in-stream investigations as proposed, which will provide further information on the condition of the receiving waterways.

6.3 Sampling Methods

6.3.1 Receiving Environment Water Quality during Release Events

Water samples are to be collected from the receiving environment monitoring locations daily during release events. Samples are to be taken approximately 0.2 metres below the water surface in compliance with the latest edition of the *Queensland EPA' s W ater Qu ality Sampling Manual,* 1999. Details of the equipment used, and calibration process followed, to take in-situ field measurements must be documented.

Samples will then be transferred into labelled plastic containers supplied by the analytical laboratory, placed into eskies on ice and delivered to the laboratory within recommended holding times stipulated by the *EPA's Water Quality Sampling Manual, 1999* or as otherwise stated by the laboratory. Water samples are to be analysed by a NATA accredited laboratory. HCM use ALS Environmental in Brisbane as our preferred laboratory.

The following parameters must be collected as a minimum:-

- In–situ Temperature;
- In-situ pH;
- in-situ Electrical Conductivity;
- in-situ Turbidity;
- Total Suspended Solids;
- Hardness;
- Total and Dissolved Metals* (specifically including those metals listed in Table W3 & Sulphate (So_4^{2-}); and
- Petroleum Hydrocarbons (C6-C36).

*Dissolved Metals are field filtered using disposable 10ml syringes and disposable 0.45 µm syringe filters.

6.3.2 Strea m Flow & Hydrology

Stream flow in Bee Creek is captured by a real-time stream flow gauge installed in an Automatic Water Monitoring Station that HCM had previously installed at the downstream receiving environment monitoring location adjacent to Bee Creek (GPS location - N 7,615,596; E 650,715). This location is also listed in the Hail Creek EA (Table W4).

This station utilises a Campbell Scientific Logger that record data at thirty minute intervals and feeds back to HCM via radio telemetry into the main CITECT telemetry system. This automatic monitoring station provides regular flow data of the Bee Creek catchment during flow events.

This information will be collated and reviewed as part of the REMP process, to understand the nature of the Bee Creek catchment, its flow dynamics, and changes in hydrology.

6.3.3 Sampling & Water Quality Guidelines under the REMP/ ASHA

Single water samples are to be collected approximately 0.2 metres below the water surface in compliance with the latest edition of the *Queensland EPA's Water Quality Sampling Manual,* 1999. Replicate samples are to be taken within the same pool at each site, for those locations sampled specifically for the REMP. Details of the equipment used, and calibration process followed, to take in-situ field measurements must be detailed in all reports.

Water quality samples collected will then be transferred into labelled plastic containers supplied by the analytical laboratory, placed into eskies on ice and delivered to the laboratory within recommended holding times stipulated by the *EPA's Water Quality Sampling Manual, 1999* or as otherwise stated by the laboratory. Water samples must be analysed by a NATA o accredited laboratory. HCM use ALS Environmental in Brisbane as our preferred laboratory.

Water samples will be collected in accordance with the latest edition of the *Queensland EPA Water Quality Sampling Manual, 1999.* All personnel collecting or processing samples are to wear new disposable gloves to avoid contamination of samples.

The following parameters must be collected as a minimum, and are to be compared to the all relevant reference values (as detailed below), as well as to historical data recorded from HCM. Where inconsistencies exist between reference values or the actual records being observed, the REMP will investigate whether the actual water quality records suggest a situation where potential environmental harm is being caused, or impact to downstream waterway users is occurring, or whether the references values need revision.

This program will collect records for all contaminants adopted by HCM as relevant for water quality under the REMP. The suite of parameters to be monitoring is in accordance with Queensland Water Quality Guide (QWQG) and ANZECC & ARMCANZ guidelines for ecosystem protection and contaminant control, and also in accordance with the contaminants listed in the EA (See table 3):-

Table 1. Queensland Water Quality Guideline (QWQG) value for upland freshwaters in the Central Coast region (altitude > 150m).

Parameter	Units	QWQG Value
Physio-Chemical		
Water Temperature	(°C)	-
pH	pH units	6.5-7.5
Dissolved Oxygen (DO)	% saturation	90-110
Turbidity	NTU	120
Nutrients		
Total Nitrogen	mg/L	0.35
Total Phosphorus	mg/L	0.1
Ammonia Nitrogen	mg/L	0.1
Oxidized Nitrogen	mg/L	0.1

Table 2. ANZECC & ARMCANZ (2000) guideline values for contaminants in slightly to moderately disturbed waters and for stock watering.

Parameter	Units	Trigger value for slightly-moderately disturbed waters	Stock watering guidelines
Physio-Chemical			
Total Suspended Solids	mg/L	N/A	N/A
Total Dissolved Solids	mg/L	N/A	0-4000
Major Cations and Anions			
Calcium	mg/L	N/A	1000
Chloride	mg/L	N/A	N/A
Fluoride	mg/L	N/A	2
Potassium	mg/L	N/A	N/A
Sodium	mg/L	N/A	N/A
Sulfate	mg/L	N/A	1000
Metals / Metaloids			
Aluminium (pH>6.5)	µg/L	55	5000
Arsenic	µg/L	13	500-5000
Barium	µg/L	N/A	N/A
Beryllium	µg/L	N/A	N/A
Boron	µg/L	370	5000

Cadmium	µg/L	0.2	10
Chromium	µg/L	1.0	1000
Cobalt	µg/L	N/A	1000
Copper	µg/L	1.4	400-5000
Iron	µg/L	N/A	N/A
Lead	µg/L	3.4	100
Manganese	µg/L	1900	N/A
Magnesium	µg/L	N/A	2000
Mercury	µg/L	0.06	2
Mollybdenum	µg/L	N/A	150
Nickel	µg/L	11	1000
Selenium	µg/L	5	20
Silver	µg/L	0.05	N/A
Uranium	µg/L	N/A	200
Vanadium	µg/L	N/A	N/A
Zinc	µg/L	8.0	20 000
Total Petroleum Hydrocarbons (TPH)			
C6-C9 fraction	µg/L	N/A	N/A
C10-C36 fraction	µg/L	N/A	N/A
Biological			
Faecal coliforms	CFU/mL	N/A	100

Table 3. Water Contaminant Guidelines as specified by the Environmental Authority for Hail Creek Mine. The release of contaminants to our receiving environment must not exceed the trigger limits stated below;

Quality Characteris	Trigger Levels	Comment on trigger level	Monitoring frequency
Aluminium	100	For Aquatic ecosystem protection, based on LOR for ICPMS	Commencem
Arsenic	13	For aquatic ecosystem protection, based on SMD guidelines	ent of release
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guidelines	
Chromium	1	For aquatic ecosystem protection, based on SMD guidelines	and
Copper	2	For Aquatic ecosystem protection, based on LOR for ICPMS	thereafter
Iron	300	For aquatic ecosystem protection, based on low reliability guidelines	
Lead	10	For Aquatic ecosystem protection, based on LOR for ICPMS	weekly

Mercury (inorganic)	0.2	For aquatic ecosystem protection, based on LOR for CV FIMS
Nickel	11	For aquatic ecosystem protection, based on SMD guidelines
Zinc	8	For aquatic ecosystem protection, based on SMD guidelines
Molybdenum	34	For aquatic ecosystem protection, based on low reliability guideline
Selenium	10	For Aquatic ecosystem protection, based on LOR for ICPMS
Silver	1	For Aquatic ecosystem protection, based on LOR for ICPMS
Uranium	1	For Aquatic ecosystem protection, based on LOR for ICPMS
Vanadium	10	For Aquatic ecosystem protection, based on LOR for ICPMS
Nitrate	1100	For aquatic ecosystem protection, based on ambient QLD WQ Guidelines (2006) for TN
Petroleum Hydrocarbon	20	
Petroleum Hydrocarbon	100	

6.3.4 Sampling of Sediments

It is understood that, under the DERM guideline, monitoring of sediment is only required when water quality results indicate regular and sustained exceedances of downstream trigger values. This is not the case for HCM, however as part of the initial ASHA program, sediment sampling was undertaken to gain a complete understanding of the aquatic environment. This information has been valuable in the past, and therefore HCM are commited to continuing to collect this information.

The initial selection of sampling sites (as detailed in Section 6.1) was completed with a view to the suitability of the location for completing sediment sampling. It is understood that sites are selected where muddy or silty substrates exist and can be sampled.

Sediment sampling is conducted using a 0.026 m^2 Van Veen sediment grab at all sites in accordance with the latest edition of the *Queensland EPA Water Quality Sampling Manual*, 1999. All personnel collecting or processing samples must wear new disposable gloves to avoid contamination of samples. Each site will be characterised by three sediment samples mixed together to form one composite sample. Sediment that may have come into contact with the metal grab should be discarded, to prevent potential metal contamination from the grab.

The following parameters must be collected as a minimum:-

- In-situ pH;
- Particle Size Analysis (including vertical profile)
- 13 NEPM metals suite plus Selenium (unfiltered);
- Pore-water Metals;

- Ammonia;
- Redox in sediment;
- Total Organic Carbon;
- Petroleum (C6-C36) & Poly-Aromatic Hydrocarbons (PAHs); and
- Creek Profile.

6.3.5 Biological Sampling

It is understood that, under the DERM guideline, monitoring of aquatic macro-invertebrates is only required when permanent or semi-permanent waterholes exist within the REMP area. This is not the case for HCM, however as part of the initial ASHA program, macro-invertebrate sampling was undertaken to gain a complete understanding of the aquatic receiving environment. This information has been valuable in the past and provides some indication of the ongoing health of the receiving environment, and therefore HCM are committed to continuing to collect this information.

Macroinvertebrate sampling is to be undertaken, and must be collected only by accredited AusRivaS personnel using Queensland AusRivaS protocols. Sampling must be undertaken for the same habitat across all sites, to allow for direct comparison between the sites. Care must be taken to ensure all sub-habitats within the site were represented within the sample.

The sampling area has been determined as incorporating a stream length of 100 m, from the 2009 ASHA. At each sample site, macroinvertebrate samples are to be collected from pool habitats (zones of relatively deep, stationary or very slow flowing water over silty, sandy, stony or rocky beds), in line with past studies completed. Riffle and edge habitats may not be able to be sampled due to a lack of suitable habitat across all sites.

Samples are to be collected from 10 m of representative pool sub-habitats using a dip net (0.25 mm mesh size) to dislodge macroinvertebrates, whilst noting physical habitat at the location. Samples are to be live picked as soon as possible after collection. All macroinvertebrates must be counted and identified to the lowest practical taxonomic level (in most instances family level) to comply with AusRivaS protocols. One of the residues should be sorted and identified by the laboratory to determine the quality of live picking. All identifications must be verified by personnel with AusRivaS identification accreditation.

Chemical and physical habitat variables (environmental data) are to be recorded onto AusRivaS datasheets at each site and used as predictor variables in the AusRivaS modelling program. Habitat characteristics relevant to the AusRivas protocol should also be collected, such as physical habitat variables, latitude, longitude, altitude, slope and distance from source. Site descriptions are to be developed with reference to the presence of riparian vegetation, in-stream habitat, macrophyte communities, overall habitat type and substrate descriptions.

Based upon work completed for the 2009 ASHA, it has been determined that a habitat assessment will be sufficient to gain an appreciation of the fish assemblages present at the sites. Bait trapping (box traps) was undertaken in 2009 with little success, due to the strongly ephemeral nature of the stream systems.

7. Analysis of Results

7.1 Statistical Analyses

All data collected will be subject to the appropriate level of statistical analyses required to demonstrate significant patterns or otherwise, and to highlight trends within the data. Water quality data will be graphically compared for each sample site, with standard deviation/error illustrated as appropriate. Some physio-chemical data, such as the metals suite, will be subject to multivariate analyses (such as Multi-Dimensional Scaling) to demonstrate the overall patterns of groupings of and demonstrate interactions between contaminants at the sites, where descriptive statistics indicate contaminant levels, groupings or patterns that warrant further investigation.

Comparison will be made with relevant trigger values identified for both livestock drinking water quality and for aquatic ecosystems (upland rivers) in Eastern Australia as outlined in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000). An assessment of water quality will also be made with the guideline values for the Central Coast Region as outlined in the Queensland Water Quality Guidelines, 2007, where values exist. Reference will also be made against the contaminant trigger values within the EA. Water quality results will be against the trigger limits and reference values provided in Section 6.3.3. For calculated values, only industry standard calculation methodologies will be used and factors and equations that are standard, documented and referenced.

Integration and inference between contaminants, hydrological and physical patterns and biological outcomes will be drawn wherever possible, and water quality data will be directly compared to the outputs of the AusRivas assessments. It is noted that water chemistry can be compared to the ecological health SIGNAL scores and macroinvertebrate taxa presence to determine variables impacting upon macroinvertebrate communities. Chemical and physical habitat variables (environmental data) will be used as predictor variables in the AusRivaS modelling program. SIGNAL scores will be developed for each of the REMP sites.

SIGNAL is a biotic index system that allocates a value to each macroinvertebrate family based largely upon their sensitivity to pollution (a value of 10 indicates high sensitivity, 1 represents high tolerance). Based on the presence or absence of families, the environmental quality of the site can be assessed and provide an indication of long term water quality.

Identified macroinvertebrate data is to be used to develop an AusRivaS modelling program, which is a mathematical model used to predict the aquatic macroinvertebrate fauna expected to occur at locations with similar habitat which have minimal or no impact from human activity (reference condition). This model is then used to compare these results with the fauna actually collected, to provide a measure of biological impairment.

The biological data is to be analysed for a number of key freshwater macroinvertebrate indices (taxonomic richness, PET Richness and SIGNAL 2 scores), and presented as SIGNAL 2 / Family Bi-plots. It is expected that the AusRivaS model software be used to output the Observed (macroinvertebrates collected during sampling) to Expected Ratios (macroinvertebrates predicted to occur in reference conditions), to give an O/E value

7.2 Quality Assurance/ Control

It is expected that a range of measures be employed for the purposes of quality assurance and control, including calibration and maintenance of equipment, use of standard sampling procedures, methods and equipment and following peer review procedures.

Rio Tinto have developed a Data Quality Guidance Note which supports the implementation of the Rio Tinto Health, Safety, Environmental & Quality Management System Standard. It is expected that the provisions of this guidance note will be adhered to when work is being competed for this REMP. The guidance note requires that the data quality provisions are established for all environmental data to ensure completeness, comparability and representativeness, to ensure that the methods used are defensible and to establish and ensure the required accuracy and precision.

7.2.1 Equipment Calibration

It is expected that all equipment used to collect in-situ water quality measurements will be maintained and calibrated to ensure reliability and credibility of the data produced. A multi-staged calibration process is recommended to ensure instrumentation is maintained in sound operating condition, is capable of operating at acceptable performance levels, will not deteriorate from lack of required servicing, and that the credibility of the data the instrument records can be demonstrated (with maintenance records and calibration logs). The calibration process must include the following elements:-

- laboratory calibration prior to fieldwork being undertaken;
- field calibration prior to the instrument's use *in s itu*, to ensure accuracy of the instrument hasn't altered during storage and/or travel time; and
- post-fieldwork calibration on return to the laboratory, to ensure the instrument has retained its calibration and the accuracy of the results.

Manufacturer recommendations should form the basis of the methodology and frequency of maintenance and calibration. Variability in calibration performance before and at the conclusion of sampling exercises must be reported with the data provided for the REMP.

7.2.2 Sample Collection

Further, environmental sampling requires a high level of care in order to ensure that no contamination of the samples occurs and that the samples are delivered to the laboratory without degradation of the analytes. This is to ensure that results are truly representative of the environment that is being sampled. The following measures must be in place to ensure accuracy in sample results.

The following controls are to be employed for the duration of sampling for the REMP to ensure the risk of contamination is reduced to a practical minimum:-

- Methods employed for sample collection have been developed with the expert advice of relevant laboratories and to comply with relevant Australian Standards;
- Only NATA accredited laboratories are used for all primary analysis;
- Duplicates and blanks are periodically collected for analysis as QA/QC 'tests';

- All data collected and supporting documentation such as field sheets/dispatch forms are kept and appropriately filed. Where information is obtained in a hard copy format (e.g.: field sheets), these are scanned so that an electronic back-up copy is available. Photocopies or all dispatch/chain of custodies are kept;
- No smoking prior to or during any field work to avoid ammonia contamination; and
- Minimise cross contamination of samples by the use of new gloves for each sample.

All containers used will be supplied directly by the laboratory (ALS is HCM's preferred supplier), prepared as described in Australian Standards (AS/NZS 5667:1998 and AS 2031:2001) and ready for use. Each container must have a waterproof label attached with spaces for the user to fill in the appropriate details for the sample with a waterproof pen.

7.2.3 Report Review Process

It is expected that all data, interpretation and reports will be internally peer reviewed by independent personnel. The reviewer must have adequate technical background to facilitate a high level review process and provide advice throughout the monitoring program.

It is expected that the REMP will be undertaken by a third party specialist consultant, so that once data interpretation and reports have undergone an internal peer review, they will be then issued to the HCM for further comment and review.

7.3 Reporting

A single report will be prepared annually detailing the findings of the REMP, and addressing the aim of the undertaking the programme. The reports must be scientific, professional and succinct. This report must contain as a minimum:-

- An overview of the aims and objectives of the investigation;
- Identification of survey locations, and detail of survey effort and timing;
- An explanation of the monitoring methodology and approach;
- Identification of all assumptions, constraints and limitations;
- Interpretation and discussion of all results;
- Conclusions and recommendations;
- Recommendations for future monitoring programmes; and
- Appendices containing all raw data, field sheets and chain of custody information.

The report must provide full referencing and a bibliography of relevant information sources. Where appropriate, tables and figures should be used to present and summarise data. Photographs may be needed to illustrate and support the report findings. Mapping should be used as appropriate and must be of sufficient detail to enable identification and location of significant features, fauna observations and survey sites. All field survey sites, transects, locations of notable species observations, etc, are to be geo-referenced and detailed in mapping outputs presented in the report. Species/taxa lists are to be incorporated as appendices to the main report and may need to be provided in spreadsheet format upon request.

Each of the annual reports, and sampling events, will be timed to occur within 6 weeks of the end of the wet season, as evidenced by at least 2 weeks without significant raionfall or stream flow. The draft report will be requested to be supplied to HCM within 4 weeks of completing the field work. Each of these annual reports will be provided to HCM, as a progress report for the overall REMP program. A final, consolidated, REMP report will be provided to DERM no later than 1st October 2011 - as required by w33 of the EA. This consolidated report will contain all available information collected and analysed under the REMP.