

Date : 10/05/2019 7:52:11 PM

From : "MERRICK Jamie"

To : "Rachel Hunter"

Subject : Fwd: QLD DES Request CSIRO/GA Clarification

Attachment : Letter GA_CSIRO clarification 10 May 2019.pdf;ATT00001.htm;Source Aquifer to Doongmabulla Springs_final_20181129.pdf;ATT00002.htm;

Rachel

Attached is the letter that has been sent to CSIRO and GA requesting an update of their report based on the latest version of the GDEMP (11b).

The CSIRO/GA report in February was based on version 10.

We have asked for specific advice on source aquifers as that is a specific issue at large for assessing the extent to which it satisfies EA conditions at State level.

The other questions are merely to update based on the latest version (e.g question 5 is seeking an update on the issues in Chapter 3 of the CSIRO/GA report of Feb).

I will send a holding statement shortly - again for reference.

Cheers

Jamie

Published on DES Disclosure Log
RTI Act 2009

Date : 13/05/2019 6:17:53 PM
From : "WELLS Melissa"
To : "MERRICK Jamie"
Subject : FW: Actions
Attachment : image001.jpg;image002.png;image003.png;image006.png;

FYI



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: WELLS Melissa
Sent: Monday, 13 May 2019 6:16 PM
To: s.73
Cc: ELLWOOD Dean
Subject: RE: Actions

Good evening s.73

On behalf of Dean I can confirm DES will be in a position to provide Adani comments on the GMMP this week. As you are aware, a meeting request has been sent out for the BTFMP workshop and the meeting will take place in Rockhampton from 2.30-5pm this Wednesday. As discussed in our meeting last week, the relevant staff are unavailable to meet again later this week and the next earliest opportunity is Monday 20 May. If you have a preference for the meeting location please let me know and we can send a calendar invitation.

In regards to the questions posed to GA/CSIRO I can advise that DES is seeking clarification and feedback regarding the level of certainty around the source aquifer/s, its monitoring and management in light of the GA/CSIRO report, the resubmitted GDEMP (version 11b) and the relevant environmental authority conditions in accordance with the *Environmental Protection Act 1994*.

In relation to timing for clarification sought from GA/CSIRO, DES has expressed the urgency around the request. From discussions with GA today, DES is advised they are currently reviewing the request and will be in a position to provide certainty around timeframes later this week as the contract is in place .

We look forward to receiving your comments on the BTFMP prior to the workshop this Wednesday and finalising the BTFMP.

Kind regards,
Melissa



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: s.73 <adani.com.au>
Sent: Monday, 13 May 2019 2:59 PM
To: ELLWOOD Dean; WELLS Melissa
Subject: Actions

Dean

Thank you for your time on Friday to talk through the finalisation of our management plans.

We have been consistent in requesting clarity of both process and timing to finalise the outstanding management plans. Based on the discussions from last Friday we understand that the following actions were committed to:

- In relation to the GMMP, DES will provide comments to Adani this week in a similar format to that provided for the BTFMP;
- Adani and DES will meet in a workshop to work through feedback on the GDEMP and GMMP. We note you offered Monday 20th May to hold this workshop. We stated our preference and desire for a meeting during the course of this week and we respectfully request that DES provide an opportunity for that timing to be met.
- For the BTFMP, on a forward looking basis, we agreed to meet on Wednesday the 15th of May to workshop the matters as expressed in the BTFMP.

the reasons in your Attachment A.

- Prior to that workshop this Wednesday, Adani will send through high level comments in relation to the reasons set out in your Attachment A of the BTFMP decision of 2 May 2019. These comments are being provided in the context of Adani considering resubmission and are without prejudice to any other right me may have with respect to the BTFMP decision.

We also again request that DES provide to Adani the questions asked of CSIRO & GA regarding the Source Aquifer (GDEMP), and the timing in which CSIRO & GA will respond to those questions. As discussed in the meeting you undertook to provide me with this information today.

Thanks

s.73

s.73

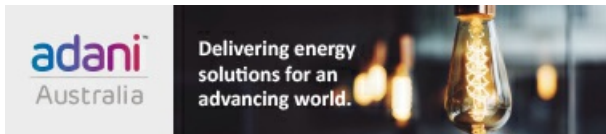
E s.73 @adani.com.au

P office: +61 7 3223 4800 | direct: s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

Published on DES Disclosure Log
RTI Act 2009

Date : 13/05/2019 5:27:07 PM
From : "WELLS Melissa"
To : "ELLWOOD Dean" , "MERRICK Jamie"
Subject : FW: Actions
Attachment : image001.jpg;image002.png;image003.png;

Good evening Jamie and Dean - FYI. Thanks, Melissa.

"Thank you for the email s.73(2)

I can confirm DES will be in a position to provide Adani comments on the GMMP this week. I am advised that a meeting request has been sent out for the BTFMP workshop and the meeting will take place in Rockhampton from 2.30-5pm this Wednesday. As discussed in our meeting last week, the relevant staff are unavailable to meet again later this week and the next earliest opportunity is Monday 20 May. If you have a preference for the meeting location please let me know and we can send a calendar invitation.

In regards to the questions posed to GA/CSIRO I can advise that DES is seeking clarification and feedback regarding the level of certainty around the source aquifer, its monitoring and management in light of the GA/CSIRO report, the resubmitted GDEMP (version 11b) and the relevant environmental authority conditions in accordance with the *Environmental Protection Act 1994*.

In relation to timing for clarification sought from GA/CSIRO, DES has expressed the urgency around the request. From discussions with GA today, DES is advised they are currently reviewing the request and will be in a position to provide certainty around timeframes later this week. We look forward to receiving your comments on the BTFMP prior to the workshop this Wednesday and finalising the BTFMP.

Regards,

Dean/Melissa"



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From s.73 @adani.com.au>

Sent: Monday, 13 May 2019 2:59 PM

To: ELLWOOD Dean; WELLS Melissa

Subject: Actions

Dean

Thank you for your time on Friday to talk through the finalisation of our management plans.

We have been consistent in requesting clarity of both process and timing to finalise the outstanding management plans. Based on the discussions from last Friday we understand that the following actions were committed to:

- In relation to the GMMP, DES will provide comments to Adani this week in a similar format to that provided for the BTFMP;
- Adani and DES will meet in a workshop to work through feedback on the GDEMP and GMMP. We note you offered Monday 20th May to hold this workshop. We stated our preference and desire for a meeting during the course of this week and we respectfully request that DES provide an opportunity for that timing to be met.
- For the BTFMP, on a forward looking basis, we agreed to meet on Wednesday the 15th of May to workshop the matters as expressed in the reasons in your Attachment A.
- Prior to that workshop this Wednesday, Adani will send through high level comments in relation to the reasons set out in your Attachment A of the BTFMP decision of 2 May 2019. These comments are being provided in the context of Adani considering resubmission and are without prejudice to any other right me may have with respect to the BTFMP decision.

We also again request that DES provide to Adani the questions asked of CSIRO & GA regarding the Source Aquifer (GDEMP), and the timing in which CSIRO & GA will respond to those questions. As discussed in the meeting you undertook to provide me with this information today.

Thanks

s.73

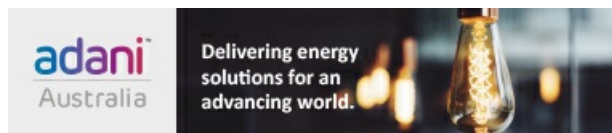
E s.73 @adani.com.au

P office: +61 7 3223 4800|direct: s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

Date : 13/05/2019 6:17:53 PM
From : "WELLS Melissa"
To : "MERRICK Jamie"
Subject : FW: Actions
Attachment : image001.jpg;image002.png;image003.png;image006.png;

FYI



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: WELLS Melissa
Sent: Monday, 13 May 2019 6:16 PM
To: s.73
Cc: ELLWOOD Dean
Subject: RE: Actions
Good evenin s.73

On behalf of Dean I can confirm DES will be in a position to provide Adani comments on the GMMP this week. As you are aware, a meeting request has been sent out for the BTFMP workshop and the meeting will take place in Rockhampton from 2.30-5pm this Wednesday. As discussed in our meeting last week, the relevant staff are unavailable to meet again later this week and the next earliest opportunity is Monday 20 May. If you have a preference for the meeting location please let me know and we can send a calendar invitation.

In regards to the questions posed to GA/CSIRO I can advise that DES is seeking clarification and feedback regarding the level of certainty around the source aquifer/s, its monitoring and management in light of the GA/CSIRO report, the resubmitted GDEMP (version 11b) and the relevant environmental authority conditions in accordance with the *Environmental Protection Act 1994*.

In relation to timing for clarification sought from GA/CSIRO, DES has expressed the urgency around the request. From discussions with GA today, DES is advised they are currently reviewing the request and will be in a position to provide certainty around timeframes later this week as the contract is in place.

We look forward to receiving your comments on the BTFMP prior to the workshop this Wednesday and finalising the BTFMP.

Kind regards,
Melissa



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: s.73 <s.73@adani.com.au>
Sent: Monday, 13 May 2019 2:59 PM
To: ELLWOOD Dean; WELLS Melissa
Subject: Actions
Dean

Thank you for your time on Friday to talk through the finalisation of our management plans.

We have been consistent in requesting clarity of both process and timing to finalise the outstanding management plans. Based on the discussions from last Friday we understand that the following actions were committed to:

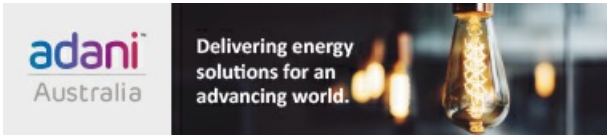
- In relation to the GMMP, DES will provide comments to Adani this week in a similar format to that provided for the BTFMP;
- Adani and DES will meet in a workshop to work through feedback on the GDEMP and GMMP. We note you offered Monday 20th May to hold this workshop. We stated our preference and desire for a meeting during the course of this week and we respectfully request that DES provide an opportunity for that timing to be met.
- For the BTFMP, on a forward looking basis, we agreed to meet on Wednesday the 15th of May to workshop the matters as expressed in the reasons in your Attachment A.
- Prior to that workshop this Wednesday, Adani will send through high level comments in relation to the reasons set out in your Attachment A of the BTFMP decision of 2 May 2019. These comments are being provided in the context of Adani considering resubmission and are without prejudice to any other right me may have with respect to the BTFMP decision.

We also again request that DES provide to Adani the questions asked of CSIRO & GA regarding the Source Aquifer (GDEMP), and the timing in which CSIRO & GA will respond to those questions. As discussed in the meeting you undertook to provide me with this information today.

Thanks

s.73

E s.73 <s.73@adani.com.au>
P office: +61 7 3223 4800|direct: s.73
A Level 25, 10 Eagle Street, Brisbane, QLD, 4000
P GPO Box 2569, Brisbane, QLD, 4001
W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

Published on DES Disclosure Log
RTI Act 2009

Date : 14/05/2019 7:04:11 PM
From : "WELLS Melissa"
To : "HALLIDAY Genevieve"
Cc : "MERRICK Jamie" , "LAWRENCE Rob"
Subject : Fwd: Adani response to DES email 13 May 2019
Attachment : image568012.jpg;
FYI

Sent from my iPhone

Begin forwarded message:

From: [redacted] s.73 [redacted]@adani.com.au>
Date: 14 May 2019 at 6:51:38 pm AEST
To: WELLS Melissa <Melissa.Wells@des.qld.gov.au>
Cc: [redacted] s.73 [redacted]@adani.com.au>, ELLWOOD Dean <Dean.Ellwood@des.qld.gov.au>
Subject: Re: Adani response to DES email 13 May 2019

Melissa

Thank you for your email. As per my email this morning, can you please advise Adani as to when DES will provide Adani with a copy of the questions that you have provided CSIRO/GA in relation to the GDEMP?

[redacted] s.73

[redacted] s.73 Adani Australia
Level 25, AMP Place, 10 Eagle Street, Brisbane, QLD 4000
Phone: +61 (07) 3223 4806 | Mobile: [redacted] s.73
[redacted] s.73 [redacted]@adani.com.au

[redacted] s.73

E [redacted] s.73 adani.com.au

P office: +61 7 3223 4800 | direct: [redacted] s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com

□

If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

On 14 May 2019, at 6:26 pm, WELLS Melissa <Melissa.Wells@des.qld.gov.au> wrote:

[redacted]
I refer to your email of this morning, 14 May 2019 concerning the departments review of the resubmitted Adani GDEMP.

I remind you that the review of the Adani GDEMP undertaken by CSIRO/GA (the review) was commissioned by the Department of the Environment and Energy (DOEE).

While the department was consulted by DOEE on the review's terms of reference and attended a presentation of the CSIRO/GA's Tranche 1 advice, the department did not further participate or meet with CSIRO/GA during the DOEE independent review. Nor did the department have any commercial arrangement with CSIRO/GA regarding the DOEE review.

The final review (advice/report) was not provided to department until 9 April 2019, some four weeks after multiple requests by the department to DOEE, including requests at Ministerial level.

Again, given that Adani has submitted a revised version of the GDEMP (version 11b), a version that is different to the one that the CSIRO/GA review (advice/report) relied on, the department is simply seeking clarification from CSIRO/GA about its review in light of the revised GDEMP. This clarification will assist the department in part to decide whether the GDEMP is in compliance with the conditions of the environmental authority (EA) granted to Adani under the *Environmental Protection Act 1994* (Act) for the Carmichael Mine. This is not a 'new' review of the GDEMP, and it is entirely consistent with the clear message provided to Adani that the department would rely upon advice from CSIRO/GA and not seek other third party advice.

Given the resource implications and urgency around the timeliness of the advice sought from CSIRO/GA, the department considers the requirement of a contract and fee for service by CSIRO/GA as reasonable and consistent with any necessary governance in relation to a process such as this.

To date, the department has communicated with [s.78B(2)], CEO Geoscience Australia and [s.78B(2)] Director CSIRO in relation to the department's request.

The names of the officers of CSIRO/GA who will be involved in preparing advice for the department is a matter for CSIRO/GA. I am neither furnished with the information nor would it be appropriate for me to comment on the CSIRO/GA officers who were involved with the DOEE GDEMP review.

The department's actions in relation to the Adani GDEMP are directed solely at ensuring the proper administration of the Act and compliance with the conditions of the environmental authority.

My email of yesterday, gave you an indication on the timing of the review of the GDEMP by the department and the advice of CSIRO/GA.

Kind regards
Melissa

<image001.png> **Melissa Wells**
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From [s.73]@adani.com.au
Sent: Tuesday, 14 May 2019 10:21 AM
To: ELLWOOD Dean
Cc: WELLS Melissa [s.73]
Subject: Adani response to DES email 13 May 2019

Dean

I refer to Melissa Well's email sent last evening. It would appear despite DES' public claims that you would not be seeking a new or further review of the scientific evidence presented by CSIRO /GA, you are in fact engaging in another review as evidenced by Ms Well's reference to having to put in place a new contract. If this round of questions was simply an extension of the work undertaken we do not see how there would be any requirement for a new contract.

Furthermore we submit that the email fails to provide Adani with the necessary clarity regarding the "contract" between DES and CSIRO/GA or the substance of the questions that have been presented to CSIRO/GA by DES. Accordingly and consistent with our request on Friday 10 May, we once again request a copy of the questions you have asked CSIRO/GA to consider under this new contract. This request is reasonable given DES is commissioning a new review or assessment of Adani's GDEMP, and that DES previously provided Adani with a copy of the Terms of Reference for the so-called Wintle Review of the BTFMP. An ability to consider the questions as posed by the DES to CSIRO/GA would seem a normal part of this process and is clearly required to permit us to fully participate.

Could you also clarify whether the officers of CSIRO/GA engaged by DES were directly involved in the GDEMP review process commissioned by the Department of Environment and Energy? Can you also provide Adani with the names of all CSIRO/GA officers engaged for the DES contract? Can you confirm that DES were consulted and participated with DoEE in the original questions put to CSIRO/GA?

We request the above information by close of business today. Please contact me if I can provide further information.

[s.73]

E [s.73]@adani.com.au

P office: +61 7 3223 4800 | direct: [s.73]

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000
19-077

File F

Page 8 of 54

If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt of this material.

Any form of review, disclosure, modification, distribution and/or publication of this email message is prohibited, unless as a necessary part of Departmental business.

If you have received this message in error, you are asked to inform the sender as quickly as possible and delete this message and any copies of this message from your computer and/or your computer system network.

Published on DES Disclosure Log
RTI Act 2009

Date : 14/05/2019 6:27:12 PM
From : "WELLS Melissa"
To : "MERRICK Jamie" , "LAWRENCE Rob"
Subject : FW: Adani response to DES email 13 May 2019
Attachment : image002.png;image004.jpg;image001.png;image006.png;

FYI



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: WELLS Melissa
Sent: Tuesday, 14 May 2019 6:26 PM
To: s.73
Cc: s.73 ELLWOOD Dean
Subject: RE: Adani response to DES email 13 May 2019

s.73

I refer to your email of this morning, 14 May 2019 concerning the departments review of the resubmitted Adani GDEMP.

I remind you that the review of the Adani GDEMP undertaken by CSIRO/GA (the review) was commissioned by the Department of the Environment and Energy (DOEE).

While the department was consulted by DOEE on the review's terms of reference and attended a presentation of the CSIRO/GA's Tranche 1 advice, the department did not further participate or meet with CSIRO/GA during the DOEE independent review. Nor did the department have any commercial arrangement with CSIRO/GA regarding the DOEE review.

The final review (advice/report) was not provided to department until 9 April 2019, some four weeks after multiple requests by the department to DOEE, including requests at Ministerial level.

Again, given that Adani has submitted a revised version of the GDEMP (version 11b), a version that is different to the one that the CSIRO/GA review (advice/report) relied on, the department is simply seeking clarification from CSIRO/GA about its review in light of the revised GDEMP. This clarification will assist the department in part to decide whether the GDEMP is in compliance with the conditions of the environmental authority (EA) granted to Adani under the *Environmental Protection Act 1994* (Act) for the Carmichael Mine. This is not a 'new' review of the GDEMP, and it is entirely consistent with the clear message provided to Adani that the department would rely upon advice from CSIRO/GA and not seek other third party advice.

Given the resource implications and urgency around the timeliness of the advice sought from CSIRO/GA, the department considers the requirement of a contract and fee for service by CSIRO/GA as reasonable and consistent with any necessary governance in relation to a process such as this.

To date, the department has communicated with s.78B(2), CEO Geoscience Australia and s.78B(2) Director CSIRO in relation to the department's request.

The names of the officers of CSIRO/GA who will be involved in preparing advice for the department is a matter for CSIRO/GA. I am neither furnished with the information nor would it be appropriate for me to comment on the CSIRO/GA officers who were involved with the DOEE GDEMP review.

The department's actions in relation to the Adani GDEMP are directed solely at ensuring the proper administration of the Act and compliance with the conditions of the environmental authority.

My email of yesterday, gave you an indication on the timing of the review of the GDEMP by the department and the advice of CSIRO/GA.

Kind regards
Melissa

Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

From [redacted] s.73 [redacted]@adani.com.au>
Sent: Tuesday, 14 May 2019 10:21 AM
To: ELLWOOD Dean
Cc: WELLS Melissa; [redacted] s.73 [redacted]
Subject: Adani response to DES email 13 May 2019

Dean

I refer to Melissa Well's email sent last evening. It would appear despite DES' public claims that you would not be seeking a new or further review of the scientific evidence presented by CSIRO /GA, you are in fact engaging in another review as evidenced by Ms Well's reference to having to put in place a new contract. If this round of questions was simply an extension of the work undertaken we do not see how there would be any requirement for a new contract.

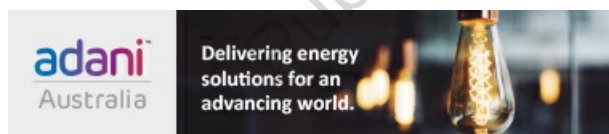
Furthermore we submit that the email fails to provide Adani with the necessary clarity regarding the "contract" between DES and CSIRO/GA or the substance of the questions that have been presented to CSIRO/GA by DES. Accordingly and consistent with our request on Friday 10 May, we once again request a copy of the questions you have asked CSIRO/GA to consider under this new contract. This request is reasonable given DES is commissioning a new review or assessment of Adani's GDEMP, and that DES previously provided Adani with a copy of the Terms of Reference for the so-called Wintle Review of the BTFMP. An ability to consider the questions as posed by the DES to CSIRO/GA would seem a normal part of this process and is clearly required to permit us to fully participate.

Could you also clarify whether the officers of CSIRO/GA engaged by DES were directly involved in the GDEMP review process commissioned by the Department of Environment and Energy? Can you also provide Adani with the names of all CSIRO/GA officers engaged for the DES contract? Can you confirm that DES were consulted and participated with DoEE in the original questions put to CSIRO/GA?

We request the above information by close of business today. Please contact me if I can provide further information.

[redacted]
s.73

E [redacted] s.73 [redacted]@adani.com.au
P office: +61 7 3223 4800 | direct: [redacted] s.73 [redacted]
A Level 25, 10 Eagle Street, Brisbane, QLD, 4000
P GPO Box 2569, Brisbane, QLD, 4001
W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

Date : 14/05/2019 6:27:12 PM
From : "WELLS Melissa"
To : "MERRICK Jamie" , "LAWRENCE Rob"
Subject : FW: Adani response to DES email 13 May 2019
Attachment : image002.png;image004.jpg;image001.png;image006.png;

FYI



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: WELLS Melissa
Sent: Tuesday, 14 May 2019 6:26 PM
To: [REDACTED]
Cc: [REDACTED] s.73; ELLWOOD Dean
Subject: RE: Adani response to DES email 13 May 2019

[REDACTED] s.73

I refer to your email of this morning, 14 May 2019 concerning the departments review of the resubmitted Adani GDEMP. I remind you that the review of the Adani GDEMP undertaken by CSIRO/GA (the review) was commissioned by the Department of the Environment and Energy (DOEE). While the department was consulted by DOEE on the review's terms of reference and attended a presentation of the CSIRO/GA's Tranche 1 advice, the department did not further participate or meet with CSIRO/GA during the DOEE independent review. Nor did the department have any commercial arrangement with CSIRO/GA regarding the DOEE review. The final review (advice/report) was not provided to department until 9 April 2019, some four weeks after multiple requests by the department to DOEE, including requests at Ministerial level. Again, given that Adani has submitted a revised version of the GDEMP (version 11b), a version that is different to the one that the CSIRO/GA review (advice/report) relied on, the department is simply seeking clarification from CSIRO/GA about its review in light of the revised GDEMP. This clarification will assist the department in part to decide whether the GDEMP is in compliance with the conditions of the environmental authority (EA) granted to Adani under the *Environmental Protection Act 1994* (Act) for the Carmichael Mine. This is not a 'new' review of the GDEMP, and it is entirely consistent with the clear message provided to Adani that the department would rely upon advice from CSIRO/GA and not seek other third party advice. Given the resource implications and urgency around the timeliness of the advice sought from CSIRO/GA, the department considers the requirement of a contract and fee for service by CSIRO/GA as reasonable and consistent with any necessary governance in relation to a process such as this. To date, the department has communicated with [REDACTED] s.78B(2) CEO Geoscience Australia and [REDACTED] s.78B(2) Director CSIRO in relation to the department's request. The names of the officers of CSIRO/GA who will be involved in preparing advice for the department is a matter for CSIRO/GA. I am neither furnished with the information nor would it be appropriate for me to comment on the CSIRO/GA officers who were involved with the DOEE GDEMP review. The department's actions in relation to the Adani GDEMP are directed solely at ensuring the proper administration of the Act and compliance with the conditions of the environmental authority. My email of yesterday, gave you an indication on the timing of the review of the GDEMP by the department and the advice of CSIRO/GA. Kind regards

Melissa



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: [REDACTED] s.73 <[REDACTED]@adani.com.au>
Sent: Tuesday, 14 May 2019 10:21 AM
To: ELLWOOD Dean
Cc: WELLS Melissa; [REDACTED] s.73
Subject: Adani response to DES email 13 May 2019

Dean

I refer to Melissa Well's email sent last evening. It would appear despite DES' public claims that you would not be seeking a new or further review of the scientific evidence presented by CSIRO /GA, you are in fact engaging in another review as evidenced by Ms Well's reference to having to put in place a new contract. If this round of questions was simply an extension of the work undertaken we do not see how there would be any requirement for a new contract. Furthermore we submit that the email fails to provide Adani with the necessary clarity regarding the "contract" between DES and CSIRO/GA or the substance of the questions that have been presented to CSIRO/GA by DES. Accordingly and consistent with our request on Friday 10 May, we once again request a copy of the questions you have asked CSIRO/GA to consider under this new contract. This request is reasonable given DES is commissioning a new review or assessment of Adani's GDEMP, and that DES previously provided Adani with a copy of the Terms of Reference for the so-called Wintle Review of the BTFMP. An ability to consider the questions as posed by the DES to CSIRO/GA would seem a normal part of this process and is clearly required to permit us to fully participate.

Could you also clarify whether the officers of CSIRO/GA engaged by DES were directly involved in the GDEMP review process commissioned by the Department of Environment and Energy? Can you also provide Adani with the names of all CSIRO/GA officers engaged for the DES contract? Can you confirm that DES were consulted and participated with DoEE in the original questions put to CSIRO/GA?

We request the above information by close of business today. Please contact me if I can provide further information.

s.73

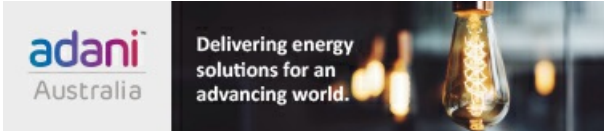
E [redacted]@adani.com.au

P office: +61 7 3223 4800|direct: [redacted] s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system. Privilege, confidentiality and copyright associated with this email is not waived.

Published on DES Disclosure Log
RTI Act 2009

Date : 16/05/2019 5:39:36 PM
From : "WELLS Melissa"
To : "MERRICK Jamie" , "LAWRENCE Rob"
Subject : Fwd: Adani response to DES email 13 May 2019
Attachment : image002.png;image003.jpg;
FYI

Sent from my iPhone

Begin forwarded message:

From: WELLS Melissa <Melissa.Wells@des.qld.gov.au>
Date: 16 May 2019 at 5:15:23 pm AEST
To: [redacted] s.73 <[\[redacted\]@adani.com.au](mailto:[redacted]@adani.com.au)>
Cc: [redacted] s.73 <[\[redacted\]@adani.com.au](mailto:[redacted]@adani.com.au)>, ELLWOOD Dean <Dean.Ellwood@des.qld.gov.au>
Subject: RE: Adani response to DES email 13 May 2019

Hi [redacted] s.73

As stated, the CSIRO/GA advice is to provide clarification to the department about its original review in light of the revised GDEMP. Adani will be provided with a copy of the CSIRO/GA advice once it becomes available.

Kind regards,
Melissa.



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: [redacted] s.73 <[\[redacted\]@adani.com.au](mailto:[redacted]@adani.com.au)>
Sent: Tuesday, 14 May 2019 6:52 PM
To: WELLS Melissa
Cc: [redacted] s.73 ELLWOOD Dean
Subject: Re: Adani response to DES email 13 May 2019

Melissa

Thank you for your email. As per my email this morning, can you please advise Adani as to when DES will provide Adani with a copy of the questions that you have provided CSIRO/GA in relation to the GDEMP?

[redacted] s.73

Adani Australia

[Level 25, AMP Place, 10 Eagle Street, Brisbane, QLD 4000](#)

Phone: [+61 \(07\) 3223 4806](tel:+61732234806) | Mobil [redacted] s.73

[redacted] s.73 <[\[redacted\]@adani.com.au](mailto:[redacted]@adani.com.au)>

[redacted] s.73

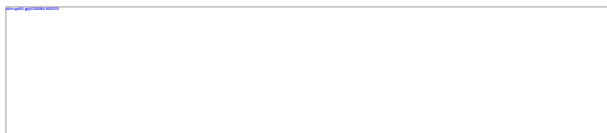
E [redacted] s.73 <[\[redacted\]@adani.com.au](mailto:[redacted]@adani.com.au)>

P office: [+61 7 3223 4800](tel:+61732234800) | direct: [redacted] s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

On 14 May 2019, at 6:26 pm, WELLS Melissa <Melissa.Wells@des.qld.gov.au> wrote:

s.73

I refer to your email of this morning, 14 May 2019 concerning the department's review of the resubmitted Adani GDEMP.

I remind you that the review of the Adani GDEMP undertaken by CSIRO/GA (the review) was commissioned by the Department of the Environment and Energy (DOEE).

While the department was consulted by DOEE on the review's terms of reference and attended a presentation of the CSIRO/GA's Tranche 1 advice, the department did not further participate or meet with CSIRO/GA during the DOEE independent review. Nor did the department have any commercial arrangement with CSIRO/GA regarding the DOEE review.

The final review (advice/report) was not provided to department until 9 April 2019, some four weeks after multiple requests by the department to DOEE, including requests at Ministerial level.

Again, given that Adani has submitted a revised version of the GDEMP (version 11b), a version that is different to the one that the CSIRO/GA review (advice/report) relied on, the department is simply seeking clarification from CSIRO/GA about its review in light of the revised GDEMP. This clarification will assist the department in part to decide whether the GDEMP is in compliance with the conditions of the environmental authority (EA) granted to Adani under the *Environmental Protection Act 1994* (Act) for the Carmichael Mine. This is not a 'new' review of the GDEMP, and it is entirely consistent with the clear message provided to Adani that the department would rely upon advice from CSIRO/GA and not seek other third party advice.

Given the resource implications and urgency around the timeliness of the advice sought from CSIRO/GA, the department considers the requirement of a contract and fee for service by CSIRO/GA as reasonable and consistent with any necessary governance in relation to a process such as this.

To date, the department has communicated with s.78B(2) CEO Geoscience Australia and s.78B(2) Director CSIRO in relation to the department's request.

The names of the officers of CSIRO/GA who will be involved in preparing advice for the department is a matter for CSIRO/GA. I am neither furnished with the information nor would it be appropriate for me to comment on the CSIRO/GA officers who were involved with the DOEE GDEMP review.

The department's actions in relation to the Adani GDEMP are directed solely at ensuring the proper administration of the Act and compliance with the conditions of the environmental authority.

My email of yesterday, gave you an indication on the timing of the review of the GDEMP by the department and the advice of CSIRO/GA.

Kind regards
Melissa

<image001.png> **Melissa Wells**
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: s.73 <s.73@adani.com.au>
Sent: Tuesday, 14 May 2019 10:21 AM
To: ELLWOOD Dean
Cc: WELLS Melissa; s.73
Subject: Adani response to DES email 13 May 2019

Dean

I refer to Melissa Well's email sent last evening. It would appear despite DES' public claims that you would not be seeking a new or further review of the scientific evidence presented by CSIRO /GA, you are in fact engaging in another review as evidenced by Ms Well's reference to having to put in place a new contract. If this round of questions was simply an extension of the work undertaken we do not see how there would be any requirement for a new contract.

Furthermore we submit that the email fails to provide Adani with the necessary clarity regarding the "contract" between DES and CSIRO/GA or the substance of the questions that have been presented to CSIRO/GA by DES. Accordingly and consistent with our request on Friday 10 May, we once again request a copy of the questions you have asked CSIRO/GA to consider under this new contract. This request is reasonable given DES is commissioning a new review or assessment of Adani's GDEMP, and that DES previously provided Adani with a copy of the Terms of Reference for the so-called Wintle Review of the BTFMP. An ability to consider the questions as posed by the DES to CSIRO/GA would seem a normal part of this process and is clearly required to permit us to fully participate.

Could you also clarify whether the officers of CSIRO/GA engaged by DES were directly involved in the GDEMP review process commissioned by the Department of Environment and Energy? Can you also provide Adani with the names of all CSIRO/GA officers engaged for the DES contract? Can you confirm that DES were consulted and participated with DoEE in the original questions put to CSIRO/GA?

We request the above information by close of business today. Please contact me if I can provide further information.

s.73

E s.73@adani.com.au

P office: +61 7 3223 4800 | direct: s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com

If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt of this material.
Any form of review, disclosure, modification, distribution and/or publication of this email message is prohibited, unless as a necessary part of Departmental business.
If you have received this message in error, you are asked to inform the sender as quickly as possible and delete this message and any copies of this message from your computer and/or your computer system network.

Date : 16/05/2019 5:39:36 PM
From : "WELLS Melissa"
To : "MERRICK Jamie" , "LAWRENCE Rob"
Subject : Fwd: Adani response to DES email 13 May 2019
Attachment : image002.png;image003.jpg;
FYI

Sent from my iPhone

Begin forwarded message:

From: WELLS Melissa <Melissa.Wells@des.qld.gov.au>
Date: 16 May 2019 at 5:15:23 pm AEST
To: [REDACTED] s.73 <[\[REDACTED\]@adani.com.au](mailto:[REDACTED]@adani.com.au)>
Cc: [REDACTED] s.73 <[\[REDACTED\]@adani.com.au](mailto:[REDACTED]@adani.com.au)>, ELLWOOD Dean <Dean.Ellwood@des.qld.gov.au>
Subject: RE: Adani response to DES email 13 May 2019

Hi [REDACTED] s.73

As stated, the CSIRO/GA advice is to provide clarification to the department about its original review in light of the revised GDEMP. Adani will be provided with a copy of the CSIRO/GA advice once it becomes available.

Kind regards,
Melissa.



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: [REDACTED] s.73 <[\[REDACTED\]@adani.com.au](mailto:[REDACTED]@adani.com.au)>

Sent: Tuesday, 14 May 2019 6:52 PM

To: WELLS Melissa

Cc: [REDACTED] s.73 ELLWOOD Dean

Subject: Re: Adani response to DES email 13 May 2019

Melissa

Thank you for your email. As per my email this morning, can you please advise Adani as to when DES will provide Adani with a copy of the questions that you have provided CSIRO/GA in relation to the GDEMP?

[REDACTED] s.73

[REDACTED] s.73

| Adani Australia

[Level 25, AMP Place, 10 Eagle Street, Brisbane, QLD 4000](#)

Phone: [+61 \(07\) 3223 4806](tel:+61(07)32234806) | Mobile: [REDACTED] s.73

[REDACTED] s.73 <[\[REDACTED\]@adani.com.au](mailto:[REDACTED]@adani.com.au)>

[REDACTED] s.73

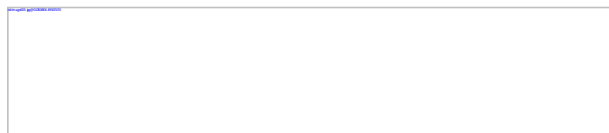
E [REDACTED] s.73 <[\[REDACTED\]@adani.com.au](mailto:[REDACTED]@adani.com.au)>

P office: [+61 7 3223 4800](tel:+61732234800) | direct: [REDACTED] s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

On 14 May 2019, at 6:26 pm, WELLS Melissa <Melissa.Wells@des.qld.gov.au> wrote:

[REDACTED] s.73

I refer to your email of this morning, 14 May 2019 concerning the departments review of the resubmitted Adani GDEMP.

I remind you that the review of the Adani GDEMP undertaken by CSIRO/GA (the review) was commissioned by the Department of the Environment and Energy (DOEE).

While the department was consulted by DOEE on the review's terms of reference and attended a presentation of the CSIRO/GA's Tranche 1 advice, the department did not further participate or meet with CSIRO/GA during the DOEE independent review. Nor did the department have any commercial arrangement with CSIRO/GA regarding the DOEE review.

The final review (advice/report) was not provided to department until 9 April 2019, some four weeks after multiple requests by the department to DOEE, including requests at Ministerial level.

Again, given that Adani has submitted a revised version of the GDEMP (version 11b), a version that is different to the one that the CSIRO/GA review (advice/report) relied on, the department is simply seeking clarification from CSIRO/GA about its review in light of the revised GDEMP. This clarification will assist the department in part to decide whether the GDEMP is in compliance with the conditions of the environmental authority (EA) granted to Adani under the *Environmental Protection Act 1994* (Act) for the Carmichael Mine. This is not a 'new' review of the GDEMP, and it is entirely consistent with the clear message provided to Adani that the department would rely upon advice from CSIRO/GA and not seek other third party advice.

Given the resource implications and urgency around the timeliness of the advice sought from CSIRO/GA, the department considers the requirement of a contract and fee for service by CSIRO/GA as reasonable and consistent with any necessary governance in relation to a process such as this.

To date, the department has communicated with s.78B(2) CEO Geoscience Australia and s.78B(2) Director CSIRO in relation to the department's request.

The names of the officers of CSIRO/GA who will be involved in preparing advice for the department is a matter for CSIRO/GA. I am neither furnished with the information nor would it be appropriate for me to comment on the CSIRO/GA officers who were involved with the DOEE GDEMP review.

The department's actions in relation to the Adani GDEMP are directed solely at ensuring the proper administration of the Act and compliance with the conditions of the environmental authority.

My email of yesterday, gave you an indication on the timing of the review of the GDEMP by the department and the advice of CSIRO/GA.

Kind regards

Melissa

<image001.png>

Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science

P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: s.73 @adani.com.au>

Sent: Tuesday, 14 May 2019 10:21 AM

To: ELLWOOD Dean

Cc: WELLS Melissa s.73

Subject: Adani response to DES email 13 May 2019
Dean

I refer to Melissa Well's email sent last evening. It would appear despite DES' public claims that you would not be seeking a new or further review of the scientific evidence presented by CSIRO /GA, you are in fact engaging in another review as evidenced by Ms Well's reference to having to put in place a new contract. If this round of questions was simply an extension of the work undertaken we do not see how there would be any requirement for a new contract.

Furthermore we submit that the email fails to provide Adani with the necessary clarity regarding the "contract" between DES and CSIRO/GA or the substance of the questions that have been presented to CSIRO/GA by DES. Accordingly and consistent with our request on Friday 10 May, we once again request a copy of the questions you have asked CSIRO/GA to consider under this new contract. This request is reasonable given DES is commissioning a new review or assessment of Adani's GDEMP, and that DES previously provided Adani with a copy of the Terms of Reference for the so-called Wintle Review of the BTFMP. An ability to consider the questions as posed by the DES to CSIRO/GA would seem a normal part of this process and is clearly required to permit us to fully participate.

Could you also clarify whether the officers of CSIRO/GA engaged by DES were directly involved in the GDEMP review process commissioned by the Department of Environment and Energy? Can you also provide Adani with the names of all CSIRO/GA officers engaged for the DES contract? Can you confirm that DES were consulted and participated with DoEE in the original questions put to CSIRO/GA?

We request the above information by close of business today. Please contact me if I can provide further information.

s.73

E s.73 @adani.com.au

P office: +61 7 3223 4800|direct: s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com

If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt of this material.

Any form of review, disclosure, modification, distribution and/or publication of this email message is prohibited unless
19-077 Page 18 of 54

as a necessary part of Departmental business.

If you have received this message in error, you are asked to inform the sender as quickly as possible and delete this message and any copies of this message from your computer and/or your computer system network.

Published on DES Disclosure Log
RTI Act 2009

Date : 17/05/2019 3:18:06 PM

From : [REDACTED] s.73

To : "MERRICK Jamie"

Cc : "WELLS Melissa" , "ELLWOOD Dean"

Subject : Correspondence for DES

Attachment : DES re Groundwater Management Plan - 20190517.pdf;2019 05 16 Application RTI to DES re GMMP and GDEMP (Lodged).pdf;image146889.jpg;

Jamie,

Please find attached correspondence in relation to the GDEMP.

Thanks

[REDACTED] s.73

[REDACTED] s.73 Adani Mining

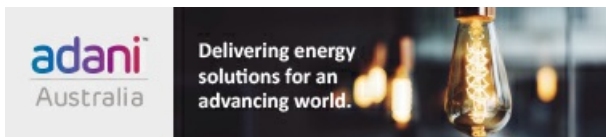
E [REDACTED] s.73 @adani.com.au

P office: +61 7 3223 4800|direct: [REDACTED] s.73

A Level 25, 10 Eagle Street, Brisbane, QLD, 4000

P GPO Box 2569, Brisbane, QLD, 4001

W adaniaustralia.com



If you receive this message by mistake please tell me, do not use it and remove both messages from your system.
Privilege, confidentiality and copyright associated with this email is not waived.

17 May 2019

Private & Confidential

Mr Jamie Merrick
Director-General
Department of Environment and Science
Queensland Government
400 George Street
Brisbane QLD 4000

By email: jamie.merrick@des.qld.gov.au

Dear Jamie

Adani Mining Pty Ltd – Groundwater Management Plans

We refer to our previous correspondence in relation to groundwater management plans, in particular the Groundwater Dependent Ecosystems Management Plan (**GDEMP**) and the Groundwater Monitoring and Management Plan (**GMMP**) for Adani Mining Pty Ltd (**Adani**), and in particular our letter to you more than a month ago on 12 April 2019 which sought clarity from you on the process and timing for approval of those plans. In the most recent email from your Ms Melissa Wells at 5:15pm on 16 May 2019, we have been advised by the Department of Environment and Science (**DES**) that:

"...the CSIRO/GA advice is to provide clarification to the department about its original review in light of the revised GDEMP. Adani will be provided with a copy of the CSIRO/GA advice once it becomes available..."

This latest correspondence from Ms Wells was in response to our request where we had once again sought that DES provide us with the questions that DES has put to CSIRO / GA. We understand that these questions form the basis for a new contract being entered into between DES and CSIRO / GA. The latest email from DES is, at best, unresponsive and we ask:

Question 1: Can the DES please provide us with the questions that have been asked of CSIRO / GA?

It would seem fairer and simpler if you just provided us with these basic details so we have a proper opportunity to understand and engage in the process.

However, given the apparent unwillingness to meet this very simple request we have also submitted a formal Right to Information application (copy attached). As that RTI application exclusively relates to ourselves, DES and then to CSIRO / GA (who seem able to respond very rapidly to such requests) it is our expectation that this application will be dealt with as a priority.

Adani Mining Pty Ltd
Level 25
10 Eagle Street, Brisbane QLD 4000
GPO Box 2569, Brisbane QLD 4001
Australia

Tel +61 7 3223 4800
www.adaniaustralia.com

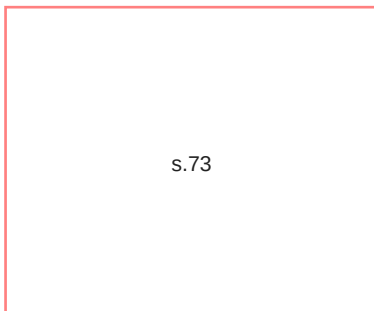
Question 2: When will you receive the advice from CSIRO / GA?

Separately, with respect to the latest correspondence from Ms Wells, there is a reference to advice from CSIRO / GA and its provision to us when it becomes available. We would expect it is a very short time frame given what seems to be, by implication, a strictly limited scope and we wish to be prepared to respond once it is available.

We are only seeking clarity as to process and timing and would appreciate the ability to be able to fully engage with the DES with a proper understanding of what is happening.

We remain committed to working collaboratively to finalise these plans so that we can get on with the task of delivering thousands of jobs for Queenslanders.

Yours sincerely



s.73

Attachment 2019 05 16 Application RTI to DES re GMMP and GDEMP (Lodged).pdf

cc Ms Mellissa Wells Melissa.Wells@des.qld.gov.au
Mr Dean Ellwood Dean.Ellwood@des.qld.gov.au

17 May 2019

Private & Confidential

Mr Jamie Merrick
Director-General
Department of Environment and Science
Queensland Government
400 George Street
Brisbane QLD 4000

By email: jamie.merrick@des.qld.gov.au

Dear Jamie

Adani Mining Pty Ltd – Groundwater Management Plans

We refer to our previous correspondence in relation to groundwater management plans, in particular the Groundwater Dependent Ecosystems Management Plan (**GDEMP**) and the Groundwater Monitoring and Management Plan (**GMMP**) for Adani Mining Pty Ltd (**Adani**), and in particular our letter to you more than a month ago on 12 April 2019 which sought clarity from you on the process and timing for approval of those plans. In the most recent email from your Ms Melissa Wells at 5:15pm on 16 May 2019, we have been advised by the Department of Environment and Science (**DES**) that:

"...the CSIRO/GA advice is to provide clarification to the department about its original review in light of the revised GDEMP. Adani will be provided with a copy of the CSIRO/GA advice once it becomes available..."

This latest correspondence from Ms Wells was in response to our request where we had once again sought that DES provide us with the questions that DES has put to CSIRO / GA. We understand that these questions form the basis for a new contract being entered into between DES and CSIRO / GA. The latest email from DES is, at best, unresponsive and we ask:

Question 1: Can the DES please provide us with the questions that have been asked of CSIRO / GA?

It would seem fairer and simpler if you just provided us with these basic details so we have a proper opportunity to understand and engage in the process.

However, given the apparent unwillingness to meet this very simple request we have also submitted a formal Right to Information application (copy attached). As that RTI application exclusively relates to ourselves, DES and then to CSIRO / GA (who seem able to respond very rapidly to such requests) it is our expectation that this application will be dealt with as a priority.

Adani Mining Pty Ltd
Level 25
10 Eagle Street, Brisbane QLD 4000
GPO Box 2569, Brisbane QLD 4001
Australia

Tel +61 7 3223 4800
www.adaniaustralia.com

Question 2: When will you receive the advice from CSIRO / GA?

Separately, with respect to the latest correspondence from Ms Wells, there is a reference to advice from CSIRO / GA and its provision to us when it becomes available. We would expect it is a very short time frame given what seems to be, by implication, a strictly limited scope and we wish to be prepared to respond once it is available.

We are only seeking clarity as to process and timing and would appreciate the ability to be able to fully engage with the DES with a proper understanding of what is happening.

We remain committed to working collaboratively to finalise these plans so that we can get on with the task of delivering thousands of jobs for Queenslanders.

Yours sincerely



s.73

Attachment 2019 05 16 Application RTI to DES re GMMP and GDEMP (Lodged).pdf

cc Ms Mellissa Wells Melissa.Wells@des.qld.gov.au
Mr Dean Ellwood Dean.Ellwood@des.qld.gov.au

Date : 23/05/2019 5:23:12 PM

From : "ELLWOOD Dean"

To : s.73

Cc : "MERRICK Jamie" (6) Personal information "WELLS Melissa"

Subject : DES request

Attachment : DES CSIRO_GA Request REVISED.docx;image001.png;image002.png;

s.73 please find attached DES's request to CSIRO/GA. I will also provide further correspondence tomorrow with respect to any additional requirements for either BTFM and GDEM plans will not preclude the commencement of stage 2 activities.

Regards

dean



Dean Ellwood

Project Executive

Department of Environment and Science

400 George St, Brisbane QLD 4000

GPO Box 2454, Brisbane QLD 4001

Published on DES Disclosure Log
RTI Act 2009

DES CSIRO/GA GDEMP 11b Advice request – REVISED based on CSIRO/GA feedback and clarification provided 20 May 2019

Review documents (for clarification please note DES does not require a review of the GMMP):

1. GDEMP v11b (track change versions v10 – v11 and v11a-11b attached);

Following the department's review of the CSIRO/GA 2019 Report, the department seeks your advice about the type of investigation and research that may provide greater certainty regarding the department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex (DSC).

The environmental authority (EA) for the Carmichael Coal Mine requires Adani to develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP). The term GDEMP is defined in the EA and states, among other things, that a GDEMP must include *'detailed baseline research to establish the source aquifer(s) for groundwater supply to each groundwater dependent ecosystem [potentially or indirectly impacted by mining activities]'*.

Your 2019 Report states that:

'It is plausible and reasonable that the Clematis Sandstone is a major source aquifer for the DSC... It is not plausible and reasonable to state unequivocally that the Clematis Sandstone is the sole source aquifer for the DSC...' (p2); and

'Available evidence supports the conceptualisation that the Clematis Sandstone is a likely source aquifer for the DSC. However, the proposed monitoring and management approaches do not sufficiently address the uncertainty regarding the potential alternative or additional source aquifers (refer Section 3.2 and 3.3).' (p9); and

'To constrain the source aquifer(s) of the DSC, a more sophisticated statistical analysis of hydrochemistry data is required. This includes assessing a wider variety of groundwater and surface water analytes, as well as appropriate use of isotope hydrochemistry analysis. Further information on potential techniques is provided (CSIRO and Geoscience Australia, 2018) and other readily available references.' (p10)

Further, in advice given to the Commonwealth Department of the Environment and Energy, *'Advice on draft research plans to the Department of the Environment and Energy'*, dated November 2018, you state:

'An integrated analysis of existing and newly acquired geological, hydrodynamic and hydrochemical data would improve the conceptual understanding of the groundwater sources of the DSC'. (at page 5); and

'Further information on the specific methods and techniques to be applied to chemically assess the springs source and groundwater flow processes is required for a more detailed assessment to be made. This includes the need to define the

analytical suite, quality assurance and quality control methods, and use of a broader range of isotopic and environmental traces...' (at page 13).

Having regard to **the 2019 Report, the 2018 advice, and our meeting of 16 April 2019**, the department has the understanding that the following further research (steps) would improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems:

- a) hydrogeochemical analysis of water samples for comparison within and across relevant aquifers (Clematis Sandstone, Dunda Beds and Rewan Formation);
 - b) incorporation of the use of isotope and ageing tracers in the above hydrogeochemical analysis;
 - c) a comprehensive review of groundwater level and quality data from relevant aquifers including data from new proposed nested bores in the vicinity of DSC;
 - d) detailed geological mapping including cores from bores drilled in the vicinity of DSC and facies modelling to better inform hydraulic connectivity within and across all aquifers;
 - e) incorporation of the airborne electro-magnetic modelling recently completed by Geoscience Australia (and available to Adani by June 2020); and
 - f) revision of the conceptual understanding of the source aquifer(s) for DSC and groundwater system based on information collected from the above for incorporation into the groundwater model review (re-run).
1. Does the above summary accurately reflect the CSIRO/GA advice with respect to further work that could increase certainty of the source aquifer(s) for the DSC?
 2. Would CSIRO/GA recommend any additional measures?
 3. Would it be appropriate from an adaptive management framework for all the above matters to be undertaken over a set period i.e. prior to the model review (re-run)?

Based on GDEMP 11b (track change version/s) and the CSIRO/GA advice dated November 2018 and February 2019, the department seeks your additional advice on the following questions:

4. Generally, in respect to groundwater research and modelling, is it acceptable and/or common from a scientific basis to have some level of uncertainty? i.e. can source aquifer(s) ever be categorically determined or definitively identified? Can you have absolute certainty? Is there always some level of uncertainty?
5. Are the groundwater drawdown trigger thresholds proposed in the updated GDEMP 11b appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the numerical model is not fit for purpose?
6. For question 5, are the adaptive management measures and commitments in the updated GDEMP appropriate? If not, please provide suggestions to address this?

This advice will assist the department's review and assessment of the latest version of the GDEMP 11b.

Please note there is a high level of urgency to your advice given the department wishes to progress the assessment of the GDEMP and work with Adani to finalise the plan.

Date : 23/05/2019 9:20:49 AM
From : "ELLWOOD Dean"
To : "MERRICK Jamie"
Subject : FW: Proposal for advice request from DHES around the Adani Carmichael mine
Attachment : DES CSIRO_GA Request REVISED.docx;image001.png;image002.png;image004.png;

From: WELLS Melissa <Melissa.Wells@des.qld.gov.au>
Sent: Wednesday, 22 May 2019 12:53 PM
To: ELLWOOD Dean
Subject: FW: Proposal for advice request from DHES around the Adani Carmichael mine
Importance: High
FYI (removed GDEMP attachments).



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science
P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: WELLS Melissa
Sent: Wednesday, 22 May 2019 12:06 PM
To: (6) Personal information & WJ Black Mountain)

Cc: s.78B(2)
Subject: RE: Proposal for advice request from DHES around the Adani Carmichael mine
Importance: High

Thank you for your proposal. In light of the feedback and information that CSIRO/GA have sought clarification on, DES has significantly reviewed the initial scope of the request to provide more clarity and direction in relation to DES's interests. The revised scope provides clarity and focusses on the track changed versions of the GDEMP. The scope provides confirmation that the review does not include the updated GMMP and includes a refined list of questions. Accordingly, please find attached a narrowed and refined scope for the review and the 'track changed' GDEMPs (for ease of reference). Again, given the urgency around timeliness, if you could please review and provide an update proposal (costings/timeframes) at your earliest convenience. If you would like to discuss or seek clarification I would be happy to arrange a meeting as soon as possible. Kind regards, Melissa.



Melissa Wells
Executive Director
Coal and Central Qld Compliance
Department of Environment and Science
P 07 4987 9343
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: (6) Personal information & WJ Black Mountain) <(6) Personal information>
Sent: Monday, 20 May 2019 3:31 PM
To: WELLS Melissa

Cc: s.78B(2)
Subject: Proposal for advice request from DHES around the Adani Carmichael mine
Dear Melissa s.78B(2)

Thank you for your request on Friday May 10th for GA and CSIRO to provide advice about the type of investigation and research that may provide greater certainty regarding your Department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex.

GA and CSIRO would be happy to undertake the work detailed in your email. Please find attached our joint proposal, noting we are seeking clarification on aspects of the advice you are seeking. In summary, we have estimated the cost at \$103,072 (GST exclusive) and the advice delivered to you within 20 working days following contract execution. Please engage with (6) Personal information the primary contact in relation to contractual issues (6) Personal information (6) Personal information

With regards,
sch4p4(6) Personal information
sch4p4(6) Personal information

Director
CSIRO Land and Water
sch4p4(6) Personal information

T sch4p4(6) Personal information
<https://www.csiro.au/en/Research/LWF>

CSIRO acknowledges the Traditional Owners of the lands that we live and work on across Australia and pays its respect to Elders past and present.
GPO Box 1700
CSIRO Black Mountain Site
Clunies Ross St, Canberra ACT 2601

DES CSIRO/GA GDEMP 11b Advice request – REVISED based on CSIRO/GA feedback and clarification provided 20 May 2019

Review documents (for clarification please note DES does not require a review of the GMMP):

1. GDEMP v11b (track change versions v10 – v11 and v11a-11b attached);

Following the department's review of the CSIRO/GA 2019 Report, the department seeks your advice about the type of investigation and research that may provide greater certainty regarding the department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex (DSC).

The environmental authority (EA) for the Carmichael Coal Mine requires Adani to develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP). The term GDEMP is defined in the EA and states, among other things, that a GDEMP must include *'detailed baseline research to establish the source aquifer(s) for groundwater supply to each groundwater dependent ecosystem [potentially or indirectly impacted by mining activities]'*.

Your 2019 Report states that:

'It is plausible and reasonable that the Clematis Sandstone is a major source aquifer for the DSC... It is not plausible and reasonable to state unequivocally that the Clematis Sandstone is the sole source aquifer for the DSC...' (p2); and

'Available evidence supports the conceptualisation that the Clematis Sandstone is a likely source aquifer for the DSC. However, the proposed monitoring and management approaches do not sufficiently address the uncertainty regarding the potential alternative or additional source aquifers (refer Section 3.2 and 3.3).' (p9); and

'To constrain the source aquifer(s) of the DSC, a more sophisticated statistical analysis of hydrochemistry data is required. This includes assessing a wider variety of groundwater and surface water analytes, as well as appropriate use of isotope hydrochemistry analysis. Further information on potential techniques is provided (CSIRO and Geoscience Australia, 2018) and other readily available references.' (p10)

Further, in advice given to the Commonwealth Department of the Environment and Energy, *'Advice on draft research plans to the Department of the Environment and Energy'*, dated November 2018, you state:

'An integrated analysis of existing and newly acquired geological, hydrodynamic and hydrochemical data would improve the conceptual understanding of the groundwater sources of the DSC'. (at page 5); and

'Further information on the specific methods and techniques to be applied to chemically assess the springs source and groundwater flow processes is required for a more detailed assessment to be made. This includes the need to define the

analytical suite, quality assurance and quality control methods, and use of a broader range of isotopic and environmental traces...' (at page 13).

Having regard to **the 2019 Report, the 2018 advice, and our meeting of 16 April 2019**, the department has the understanding that the following further research (steps) would improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems:

- a) hydrogeochemical analysis of water samples for comparison within and across relevant aquifers (Clematis Sandstone, Dunda Beds and Rewan Formation);
 - b) incorporation of the use of isotope and ageing tracers in the above hydrogeochemical analysis;
 - c) a comprehensive review of groundwater level and quality data from relevant aquifers including data from new proposed nested bores in the vicinity of DSC;
 - d) detailed geological mapping including cores from bores drilled in the vicinity of DSC and facies modelling to better inform hydraulic connectivity within and across all aquifers;
 - e) incorporation of the airborne electro-magnetic modelling recently completed by Geoscience Australia (and available to Adani by June 2020); and
 - f) revision of the conceptual understanding of the source aquifer(s) for DSC and groundwater system based on information collected from the above for incorporation into the groundwater model review (re-run).
1. Does the above summary accurately reflect the CSIRO/GA advice with respect to further work that could increase certainty of the source aquifer(s) for the DSC?
 2. Would CSIRO/GA recommend any additional measures?
 3. Would it be appropriate from an adaptive management framework for all the above matters to be undertaken over a set period i.e. prior to the model review (re-run)?

Based on GDEMP 11b (track change version/s) and the CSIRO/GA advice dated November 2018 and February 2019, the department seeks your additional advice on the following questions:

4. Generally, in respect to groundwater research and modelling, is it acceptable and/or common from a scientific basis to have some level of uncertainty? i.e. can source aquifer(s) ever be categorically determined or definitively identified? Can you have absolute certainty? Is there always some level of uncertainty?
5. Are the groundwater drawdown trigger thresholds proposed in the updated GDEMP 11b appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the numerical model is not fit for purpose?
6. For question 5, are the adaptive management measures and commitments in the updated GDEMP appropriate? If not, please provide suggestions to address this?

This advice will assist the department's review and assessment of the latest version of the GDEMP 11b.

Please note there is a high level of urgency to your advice given the department wishes to progress the assessment of the GDEMP and work with Adani to finalise the plan.

Date : 27/05/2019 12:35:18 PM

From : "WELLS Melissa"

To : "ELLWOOD Dean" , "TRACEY Alena"

Cc : "MERRICK Jamie"

Subject : Fwd: urgent - Brief

Attachment : attachment 1.docx;ATT00001.htm;image003.png;ATT00002.htm;

Hi Dean and Alena as per below advice BN now attached for DDG and DG consideration and approval. Thanks, Melissa.

Published on DES Disclosure Log
RTI Act 2009

SECURITY CLASSIFICATION: UNCLASSIFIED

BRIEFING NOTE – EXECUTIVE DIRECTOR

Subject Engagement of CSIRO to provide advice relating to the Adani Carmichael Coal Mine Groundwater Dependent Ecosystem Management Plan

Approval required 27 May 2019.

RECOMMENDATION

It is recommended that the Executive Director:

- **approve** the engagement of CSIRO to provide advice relating to the Adani Carmichael Coal Mine Groundwater Dependent Ecosystem Management Plan (GDEMP).

BACKGROUND

- On 9 April 2019, Adani submitted the most recent version of the GDEMP (version 11b).
- The Commonwealth Department of the Environment and Energy (DOEE) previously engaged CSIRO and Geoscience Australia (GA) to review the GDEMP (version 10a), before the Federal Minister decided to approve that version of the GDEMP on 9 April 2019.
- CSIRO and GA's review report (February 2019) was received by DES on 9 April 2019.
- DES officers met with DOEE, CSIRO and Geoscience Australia representatives on 16 April 2019 to discuss the review report.
- Given that Adani has submitted a revised version of the GDEMP (version 11b) that is different to the one that the CSIRO/GA review relied on, DES is seeking clarification from CSIRO/GA about its review in light of the revised GDEMP.
- DES is seeking clarification around the evidence to support identification of the source aquifer(s) of the Doongmabulla Springs Complex.
- On 10 May 2019, DES wrote to CSIRO and GA requesting advice on five areas, and subsequently provided clarification of the advice sought on 22 May 2019.
- CSIRO and GA have agreed in-principle to provide the advice on a fee-for-service basis.

KEY ISSUES

- As CSIRO and GA conducted the review of the GDEMP for DoEE, and DES requires advice on specific issues within the scope of that review, only CSIRO and GA can provide the requested consulting services in the required timeframe
- The advice is required by COB 7 June 2019, as a decision on the GDEMP must be made by 13 June 2019.
- DES have accepted in-principle CSIRO's terms and conditions in the short form consulting services agreement.
- CSIRO will subcontract to GA through a standing order arrangement, therefore DES only require a contract with CSIRO.

ELECTION/CABINET/PUBLIC COMMITMENTS/LEGISLATION

- DES is required to make a decision whether to approve the GDEMP under environmental authority (EA) condition I12 for the Carmichael Coal Mine (EPML01470513) by 13 June 2019.
- DES has publically stated that advice on version 11b of the GDEMP will be sought from CSIRO and GA.

FINANCIAL IMPACTS

- Funding is available from within existing divisional budget.
- The estimated cost for the advice is approximately \$48,410.00 (GST exclusive).

CONSULTATION

- Procurement Services (mandatory if approval is related to a procurement exercise).

FUTURE STEPS

- The delegate will assess the GDEMP submitted by Adani on 9 April 2019 against the EA requirements. A decision is required to be made by 13 June 2019.
- The delegate will consider the advice from CSIRO and GA when assessing version 11b of the GDEMP.

Endorsed

Noted / Approved / Not Approved

Dean Ellwood
Deputy Director-General
Environmental Services and Regulation
27 / 5 / 2019

Jamie Merrick (or Executive Director on behalf of)
Director-General
27 / 05 / 2019

Director-General or Executive Director comments

Date : 31/05/2019 4:00:53 PM

From : "LOWE Trinity"

To : "Hannah Jackson"

Cc : "MACGROARTY Robynne" , "ELLWOOD Dean" , "MONKIVITCH James" , "BROWN Glen" , "LOVEDAY Chris" ,
"MERRICK Jamie" , "TRACEY Alena"

Subject : Adani Calls

Attachment : Adani_Script CRT 31 May 2019 (002).docx;image001.png;image003.png;

Good Afternoon Hannah

Please see the attached script that has been provided to the Community Response Team (CRT).

Calls can be transferred to our internal bypass number until 5:00pm (this is an automatic computer timed lock out number – 3330 5280.

After 5:00pm the Pollution Hotline number can be given which is 1300 130 372 – Option 2 where a message can be left for a call back from the department on Monday.

Please let me know if there is anything else you need.

Thanks & Cheers

Trinity



Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

P 07 3330 5812
Level 7 400 George St Brisbane

Published on DES Disclosure Log
RTI Act 2009

SCRIPT: ADANI – CARMICHAEL COAL MINE – GROUNDWATER DEPENDENT ECOSYSTEM MANAGEMENT PLAN AND BLACK-THROATED FINCH MANAGEMENT PLAN

Status Adani State Government Approvals:

- As at 31 May 2019, there is one outstanding plan requiring departmental approval before significant mining activities can commence at the Carmichael Coal Mine site that being the Groundwater Dependent Ecosystem Management Plan (GDEMP).
- **On 31 May 2019, DES approved the Black Throated Finch Management Plan.**
- As part of their Environmental Authority, Adani is required to publish a copy of the BTFMP within 10 business days on their website.

Black-throated Finch Management Plan (BTFMP)

- DES approved the BTFMP on 31 May 2019
- The BTFMP details the management, mitigation measures and monitoring to minimise impacts to the endangered Black-throated Finch.
- Because the location of the Carmichael Coal Mine site hosts the most significant known population of the Black-throated Finch in Australia, DES engaged an independent expert panel to review the Plan.
- Review process:
 - The review was finalised and the final report was provided to Adani on 18 February 2019 for their consideration. Adani provided submissions to DES on 15 March and 2 April 2019 about the review.
 - On 2 May 2019, DES advised Adani that the BTFMP did not meet the EA requirements and that it required amendments.
 - On 24 May 2019, DES reached agreement with Adani with respect to the requirements of the BTFMP.
 - On 28 May 2019, Adani submitted its most recent version of the plan addressing the required amendments.
- On 31 May 2019, DES approved the BTFMP.
- Note: The independent expert panel review report (Wintle Report) on the Black-throated Finch Management Plan (BTFMP) is not a document available on the public register under the *Environmental Protection Act 1994*. However, the report would be subject to Right to Information provisions and may be accessible through that process. DES is currently determining whether the report is able to be published on the DES website.

Groundwater Dependent Ecosystem Management Plan (GDEMP)

- DES is currently assessing a Groundwater Dependant Ecosystem Monitoring Plan for the proposed mine.
- The GDEMP must identify the source aquifer of the Doongmabulla Springs Complex and methodology used to determine the source.
- The Commonwealth Department of the Environment and Energy had engaged the CSIRO and Geoscience Australia to undertake an independent scientific review of the GDEMP and DES received a copy of the review on 9 April 2019.
- DES will assess whether the GDEMP meets the EA requirements, and advise Adani if further information or changes are required.

- DES will make a decision on the GDEMP by 13 June 2019.

State Approval

- The Queensland Coordinator-General approved the Environmental Impact Statement for the project in 2014. The development of the BTFMP and GDEMP have been required since then by conditions of the mine's Environmental Authority.

Commonwealth approval

- The Commonwealth Department of the Environment and Energy (DoEE) approved the BTFMP on 18 December 2018 and the GDEMP on 9 April 2019.

Financial Assurance

- DES currently holds the full required amount \$15,824,063.00 in financial assurance for Carmichael Coal Mine.

Published on DES Disclosure Log
RTI Act 2009

Main.pdf;image001.png;image003.gif;image005.jpg;image006.png;image002.png;image004.png;image009.jpg;image010.png;



E: alena.tracey@des.qld.gov.au
p4(6) Personal information
Level 32, 1 William Street, Brisbane Qld 4000
Level 27, 400 George Street, Brisbane Qld 4000

s.78B(2)

E: s.78B(2) @flinders.edu.au | www.flinders.edu.au/people/ s.78B(2)

CRICOS No: 00114A This email and any attachments may be confidential. If you are not the intended recipient, please inform the sender by reply email and delete all copies of this message.



NATIONAL CENTRE FOR
GROUNDWATER
RESEARCH AND TRAINING



Flinders
UNIVERSITY
College of Science
& Engineering

Jamie Merrick
Director-General
Department of Environment and Science
Jamie.Merrick@des.qld.gov.au
Jamie.Merrick@qld.gov.au

Dean Ellwood
Deputy Director-General
Environmental Services and Regulation
Department of Environment and Science
Dean.Ellwood@des.qld.gov.au

Tony Roberts
Deputy Director-General
Environmental Policy & Programs
Department of Environment and Science
Tony.Roberts@des.qld.gov.au

cc, Minister Enoch
Minister for Environment and the Great Barrier Reef, Minister for Science, and
Minister for the Arts
environment@ministerial.qld.gov.au

Dear Mr Merrick,

I would like to arrange **a meeting with you and your staff** to discuss groundwater issues related to the Doongmabulla Springs Complex and the Adani Carmichael Coal Mine, in Central Queensland.

I am writing to you on behalf of seven University groundwater researchers who are motivated to ensure that important public policy decisions are made on the best available science.

We have reviewed the publicly available information regarding future impacts to the Doongmabulla Springs Complex (DSC) by the proposed Carmichael Coal Mine. We conclude, on the best available science, that the DSC face a legitimate threat of permanent and significant degradation, or possibly extinction, due to fundamental issues within the current modelling, hydrogeological assessment, and mitigation measures proposed for the Carmichael Mine project.

The purpose of the meeting is to discuss our findings, as summarised in the attached position paper. The complete analysis will be provided during the meeting, and we welcome you to invite your principle staff to join this meeting.

Due to the considerable public interest in this issue, I suggest Monday the 3rd June for this meeting. Accompanying me in attendance shall be:

1. A/Prof. [s.78B(2)] School of Engineering (Chemical and Environmental Engineering), RMIT University
2. A/Prof. [s.78B(2)] School of Life Sciences (Ecology, Environment and Evolution) and National Centre for Groundwater Research and Training, La Trobe University

This request is made to assist the Queensland Government in making the best-informed decisions regarding the mine development proposal. In addition, we offer the Queensland Government our assistance to determine the best approach to understand the likely impacts of the Carmichael mine on the springs, and to regional groundwater users.

We would also like to discuss with you the most appropriate approach to make the complete analysis a document public. We understand there is considerable interest in this important public policy decision.

Please do not hesitate to contact me., I look forward to hearing from you.

Sincerely,

[Redacted]
sch4p4(6) Personal information

Prof [s.78B(2)]

College of Science and Engineering, Flinders University
National Centre for Groundwater Research and Training
ARC Future Fellow

Att(1)

Position Paper by Concerned Scientists

Deficiencies in the scientific assessment of the Carmichael Mine impacts to the Doongmabulla Springs

Key points:

- (1) *Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.*
- (2) *Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.*
- (3) *The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from severe degradation or cessation of flow.*
- (4) *Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.*

We conclude that the DSC face a legitimate threat of extinction due to the Carmichael Mine project.

Authors:

Prof. Adrian Werner: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, adrian.werner@flinders.edu.au

A/Prof. Andy Love: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, andy.love@flinders.edu.au

Dr Dylan Irvine: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, dylan.irvine@flinders.edu.au

Dr Eddie Banks: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, eddie.banks@flinders.edu.au

Prof. Ian Cartwright: School of Earth, Atmosphere & Environment, Monash University, ian.cartwright@monash.edu

A/Prof. John Webb: School of Life Sciences (Ecology, Environment and Evolution) and National Centre for Groundwater Research and Training, La Trobe University, john.webb@latrobe.edu.au

A/Prof. Matthew Currell: School of Engineering (Chemical and Environmental Engineering), RMIT University, matthew.currell@rmit.edu.au

Justification (see also Appendix A):

Key point 1:

Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.

Justification Summary:

- (1) *The Carmichael Mine will cause considerable drawdown (groundwater level drop) in the coal-rich sediments (Permian aquifers) that lie beneath the DSC.*

Source: GHD and Adani (2013), Hydrosimulations (2015), AECOM (2019)

- (2) *Adani presumes that the source aquifer for the DSC is the shallow Triassic aquifer and that the Rewan Formation effectively isolates the DSC from significant drawdown in the Permian aquifers.*

Source: GHD and Adani (2013), Land Court of Queensland (2015), Adani (2019)

- (3) *However, the source aquifer for the springs is still uncertain, because the existing data indicate that the Rewan Formation may not be regionally impermeable or near-impermeable, as Adani have presumed.*

Source: IESC (2013), Webb (2015), Currell et al. (2017), Lewis et al. (2018), CSIRO and Geoscience Australia (2019)

- (4) *It follows that if the DSC relies on water from the Permian aquifers to maintain discharge rates, the impact to the DSC (e.g., reduction in spring discharge and wetland areas) from drawdown caused by the proposed Carmichael Mine is highly uncertain.*

Source: IESC (2013), Currell et al. (2017), CSIRO and Geoscience Australia (2019)

- (5) *Even if the DSC is predominantly dependent on groundwater flow from above the Rewan Formation, unrealistic model assumptions mean that drawdown is still likely to be greater than currently predicted.*

Source: Werner (2015), CSIRO and Geoscience Australia (2019)

Key point 2:

Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.

Justification Summary:

- (1) *Significant drawdown will remain at the end of the Carmichael Mine's life.*

Source: GHD and Adani (2013), AECOM (2019)

- (2) *The mine will impact groundwater flow pathways permanently by modifying landforms and the properties of the geological strata, e.g., by fracturing strata near longwall operations.*

Source: GHD and Adani (2013), Hydrosimulations (2014), CSIRO and Geoscience Australia (2019)

- (3) *Previous cases of mining- and pumping-induced spring extinction demonstrate that permanent cessation of spring flow due to human interference is a strong possibility.*

Source: Younger and Wolkersdorfer (2004), Wu et al. (2011), Brunetti et al. (2013), Fan et al. (2018).

Key point 3:

The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from extinction.

Justification Summary:

- (1) *The Queensland Land Court decision and EPBC approval decision relied heavily on the capacity for Adaptive Management, proposed by Adani, to protect the springs from future unknown impacts.*

Source: Land Court of Queensland (2015), Department of the Environment (2015)

- (2) *However, Adaptive Management is unsuitable for projects potentially causing irreversible impacts or where rehabilitation is impractical.*

Source: Williams et al. (2009)

- (3) *Adaptive Management requires that methods for addressing impacts should be detailed and assessed at the project outset. However, Adani has not provided information on exactly how the DSC would be remediated from impacts.*

Source: Williams et al. (2009), GHD and Adani (2013), AECOM (2019)

- (4) *Lag times between mining operations and identifiable impacts to the DSC are potentially considerable. This likely precludes effective responses to DSC decline.*

Source: Williams et al. (2009), GHD and Adani (2013), Currell (2016)

Key point 4:

Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.

Justification Summary:

- (1) *The cumulative impacts to the DSC from other current and proposed mining activities in the region (such as the possible China Stone Coal mine, North Alpha mine, etc.;*

amongst other likely project proposals) are additive and significant, and yet have not been adequately assessed by Adani.

Source: IESC (2013), Werner (2015), Lewis et al (2019), CSIRO and Geoscience Australia (2019)

(2) *An assessment of cumulative impacts is industry best practice.*

Source: National Water Commission (2009)

Published on DES Disclosure Log
RTI Act 2009

References:

Adani (2019) Statement from Adani Mining, 11 April 2019.

https://www.adaniaustralia.com/-/media/190411%20MS%20GDEMP%20Federal%20approval%20and%20Qld%20comments_FINAL.

AECOM (2019) Groundwater Management and Monitoring Program: Carmichael Coal Project. 15th March 2019, 1438 pp.

Brunetti E, Jones JP, Petitta M, Rudolph DL (2013) Assessing the impact of large-scale dewatering on fault-controlled aquifer systems: a case study in the Acque Albule basin (Tivoli, central Italy), *Hydrogeology Journal* 21: 401-423.

CSIRO and Geoscience Australia (2019) Advice on Groundwater Management and Monitoring and Groundwater Dependent Ecosystem Management plans to the Department of the Environment and Energy. February 2019, 63pp.

<http://www.environment.gov.au/system/files/pages/cb8a9e41-eba5-47a4-8b72-154d0a5a6956/files/csiro-geoscience-australia-final-advice.pdf>.

Currell MJ (2016) Drawdown “triggers”: a misguided strategy for protecting groundwater-fed streams and springs. *Groundwater* 54: 619-622.

Currell MJ, Werner AD, McGrath C, Webb JA, Berkman M (2017) Problems with the application of hydrogeological science to regulation of Australian mining projects: Carmichael Mine and Doongmabulla Springs, *Journal of Hydrology* 548: 674-682.

Department of the Environment (2015) Approval. Carmichael Coal Mine and rail Infrastructure Project, Queensland (EPBC/5736).

<http://www.environment.gov.au/epbc/notices/assessments/2010/5736/2010-5736-approval-decision.pdf>.

Ecological Associates (2019) Groundwater Dependent Ecosystem Management Plan: Carmichael Coal Mine Project. Prepared for Adani Mining Pty Ltd, 19 March 2019.

Fan L-M, Li T, Xiang M et al. (2018) Effect of Coal Mining on Springs in the Yushenfu Mining Area of China, *Geofluids* 2018: Art. no. 3564360.

GHD and Adani (2013) Carmichael Coal Mine and Rail Project SEIS: Report for Mine Hydrogeology Report, Report no. 41/26422.

<http://eisdocs.dsdip.qld.gov.au/Carmichael%20Coal%20Mine%20and%20Rail/SEIS/Appendices/Appendix%20K/Appendix-K1-Mine-Hydrogeology-Report.pdf>.

Hydrosimulations (2014) Adani - Carmichael Coal Project: Assessment of Fracturing in the Groundwater Model. <http://envlaw.com.au/wp-content/uploads/carmichael10-NPM-4.pdf>.

Hydrosimulations (2015) Galilee Basin hydrogeological model. Milestone 3 Report.

Prepared for Geoscience Australia under the Lake Eyre Basin Bioregional Assessment.

<http://www.bioregionalassessments.gov.au/sites/default/files/galilee-basin-hydrogeological-model-pdf.pdf>.

IESC (2013) Advice to decision maker on coal mining project. Carmichael Coal Mine and Rail Project, Queensland (EPBC 2010/5736). 16th December 2013.

Land Court of Queensland (2015) *Adani Mining Pty Ltd v Land Services of Coast and Country Inc & Ors* [2015] QLC 48, CAC MacDonald (Pres.), Brisbane.

Lewis S, Evans T, Pavey C, Holland KL, Henderson BL, Kilgour P, Dehelean A, Karim F, Viney NR, Post DA, Schmidt RK, Sudholz C, Brandon C, Zhang YQ, Lymburner L, Dunn B, Mount R, Gonzalez D, Peeters LJM, O'Grady A, Dunne R, Ickowicz A, Hosack G, Hayes KR, Dambacher J, Barry S (2018) Impact and risk analysis for the Galilee subregion. Product 3-4 for the Galilee subregion from the Lake Eyre Basin Bioregional Assessment. Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia.

<http://data.bioregionalassessments.gov.au/product/LEB/GAL/3-4>.

National Water Commission (2009) Framework for assessing local and cumulative effects of mining on groundwater resources, Report 1: Report on the inclusion and implementation of NWI objectives and consideration of cumulative effects, SKM and SMI, NWC Project no. VE23097, 93 pp.

Webb JA (2015) Statement of Evidence: "Report on groundwater impacts", Adani Mining Pty Ltd v Land Services of Coast and Country Inc. & Ors, Report for the Queensland Land Court.

Werner AD (2015) Statement of Evidence: "Analysis of Carmichael coal mine assessment", Adani Mining Pty Ltd v Land Services of Coast and Country Inc. & Ors, Report for the Queensland Land Court.

Williams BK, Szaro RC, Shapiro CD (2009) Adaptive management: The U.S. Department of the interior technical guide. US Department of the Interior, 72 pp.

Wu Q, Xing LT, Ye CH, Liu YZ (2011) The influences of coal mining on the large karst springs in North China, *Environmental Earth Sciences* 64: 1513-1523.

Younger PL, Wolkersdorfer C (eds) (2004) Mining Impacts on the Fresh Water Environment: Technical and Managerial Guidelines for Catchment Scale Management, *Mine Water and the Environment* 23: S2-S80.

Date : 31/05/2019 3:47:54 PM

From : "Adrian Werner"

To : "MERRICK Jamie" , "Jamie.Merrick@qld.gov.au" , "ELLWOOD Dean" , "ROBERTS Tony" , "environment@ministerial.qld.gov.au"

Cc : [redacted] s.78B(2) [redacted] @latrobe.edu.au)"

Subject : PRINTED Meeting request: Adani Carmichael Coal Mine impacts to the Doongmabulla Springs

Attachment : MeetingRequest 20190531.pdf;PositionPaper Ver5

Main.pdf;image001.png;image003.gif;image005.jpg;image006.png;image007.jpg;image008.png;

Dear Mr Merrick, Mr Ellwood, Mr Roberts and Minister Enoch,

Please find attached a meeting request and associated position paper regarding our concerns with the current state of science for assessing Carmichael Coal Mine impacts.

Sincerely,

[redacted] s.78B(2)

Australian Research Council Future Fellow

Professor of Hydrogeology

College of Science and Engineering

Flinders University

Chief Investigator, National Centre for Groundwater Research and Training

Associate Editor, Advances in Water Resources

Room 314, Earth Sciences Building

Flinders University / Sturt Road, Bedford Park South Australia 5042

GPO Box 2100 Adelaide SA 5001

P: +61 8 8201 2710 [redacted] s.78B(2) [redacted] (6) Personal information

E [redacted] s.78B(2) [redacted] @flinders.edu.au | www.flinders.edu.au/people [redacted] s.78B(2)

CRICOS No: 00114A This email and any attachments may be confidential. If you are not the intended recipient, please inform the sender by reply email and delete all copies of this message.



Jamie Merrick
Director-General
Department of Environment and Science
Jamie.Merrick@des.qld.gov.au
Jamie.Merrick@qld.gov.au

Dean Ellwood
Deputy Director-General
Environmental Services and Regulation
Department of Environment and Science
Dean.Ellwood@des.qld.gov.au

Tony Roberts
Deputy Director-General
Environmental Policy & Programs
Department of Environment and Science
Tony.Roberts@des.qld.gov.au

cc, Minister Enoch
Minister for Environment and the Great Barrier Reef, Minister for Science, and
Minister for the Arts
environment@ministerial.qld.gov.au

Dear Mr Merrick,

I would like to arrange **a meeting with you and your staff** to discuss groundwater issues related to the Doongmabulla Springs Complex and the Adani Carmichael Coal Mine, in Central Queensland.

I am writing to you on behalf of seven University groundwater researchers who are motivated to ensure that important public policy decisions are made on the best available science.

We have reviewed the publicly available information regarding future impacts to the Doongmabulla Springs Complex (DSC) by the proposed Carmichael Coal Mine. We conclude, on the best available science, that the DSC face a legitimate threat of permanent and significant degradation, or possibly extinction, due to fundamental issues within the current modelling, hydrogeological assessment, and mitigation measures proposed for the Carmichael Mine project.

The purpose of the meeting is to discuss our findings, as summarised in the attached position paper. The complete analysis will be provided during the meeting, and we welcome you to invite your principle staff to join this meeting.

Due to the considerable public interest in this issue, I suggest Monday the 3rd June for this meeting. Accompanying me in attendance shall be:

1. A/Prof. [s.78B(2)] School of Engineering (Chemical and Environmental Engineering), RMIT University
2. A/Prof [s.78B(2)] School of Life Sciences (Ecology, Environment and Evolution) and National Centre for Groundwater Research and Training, La Trobe University

This request is made to assist the Queensland Government in making the best-informed decisions regarding the mine development proposal. In addition, we offer the Queensland Government our assistance to determine the best approach to understand the likely impacts of the Carmichael mine on the springs, and to regional groundwater users.

We would also like to discuss with you the most appropriate approach to make the complete analysis a document public. We understand there is considerable interest in this important public policy decision.

Please do not hesitate to contact me., I look forward to hearing from you.

Sincerely,

[sch4p4(6) Personal information]

[Redacted]
College of Science and Engineering, Flinders University
National Centre for Groundwater Research and Training
ARC Future Fellow

Att(1)

Position Paper by Concerned Scientists

Deficiencies in the scientific assessment of the Carmichael Mine impacts to the Doongmabulla Springs

Key points:

- (1) *Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.*
- (2) *Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.*
- (3) *The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from severe degradation or cessation of flow.*
- (4) *Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.*

We conclude that the DSC face a legitimate threat of extinction due to the Carmichael Mine project.

Authors:

Prof. Adrian Werner: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, adrian.werner@flinders.edu.au

A/Prof. Andy Love: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, andy.love@flinders.edu.au

Dr Dylan Irvine: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, dylan.irvine@flinders.edu.au

Dr Eddie Banks: College of Science and Engineering, Flinders University and National Centre for Groundwater Research and Training, eddie.banks@flinders.edu.au

Prof. Ian Cartwright: School of Earth, Atmosphere & Environment, Monash University, ian.cartwright@monash.edu

A/Prof. John Webb: School of Life Sciences (Ecology, Environment and Evolution) and National Centre for Groundwater Research and Training, La Trobe University, john.webb@latrobe.edu.au

A/Prof. Matthew Currell: School of Engineering (Chemical and Environmental Engineering), RMIT University, matthew.currell@rmit.edu.au

Justification (see also Appendix A):

Key point 1:

Adani appears likely to have significantly under-estimated future impacts to the Doongmabulla Springs Complex (DSC) arising from the Carmichael Mine.

Justification Summary:

- (1) *The Carmichael Mine will cause considerable drawdown (groundwater level drop) in the coal-rich sediments (Permian aquifers) that lie beneath the DSC.*

Source: GHD and Adani (2013), Hydrosimulations (2015), AECOM (2019)

- (2) *Adani presumes that the source aquifer for the DSC is the shallow Triassic aquifer and that the Rewan Formation effectively isolates the DSC from significant drawdown in the Permian aquifers.*

Source: GHD and Adani (2013), Land Court of Queensland (2015), Adani (2019)

- (3) *However, the source aquifer for the springs is still uncertain, because the existing data indicate that the Rewan Formation may not be regionally impermeable or near-impermeable, as Adani have presumed.*

Source: IESC (2013), Webb (2015), Currell et al. (2017), Lewis et al. (2018), CSIRO and Geoscience Australia (2019)

- (4) *It follows that if the DSC relies on water from the Permian aquifers to maintain discharge rates, the impact to the DSC (e.g., reduction in spring discharge and wetland areas) from drawdown caused by the proposed Carmichael Mine is highly uncertain.*

Source: IESC (2013), Currell et al. (2017), CSIRO and Geoscience Australia (2019)

- (5) *Even if the DSC is predominantly dependent on groundwater flow from above the Rewan Formation, unrealistic model assumptions mean that drawdown is still likely to be greater than currently predicted.*

Source: Werner (2015), CSIRO and Geoscience Australia (2019)

Key point 2:

Should the Carmichael Mine cause springs within the DSC to cease flowing, this impact may be irreversible.

Justification Summary:

- (1) *Significant drawdown will remain at the end of the Carmichael Mine's life.*

Source: GHD and Adani (2013), AECOM (2019)

- (2) *The mine will impact groundwater flow pathways permanently by modifying landforms and the properties of the geological strata, e.g., by fracturing strata near longwall operations.*

Source: GHD and Adani (2013), Hydrosimulations (2014), CSIRO and Geoscience Australia (2019)

- (3) *Previous cases of mining- and pumping-induced spring extinction demonstrate that permanent cessation of spring flow due to human interference is a strong possibility.*

Source: Younger and Wolkersdorfer (2004), Wu et al. (2011), Brunetti et al. (2013), Fan et al. (2018).

Key point 3:

The safeguard against DSC impacts proposed by Adani, namely Adaptive Management, is unsuitable and unlikely to protect the DSC from extinction.

Justification Summary:

- (1) *The Queensland Land Court decision and EPBC approval decision relied heavily on the capacity for Adaptive Management, proposed by Adani, to protect the springs from future unknown impacts.*

Source: Land Court of Queensland (2015), Department of the Environment (2015)

- (2) *However, Adaptive Management is unsuitable for projects potentially causing irreversible impacts or where rehabilitation is impractical.*

Source: Williams et al. (2009)

- (3) *Adaptive Management requires that methods for addressing impacts should be detailed and assessed at the project outset. However, Adani has not provided information on exactly how the DSC would be remediated from impacts.*

Source: Williams et al. (2009), GHD and Adani (2013), AECOM (2019)

- (4) *Lag times between mining operations and identifiable impacts to the DSC are potentially considerable. This likely precludes effective responses to DSC decline.*

Source: Williams et al. (2009), GHD and Adani (2013), Currell (2016)

Key point 4:

Possible cumulative impacts to the DSC from other mining activities in the Galilee Basin have not been adequately considered.

Justification Summary:

- (1) *The cumulative impacts to the DSC from other current and proposed mining activities in the region (such as the possible China Stone Coal mine, North Alpha mine, etc.;*

amongst other likely project proposals) are additive and significant, and yet have not been adequately assessed by Adani.

Source: IESC (2013), Werner (2015), Lewis et al (2019), CSIRO and Geoscience Australia (2019)

(2) *An assessment of cumulative impacts is industry best practice.*

Source: National Water Commission (2009)

Published on DES Disclosure Log
RTI Act 2009

References:

Adani (2019) Statement from Adani Mining, 11 April 2019.

https://www.adaniaustralia.com/-/media/190411%20MS%20GDEMP%20Federal%20approval%20and%20Qld%20comments_FINAL.

AECOM (2019) Groundwater Management and Monitoring Program: Carmichael Coal Project. 15th March 2019, 1438 pp.

Brunetti E, Jones JP, Petitta M, Rudolph DL (2013) Assessing the impact of large-scale dewatering on fault-controlled aquifer systems: a case study in the Acque Albule basin (Tivoli, central Italy), *Hydrogeology Journal* 21: 401-423.

CSIRO and Geoscience Australia (2019) Advice on Groundwater Management and Monitoring and Groundwater Dependent Ecosystem Management plans to the Department of the Environment and Energy. February 2019, 63pp.

<http://www.environment.gov.au/system/files/pages/cb8a9e41-eba5-47a4-8b72-154d0a5a6956/files/csiro-geoscience-australia-final-advice.pdf>.

Currell MJ (2016) Drawdown “triggers”: a misguided strategy for protecting groundwater-fed streams and springs. *Groundwater* 54: 619-622.

Currell MJ, Werner AD, McGrath C, Webb JA, Berkman M (2017) Problems with the application of hydrogeological science to regulation of Australian mining projects: Carmichael Mine and Doongmabulla Springs, *Journal of Hydrology* 548: 674-682.

Department of the Environment (2015) Approval. Carmichael Coal Mine and rail Infrastructure Project, Queensland (EPBC/5736).

<http://www.environment.gov.au/epbc/notices/assessments/2010/5736/2010-5736-approval-decision.pdf>.

Ecological Associates (2019) Groundwater Dependent Ecosystem Management Plan: Carmichael Coal Mine Project. Prepared for Adani Mining Pty Ltd, 19 March 2019.

Fan L-M, Li T, Xiang M et al. (2018) Effect of Coal Mining on Springs in the Yushenfu Mining Area of China, *Geofluids* 2018: Art. no. 3564360.

GHD and Adani (2013) Carmichael Coal Mine and Rail Project SEIS: Report for Mine Hydrogeology Report, Report no. 41/26422.

<http://eisdocs.dsdip.qld.gov.au/Carmichael%20Coal%20Mine%20and%20Rail/SEIS/Appendices/Appendix%20K/Appendix-K1-Mine-Hydrogeology-Report.pdf>.

Hydrosimulations (2014) Adani - Carmichael Coal Project: Assessment of Fracturing in the Groundwater Model. <http://envlaw.com.au/wp-content/uploads/carmichael10-NPM-4.pdf>.

Hydrosimulations (2015) Galilee Basin hydrogeological model. Milestone 3 Report. Prepared for Geoscience Australia under the Lake Eyre Basin Bioregional Assessment. <http://www.bioregionalassessments.gov.au/sites/default/files/galilee-basin-hydrogeological-model-pdf.pdf>.

IESC (2013) Advice to decision maker on coal mining project. Carmichael Coal Mine and Rail Project, Queensland (EPBC 2010/5736). 16th December 2013.

Land Court of Queensland (2015) *Adani Mining Pty Ltd v Land Services of Coast and Country Inc & Ors* [2015] QLC 48, CAC MacDonald (Pres.), Brisbane.

Lewis S, Evans T, Pavey C, Holland KL, Henderson BL, Kilgour P, Dehelean A, Karim F, Viney NR, Post DA, Schmidt RK, Sudholz C, Brandon C, Zhang YQ, Lymburner L, Dunn B, Mount R, Gonzalez D, Peeters LJM, O'Grady A, Dunne R, Ickowicz A, Hosack G, Hayes KR, Dambacher J, Barry S (2018) Impact and risk analysis for the Galilee subregion. Product 3-4 for the Galilee subregion from the Lake Eyre Basin Bioregional Assessment. Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia, Australia.

<http://data.bioregionalassessments.gov.au/product/LEB/GAL/3-4>.

National Water Commission (2009) Framework for assessing local and cumulative effects of mining on groundwater resources, Report 1: Report on the inclusion and implementation of NWI objectives and consideration of cumulative effects, SKM and SMI, NWC Project no. VE23097, 93 pp.

Webb JA (2015) Statement of Evidence: "Report on groundwater impacts", Adani Mining Pty Ltd v Land Services of Coast and Country Inc. & Ors, Report for the Queensland Land Court.

Werner AD (2015) Statement of Evidence: "Analysis of Carmichael coal mine assessment", Adani Mining Pty Ltd v Land Services of Coast and Country Inc. & Ors, Report for the Queensland Land Court.

Williams BK, Szaro RC, Shapiro CD (2009) Adaptive management: The U.S. Department of the interior technical guide. US Department of the Interior, 72 pp.

Wu Q, Xing LT, Ye CH, Liu YZ (2011) The influences of coal mining on the large karst springs in North China, *Environmental Earth Sciences* 64: 1513-1523.

Younger PL, Wolkersdorfer C (eds) (2004) Mining Impacts on the Fresh Water Environment: Technical and Managerial Guidelines for Catchment Scale Management, *Mine Water and the Environment* 23: S2-S80.