Mobil Neumann Sugars Road Alexandra Headland
1&2 RP176929
BNE9848
\EO_Integrated Assessment\Project Support\Manager GOC\Contaminated Land\Mobil Sugar Road Maroochydore
TPR Mack Dreyer
10 October 2012

Site History
The site has been a service station for 30 years, prior to which it was a car sales yard. A substantial fuel leak occurred at the site some time ago.

Topography
The site slopes gently to the south east to south.

Geology
The site is underlain by Quaternary estuarine and swamp deposits. Soils on the site are a mix of clay, sand and gravels, with some varied fills in parts providing preferential pathways.

Hydrogeology
Local perched aquifer which generally follows surface contours with the overall direction to a swamp in the west south west.

Investigations
Significant investigations have been conducted at the site with PSH found in 2001. Up to 37cm was found in MW13 and PSH had left the site. An MPE trial was conducted in Aug 2001. The site was listed on the CLR in Oct 2002 and a remediation notice issued to Mobil (the polluter). There was a requirement for a TPR.

An MPE system has been operated on the site by Otek for some time. A surfactant flush event was conducted in mid-2012 to speed up recovery.

Substantial product has been recovered (over 5t) with reasonable quantities continuing to be recovered on a daily basis. The attached graph shows recoveries and the figure shows the most recent available benzene results.

RTI DL RELEASE - EHP

Current Status
The remediation has taken longer than originally anticipated, although it is reasonable to conclude that the risk has been substantially reduced.

A meeting was held on-site 30 May 2012 and the following timeframes were agreed with Mobil:

1. *Surfactant injection 30/5/12*
2. *Supply TPR with revised surfactant injection plan - 8/6/2012*
3. *MPE system operation for 3 months from early June 2012*
4. *Risk assessment to TPR by 8/6/2012*
5. *Stegbar validation report - mid Aug 2012*

6. *2nd Surfactant injection early Sept 2012*
7. *MPE system operation for 3 months to end of Dec 2012*
8. *1st GME - Jan 2013*
9. *Check against agreed SSTL early Feb 2013*
10. *2nd GME - Mar 2013*
11. *3rd GME - June 2013*

- *Otek are to dip wells for the presence of PSH during the remediation works. If you would please advise me (& the TPR) if any PSH is encountered.*
- *Mobil was to respond with its plans for the adjacent former Midas site within 2 weeks.*

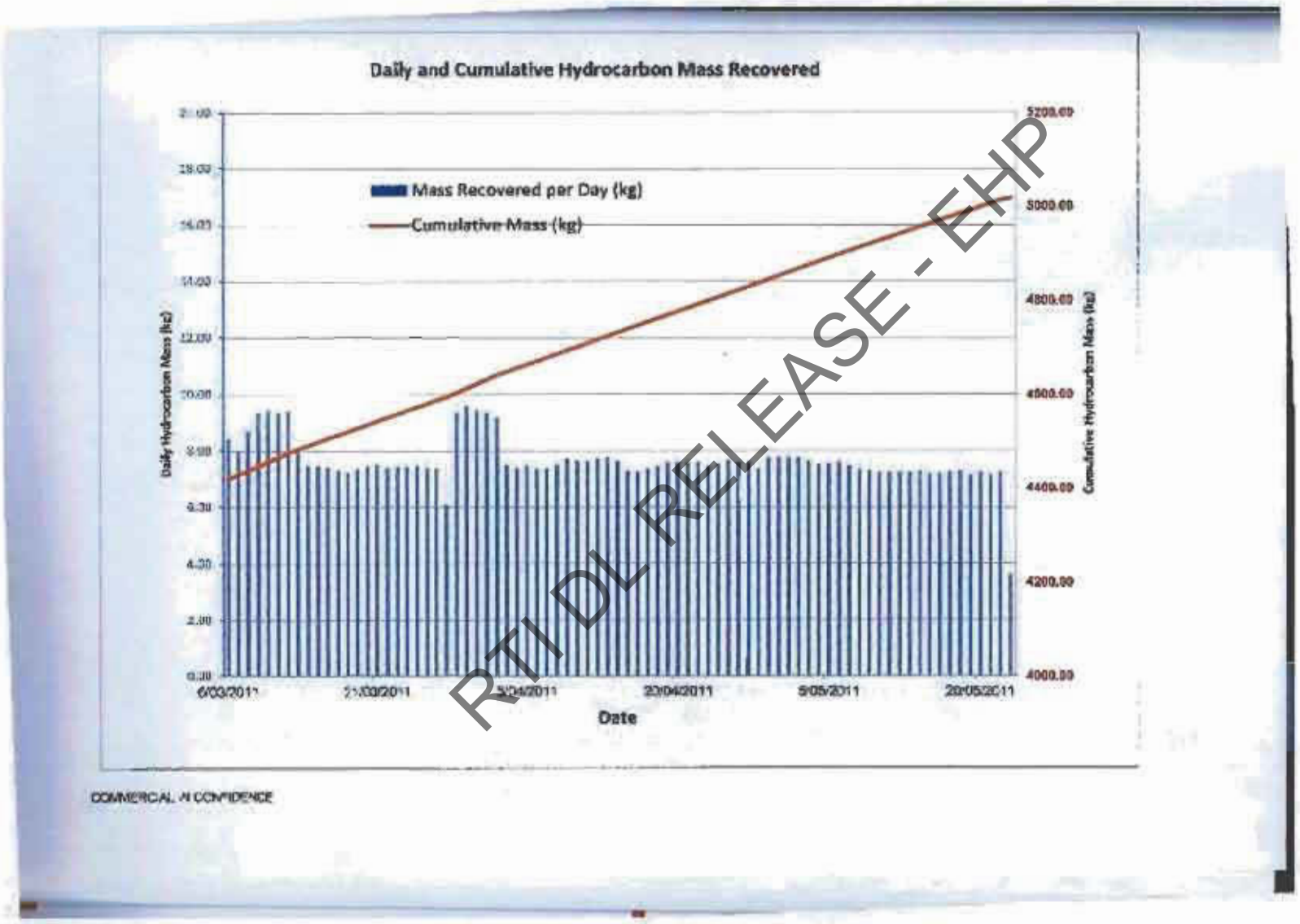
To date items 1-6 are on track. The Stegbar validation report was provided to the TPR in late August and is expected to be finalised shortly. There has been no reported PSH. Mobil also advised that the adjacent former Midas site validation report would be provided at the end of remedial activities on the Neumann site.

Action Required
Follow ups with Luis Cifuentes of Mobil on the progress of the above list.

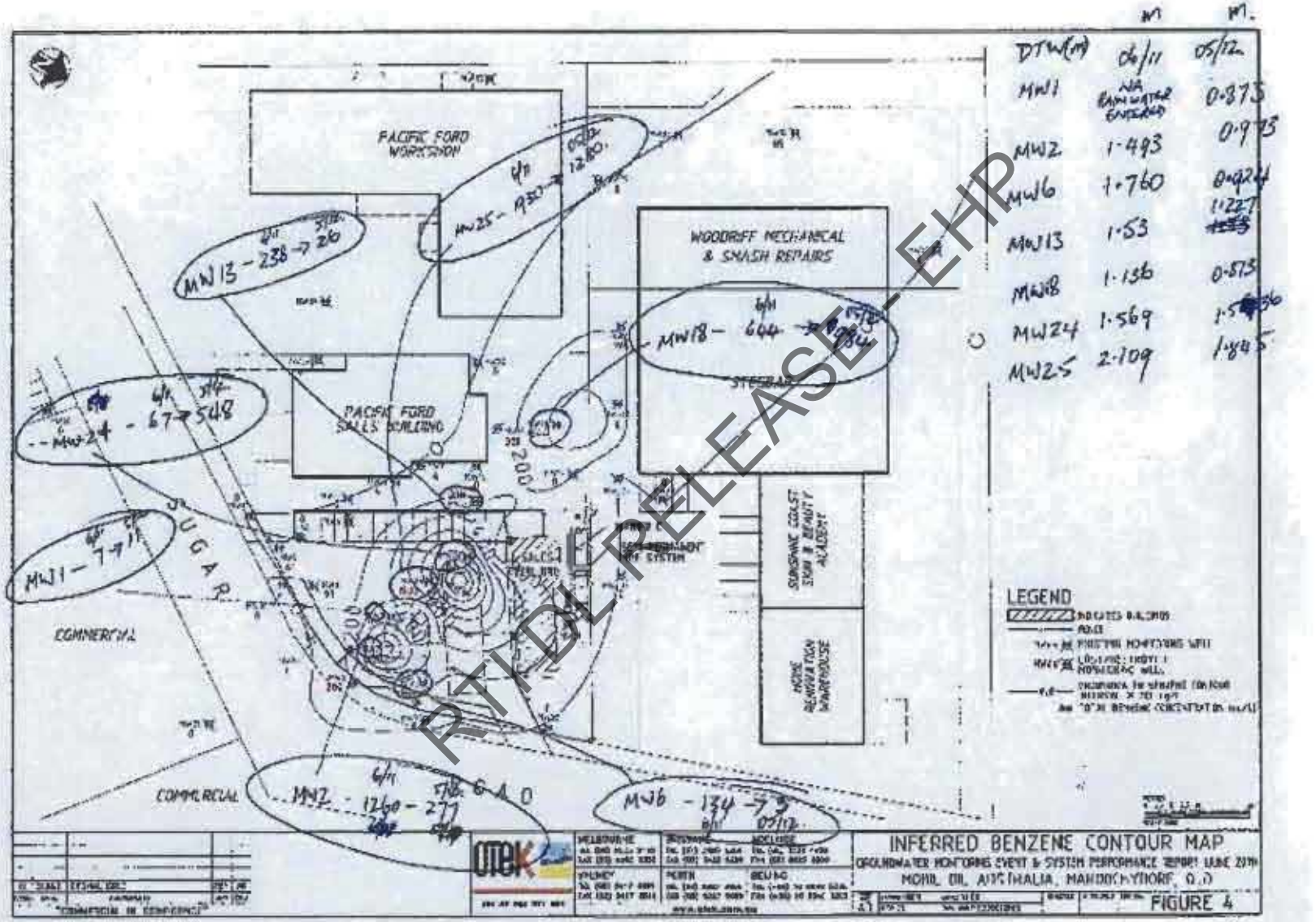
The ultimate aim is to have the site removed from the CLR (but stay on the EMR as it is an operating service station) and have the affected neighbouring properties removed from the EMR (Stegbars) or, if suitable to the owner, left on the EMR with an SMP.

Contacts
Mack Dreyer 3711-5088
Luis Cifuentes, Mobil, Project Manager luis.cifuentes@exxonmobil.com

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP



RTIDL RELEASE - EHP

O'Connor Gary

From: O'Connor Gary
Sent: 19 June 2012 4:15 PM
To: 'Cifuentes, Luis /C'
Subject: RE: Mobil Sugar Road Maroochydore

Thanks Luis

All is in order

Regards

Gary O'Connor
Manager, Project Support, Statewide Environmental Assessment
Environmental Performance and Coordination Branch
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

GPO Box 2454 Brisbane QLD 4001
400 George Street Brisbane

RTI DL RELEASE - EHP

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: 18 June 2012 9:16 AM
To: O'Connor Gary; mack@birchwoodenviro.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Hi Gary,

Apologies for the delay getting back to you with this one. I confirm that the HRA report was sent a couple of weeks ago to Mack , according to OTEK.

Mack, anyway please let me know if this is correct.

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

---

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Friday, 15 June 2012 11:39 AM
To: Cifuentes, Luis /C; mack@birchwoodenviro.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Thanks Luis for the information.

I have also been advised by the TPR that the Surfactant Injection Event Plan has been received and reviewed. A copy has been forwarded to EHP for our records. Thanks.

The one outstanding item on my list is the Risk Assessment, which was to be provided to the TPR, due date 8/6/12. Could you please advise if this has occurred

Regards

Gary O'Connor
Manager, Project Support, Statewide Environmental Assessment
Environmental Performance and Coordination Branch
Department of Environment and Heritage Protection

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

GPO Box 2454 Brisbane QLD 4001
400 George Street Brisbane

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: 8 June 2012 8:21 AM
To: O'Connor Gary; mack@birchwoodenviro.com.au
Subject: FW: Mobil Sugar Road Maroochydore

Hi Gary,

Following your email attached below, please find below the plan for the validation report for Midas site.

Any question, please let me know.

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006
Phone: +61 3 9622 7824 / sch4p4(6) Personal information

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Friday, 8 June 2012 8:16 AM
To: Cifuentes, Luis /C
Cc: Brendan Ebzery
Subject: FW: Mobil Sugar Road Maroochydore

Hi Luis – Please see the response from Brendan. As I recall this was discussed with the Midas lawyer earlier this year so they should be aware of the timing.

Regards - Andrew

Andrew Hunt
Kleinfelder
M: 161
sch4p4(6) Personal information

From: Brendan Ebzery [mailto:BEbzery@otek.com.au]
Sent: Thursday, June 07, 2012 4:21 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Andrew/Luis

The validation report for the Midas site will be undertaken once site remediation works are complete. The on-site results need to meet the SSTLs for the Midas site to ensure no re-contamination of the Midas site. This report is not expected to be complete for at least 8 months. Thanks

Regards

RTI DL RELEASE - EHP

Brendan Ebzery
National Remediation Manager
Senior Principal Remediation Scientist
T +61 7 3426 5200 D +61 7 3426 5216 F +61 7 3426 5299 sch4p4(6) Personal information
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105
E bebzery@otek.com.au
W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs). We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return e-mail.

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

RTI DL RELEASE - EHP

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Wednesday, 6 June 2012 9:01 AM
To: Brendan Ebzery
Subject: RE: Mobil Sugar Road Maroochydore

Hi No 2 – Can you advise on the below. Thanks.

Regards - Andrew

Andrew Hunt
Kleinfelder
ph +61 sch4p4(6) Personal information

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: Tuesday, June 05, 2012 3:54 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Hi Andrew,

I don't see any validation report for the adjacent Midas site. I understand that this is part of the obligations we have but not sure how it will be completed.

Could you please advise which is the plan?

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Wednesday, 30 May 2012 4:35 PM
To: Adam Breen; Cifuentes, Luis /C; Mack Dreyer; Brendan Ebzery; AHunt@kleinfelder.com
Cc: Marc Andrews
Subject: RE: Mobil Sugar Road Maroochydore

Hi all

Thanks for the overview of the works being conducted at the site. To confirm our discussions of the actions and timeframes:

1. Surfactant injection 30/5/12
2. Supply TPR with revised surfactant injection plan - 8/6/2012
3. MPE system operation for 3 months from early June 2012
4. Risk assessment to TPR by 8/6/2012
5. Stegbar validation report - mid Aug 2012
6. 2nd Surfactant injection early Sept 2012
7. MPE system operation for 3 months to end of Dec 2012
8. 1st GME - Jan 2013
9. Check against agreed SSTL early Feb 2013
10. 2nd GME - Mar 2013
11. 3rd GME - June 2013

I also note that Otek are to dip wells for the presence of PSH during the remediation works. If you would please advise me (& the TPR) if any PSH is encountered.

I also noted that Mobil is to respond with its plans for the adjacent former Midas site within 2 weeks.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

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.

O'Connor Gary

From: O'Connor Gary
Sent: 15 June 2012 11:39 AM
To: 'Cifuentes, Luis /C'; mack@birchwoodenviro.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Thanks Luis for the information.

I have also been advised by the TPR that the Surfactant Injection Event Plan has been received and reviewed. A copy has been forwarded to EHP for our records. Thanks.

The one outstanding item on my list is the Risk Assessment, which was to be provided to the TPR, due date 8/6/12. Could you please advise if this has occurred.

Regards

Gary O'Connor
Manager, Project Support, Statewide Environmental Assessment
Environmental Performance and Coordination Branch
Department of Environment and Heritage Protection

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

GPO Box 2454 Brisbane QLD 4001
400 George Street Brisbane

RTI DL RELEASE - EHP

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: 8 June 2012 8:21 AM
To: O'Connor Gary; mack@birchwoodenviro.com.au
Subject: FW: Mobil Sugar Road Maroochydore

Hi Gary,

Following your email attached below, please find below the plan for the validation report for Midas site.

Any question, please let me know.

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

---

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Friday, 8 June 2012 8:16 AM
To: Cifuentes, Luis /C
Cc: Brendan Ebzery
Subject: FW: Mobil Sugar Road Maroochydore

Hi Luis – Please see the response from Brendan. As I recall this was discussed with the Midas lawyer earlier this year so they should be aware of the timing.

Regards - Andrew

Andrew Hunt
Kleinfelder
m +61 sch4p4(6) Personal information

From: Brendan Ebzery [mailto:BEbzery@otek.com.au]
Sent: Thursday, June 07, 2012 4:21 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Andrew/Luis

The validation report for the Midas site will be undertaken once site remediation works are complete. The on-site results need to meet the SSTLs for the Midas site to ensure no re-contamination of the Midas site. This report is not expected to be complete for at least 8 months. Thanks

Regards

Brendan Ebzery
National Remediation Manager
Senior Principal Remediation Scientist
E bebzery@otek.com.au
T +61 7 3426 5200 D +61 7 3426 5216 F +61 7 3426 5299 M sch4p4(6) Personal information
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105 W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs). We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return email.

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

RTI DISCLEASE - EHP

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Wednesday, 6 June 2012 9:01 AM
To: Brendan Ebzery
Subject: RE: Mobil Sugar Road Maroochydore

Hi No 2 – Can you advise on the below. Thanks.

Regards - Andrew

Andrew Hunt
Kleinfelder
m +61 sch4p4(6) Personal information

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: Tuesday, June 05, 2012 3:54 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Hi Andrew,

I don't see any validation report for the adjacent Midas site. I understand that this is part of the obligations we

have but not sure how it will be completed.

Could you please advise which is the plan?

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

---

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Wednesday, 30 May 2012 4:35 PM
To: Adam Breen; Cifuentes, Luis /C; Mack Dreyer; Brendan Ebzery; AHunt@kleinfelder.com
Cc: Marc Andrews
Subject: RE: Mobil Sugar Road Maroochydore

Hi all

Thanks for the overview of the works being conducted at the site. To confirm our discussions of the actions and timeframes:

1. Surfactant injection 30/5/12
2. Supply TPR with revised surfactant injection plan - 8/6/2012
3. MPE system operation for 3 months from early June 2012
4. Risk assessment to TPR by 8/6/2012
5. Stegbar validation report - mid Aug 2012
6. 2nd Surfactant injection early Sept 2012
7. MPE system operation for 3 months to end of Dec 2012
8. 1st GME - Jan 2013
9. Check against agreed SSTL early Feb 2013
10. 2nd GME - Mar 2013
11. 3rd GME - June 2013

I also note that Otek are to dip wells for the presence of PSH during the remediation works. If you would please advise me (& the TPR) if any PSH is encountered.

I also noted that Mobil is to respond with its plans for the adjacent former Midas site within 2 weeks.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

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.

Release

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.

RTI DL RELEASE - EHP

O'Connor Gary

From: Cifuentes, Luis /C [luis.cifuentes@exxonmobil.com]
Sent: 8 June 2012 8:21 AM
To: O'Connor Gary; mack@birchwoodenviro.com.au
Subject: FW: Mobil Sugar Road Maroochydore

Hi Gary,

Following your email attached below, please find below the plan for the validation report for Midas site.

Any question, please let me know.

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Friday, 8 June 2012 8:16 AM
To: Cifuentes, Luis /C
Cc: Brendan Ebzery
Subject: FW: Mobil Sugar Road Maroochydore

Hi Luis – Please see the response from Brendan. As I recall this was discussed with the Midas lawyer earlier this year so they should be aware of the timing.

Regards - Andrew

Andrew Hunt
Kleinfelder
m: +61 sch4p4(6) Personal information

From: Brendan Ebzery [mailto:BEbzery@otek.com.au]
Sent: Thursday, June 07, 2012 4:21 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Andrew/Luis

The validation report for the Midas site will be undertaken once site remediation works are complete. The on-site results need to meet the SSTLs for the Midas site to ensure no re-contamination of the Midas site. This report is not expected to be complete for at least 8 months. Thanks

Regards

OTEK Practical Environmental Solutions

Brendan Ebzery
National Remediation Manager
Senior Principal Remediation Scientist
T +61 7 3426 5200 D +61 7 3426 5216 F +61 7 3426 5299 M sch4p4(6) Personal information
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105
E bebzery@otek.com.au
W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

RTI DL RELEASE - EHP

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs). We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return e-mail.

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

From: Andrew Hunt [mailto:AHunt@kleinfelder.com]
Sent: Wednesday, 6 June 2012 9:01 AM
To: Brendan Ebzery
Subject: RE: Mobil Sugar Road Maroochydore

Hi No 2 – Can you advise on the below. Thanks.

Regards - Andrew

Andrew Hunt
Kleinfelder
m sch4p4(6) Personal information

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: Tuesday, June 05, 2012 3:54 PM
To: Andrew Hunt
Subject: RE: Mobil Sugar Road Maroochydore

Hi Andrew,

I don't see any validation report for the adjacent Midas site. I understand that this is part of the obligations we have but not sure how it will be completed.

Could you please advise which is the plan?

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Wednesday, 30 May 2012 4:35 PM
To: Adam Breen; Cifuentes, Luis /C; Mack Dreyer; Brendan Ebzery; AHunt@kleinfelder.com
Cc: Marc Andrews
Subject: RE: Mobil Sugar Road Maroochydore

RTI DL RELEASE - EHP

Hi all

Thanks for the overview of the works being conducted at the site. To confirm our discussions of the actions and timeframes:

1. Surfactant injection 30/5/12
2. Supply TPR with revised surfactant injection plan - 8/6/2012
3. MPE system operation for 3 months from early June 2012
4. Risk assessment to TPR by 8/6/2012
5. Stegbar validation report - mid Aug 2012
6. 2nd Surfactant injection early Sept 2012
7. MPE system operation for 3 months to end of Dec 2012
8. 1st GME - Jan 2013
9. Check against agreed SSTL early Feb 2013
10. 2nd GME - Mar 2013
11. 3rd GME - June 2013

I also note that Otek are to dip wells for the presence of PSH during the remediation works. If you would please advise me (& the TPR) if any PSH is encountered.

I also noted that Mobil is to respond with its plans for the adjacent former Midas site within 2 weeks.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

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.

O'Connor Gary

From: Mack Dreyer [mack@birchwoodenviro.com.au]
Sent: 12 June 2012 11:31 AM
To: O'Connor Gary
Subject: FW: Surfactant Flush - Maroochydore
Attachments: Surfactant Injection Event Program (TPR) 7-6-12.pdf

Gary

Please find attached Otek's amended surfactant injection program as we requested during our site inspection on 30 May. Otek have not committed to a date for the second round of injection (although a MPE operation period of 3 months in between surfactant injection events has been identified in the document). This will be assessed pending the results of the monitoring post the first round of injection.

As you know I am concerned with the potential "Swiss cheese" effect of this strategy as well as potential runaway (although runaway should be manageable if the site is being dipped on a fortnightly basis), but at this stage I suggest that we wait and assess the first round of monitoring results as well as the MPE system recovery results.

I will request Otek provide us with a copy of the monitoring results as soon as they are available.

Please let me know if you have any concerns with this approach or have any additional requirements.

Regards

Mack

Mack Dreyer
Principal
P : (07) 3711 5088 | M: sch4p4(6) Personal information | F: (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

BIRCHWOOD
ENVIRONMENTAL SERVICES PTY LTD

RTI DL RELEASE - EHP

Note Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: Adam Breen [mailto:ABreen@otek.com.au]
Sent: Friday, 8 June 2012 9:30 AM
To: Mack Dreyer (mack@birchwoodenviro.com.au)
Subject: FW: Surfactant Flush - Maroochydore

Mack, Please find information attached as requested.

Regards

Adam

From: Adam Breen
Sent: Friday, 13 April 2012 3:46 PM
To: 'Mack Dreyer'
Subject: RE: Surfactant Flush - Maroochydore

Mack, the system will be recommissioned prior to works. It hasn't been turned on yet. There are drilling works that are being carried out next week. Unfortunately our project package doesn't include a GME works until later and has not been included in the contracts. The plan is for the site

Well Install
Surfactant Flush
System Operation (3 months)
Surfactant Flush 2
System Operation (3 months)
GME 1
Remediation System Removal
GME 2
GME 3
Request Site Closure
Decommission Wells

I can do some additional sampling of wells of interest next Wednesday during the Well install works. Most likely Monitor Wells MW-1, MW-25, MW-18, MW-2 and MW-13 to be sampled.

Hydraulic control will maintained by extracting well that have been injected under a push / pull methodology. CTAS testing will performed on outlier wells.

Regards

Adam

From: Mack Dreyer [mailto:mack@birchwoodenviro.com.au]
Sent: Thursday, 5 April 2012 9:52 AM
To: Adam Breen; Brendan Ebzery
Subject: Surfactant Flush - Maroochydore

Adam/Brendan

I am just going through the surfactant flush proposal for the Maroochydore site and I have a couple of questions that you might be able to help me out with.

1. Has the MPE system at Maroochydore been recommissioned? I note in section 2.2.1 of the proposal it is mentioned that the MPE system will be turned off for one day prior to injection of the surfactant. If the system has been recommissioned were you able to complete an GME (or at least a partial GME) at the site prior the recommissioning of the system as discussed at our meeting on 13 March (the system had been non-operational for 10 months or so and it would be very beneficial to obtain an understanding of the impacts at the site without the system running for such a long period of time).
2. I note in Section 2.3 of the proposal that the pre-injection monitoring will consist of the analysis of a water sample at the MPE system. Is this adequate considering the MPE system will be drawing from across the site and volatiles are likely to be lost to the vacuum.

RTI DL RELEASE - EHP

3. It appears that we will only be monitoring the injected wells as part of this program. How will you demonstrate that you have maintained hydraulic control? Is there a subsequent GME planned for the site?

Regards

Mack

Mack Dreyer
Principal
P : (07) 3711 5088 | M: sch4p4(6) Personal information | F: (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

RTI DL RELEASE - EHP

Reference Number: 5212011

7 June 2012

Mr Mack Dreyer

PO Box 2342
Sunnybank Hills QLD 4109

Groundwater Remediation – Surfactant Flush Event

Mobil – Maroochydore

Matilda Blue Service Station

116-118 Sugar Road, Maroochydore, Queensland

RTI DL RELEASE - EHP

Dear Mack,

I am writing to advise of OTEK's intention to undertake additional groundwater remediation enhancement activities at the Matilda Blue service station (formally a Mobil operated service station) site using surfactant flushing techniques, and request review and comment of these remediation activities from you as the sites third party auditor as part of our regulatory approval process.

OTEK have been commissioned by Kleinfelder Australia Pty Ltd (Kleinfelder) to undertake remediation of hydrocarbon impacted groundwater at the site via the operation of a Multi-Phase Extraction (MPE) system. The surfactant injection works are designed to complement and enhance this remediation.

Scope of Work

Target Injection Wells

Two surfactant events will be undertaken on the site with a planned 3 month operation of the on-site MPE system between surfactant flushing events. The scope of work detailed below will be the same for each surfactant event.

A total of 7 wells (MW-1, MW-6, MW-24, MW-26, MW-39, MW-40 and MW-41) were injected with Ivey Sol surfactant. The MPE system was turned off one day prior to injection. Extraction wells that are adjacent to the western or eastern boundary property were injected with surfactant to ensure they are utilised for recovery purposes and to maintain control of the surfactant transport and capture process.

OTEK Brisbane, Level 1, 9/44 Station Road, Yeerongpilly, QLD, 4017
T: (07) 3426 5200 F: (07) 3426 5299 ABN 32 054 371 596

Solution Injection Volume

The surfactant was prepared as a weak solution (**0.75%** by vol) in water. A volume of 20 litres of diluted Surfactant solution was injected to each target well. This was followed with approximately 150-litres of clean water to flush the surfactant into the aquifer surrounding the bore.

Duration

The surfactant has been left within the aquifer for an initial residence period of approximately 1 week. This has allowed the fluid to permeate into the impacted aquifer surrounding each well and work to locally de-sorb as much hydrocarbon as possible prior to MPE re-commencement. This residence period also aims to permeate into the lower permeability groundwater pathways (whilst the MPE system is off) as well as the more permeable, hence achieving greater hydrocarbon contact and thus removal.

An approximate hydraulic gradient of 0.19m/m was established using the level survey data and groundwater elevations calculated between Monitoring Well MW-17 to MW-18 (refer to Table 1). The hydraulic conductivity (K) of the aquifer was estimated at between 0.2E-06 based on a rising head test performed by OTEK on the 10 December, 2010. An estimated effective porosity value of 0.15 is assumed loamy sand (US Department of Interior, Bureau of Reclamation). Using these measured and estimated values the maximum rate of groundwater flow is estimated to be approximately 87.8 metres per year or 1.7 metres per week. It should noted that contaminant flow would most likely be less due to retardation by absorption, dispersion and biodegradation.

MPE Operation

The MPE system will remain in operation post-injection for a period of three months. One week after resumption, gauging off all non extraction wells will occur, vacuum will be measured at all wells and qualitative water tests will be undertaken to determine the presence of surfactant by the degree of liquid bubbling. Gauging and vacuum monitoring will then occur fortnightly. Six weeks after resumption of extraction six wells will be sampled for BTEX and TRH with four of the samples additionally analysed for Cobalt Thiocyanate Active Substances (CTAS). Based upon the results of sampling the timing for the next sampling event will be determined. The surfactant is meant to be have a half life in the ground of approximately 4 weeks.

Yours sincerely,

RTI DL RELEASE - EHP

sch4p4(6) Personal information

Adam Breen
Senior Remediation Scientist

sch4p4(6) Personal information

Brendan Ebzery
Senior Principal Remediation Scientist

O'Connor Gary

From: Mack Dreyer [mack@birchwoodenviro.com.au]
Sent: 4 June 2012 12:56 PM
To: O'Connor Gary
Subject: Sugar Rd Maroochydore
Attachments: Cumulative Mass removal 0511.pdf; Commentry 0511 mass removal.pdf

Gary

As discussed please find attached the hydrocarbon recovery graph and some commentary provided by Otek for the Sugar Rd site. As you can see the recoveries are consistent over the monitoring period (no real improvement over the 3 month period) and we are looking at recoveries of approx. 200kg per month. Hence my on-going concerns.

Give me a call if you have any questions.

Regards

Mack

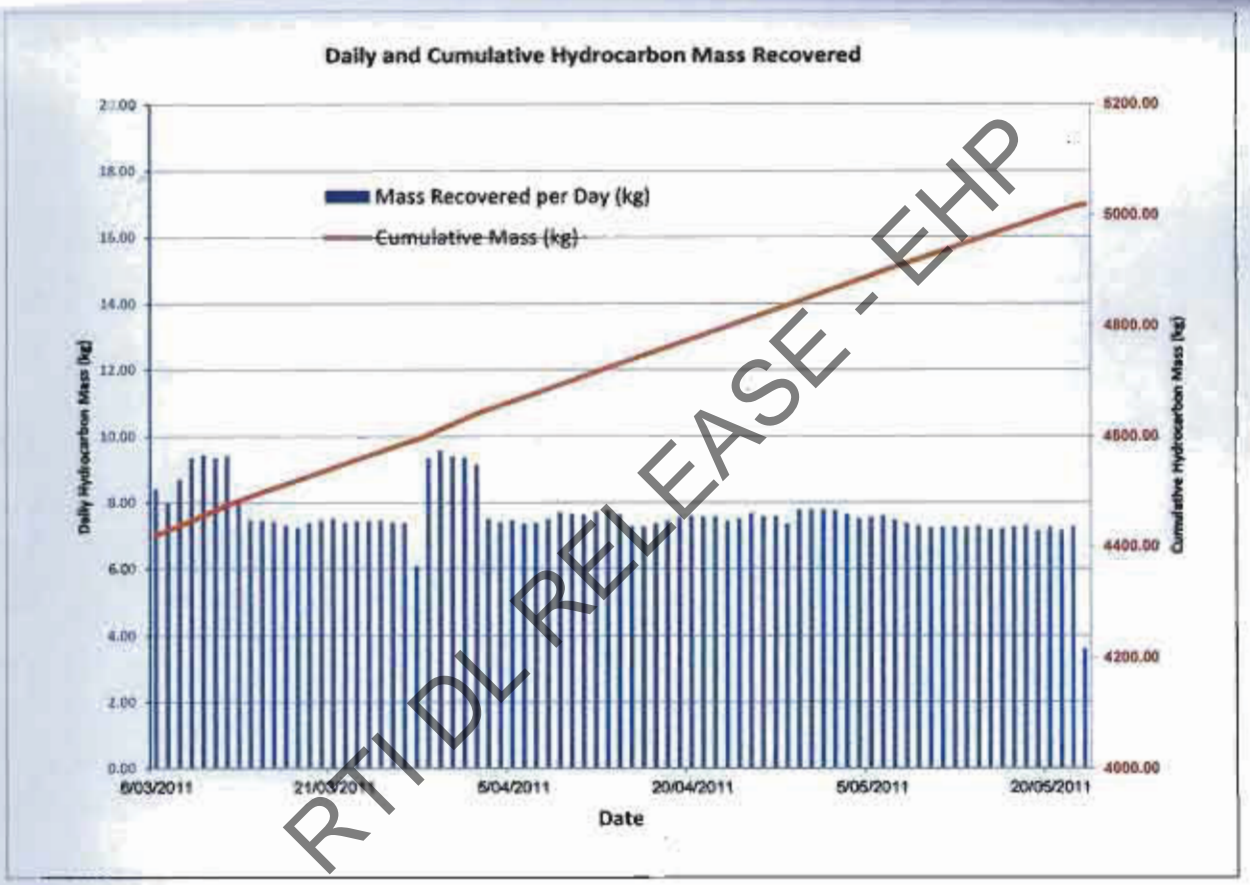
Mack Dreyer
Principal
P : (07) 3711 5088 | M : sch4p4(6) Personal information | F : (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

birchwood
ENVIRONMENTAL SERVICES PTY LTD

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

RTI DL RELEASE - EHP

Release



RTI DL RELEASE - EHP

COMMERCIAL IN CONFIDENCE

Release

6.4.1 System Runtime

Between 4 March 2011 and 23 May 2011 the remediation system was operational for 99.6% of the total possible runtime. The system was operational during the 80 days of this time period. The majority of the downtime was due to minor system faults that were repaired or rectified.

6.4.2 Radius of Influence (ROI) Measurements

The groundwater drawdown and negative pressure (vacuum) obtained at each monitoring well over the entire operation and maintenance period is summarised in Table 3. The maximum ROI measured in monitoring wells surrounding the extraction well network are illustrated on Figure 6. Based on the vacuum within each well, the ROI extends up to approximately 20 m from the extraction points on the southern portion of the site. Monitoring Wells MW-3, MW-4, MW-8, MW-9, MW-10 indicated vacuum influence on the eastern corner of the site (refer to Figure 6).

The Extraction Well and Line Vacuum pressures are highlighted in Table 3, and indicate that an even amount of groundwater vacuum pressure was applied to each operating extraction well from the March to May operation period.

6.4.3 Hydrocarbon Mass Removal

Hydrocarbon recovery by the remediation system is calculated using the following equation.

$$\text{Mass (kg)} = \frac{(MW \times C)}{RT} \times 1 \times 10^{-6} \times \text{MPE Flow} \times \text{MPE Runtime}$$

Where:

C = Hydrocarbon concentration (ppmv);

R = 0.08205 (universal gas constant);

T = Temperature in Kelvins;

MPE Flow (m^3/min);

MPE Runtime (min); and

MW = Molecular weight (hexane = 84 g/mole).

Approximately **563** kg of hydrocarbons have been removed between 4 March 2011 and 23 May 2011, immediately prior to system shutdown before conducting the GME. A total of **4,965** kg of hydrocarbons have been removed from this site since the beginning of this remediation system's operation in October 2009 as shown in Appendix C. The rate of hydrocarbon mass removal has maintained his high level since October 2010 coinciding with reducing the level of extraction in the neighbouring ford premises due to low hydrocarbon concentrations in this area. This involves an increase in the vacuum extraction efficiency on the remaining wells that are functioning on-site and in-turn remove more contaminated groundwater.

6.5 Groundwater Quality Results

Groundwater quality values obtained for measured parameters are provided in Table 2.

Groundwater parameter ranges were as follows:

RTI DL RELEASE - EHP

O'Connor Gary

From: Mack Dreyer [mack@birchwoodenviro.com.au]
Sent: 4 June 2012 11:49 AM
To: Jackie Wright
Cc: O'Connor Gary
Subject: FW: Maroochydore
Attachments: 5209012 HRA Final.pdf

Jackie

Following our discussions the other day Otek have forwarded me the revised risk assessment for the former Mobil site at Maroochydore. Could I please get you to review and provide comment on this amended report.

I haven't gone through the report in any detail but I am concerned with the derived SSTLs in Table 8.6.1, they just seem too high to have land removed from the EMR (but I will defer to you on that one). I do note that the service station site will remain on the EMR with a SMP but the Stegbar site (to the north) and the Pacific Ford site (to the west) have been put on the EMR as a result of impacts from the service station site and it is a requirement of the Remediation Notice to have these adjacent land parcels removed from the EMR. As I understand it the SSTLs in Table 8.6.1 have been derived to have these land parcels removed from the EMR.

Thanks for your help with this and please give me a call if you have any questions.

Regards

Mack

Mack Dreyer
Principal
P : (07) 3711 5088 M: sch4p4(6) Personal information F: (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

BIRCHWOOD
ENVIRONMENTAL SERVICES PTY LTD

RTI DL RELEASE - EHP

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: Adam Breen [mailto:ABreen@otek.com.au]
Sent: Monday, 4 June 2012 9:13 AM
To: Mack Dreyer (mack@birchwoodenviro.com.au)
Cc: luis.cifuentes@exxonmobil.com
Subject: Maroochydore

Mack,

Please find attached the amended HRA report following Jackie's comments for Maroochydore. I have been really busy in the field of late and only have just had a chance to get around to these items. The additional information you requested such as the remediation strategy and direction forward will be

sent soon. I have sent you some information pertaining to this previously.

Regards

OTEK
Practical Environmental Solutions

Adam Breen
Senior Remediation Scientist
T +61 7 3426 5200 D +61 7 3426 5220 F +61 7 3426 5299
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105

E abreen@otek.com.au
M sch4p4(6) Personal information
W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs) We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return e-mail

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

RTI DL RELEASE - EH

Release

Revision of Site Specific Target Levels

Neumann Service Station (QL3815)

116-118 Sugar Road, Maroochydore, QLD

RTI DL RELEASE - EHP

Prepared for: Mobil Oil Australia Pty Ltd

Project Job Number: 5209012 / 2006

Date Submitted: 17 May 2012

Submitted by: OTEK Australia Pty Ltd

Name: Charles Grimison

Title: Senior Remediation Project Manager

OTEK Sydney, Level 4, 146 Arthur Street, North Sydney, NSW 2060
T: (+61) 2 9417 4499 F: (+61) 2 9417 2314 ABN 32 054 371 596

Revision of Site Specific Target Levels

Neumann Service Station (QL3815), 116-118 Sugar Road, Maroochydore, QLD

Prepared for:
Mobil Oil Australia Pty Ltd
12 Riverside Quay
Southbank VIC 3006

Prepared by:
OTEK Australia Pty Ltd
Level 4, 146 Arthur Street
North Sydney NSW 2060
T: (+61) 2 9417 4499 F: (+61) 2 9417 2314

Report Issued:	Draft	20 October 2011
	Preliminary Final	20 December 2011
	Final	17 May 2012

sch4p4(6) Personal information

Author: _____
Danielle Trice
Remediation Engineer / BEng (Geol)

sch4p4(6) Personal information

Author/Reviewer: _____
Charles Grimison
Senior Remediation Engineer / BSc (Env) (Hons), MHydGWM

sch4p4(6) Personal information

Reviewer: _____
Andrew Kita
Principal Hydrogeological Engineer / BEng (Geol.Hons), MIEAust, MIAH

Distribution:

CLIENT:	3 x CD
	2 x Bound Copies
OTEK:	Electronic Copy

Disclaimer:

THIS DOCUMENT IS SUBJECT TO LIMITATIONS NOTED

RTI DL RELEASE - EHP

Release

Table of Contents

Executive Summary 1
1 Introduction 3
2 Objectives 3
3 Scope of Work 3
4 Site Description 4
4.1 Surrounding Land Uses 4
4.2 Local Geology and Soil Lithology 5
4.3 Site Specific Geology 6
4.4 Hydrogeology 6
4.5 Registered Groundwater Bores 8
4.6 Topography and Drainage 8
4.7 Local Climate and Rainfall 8
4.8 On-Site Fuel/Chemical Storage Facilities 8
5 Data Collection and Evaluation 9
5.1 Summary of Groundwater Concentrations 9
5.1.1 Soil COPC Concentrations 9
5.1.2 On-Site Maximum Groundwater Concentrations 9
5.1.3 Maximum Off-Site Groundwater Concentrations 10
5.1.4 TPH Fractionation Data 11
6 Site History 12
6.1 Previous Environmental Investigations 12
6.2 Zoning 17
6.3 Previous Potential Contaminant Releases 18
6.4 Groundwater Remediation Strategy 18
7 Risk Assessment Methodology 19
7.1 Existing Risk Assessment 19
7.2 Coffey (2010) Human Risk Assessment 19
7.3 Existing Site Specific Target Levels 20
7.4 Approach to Modifying Risk-based SSTLs 21
7.5 Screening Criteria 21
7.6 Hazard Identification 21
7.7 Toxicological Profiles 22
7.8 Receptors 24
7.8.1 Future Residents 24
7.8.2 Maintenance (Trench) Workers 24
7.9 Source-Pathway-Receptor (SPR) Linkages 24
8 Risk Characterisation 26
8.1 Non-Threshold (Cancer) Risk 26

RTI DL RELEASE - EHP

8.2 Threshold (Non-Cancer) Risk 26
8.2.1 Residential: Slab on Grade 26
8.3 Residential: Basement 27
8.4 Shallow Excavations (1m trench) 28
8.5 Increased Lifetime Cancer Risk (ILCR) 29
8.6 Site Specific Target Levels (SSTLs) 30
8.7 Coffey (2010) Ecological Risk Assessment 30
9 Conclusions 32
10 Limitations 34
11 References 35

This report is subject to limitations presented in Section 10.

RTI DL RELEASE - EHP

Release

Tables (In Text)

Title	Page
Table 4.1: Summary of Site Description Details	4
Table 4.1.1: Surrounding Land Uses	5
Table 4.3.1: General On-Site Soil Lithology	6
Table 4.4.1 Site Specific Hydrogeology	7
Table 4.8.1 Details of Fuel Infrastructure	8
Table 5.1.1: Maximum On-Site Groundwater Concentrations	10
Table 5.1.2. Maximum Off-Site Groundwater Concentrations	11
Table 5.1.3. Maximum TPH Fractionation Data On and Off-Site (June 2011)	11
Table 6.1.1: Previous Environmental Investigations	12
Table 7.2.1: Summary of Hazard Index and Cancer Risk Assessment (Coffey, 2010)	19
Table 7.4.1: Existing Site Specific Target Levels (Coffey, 2010)	21
Table 7.7.1: Toxicity Values for COPC	22
Table 7.7.2. Toxicological Profiles for Tier 2 Chemicals of Concern	23
Table 7.9.1.Source-Pathway-Receptor (SPR) Linkages	25
Table 8,3,1, Hazard Index for Residents – Slab on Grade	27
Table 8.4.1. Hazard Index for Basement and Groundwater Seepage	28
Table 8.5.1 Hazard Index (HI) for Shallow (1m) Trench Excavation Worker	29
Table 8.6.1 Increased Lifetime Cancer Risk (ILCR) Future Residents – Slab on Grade	29
Table 8.6.2 Increased Lifetime Cancer Risk – Standard Basement and Seepage into Basement	29
Table 8.6.3 ILCR for Worker Excavating Shallow (1m) Trench	29
Table 8.7.1 SSTLs for Off-Site (Pacific Ford and Stegbar) Sites	30
Table 9.1 Re-calculated SSTLs, based on the HI and ILCR results	33

Tables (Attached)

Title	Table
Current Analytical Summary – Groundwater Samples (TPH and BTEX)	1
Current Analytical Summary – Groundwater Samples (Aliphatic and Aromatic TPH Speciation)	2
Current Analytical Summary – Groundwater Samples (PAH)	3
Current and Historical Analytical Summary – Groundwater Samples (TPH, BTEX and Lead)	4
Current Analytical Summary – Groundwater Samples (Biodegradation Parameters)	5
Current and Historical Multi-Parameter Readings and Well Gauging Summary	6
Current and Historical Groundwater Elevations	7
Bioscreen Parameters	8

RTI DL RELEASE - EHP

Figures

Title	Figure
Regional and Vicinity Maps	1
Site Layout & Monitoring Well Locations	2
Groundwater Elevation Map	3
Inferred Benzene Contour Map	4
Inferred Volatile TPH Contour Map	5
Site Conceptual Model	6

Appendices

Title	Appendix
Algorithms	A
Model Input Parameters	B
Model Output Data	C

RTI DL RELEASE - EHP

Acronyms

Acronym	Definition
ADI	Acceptable Daily Intake
ADF	Automotive Diesel Fuel
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agricultural and Resource Management Council of Australia and New Zealand
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substances and Disease Registry
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes (m-, o- and p-)
BUA	Beneficial Use Assessment
CCME	Canadian Council of Ministers of the Environment
CLM	Contaminated Land Management
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DECC	NSW Department of Environment and Climate Change
DP	Deposited Plan
EC	Electrical Conductivity
EC##	Effects Concentration, EC50 = Median Effects Concentration.
EIL	Ecological Investigation Level (NEPC, 1999)
ELS	Early Life Stage
EMP	Environmental Management Plan
EPBC	Environment Protection and Biodiversity Conservation
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
ETSA	Electricity Trust of South Australia
FAO	Food and Agriculture Organisation
FDU	Fuel Dispensing Unit (i.e. Bowser)
GME	Groundwater Monitoring Event
HERA	Human Health and Environmental Risk Assessment
HI	Hazard Index
HIL	Health Investigation Level (NEPC, 1999)
HQ	Hazard Quotient
HUB	Hydrocarbon Utilising Bacteria

RTI DL RELEASE - EHP

Acronym	Definition
IC	Inhibition Concentration
IRIS	Integrated Risk Information System
km	Kilometre
L	Litre
LC	Lethal Concentration
LOEC	Lowest Observed Effect Concentration
LOR	Limit Of Reporting
LPG	Liquid Petroleum Gas
LMS	Leaded Motor Spirit
LRP	Lead Replacement Petroleum
mbgs	metres below ground surface
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per litre
MNA	Monitored Natural Attenuation
MPC	Maximum Permissible Concentration
MW	Monitoring Well (Groundwater)
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999
NHMRC	National Health and Medical Research Council
NICNAS	National Industrial Chemical Notification and Assessment Scheme
NOEC	No Observed Effect Concentration
NTP	National Toxicology Program
OECD	Organisation for Economic Co-operation and Development
OH&S	Occupational Health and Safety
OSHA	Occupational Safety & Health Administration (USA)
OTEK	OTEK Australia Pty Ltd
PAHs	Polyaromatic Hydrocarbons
PEL	Permissible Exposure Level
PHC	Petroleum Hydrocarbon
PID	Photo-ionisation Detector
PNEC	Predicted No Effect Concentration
PSH	Phase Separated Hydrocarbon
PUMS	Premium Unleaded Motor Spirit

PTI DL RELEASE - EHP

Release

Acronym	Definition
RAP	Remediation Action Plan
RfC	Reference Concentration
RfD	Reference Dose
RME	Reasonable Maximum Exposure
RP	Registered Plan
RBSL	Risk-based Screening Level
SADME	South Australian Department of Mines and Energy
SAHC	South Australian Health Commission
SAP	Sampling and Analysis Plan
SIL	Soil Investigation Level (*EIL, HIL or guideline*)
SMP	Site Management Plan
SP	Survey Plan
SQL	Soil Quality Level (CCME, 2008)
SSTL	Site Specific Target Level
SVE	Soil Vapour Extraction
TDI	Tolerable Daily Intake
TDS	Total Dissolved Solids
TEA	Tank Excavation and Assessment
TGA	Therapeutic Goods Administration
TPH	Total Petroleum Hydrocarbons
TPW	Tank Pit Well, also referred to as TPMW Tank Pit Monitoring Well
TPHCWG	Total Petroleum Hydrocarbon Criteria Working Group
TRV	Toxicity Reference Value
TWA	Time Weighted Average
UMS	Unleaded Motor Spirit
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
WAF	Water Available Fraction (=WSF)
WHO	World Health Organisation
WSF	Water Soluble Fraction (=WAF)
VOCs	Volatile Organic Compounds
QSAR	Quantitative Structure Activity Relationship

RTI DL RELEASE - EHP

Executive Summary

OTEK Australia Pty Ltd (OTEK) was engaged by Mobil Oil Australia Pty Ltd (Mobil) to revise existing Site-Specific Target Levels (SSTLs) so they are suitable as on-site remediation end-points for hydrocarbon impacted groundwater sourced from the Neumann's Matilda Blue Maroochydore Service Station (QL3815) located at 116-118 Sugar Road, Maroochydore, Queensland (the site) (Figure 1).

The site is currently listed on the Department of Environment and Resource Management (DERM), Contaminated Land Register (CLR). In addition, the neighbouring properties to the north (Stegbar on Lot 7 on Plan RP848505) and to the west (Pacific Ford Lot 2 on Plan RP176929) are listed on the DERM Environmental Management Register (EMR).

A risk assessment – Coffey (2010) *Human Health and Ecological Risk Assessment* – has previously been prepared for the site. The Coffey (2010) report has been reviewed by the Third Party Reviewer and the SSTLs within the report have been endorsed.

The objectives of this risk assessment were to:

- Assess the on- and off-site risks to humans and the environment from exposure to hydrocarbon impacted groundwater originating from the site;
- Develop remediation end points for the site to enable the site listing to be transferred from the DERM CLR to the DERM EMR; and
- Develop remediation goals for the off-site properties (Stegbar and Pacific Ford) to be removed from the EMR, using HSL-A residential with garden (slab on grade and basement scenarios).

The potential threshold and non-threshold risks, as presented in Coffey (2010), were reviewed. The report indicated that at September 2008 groundwater concentrations at the site, which were significantly higher than present levels, did not pose a potentially unacceptable risk to on- and off-site site workers or intrusive maintenance trench workers. This conclusion was inferred to be the same for the current on-site scenario. As the site did not present an unacceptable risk to site workers or on-site intrusive maintenance trench workers the site was considered suitable for continued petroleum use based on the following assumptions:

- The site will continue to be used as a service station;
- No changes are made to the layout and configuration of the existing site infrastructure (buildings, canopy etc.);
- The integrity of the concrete surface is maintained during operation of the site as a service station;
- Standard service station operating protocols are maintained; and
- Appropriate health and safety procedures (including PPE) are implemented during intrusive works at the site, including excavation of pits and trenches, and include the use of vapour monitoring during works.

For receptors where an unacceptable risk was identified by Coffey (2010), ie; potential future residents (living in houses with and without basements) off-site workers (if the off-site areas were redeveloped with basements) and construction workers, a re-evaluation was undertaken using recent (June 2011) groundwater analytical data. The current re-assessment was conducted as Otek installed a multi-phase extraction (MPE) system in October 2009. As such, the conclusions drawn by Coffey (2010) were considered to be invalidated as conditions had changed.

RTI DL RELEASE - EHP

Release

The results from the assessment indicated that a potentially unacceptable risk may exist for slab on grade residents as the HI (1.1) and ILCR (1.1E-05) were marginally above their respective acceptable values of 1.0 and 1.0E-05. The results for the basement scenario incorporating seepage and cumulative exposure in a basement and first floor resulted in Hi of 0.4, which is acceptable and an ILCR of1.5E-05, which was marginally above the acceptable value of 1.0E-05. The re-calculated SSTLs based on the ILCR results are:

COPC	Current Concentration (mg/L)	SSTL
Benzene	0.644	0.43
TPH C_{10}-C_{14} (aliphatic)	0.38	0.35

The concentrations of all other COPC (toluene, ethylbenzene, xylenes, naphthalene, TPH C_6-C_9 and TPH C_{10}-C_{14} aromatic) did not significantly influence the HI values and as such there was no requirement to re-evaluate their concentrations from those used in the assessment.

Fate and transport modelling indicated the hydrocarbon plume, as of September 2008, would not migrate beyond 100m from the site and would therefore not reach ecological receptors located approximately 500m from the site. The conclusion was also deemed suitable for the current scenario.

In order to remove the adjoining properties from the EMR, the sites must attain unrestricted use. Therefore the criteria used to assess the sites was determined to be HIL-A residential with garden. This was assessed as slab on grade and basement scenarios. The assessment is hypothetical, as the properties are currently zoned as commercial.

It is considered that once groundwater concentrations at the site are below the SSTLs presented in the table above, the site will be suitable for transferal from the DERM CLR to the DERM EMR and the off-site areas will be suitable for removal from the EMR.

RTI DL RELEASE - EHP

Release

1 Introduction

OTEK Australia Pty Ltd (OTEK) was engaged by Mobil Oil Australia Pty Ltd (Mobil) to revise existing Site-Specific Target Levels (SSTLs) so they are suitable as on-site remediation end-points for hydrocarbon impacted groundwater sourced from the Neumann's Matilda Blue Maroochydore Service Station (QL3815) located at 116-118 Sugar Road, Maroochydore, Queensland (the site) (Figure 1).

The site is currently listed on the Department Of Environment and Resource Management (DERM), Contaminated Land Register (CLR). In addition, the neighbouring properties to the north (Stegbar on Lot 7 on Plan RP848505) and to the west (Pacific Ford Lot 2 on Plan RP176929) are listed on the DERM Environmental Management Register (EMR).

A risk assessment – Coffey (2010) *Human Health and Ecological Risk Assessment* – has previously been prepared for the site. The Coffey (2010) report has been reviewed by the Third Party Reviewer and the SSTLs within the report have been endorsed.

RTI DL RELEASE - EHP

2 Objectives

The objectives of this risk assessment were to:

- Assess the on- and off-site risks to humans and the environment from exposure to hydrocarbon impacted groundwater originating from the site; and
- Develop remediation end points for the site to enable the site listing to be transferred from the DERM CLR to the DERM EMR; and
- Develop remediation goals for the off-site properties (Stegbar and Pacific Ford) to be removed from the EMR.

A SSTL is the concentration of a Contaminant of Potential Concern (COPC) in an environmental medium (e.g. soils, groundwater) that does not pose an unacceptable level of risk to a receptor under specified assumptions of exposure to that medium.

3 Scope of Work

The scope of work was undertaken in accordance with enHealth (2004) and NEPC (1999) recommendations and involved the following:

- Review the potential human health and ecological risks posed from petroleum impacted groundwater identified beneath the site and beneath down-gradient off-site areas;
- Review risk-based Site Specific Target Levels (SSTLs) for groundwater that are protective of on- and off-site human health and ecological receptors (Stegbar and Pacific Ford);
- Re-evaluate the HI and ILCR results using recent groundwater data, and

Use the maximum reported recent groundwater data from on-site and off-site to develop SSTLs, with the objective of enabling the adjoining off-site properties (Pacific Ford and Stegbar) to be removed from the EMR.

4 Site Description

A concrete surface covers the majority of the site with the exception of several small grassed areas immediately to the north and east of the salesroom and along the properties eastern and southern boundaries adjacent to the footpath and road reserve (refer to Figure 2). Site infrastructure comprises a sales building, a mechanic garage, five Underground Storage Tanks (USTs, see Table 4.8.1), associated underground piping and fill points, six fuel dispensing units and a Triple Interceptor Trap (TIT).

Table 4.1: Summary of Site Description Details

Facility Name	Neumann's Matilda Blue Maroochydore Service Station (Former Mobil Service Station)
Mobil Site Number	QL3815
Address	116-118 Sugar Road, Maroochydore, Queensland
Lot and Deposited Plan	Lots 1 on Plan RP176929
Site Operator	Neumann's Matilda Blue Maroochydore Service Station
Site Use	Petroleum Service Station
Zoning	Business and Industry (Maroochy Plan 2000)
Site Area	Approximately 2,133 m^2

RTI DL RELEASE - EHP

4.1 Surrounding Land Uses

The land uses adjoining the service station are summarised in Table 4.1.1 below. The site is currently within a commercial zone and is covered with concrete except for grass and gardens situated along the site boundaries (refer Figure 2).

Table 4.1.1: Surrounding Land Uses

Direction (Relative to site)	Surrounding Site Use (Nature of Activity)
North-east	Sugar Road; with residential properties beyond
North-west	Adjacent site; various commercial properties (Stegbar)
East	Sugar Road; with various commercial property beyond
South	Sugar Road; with various commercial property beyond
South-west	Adjacent site; with various commercial properties (120 Sugar Road, Pacific Ford)
West	Adjacent site; with various commercial (Pacific Ford)

The closest surface water body is a small lagoon located approximately 500m to the north-west of the site.

4.2 Local Geology and Soil Lithology

According to the Department of Mine and Energy's Interactive Resource and Tenure Maps, the site is located on Quaternary alluvial and colluvial deposits consisting of floodplain alluvium. The likely formation underlying the Quaternary alluvium is the Triassic aged Landsborough Sandstone consisting of lithofeldspathic labile and quartzose sandstone, siltstone, shale and minor coal (OTEK, 2009).

Based on the Queensland Department of Mines (1986), Groundwater Resources of Queensland, Mines Department Series: Map 4 (1:2,500,000), groundwater in the region is typically of moderate salinity (Total Dissolved Ions 500mg/L – 1500mg/L) and low bore yield (<5L/sec).

RTI DL RELEASE - EHP

Release

4.3 Site Specific Geology

The sub-surface soil lithology at the site is described in the Table 4.3.1 below (IT Environmental 2007; as cited by Coffey 2010).

Table 4.3.1: General On-Site Soil Lithology

Depth (mBGS)	Lithology
0.0 – 0.2	Surface covering: Concrete
0.2 – 0.5	Gravelly sandy clay: medium plasticity, brown, soft, coarse gravel
0.5 – 1.0	Sandy clay: high plasticity, red/white mottling, firm, dry
1.0 – 2.0	Clay: high plasticity, red/white or orange mottled, soft, moist
2.0 – 2.7	Sandy clay: high plasticity, grey, soft, moist
2.7 – 5.0 (extent of investigation	Clay: high plasticity, black/grey, soft, saturated

4.4 Hydrogeology

Site-specific observations of the localised groundwater from the OTEK January 2011 Groundwater Monitoring Event (GME) are summarised in Table 4.4.1 below.

RTI DL RELEASE - EHP

Table 4.4.1: Site Specific Hydrogeology

Parameter	Comments
Depth to Groundwater	Groundwater gauging at the site indicated a depth to water ranging from 0.385 metres to TOC at Monitoring Well MW-1 to 2.852 metres to TOC at Monitoring Well MW-25. All elevations measurements are relative to Australian Height Datum (AHD) and range between 1.207 to 5.453mAHD
PSH	No PSH was observed at the Site during the January 2011 GME. PSH was last recorded at the Site in January 2010 in Monitoring Well MW-1, which showed a straw coloured layer of PSH approximately 1mm in thickness
Flow Direction	The groundwater flow direction is generally towards the south westerly to westerly direction across the site.
Water Bearing Unit	As reported by Coffey (2010) groundwater at the Site is encountered within the clay and sandy clay lithologies.
Groundwater Gradient	The hydraulic gradient of the aquifer is estimated to be 0.042 m/m
Hydraulic Conductivity	The hydraulic conductivity (K) of the aquifer was estimated at between 0.232 and 0.689 m/day based on data obtained from the Coffey Environments February/March 2009 groundwater monitoring data (Coffey Environments 2009; as cited by OTEK, 2009)
Porosity	An estimated effective porosity value of 0.10 is assumed (Coffey 2010)
Groundwater Velocity	Using the measured and estimated values (above) the maximum rate of groundwater flow was estimated to be approximately 9 metres per year
Potential groundwater discharge zones	As reported by Coffey (2010), Stormwater drains surrounding the site flow into a gully located approximately 250m to the south of the site, which discharges into a downstream lagoon located approximately 500m to the south-west of the site.
Potential Beneficial Uses of Groundwater	As reported in Coffey (2010), TDS at the site ranges between 100-1500mg/L, which is a suitable range for domestic, recreational and potable use. The potential for this shallow groundwater to be used as potable water, however, has not been considered further as a reticulated water supply exists at the site and groundwater is not present in sufficient volume for extraction for beneficial uses.

RTI DL RELEASE - EHP

Release

4.5 Registered Groundwater Bores

A groundwater bore search undertaken by OTEK in December 2011 indicated that no registered groundwater bores are located with 1km of the Site. One sub-artesian bore, #14100071 was located approximately 900m to the north east of the Site but has been abandoned. As reported by Coffey (2010, citing Coffey 2009), it was also noted that the area in not within a proclaimed water use area, and therefore groundwater bores are not required to be registered.

4.6 Topography and Drainage

The elevation of the site is approximately 10 mAHD (Google Earth). The regional topography surrounding the site is moderately sloped to the south and west. As reported by Coffey (2010), stormwater drains surrounding the site flow into a gully located approximately 250m to the south of the site, which discharges into a downstream lagoon located approximately 500m to the south-west of the site.

4.7 Local Climate and Rainfall

Climate data from the Bureau of Meteorology at the closest weather station to the site, Sunshine Coast Airport, (located 8 km from the site) indicates:

- Mean rainfall at the site is 57.2 (September) to 178.7 (January) mm/month;
- Mean annual rainfall is 1434.0 mm/year;
- Mean 3 PM wind speed is between 18.2 km/h and 24.5 km/h; and
- Mean temperature is between 15.9°C and 27.1°C.

4.8 On-Site Fuel/Chemical Storage Facilities

On-site fuel system infrastructure is summarized below in Table 4.8.1 and shown on Figure 2. Other on-site facilities include six fuel bowsers and a TIT.

Table 4.8.1: Details of Fuel Infrastructure

Identification	Capacity & Product	Construction / Date Installed
T1	45 kL PULP	Unknown
T2	44 kL PULP (abandoned)	Unknown
T3	44 kL ULP	Unknown
T4	44 kL ULP	Unknown
T5	44 kl ADO	Unknown

Note: Tank information from Groundwater Monitoring Event and System Performance Report (OTEK, 2010)
ADO – Automotive Diesel Oil
PULP – Premium Unleaded Petrol
ULP – Unleaded Petrol

RTI DL RELEASE - EHP

5 Data Collection and Evaluation

5.1 Summary of Groundwater Concentrations

The most recent groundwater sampling at the site occurred in June 2011. Sampling of select monitoring wells was also undertaken in March and April 2011. Historical results (Table 4) indicate that groundwater concentrations, whilst exhibiting a small level of fluctuation, are generally decreasing. The minor observed fluctuations are potentially linked to changes in groundwater levels and the heterogeneity of the subsurface. The concentrations of COPC in groundwater have decreased following the implementation of multi-phase extraction (MPE) system by Otek in October 2009. The use of the MPE system has extracted over 4400kg of hydrocarbons up to January 2011. As such, data used by Coffey (2010) to develop SSTL's are not considered to represent existing on-site or off-site conditions and therefore a re-evaluation of the risks and subsequent SSTL values has been undertaken using the most recent (June 2011) data collected by Otek.

5.1.1 Soil COPC Concentrations

Off-site soil characterisation was undertaken by Otek in 2010 as part of monitoring well installation. The analysis of soil samples for BTEX, TPH and PAH reported all concentrations below analytical detection limits.

5.1.2 On-Site Maximum Groundwater Concentrations

The maximum concentrations from on-site monitoring wells collected during the June 2011 GME have been used as the basis for assessing the on-site scenarios. The maximum reported concentrations from the June 2011 GME are presented in Table 5.1.1 with comparative results from September 2008 used in the Coffey (2010) Health Risk Assessment

RTI DL RELEASE - EHP

Release

Table 5.1.1: Maximum On-Site Groundwater Concentrations

Analyte	Maximum Reported Concentration (mg/L)	Monitoring Well	Maximum Reported Concentration (mg/L) Sept 2008[1]	Monitoring Well
Benzene (C_6)	1.93	MW-25	9.46	MW-25
Toluene (C_7)	3.88	MW-2	6.31	MW-25
Ethylbenzene (C_8)	0.842	MW-2	0.876	MW2
Xylenes (C_8)	5.71	MW-2	4.01	MW-25
Naphthalene (C_{10})	0.089	MW-25	0.859	MW-25
TPH C_6-C_9	12.40	MW-2	20.00	MW-25
TPH C_{10}-C_{14}	3.22	MW-25	5.65	MW-25
TPH C_{15}-C_{28}	1.42	MW-25	3.50	MW-25
TPH C_{29}-C_{36}	0.140	MW-24	0.380	MW-25
1,2-dichloroethane		MW-18	0.020[2]	MW-25

Notes: 1. Coffey (2010) Health Risk Assessment
2. Concentration from September 2008 GME and represents the highest recorded concentration of this analyte.

The results from June 2011 indicate that the maximum concentrations for toluene, xylenes, and TPH C_6-C_9, are now present in MW2, whereas the maximum reported concentrations for these COPC were historically found in MW25. MW2 is located on the eastern side of the site, near the verge of Sugar Road. This monitoring well is not part of the MPE system.

5.1.3 Maximum Off-Site Groundwater Concentrations

The maximum off-site groundwater concentrations were reported from MW-13, which has historically reported the highest concentrations for the COPC. The maximum reported results from June 2011 are presented in Table 5.1.2 with comparative results from September 2008 used in the Coffey (2010) Health Risk Assessment.

RTI DL RELEASE - EHP

Table 5.1.2: Maximum Off-Site Groundwater Concentrations

Analyte	Maximum Reported Concentration (mg/L)	Monitoring Well	Maximum Concentration (mg/L) Sept 2008[1]	Monitoring Well
Benzene (C_6)	0.644	MW18	12.40	MW13
Toluene (C_7)	0.842	MW13	25.40	MW13
Ethylbenzene (C_8)	0.160	MW13	1.28	MW13
Xylenes (C_8)	3.530	MW13	14.07	MW13
Naphthalene (C_{10})	0.073	MW13	0.302	MW13
TPH C_6-C_9	5 880	MW13	58.00	MW13
TPH C_6-C_9 (-BTEX)	1.110	MW13	4.85	MW13
TPH C_{10}-C_{14}	3.060	MW13	79.40	MW13
TPH C_{15}-C_{28}	0.750	MW18	11.40	MW13
TPH C_{29}-C_{36}	0.300	MW31	0.730	MW13

The results for off-site monitoring wells indicate that marked reductions in the concentration of COPCs has occurred since September 2008.

5.1.4 TPH Fractionation Data

TPH fractionation analysis (aliphatic and aromatic) was also conducted on several samples collected from on-site (MW1, 2, 3, 6, 8, 24, 25) and off-site (MW13, 18, 19) monitoring wells during the June 2011 GME. The maximum reported concentrations for C_{10}-C_{14}, C_{15}-C_{28} and C_{29}-C_{36} fractions are presented in Table 5.1.5.

Table 5.1.3: Maximum TPH Fractionation Data On and Off-Site (June 2011)

Analyte	On-Site		Off-Site	
	Concentration (mg/L)	Monitoring Well	Concentration (mg/L)	Monitoring Well
TPH C_{10}-C_{14} aliphatic[4]	0.20	MW1	0.380	MW13
TPH C_{15}-C_{28} aliphatic[4]	0.50	MW1	<LOR	All
TPH C_{29}-C_{36} aliphatic[4]	0.10	MW24	<LOR	All
TPH C_{10}-C_{14} aromatic	0.93	MW25	1.720	MW13
TPH C_{15}-C_{28} aromatic	<LOR	All	<LOR	All
TPH C_{29}-C_{36} aromatic	<LOR	All	<LOR	All

RTI DL RELEASE - EHP

Release

6 Site History

6.1 Previous Environmental Investigations

This section provides a synopsis of the known previous environmental investigations conducted at the site. This information has been used to identify the nature and extent of contamination at the site.

Table 6.1.1 presents a chronology of environmental investigations conducted at the site.

Table 6.1.1: Previous Environmental Investigations

Report	Company (Date Issued)	Purpose/Work Scope	Results
Post Phase 2 Environmental Assessment	IT Environmental 2005	Unknown – Report not available for review	Unknown – Report not available for review
Post Phase 2 Environmental Assessment	IT Environmental 2007	Unknown – Report not available for review	Unknown – Report not available for review
September and October 2008 Pre and Post Multi Phase Extraction Groundwater Monitoring Event and Operations & Maintenance Performance Report	Coffey Environments 2009	Unknown – Report not available for review	Unknown – Report not available for review
Groundwater Monitoring Event and Operations & Maintenance Performance Report	Coffey Environments 2009	Unknown – Report not available for review	Unknown – Report not available for review
February and March 2009 Pre and Post Multi Phase Extraction Groundwater Monitoring Event and Operations & Maintenance Report	Coffey Environments 2009	Unknown – Report not available for review	Unknown – Report not available for review

RTI DL RELEASE - EHP

Report	Company (Date Issued)	Purpose/Work Scope	Results

Health and Environmental Risk Assessment	Coffey Environments 2009	To evaluate potential impacts to human health and environment associated with the petroleum impacted groundwater currently identified onsite and offsite and, where required develop risk-based levels (remediation goals) for the investigation area.	• Based on available data and constraints of the assessment model, groundwater fate and transport modelling indicates that when the groundwater plume reaches stabilised conditions, marine ecological water quality guidelines for BTEX compounds may be exceeded up to a distance of 60m hydraulically down-gradient of the source zone
			• Given chemicals of potential concern concentrations within the groundwater plume exceed criteria established for potable and recreational use, groundwater on-site and off-site within the area of investigation may not be suitable for extractive uses
			• Based on available data, exposure assumptions and constraints of the exposure assessment model, it was considered that measured COPC concentrations in groundwater, as presented in this report, may pose an unacceptable health risk to:
			  • Potential future off-site residential occupants within a slab-on-ground residential dwellings at 120 Sugar Road where vapours emitted within the sub-surface migrate into a slab-on-ground structure,
			  • Potential future off-site residential occupants within a single level basement structure at 120 Sugar Road where vapours emitted within the sub-surface migrate into a slab-on-ground structure;
			  • Off-site maintenance workers within a sub-surface maintenance trench where workers come into direct contact with petroleum hydrocarbon impacted groundwater, and/or inhale COPC vapours emitted from impacted groundwater within the trench; and
			  • Off-site construction workers within a single level basement excavation at 120 Sugar Road where workers come into direct contact with petroleum hydrocarbon impacted groundwater, and/or inhale COPC vapours emitted from impacted groundwater within the excavation.
			• RBLs for the Site and off-site properties were subsequently developed

RTI DL RELEASE - EHP

Release

Report	Company (Date Issued)	Purpose/Work Scope	Results
Groundwater Monitoring Report and System Performance Report	OTEK 2010 (January)	To gauge and sample existing monitoring wells and assess effectiveness of remediation system	The following summarises the key results of the January 2010 GME: • Groundwater stabilised between 1.670 metres to TOC at Monitoring Well MW-1 to 2.662 metres to TOC at Monitoring Well MW-22 • PSH was recorded in Monitoring Well MW-1, which showed a straw coloured layer of PSH approximately 1mm in thickness • The flow direction of the aquifer was calculated to be flowing in a south westerly to westerly direction across the site • BTEX concentrations above criteria were detected in 11 groundwater samples • Total TPH concentrations exceeding the adopted criteria (10,000µg/L) were detected in 7 groundwater samples • Natural attenuation is occurring on the site, however, is probably unlikely to be considered to be occurring at levels which would aid in remediation of the site • The system has been operating for approximately 94.7% of the time it has been on-site. In this time the system has had the effect of dewatering the local area, creating a cone of depression around the hydrocarbon contaminated areas of the site. This has lead to the successful treatment of groundwater and vapour removed from the vadose zone. • The total calculated mass of hydrocarbons removed from the site until February 2010 was approximately 2,992kg

RTI DL RELEASE - EHP

Report	Company (Date Issued)	Purpose/Work Scope	Results
Groundwater Monitoring Report and System Performance Report	OTEK 2010 (April)	To gauge and sample existing monitoring wells and assess effectiveness of remediation system.	The following summarises the key results of the April 2010 GME: • Groundwater stabilised between 0.772 metres to TOC at Monitoring Well MW-6 to 2.122 metres to TOC at Monitoring Well MW-33 • PSH was not recorded in any monitoring well • The flow direction of the aquifer was calculated to be flowing in a south westerly to westerly direction across the site • BTEX concentrations above criteria were detected in 8 groundwater samples • Total TPH concentrations exceeding the adopted criteria (10,000µg/L) were detected in 2 groundwater samples • Natural attenuation is occurring on the site • The system has been operating for approximately 95.8% of the time it has been on-site. In this time the system has had the effect of dewatering the local area, creating a cone of depression around the hydrocarbon contaminated areas of the site. This has lead to the successful treatment of groundwater and vapour removed from the vadose zone • The total calculated mass of hydrocarbons removed from the site until April 2010 was approximately 3,429kg

RTI DL RELEASE - EHP

Report	Company (Date Issued)	Purpose/Work Scope	Results
Groundwater Monitoring Report and System Performance Report	OTEK 2010 (September)	To gauge and sample existing monitoring wells and assess effectiveness of remediation system.	The following summarises the key results of the September 2010 GME: • Groundwater stabilised between 0.912 metres to TOC at Monitoring Well MW-1 to 3.197 metres to TOC at Monitoring Well MW-25 • PSH was not recorded in any monitoring well • The flow direction of the aquifer was calculated to be flowing in a south westerly to westerly direction across the site • BTEX concentrations above criteria were detected in 6 groundwater samples • Total TPH concentrations exceeding the adopted criteria (10,000µg/L) were detected in 1 groundwater samples • Natural attenuation is occurring on the site • The system has been operating for approximately 98.8% of the time it has been on-site. In this time the system has had the effect of dewatering the local area, creating a cone of depression around the hydrocarbon contaminated areas of the site. This has lead to the successful treatment of groundwater and vapour removed from the vadose zone • The total calculated mass of hydrocarbons removed from the site until September 2010 was approximately 3,710kg

RTI DL RELEASE - EHP

Report	Company (Date Issued)	Purpose/Work Scope	Results
Draft Groundwater Monitoring Report and System Performance Report	OTEK 2011 (January)	To gauge and sample existing monitoring wells and assess effectiveness of remediation system.	The following summarises the key results of the January 2011 GME: • Groundwater gauging at the site indicated a depth to water ranging from 0.385 metres to TOC at Monitoring Well MW-1 to 2.852 metres to TOC at Monitoring Well MW-25 • PSH was not detected in all Site monitoring wells • The flow direction of the aquifer was calculated to be flowing in a south westerly to westerly direction across the site • BTEX concentrations above criteria were detected in 5 groundwater samples • Total TPH concentrations exceeding the adopted criteria (10,000µg/L) were detected in 2 groundwater samples • Natural attenuation is occurring on the site • The system has been operating for approximately 90.8% of the time it has been on-site. In this time the system has had the effect of dewatering the local area, creating a cone of depression around the hydrocarbon contaminated areas of the site. This has lead to the successful treatment of groundwater and vapour removed from the vadose zone • The total calculated mass of hydrocarbons removed from the site until January is approximately 4,401kg

RTI DL RELEASE EHP

6.2 Zoning

According to the Maroochy Plan 2000, the site is zoned Business and Industry. Uses considered appropriate in the Precinct include:

- Automotive sales, services and repairs;
- Small to medium scale service trades outlets;
- Business and commercial equipment repairs and service outlets;
- Small to medium scale tourism and industry service providers;
- Small to medium scale manufacturing establishments;
- Small to medium scale transport, storage, and distribution depots;
- Showrooms;
- Service stations;
- Some professional offices; and

- Limited convenience services including convenience stores, fast food outlets and snack bar facilities.

6.3 Previous Potential Contaminant Releases

The hydrocarbon impact at the site is assumed to have originated as a result of a leaking UST and fuel line(s) / bowser(s) which have since been replaced. The exact time of release is unknown.

6.4 Groundwater Remediation Strategy

OTEK is currently operating a semi-permanent Multi-Phase Extraction (MPE) system, which has been in operation since October 2009. The remediation strategy is being used to remove residual PSH and reduce dissolved-phase concentrations to levels that will not adversely impact human or ecological receptors. Natural attenuation will be employed to further reduce dissolved-phase concentrations once active remediation has finished.

RTI DL RELEASE - EHP

Release

7 Risk Assessment Methodology

7.1 Existing Risk Assessment

A quantitative risk assessment has been undertaken at the site by Coffey Environments – Coffey (2010) *Health and Ecological Risk Assessment*. The risk from hydrocarbons to current human receptors was reviewed within this report and SSTLs were developed for the protection of current human receptors and future receptors should areas be redeveloped. Fate and transport modelling using Bioscreen AT was also used to ensure that groundwater at current concentrations would not affect down-gradient bores and ecological receptors.

7.2 Coffey (2010) Human Risk Assessment

Potential risk to current and future workers and residents as reported in Coffey (2010) is presented in Table 7.2.1. The potential risk was modelled using maximum on- and off-site concentrations as of September 2008.

Table 7.2.1: Summary of Hazard Index and Cancer Risk Assessment (Coffey, 2010)

Receptor	Hazard Index	Cumulative Incremental Risk of Cancer
On-site Receptors		
Slab-on-grade commercial	0.16	2.21×10^{-6}
1m deep sub-surface maintenance trench	0.09	1.23×10^{-6}
Off-site Receptors		
Slab-on-grade commercial (excluding 120 Sugar Road)	0.09	1.23×10^{-6}
1m deep sub-surface maintenance trench (excluding 120 Sugar Road)	2.04	2.26×10^{-5}
1m deep sub-surface maintenance trench (120 Sugar Road)	22.11	5.42×10^{-5}
Slab-on-grade residential (120 Sugar Road)	11.5	1.11×10^{-4}
Slab-on-grade commercial (120 Sugar Road)	0.26	2.97×10^{-6}
Single level basement excavation (construction workers)	79.9	5.5×10^{-6}

RTI DL RELEASE - EHP

Release

Receptor	Hazard Index	Cumulative Incremental Risk of Cancer
Single level residential with basement carpark (passive ventilation)	6.83	5.99×10^{-5}
Single level residential with basement carpark (mechanical ventilation)	0.03	2.63×10^{-7}
Single level residential with basement cellar (passive ventilation)	5.49	1.22×10^{-4}
Single level residential with basement cellar (mechanical ventilation)	0.91	2.03×10^{-5}

Notes: 1. Shaded concentrations exceed threshold / non-threshold targets of 1.0 and $1x10^{-5}$ respectively.

The risk to site workers and intrusive maintenance workers working within a trench was considered acceptable. Considering concentrations at the site have decreased significantly since this date it is inferred that the current risk on-site will also be acceptable. No further assessment of risk to site workers has therefore been undertaken.

The risk to off-site commercial receptors and residents living in a single level residential building with a basement carpark that has mechanical ventilation was also reported to be acceptable. The risk to all other receptors exceeded either the hazard index and / or cumulative risk of cancer targets and was considered unacceptable.

7.3 Existing Site Specific Target Levels

The Coffey (2010) report including the SSTLs has been endorsed by the Third Party Reviewer. OTEK has accepted the findings from the Coffey (2010) risk assessment that used the maximum concentrations of COPC from September 2008 and therefore it is not considered necessary to re-evaluate the results for receptors where HI and ILCR were below their respective values of 1.0 and 1.0E-05.

SSTLs were developed by Coffey (2010) for receptors that exceeded hazard index and cancer risk targets are shown in Table 7.4.1. The SSTLs developed by Coffey (2010) were based on groundwater data collected and modelled without consideration of groundwater remediation. As MPE was commenced in both on-and off-site settings in October 2009, the SSTLs derived by Coffey (2010) are no longer considered valid.

RTI DL RELEASE - EHP

Table 7.4.1: Existing Site Specific Target Levels (Coffey, 2010)

Analyte	Most Conservative Coffey (2010) SSTL (at-receptor target)
Benzene	1.0
Toluene	54
Ethylbenzene	>SOL
Xylene	>SOL
Naphthalene	0.97
1,2-DCA	442
TPH C6-C9 Aliphatic	>SOL
TPH C10-C14 Aromatic	1.3
TPH C10-C14 Aliphatic	>SOL

RTI DL RELEASE - EHP

7.4 Approach to Modifying Risk-based SSTLs

Since May 2010, when the Coffey (2010) report was endorsed by the Third Party Reviewer, Health Screening Levels (HSLs) for petroleum hydrocarbons have been released and endorsed by environment agencies throughout Australia for incorporation into the revised National Environment Protection Measure (NEPM). The HSLs were developed using a target hazard quotient of 1.0 for each individual chemical but did not incorporate the potential for additive or synergistic effects, as was done by Coffey (2010).

7.5 Screening Criteria

The results from the June 2011 GME have been used as the basis for assessment of risks to off-site receptors. The results have been screened using the HSL values provided in Friebel and Naderbaum (2011), which have been developed as Tier 1 screening values. As the elevation of the water table measured in off-site wells with maximum reported COPC (MW13 and MW18) were < 2m, the HSLs for groundwater are not able to be applied. Therefore, HI and ILCR risks have been assessed through the tiered risk assessment process specified by enHealth (2004).

7.6 Hazard Identification

The results from the June GME reported the following COPC in off-site monitoring wells.

- BTEX;

Release

- TPH C6-C9, C10-C14, C15-C28; C29-C36; and
- Naphthalene.

The maximum reported concentrations of each of the COPC, provided in Table 5.1.2 and aliphatic/aromatic speciation data provided in Table 5.1.3 have been taken forward to assess the potential risks to receptors specified in Section 7.7. As hydrocarbons >EC16 are not considered to be volatile, this fraction will be assessed by dermal contact pathway only. As such the following COPC have been taken forward to the Tier 2 assessment:

- Benzene, toluene, ethylbenzene, Xylenes (total);
- TPH C6-C9 (aliphatic);
- TPH C10-C14 aliphatic and aromatic; and
- Naphthalene.

7.7 Toxicological Profiles

The selection of toxicity values adopted in this HHRA follows guidance from ANZECC/NHMRC (1992), which is in accordance with NEPC (1999) policy. The sources of toxicological data used in the risk assessment process have been selected following the priority rankings detailed by Enhealth (2004). Potential threshold effects are characterised by comparing the estimated chemical intake to the ADI or equivalent toxicity value that represents the threshold intake for adverse health effects by the specific route of exposure.

Potential non-threshold (carcinogenic) effects are the estimated incremental probabilities that an individual will develop cancer over a lifetime as a result of the estimated exposure to the COPC. When a Cancer Slope Factor (CSF) is used to evaluate health risk, it is assumed that any exposure to the chemical will, in theory, result in an increased risk or probability of developing cancer. The higher the CSF, the more potent the COPC and the greater the calculated cancer risk for a given exposure. Toxicity values adopted for the risk assessment are presented in Table 7.7.1 with toxicological profiles for Tier 2 COPC presented in Table 7.7.2.

RTI DL RELEASE - EHP

Table 7.7.1: Toxicity Values for COPC

Analyte	Inhalation Toxicity Value	Oral / Dermal Toxicity Value
Benzene	Unit Risk 6 x10^{-6} ($\mu g/m^3$)$^{-1}$ (WHO 2000) Non-threshold CSF = 0.021 (mg/kg/d)$^{-1}$ Threshold RfC = 0.03 mg/m^3 (US EPA IRIS)	Non-threshold CSF = 0.035 (mg/kg/d)$^{-1}$ (WHO 2004) RfD = 0.004 mg/kg.day
TPH C_6-C_{10} Aliphatic	RfC = 18.4 mg/m^3 (TPHCWG 1997, SAHC 1998, for n-hexane), ADI = 5.26 mg/kg.day	ADI = 5.0 mg/kg.day (TPHCWG 1997)
TPH >C_{10}-C_{12} Aliphatic	RfC = 1.0 mg/m^3 (USEPA IRIS), ADI = 0.29 mg/kg.day	ADI = 0.1 mg/kg.day (TPHCWG 1997)
TPH >C_{10}-C_{12} Aromatic	RfC = 0.2 mg/m^3 (TPHCWG 1997, a mixture of C_9-C_{16} aromatic compounds including naphthalene), ADI = 0.057 mg/kg.day	ADI = 0.04 mg/kg.day (TPHCWG 1997)

Table 7.7.2: Toxicological Profiles for Tier 2 Chemicals of Concern

Chemical	Toxicological Profile
Benzene	***Toxicokinetics:*** The primary route of benzene exposure is via inhalation, with between 30% and 50% of inhaled benzene absorbed by the lungs. The majority of ingested benzene is absorbed whereas only a small proportion of benzene is dermally absorbed (< 1%), with the remainder volatilising (WHO, 1993). ***Non-cancer Health Effects:*** Acute Effects - asphyxiation, respiratory arrest, central nervous system depression, drowsiness, dizziness, headaches, skin and eye irritation. Chronic Effects - hematotoxicity (toxicity to the blood) and reproductive abnormalities (ATSDR, 1997). ***Carcinogenicity:*** Benzene is classified benzene as a Group 1 known human carcinogen. This classification is based upon sufficient evidence in both human and animal studies (IARC, 2000).
TRH C6-C16	***Toxicokinetics:*** As the petroleum products that the largest numbers of people are likely to be exposed to are highly volatile, inhalation is the primary route of exposure. Ingestion and dermal absorption of TPH via contact with fuel, and contaminated soil and groundwater are also possible routes of exposure. Little information is available regarding the toxicokinetics of TPH mixtures with the majority of studies focusing on individual aromatic TPH components, including BTEX and PAH compounds. Absorption of aliphatic TPH fractions decreases with increasing weight (ATSDR, 1999). In the absence of evidence to the contrary 100% bioavailability via ingestion and inhalation has been assumed. ***Non-cancer Health Effects:*** Acute Effects - Generally, the body system most affected by TPH compounds is the central nervous system, other body systems affected include the blood, immune system, lungs, skin and eyes. Effects of TPH compounds include dizziness, headaches, reproduction impairment, skin disorders and irritation of the throat and stomach (ATSDR, 1999). Chronic Effects - CNS depression, skin/eye irritation, renal & hepatic effects, anaemia, neurological and respiratory effects, reproductive effects, skin and eye irritation (TPHCWG, 1997)
Naphthalene	***Toxicokinetics:*** Exposure to naphthalene typically occurs through inhalation route. Naphthalene is readily absorbed through the gastrointestinal tract, lungs and skin (ATSDR, 1997) ***Non-cancer Health Effects:*** Acute Effects – headaches, nausea, anaemia, convulsion, coma and eye irritation. Chronic Effects – cataracts, retinal haemorrhage, lung and nasal inflammation (ATSDR, 2005)

World Health Organization (WHO) (1993) *Environmental Health Criteria No 150 Benzene*. International Programme of Chemical Safety, World Health Organisation, Geneva.
Agency for Toxic Substances and Disease Registry (ATSDR) (1997) *Toxicological Profile for Benzene*. United States Department of Health and Human Services, Atlanta, Georgia, USA
International Agency for Research on Cancer (IARC) (2000) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Some Industrial Chemicals*. World Health Organisation, International Agency for Research on Cancer 77, Lyons.
Agency for Toxic Substances and Disease Registry (ATSDR) (1999) *Toxicological Profile for Total Petroleum Hydrocarbons*. US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Atlanta (Georgia), USA.
TPHCWG (Total Petroleum *Hydrocarbon* Criteria Working Group Series) (July 1997) Volume 3 – *Selection of Representative TPH Fractions Based on Fate and Transport Considerations*.

RTI DL RELEASE - EHP

Release

7.8 Receptors

The receptors considered in the risk assessment concerning potential future development of the off-site properties currently occupied by Pacific Ford and Stegbar, are:

- Residents (child, adult) in a slab on grade building and a building with basement car park/workshop; and
- Workers undertaking shallow (< 1m deep) excavations.

7.8.1 Future Residents

Residents, including adults (16-70 years), youths (aged 6-15 years) and younger children (0-5 years) are assumed to live on-site following a change of land zoning in the future scenario. Assuming a Reasonable Maximum Exposure (RME) scenario, residents are assumed to occupy the premises 365 days per year, living 20 hours indoors per day (EnHealth 2004).

Residents are unlikely to come into contact with subsurface contaminated groundwater during normal daily activities. Exposure via inhalation of petroleum vapours in indoor and outdoor air has been assessed. Exposure to bore water has not been considered due to the high EC and low yield of the aquifer and therefore lack of a beneficial use.

7.8.2 Maintenance (Trench) Workers

Excavation workers may conduct excavations on the off-site properties, such as the installation or maintenance of existing services. These work programs are unlikely to be frequent or prolonged. As groundwater is approximately 1.5-2.3 mbgl, these workers may come into direct contact with groundwater but may be exposed through inhalation of vapours within a trench.

On-site and environmental receptors have been assessed previously by Coffey (2010), who determined that no significant risk existed for on-site commercial, off-site commercial workers or those conducting excavations on-site. The HI and cancer risks were calculated using much greater concentrations than currently exist and therefore have not been considered further.

7.9 Source-Pathway-Receptor (SPR) Linkages

The receptors identified in Coffey (2010) in the off-site setting for which HI and/or ILCR were found to be unacceptable are as follows:

- 1m deep sub-surface maintenance trench (120 Sugar Road);
- Slab-on-grade residential (120 Sugar Road);
- Single level basement excavation (construction workers);
- Single level residential with basement carpark/workshop; and
- Single level residential with seepage into basement cellar and vapours to first floor.

The main pathway considered for the identified receptors is inhalation of hydrocarbon vapours derived from impacted groundwater. As a potential residential development of the site may also include a basement car-park or cellar, which would extend to a depth below the water table, seepage of groundwater into this has also been assessed. The SPR assessed in this revised HERA are shown in Table 7.9.1.

RTI DL RELEASE - EHP

Release

Table 7.9.1: Source-Pathway-Receptor (SPR) Linkages

Source	Pathway	Off-site residential	Off-site excavation (1m)	Justification
Dissolved phase (BTEX, TPH C_6-C_9, C_{10}-C_{14},naphthalene)	Inhalation of vapours (indoors)	✓	X	It is plausible that vapours from groundwater may enter a residential development
	Inhalation of vapours (outdoors)	✓	✓	It is plausible that vapours may build up in a trench
	Inhalation of vapours (indoor)	✓	X	It is possible that a future residential development includes a cellar or basement carpark/work workshop
	Incidental dermal contact/ingestion	X	X	Based on the recharge rate, water quality parameters, aesthetic values and existing reticulated water supply, it unlikely that groundwater would be extracted for use

There is a possibility for the residential scenario that groundwater may be extracted for use. This is considered unlikely for the following reasons:

- As the properties (Pacific Ford and Stegbar) are currently supplied by reticulated water it is considered unlikely that groundwater would be extracted for potable use; Based on the Queensland Department of Mines (1986), Groundwater Resources of Queensland, Mines Department Series: Map 4 (1:2,500,000), groundwater in the region is typically of moderate salinity (Total Dissolved Ions 500mg/L – 1500mg/L) and low bore yield (<5L/sec). This water is suitable for most purposes, but marginal for human consumption;
- Recharge in a number of wells on the Pacific Ford and Stegbar sites was extremely slow following purging prior to sampling, indicating that yield from the shallow aquifer would be low; and
- Aesthetic considerations of groundwater quality indicated that groundwater from wells on the Pacific Ford and Stegbar properties are generally cloudy and vary in colour from light grey to dark grey with H2S odour also been identified in a number of off-site wells on the Pacific Ford and Stegbar properties. As such, it is considered unlikely that groundwater will be used and therefore this pathway is considered incomplete and will not be assessed further.

RTI DL RELEASE - EHP

Release

8 Risk Characterisation

In the quantitative risk characterisation process, the results of the human health exposure assessment and hazard assessment sections have been combined to provide numerical estimates of the potential risks to the identified receptors using maximum reported groundwater concentrations for the COPC exceeding the Tier 1 screening criteria. Risk characterisation was conducted for on-site future residents in a slab on grade building with and without a basement and off-site commercial workers in slab on grade building.

The algorithms used in the derivation of HQ, HI and ILCR values for the on-site and off-site receptors are provided in *Annex A*. The model input data are presented in *Annex B* and the output data is presented in *Annex C*.

8.1 Non-Threshold (Cancer) Risk

Cancer risk (non-threshold risk) is based on an incremental lifetime cancer risk associated with site contamination. Risks associated with carcinogenic contaminants have been characterised by an Increased Lifetime Risk of Cancer (ILCR). For this assessment, an acceptable level of risk is defined as a risk of less than $1x10^{-5}$ for all receptors in the current risk assessment. This value has been adopted by most regulatory agencies across Australia except WA, which applies a value of $1.0x10^{-5}$.

8.2 Threshold (Non-Cancer) Risk

Threshold risks can be assessed by direct comparison of an Exposure Concentration (EC) in air with a Reference Concentration (RfC) or Chronic Daily Intake (CDI) with the Acceptable Daily Intake (ADI). For assessment of inhalation of vapours (comprising inhalation of vapours in indoor and outdoor air and inhalation of dust particles) NEPM (2011) recommends quantifying intakes or exposures via inhalation on the basis of an intake (US EPA 1989) or an exposure concentration (US EPA 2009).

Risks associated with non-carcinogenic (threshold) contaminants have been characterised by Hazard Quotients (HQs) and the HQs for multiple exposure pathways and a combination of chemicals have been summed to calculate an overall risk level, or Hazard Index (HI). When a HI is above 1.0, it does not imply that risks are unacceptable but rather further assessment is required to refine the risk, including further site specific data and refinement of input parameters.

8.2.1 Residential Slab on Grade

The results from the assessment of risks for potential future residents in a slab on grade building for the indoor and outdoor scenarios are presented in Table 8.2.1.

PTI DL RELEASE - EHP

Release

Table 8.2.1: Hazard Index for Residents – Slab on Grade

COPC	HQ (Indoor)	HQ (Outdoor)
Benzene	1.8E-01	2.4E-05
Toluene	2.7E-02	3.4E-06
Ethylbenzene	5.8E-05	7.4E-09
Xylenes	3.6E-02	4.6E-06
Naphthalene	7.5E-02	1.2E-05
TRH C6-C9 (- BTEX)	4.6E-02	5.9E-06
TRH >C10-C14 (aliphatic)	7.0E-01	8.5E-05
TRH >C10-C14 (Aromatic)	6.3E-02	8.4E-06
Sum HQ	**1.1E+00**	**1.5E-04**
Hazard Index	**1.1E+00**	
Hazard Index (HI) value of 1.0 acceptable		

The results for slab on grade determined a HI value of 1.1E+00, slightly above the acceptable value of 1.0, with the main drivers being TPH C_{10}-C_{14} (aliphatic) with HQ of 7.0E-01 and benzene, with HQ of 1.8E-01. These two COPC contribute 8.8E-01 to the overall HI of 1.1E+00.Although the individual COPC do not exceed the HI of 1.0, the cumulative HI of 1.1 suggests that there may be a requirement for further reduction in the concentration of COPC, particular the two risk drivers, in order to ensure that the risks for any future residential use of the site is acceptable.

8.3 Residential: Basement

An assessment of potential risk for future residents was determined for a building with a basement carpark or cellar/workshop and was also determined for seepage of groundwater into the basement. The calculated HI for groundwater seepage also included the assessment of risk to occupants of the residence above the basement for the remainder of the daily exposure setting. The results for these scenarios in presented in Table 8 3.1.

RTI DL RELEASE - EHP

Release

Table 8.3.1: Hazard Index for Basement and Groundwater Seepage

COPC	Basement		
	Indoor	Seepage (Basement)	Seepage (first floor)
Benzene	1.4E-02	7.2E-02	1.4E-01
Toluene	2.0E-03	5.0E-04	1.0E-03
Ethylbenzene	4.4E-06	3.0E-04	7.0E-04
Xylenes	2.7E-03	1.2E-02	2.3E-02
Naphthalene	5.4E-03	2.1E-02	4.8E-01
TRH C6-C9 (- BTEX)	3.5E-03	2.0E-04	5.0E-04
TRH >C10-C14 (aliphatic)	5.3E-02	1.1E-03	2.1E-03
TRH >C10-C14 (Aromatic)	4.7E-03	2.6E-02	5.1E-02
Sum HQ	**8.5E-02**	**1.4E-01**	**2.7E-01**
Hazard Index (HI)	**8.5E-02**	**4.1E-01**	
Hazard Index (HI) value of 1.0 acceptable			

RTI DL RELEASE - EHP

The results for the hazard index (HI) shown in Table 8.4.1 indicate that the risk posed to future residents with a basement carpark is not significant, being below the acceptable value of 1.0. The result of HI (4.1E-01) associated with possible groundwater seepage into the basement and subsequent volatilisation of hydrocarbons does not represent a significant risk.

8.4 Shallow Excavations (1m trench)

The potential exists for shallow excavations to be undertaken within the off-site properties (Pacific Ford and Stegbar) as part of any future redevelopment. Therefore risks to workers who may undertake such works has been assessed. The results are presented in Table 8.4.1.

Release

Table 8.4.1: Hazard Index (HI) for Shallow (1m) Trench Excavation Worker

COPC	HQ (Outdoor)
Benzene	1.3E-04
Toluene	1.9E-05
Ethylbenzene	4.1E-08
Xylenes	2.6E-05
Naphthalene	7.2E-05
TRH C6-C9 (- BTEX)	3.2E-05
TRH >C10-C14 (aliphatic)	4.8E-04
TRH >C10-C14 (Aromatic)	7.7E-05
Sum HQ	**8.4E-04**
Hazard Index (HI)	**8.4E-04**

The calculated HI indicates that the risk posed to a worker undertaking shallow (1m) excavation is not significant, with a HI of 8.4E-04.

8.5 Increased Lifetime Cancer Risk (ILCR)

The ILCR was determined for benzene, the only non-threshold COPC. The results for each of the scenarios presented above are presented in Table 8.5.1 and Table 8.5.2, respectively whilst the ILCR for a worker excavating a shallow trench is presented in Table 8.5.3.

Table 8.5.1: Increased Lifetime Cancer Risk (ILCR) Future Residents – Slab on Grade

COPC	ILCR Indoor	ILCR Outdoor	ILCR total
Benzene	1.1E-05	1.4E-09	1.1E-05

Table 8.5.2: Increased Lifetime Cancer Risk – Standard Basement and Seepage into Basement

COPC	Basement	Basement Seepage	Seepage (first floor0	Total ILCR (basement + first floor)
Benzene	**8.6E-07**	**5.01E-06**	**9.77E-06**	**1.48E-05**

Table 8.5.3: ILCR for Worker Excavating Shallow (1m) Trench

COPC	ILCR
Benzene	3.0E-10

RTI DL RELEASE - EHP

The result for the seepage into basement (+ first floor)were both less than 1,0E-05 for the individual exposures but the cumulative value of 1.5E-05 was above the acceptable value of 1.0E-05, indicating that the seepage and volatilisatpoin of hydrocarbons into the basement may represent an unacceptable increased cancer risk. As such, there is a requirement to derive SSTLs, based on the results for hazard index for slab on grade (indoors), basement and seepage into the basement in order to ensure protection of human health.

The calculated ILCR for worker in a shallow trench of 3.0E-10 indicates that the risk is not significant.

8.6 Site Specific Target Levels (SSTLs)

Based on the results from the assessment of HI and ILCR, there is a potential for an unacceptable risk to exist for a future residential use of the Pacific Ford and Stegbar sites. Therefore, there is a requirement to develop SSTLs in order to remediate the sites to an unrestricted land use ie: HSL-A resident with garden. The results from the HI and ILCR indicated that the scenario exhibiting the highest results was for basement scenario, with TPH C_{10-14} (aliphatic) and benzene being identified as the main risk drivers. Therefore SSTLs have been derived for these chemicals of concern. The SSTLs for these COPC and the remaining COPC, are presented in Table 8.7.1.

RTI DL RELEASE - EHP

Table 8.6.1: SSTLs for Off-Site (Pacific Ford and Stegbar) Sites

COPC	Current Groundwater Concentrations (June 2011) mg/L	Derived SSTLs (mg/L)
Benzene	0.544	**0,43**
Toluene	0.842	20
Ethylbenzene	0.160	1730
Xylenes	3.53	63
Naphthalene	0.073	0.66
TPH C6-C9 (-BTEX)	1.11	15
TPH C10-C14 aliphatic	0.38	**0.35**
TPH C10-C14 aromatic	1.72	18
Hazard Index (HI)	**1.1E+00**	**1.0E+00**
ILCR	**1.5E-05**	**9.9E-06**

8.7 Coffey (2010) Ecological Risk Assessment

The Coffey (2010) report indicated that at 2008 concentrations, which were significantly higher than current concentrations, the plume was predicted to not reach nearby ecological receptors. The potential temporal migration of hydrocarbons within groundwater was assessed in the Coffey (2010) report using reportedly calibrated Bioscreen AT models for each individual BTEX. BTEX were chosen as representative chemicals of the plume due to their increased mobility compared to heavier hydrocarbons. A conservative estimate of the distance all BTEX within the plume will migrate will therefore be represented by these models.

It was concluded in the Coffey (2010) report that based on the maximum plume migration distance the plume would not migrate to the closest ecological receptors; namely a lagoon located approximately 500m from the site. Based on this interpretation and considering the Third Party Reviewer has endorsed the Coffey (2010) report, no further assessment of migration of the plume to ecological receptors was undertaken.

RTI DL RELEASE - EHP

Release

9 Conclusions

OTEK has assessed the on- and off-site risks to humans and the environment from exposure to hydrocarbon impacted groundwater originating from the site and revised existing SSTLs so they are suitable as on-site remediation end-points. The site is currently listed on the Department Of Environment and Resource Management (DERM), Contaminated Land Register (CLR). In addition, the neighbouring properties to the north (Stegbar on Lot 7 on Plan RP848505) and to the west (Pacific Ford Lot 2 on Plan RP176929) are listed on the DERM Environmental Management Register (EMR).

The potential threshold and non-threshold risks, as presented in Coffey (2010), were reviewed. The report indicated that at September 2008 groundwater concentrations at the site, which were significantly higher than present levels, did not pose a potentially unacceptable risk to on- and off-site site workers or intrusive maintenance trench workers. This conclusion was inferred to be the same for the current on-site scenario. As the site did not present an unacceptable risk to site workers or on-site intrusive maintenance trench workers the site was considered suitable for continued petroleum use based on the following assumptions:

- The site will continue to be used as a service station;
- No changes are made to the layout and configuration of the existing site infrastructure (buildings, canopy etc.);
- The integrity of the concrete surface is maintained during operation of the site as a service station;
- Standard service station operating protocols are maintained; and
- Appropriate health and safety procedures (including PPE) are implemented during intrusive works at the site, including excavation of pits and trenches, and include the use of vapour monitoring during works.

RTI DL RELEASE - EHP

For receptors where an unacceptable risk was identified by Coffey (2010), ie; potential future residents (living in houses with and without basements), off-site workers (if the off-site areas were redeveloped with basements), and construction workers, a re-evaluation was undertaken using recent (June 2011) groundwater analytical data. Otek installed a multi-phase extraction (MPE) system in October 2009 and as such, the conclusions drawn by Coffey (2010) were considered to be invalidated as conditions had changed.

A re-evaluation and calculation of Hazard Index (HI) and increased lifetime cancer risk (ILCR) were determined for a residential development on the Pacific Ford and Stegbar properties with the goal of determining SSTLs to enable the sites to be removed from the Environmental Management Register (EMR). The assessment considered a residential property as slab on grade and with a basement, as well as for worker undertaking excavation of shallow (1m) trench. The main exposure pathway for these setting was inhalation of hydrocarbon vapours derived from groundwater. As well, seepage into a basement with subsequent inhalation of vapours within the basement and overlying residence was also determined.

The results from the assessment indicated that a potentially unacceptable risk may exist for slab on grade residents as the HI of 1.1 was marginally above the acceptable value of 1.0. The result for the basement scenario incorporating seepage and exposure in the first floor was below the acceptable HI but marginally above the acceptable ILCR, with a result of 1.5E-05. The re-calculated SSTLs, based on the HI and ILCR results are shown in table below:

Table 9.1: Re-calculated SSTLs, based on the HI and ILCR results

COPC	Current Concentration (mg/L)	SSTL (mg/L)
Benzene	**0.644**	**0.43**
Toluene	0.842	20
Ethylbenzene	0.160	1730
Xylenes	3.53	63
Naphthalene	0.073	0.66
TPH C6-C9 (-BTEX)	1.11	15
TPH C10-C14 aliphatic	0.38	0.35
TPH C10-C14 aromatic	1.72	18

The concentrations of all other COPC (toluene, ethylbenzene, xylenes, naphthalene, TPH C_6-C_9 and TPH C_{10}-C_{14} aromatic) did not significantly influence the HI values and as such there was no requirement to re-evaluate their concentrations from those used in the assessment. This is shown in the calculated SSTLs for each of these chemicals

Fate and transport modelling indicated the hydrocarbon plume, as of September 2008, would not migrate beyond 100m from the site and would therefore not reach ecological receptors located approximately 500m from the site. The conclusion was also deemed suitable for the current scenario.

It is considered that once groundwater concentrations at the site are below the SSTLs presented in the table above, the site will be suitable for transferal from the DERM CLR to the DERM EMR and the off-site areas will be suitable for removal from the EMR.

RTI DL RELEASE - EHP

10 Limitations

(a) The conclusions presented in this report are relevant to the conditions of the site and the state of legislation currently enacted as at the date of this report. We do not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.

(b) OTEK has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality. Conclusions are based on representative samples or locations at the site, the intensity of those samples being in accordance with the usual levels of testing carried out for this type of investigation. Due to the inherent variability in natural soils we cannot warrant that the whole overall condition of the site is identical or substantially similar to the representative samples.

(c) This report has been prepared for Mobil Oil Australia Pty Ltd and for the specific purpose to which it refers.

(i) Mobil means:

(A) Mobil Oil Australia Pty Ltd ABN 88 004 052 984; or
(B) an Affiliate of Mobil.

(ii) an Affiliate means:

(A) a corporation owned beneficially or otherwise as to 50% of the voting shares by Mobil; or
(B) a related body corporate of Mobil or an Affiliate, provided that the term 'related body corporate' has the meaning ascribed in section 50 of the Corporations Act 2001 (Cth).

(d) This report has been provided by OTEK subject to the limitation in (a) & (b) as stated above, for the benefit of Mobil and

(i) the purchaser from Mobil (but not that purchaser's successor in title) where a site is owned by Mobil; and
(ii) the third party owner or assignee from Mobil (as the case may be) but not their respective successors in title where a site is/was leased by Mobil.

(e) Subject as is otherwise provided this report and the information contained in it is the intellectual property of OTEK.

(f) Any duly authorised and competent regulating authority or governmental body whether local, state or federal may rely upon the contents of this report subject to limitation in (a) & (b) as stated above for the purpose of reviewing and evaluating its contents.

RTI DL RELEASE - EHP

O'Connor Gary

From: O'Connor Gary
Sent: 30 May 2012 4:35 PM
To: 'Adam Breen'; Cifuentes, Luis /C; Mack Dreyer; Brendan Ebzery; AHunt@kleinfelder.com
Cc: Marc Andrews
Subject: RE: Mobil Sugar Road Maroochydore

Hi all

Thanks for the overview of the works being conducted at the site. To confirm our discussions of the actions and timeframes:

1. Surfactant injection 30/5/12
2. Supply TPR with revised surfactant injection plan - 8/6/2012
3. MPE system operation for 3 months from early June 2012
4. Risk assessment to TPR by 8/6/2012
5. Stegbar validation report - mid Aug 2012
6. 2nd Surfactant injection early Sept 2012
7. MPE system operation for 3 months to end of Dec 2012
8. 1st GME - Jan 2013
9. Check against agreed SSTL early Feb 2013
10. 2nd GME - Mar 2013
11. 3rd GME - June 2013

I also note that Otek are to dip wells for the presence of PSH during the remediation works. If you would please advise me (& the TPR) if any PSH is encountered.

I also noted that Mobil is to respond with its plans for the adjacent former Midas site within 2 weeks.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: s. 44(6) Personal information

RTI DL RELEASE - EHP

MPE Sewer Discharge

GAC

Surfactant Injection

sch4p4(6) Personal information

MPE External

BH 41.

RTI DL RELEASE - EHP

Inside MPE container

MW1

MPE external

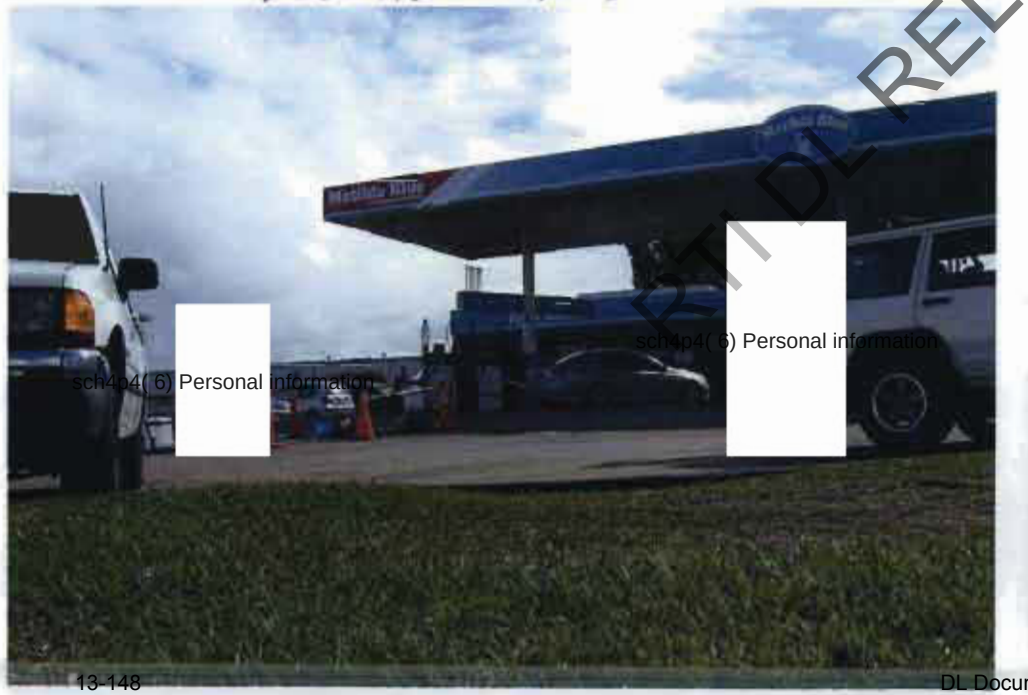
Inside MPE Air & gas sparger

PT DL RELEASE - EHP

Grand level view from MW4

View from MW 22

View from MW8

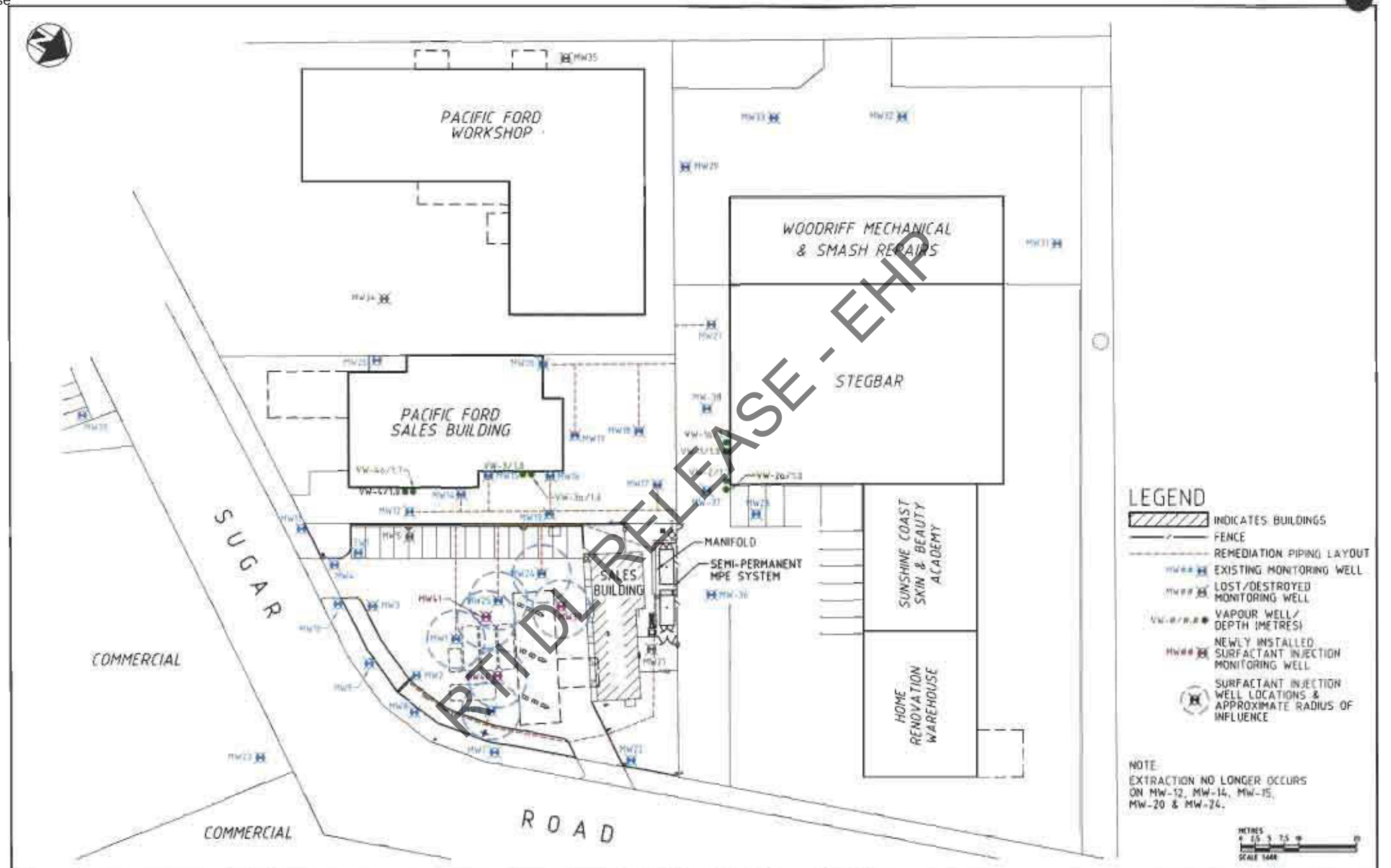


sch4p4(6) Personal information

sch4p4(6) Personal information

RTI DL RELEASE - EHP

Release



RTI DL RELEASE - EHP

ISSUE	DATE	AMENDMENTS	REN	AB
01	27.03.12	ORIGINAL ISSUE	REN	AB

"COMMERCIAL IN CONFIDENCE"

otek
ABN 32 094 371 596

MELBOURNE TEL (03) 9525 5155 FAX (03) 9593 8555
BRISBANE TEL (07) 3426 5200 FAX (07) 3426 5299
ADELAIDE TEL (08) 8423 4490 FAX (08) 8423 4500
SYDNEY TEL (02) 9417 4499 FAX (02) 9417 2314
PERTH TEL (08) 9227 9000 FAX (08) 9227 9009
BEIJING TEL (+86) 10 8840 0302 FAX (+86) 10 8840 0209

www.otek.com.au

LOCATION OF TARGET SURFACTANT INJECTION WELLS

SURFACTANT INJECTION
MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SIZE	DRAWN: REM	DATE: 27.03.12	CHECKED	APPROVED	FIG No:
A3	REV: 01	DRG. NAME: S712019F01			FIGURE 1

Date	BH No.	SWL mbgl	GW level mAHD	PSH (mm)	Benzene	Toluene	Ethyl benzene	Xylene	C6-9	C10-14	C15-28	C29-36	TPH
9/01/2001	MW1	2.05			35,000	43,000	4,700	27,000	155,000	13,000	1,450	<100	169,450
20/11/2001	MW1	2.543			21,000	28,000	2,500	15,000	76,000	9,600	1,750	264	87,614
21/05/2002	MW1	2.059			29,000	34,000	3,800	23,600	100,000	4,600	360	<100	104,960
21/02/2003	MW1				21,000	26,000	1,800	10,800	80,000	7,500	900	<100	88,400
29/04/2004	MW1	2.038	4.215		3,400	3,600	620	3,600	13,000	4,600	600		18,200
11/01/2011	MW1	0.759	5.494		37,500	75,500	4,470	31,400	171,000	465,000	46,400	<100	682,400
1/05/2012	MW1	0.873	5.38		11	2	10	28	30	300	2,030	160	2,520
20/11/2001	MW10	1.97			9	61	15	100	220	80	<100	<100	300
37397	MW10	2			53	9	<1	<3	90	<20	<100	<100	90
37673	MW10				23	9	2	11	49	<20	<100	<100	49
38106	MW10	2	4		<1	<1	<1	<3	640	<20	<100	<100	640
40554	MW10				<1	3	<1	<3	20	<20	<100	<100	20
20/11/2001	MW11	1.92			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/05/2002	MW11	1.575			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW11				9	8	3	11	30	<20	<100	<100	30
29/04/2004	MW11	1.673	3.739		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW11				<1	<1	<1	<3	<20	<20	<100	<100	<220
20/11/2001	MW12	1.83			1	6	<1	18	60	<20	<100	<100	60
21/05/2002	MW12	1.506			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW12				44	82	8	55	190		<100	<100	390
29/04/2004	MW12	1.352	3.76		28	<1	7	37	240	130	<100	<100	370
11/01/2011	MW12				<50	<50	67	748	2,080	800	270	<100	3,150
20/11/2001	MW13	2.215		365									
21/05/2002	MW13	1.637		72									
21/02/2003	MW13			PSH									
29/04/2004	MW13	1.462	3.646		30,000	57,000	2,800	19,600	110,000	11,000	4,000	900	15,900
11/01/2011	MW13	1.53	3.578		2,110	10,400	3,130	36,000	212,000	93,200	8,530	<500	313,730
1/05/2012	MW13	1.227	3.881		26	6	27	93	300	560	460		1,300
37397	MW14	1.544			20000	10000	1900	9700	60000	2400	<100	<100	48400
37673	MW14				16000	7400	1100	6100	31000	1800	<100	<100	34800
38106	MW14	1.515	3.728		42000	17000	1600	8400	73000	2200	400	100	75700
40554	MW14				1	<2	5	5	180	290	180	50	620
21/05/2002	MW15	1.617			21,000	3,300	1,600	8,600	27,000	1,400	<100	<100	28,400
21/02/2003	MW15				19,000	4,800	1,100	7,800	32,000	1,700	<100	<100	33,700
29/04/2004	MW15	1.619	3.735		23,000	540	1,100	5,400	31,000	1,800	300	<100	33,100
11/01/2011	MW15				6	<2	30	153	350	510	490	140	1,490
21/05/2002	MW16	1.592			11,000	9,100	910	4,800	29,000	1,100	<100	<100	30,100
21/02/2003	MW16				3,900	2,500	220	1,090	8,300	150	<100	<100	8,450
29/04/2004	MW16	1.495	3.63		8,700	4,000	430	1,690	17,000	1,200	400	<100	18,600
11/01/2011	MW16				2,580	11,000	1,360	10,120	33,600	45,600	8,850	790	88,840
21/05/2002	MW17	1.504			2,800	1,700	200	1,200	7,500	280	<100	<100	7,780
21/02/2003	MW17			PSH									
29/04/2004	MW17	1.305	3.563		19,000	9,900	1,200	4,700	36,000	2,000	3,000	200	41,200
11/01/2011	MW17				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/05/2002	MW18	1.413			8,300	2,400	560	3,670	16,000	1,100	<100	<100	17,100
21/02/2003	MW18				6,800	1,600	320	1,190	9,800	1,100	<100	450	11,350
29/04/2004	MW18	1.438	3.506		16,000	7,200	1,100	4,700	32,000	6,500	4,800	100	43,400
11/01/2011	MW18				2,390	740	274	1,600	8,030	650	550	280	9,510
1/05/2012	MW18	0.873	4.071		984	356	162	1,121	840	1,920	160		3,920
21/05/2002	MW19	1.687			9,600	3,000	890	4,200	19,000	1,500	<100	<100	20,500
21/02/2003	MW19				12,000	8,600	1,400	7,500	31,000	2,400			33,400
29/04/2004	MW19	1.406	3.538		14,000	7,900	1,300	6,700	32,000	3,300	200	<100	35,500
11/01/2011	MW19												
9/01/2001	MW2	1.65		35									
20/11/2001	MW2	1.742		375									
21/05/2002	MW2	1.667			59,000	80,000	8,100	53,000	217,000	25,000	2,260	118	244,378
21/02/2003	MW2				36,000	42,000	36,000	22,700	110,000	37,000	2,200	630	149,830
29/04/2004	MW2	1.787	4.298		53,000	58,000	5,000	23,800	140,000	28,000	2,200	600	170,800
11/01/2011	MW2	0.844	5.241		3,440	2,500	1,480	4,630	14,500	5,480	1,130	70	21,180
1/05/2012	MW2	0.973	5.112		277	321	245	1,093	1,970	310	110		1,490
21/05/2002	MW20	1.729			920	<10	47	200	1,300	70	<100	<100	<220
21/02/2003	MW20				160	240	180	890	2,400	1,600			4,000
29/04/2004	MW20	1.783	3.399		170	3	6	46	320	150	<100	<100	470
11/01/2011	MW20				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
21/05/2002	MW21	0.778			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW21				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW21				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW21				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/05/2002	MW22	0.971			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW22				6	5	2	7	20	<20	<100	<100	20
29/04/2004	MW22	1.615	6.5		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW22				<LOR	210	<LOR	<LOR	1,810	60	340	240	2,450
21/05/2002	MW23	1.676			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW23				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW23				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW23				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/02/2003	MW24				480	370	68	590	1,700	810	<100	<100	2,510

RTI DL RELEASE - EHP

Release

29/04/2004	MW24	2.69	4,053		700	<1	<1	<3	700	360	300	<100	1,360
11/01/2011	MW24	0.834	5,909		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
1/05/2012	MW24	1.536	5,207		548	240	138	5,016	2,310	900	210		3,420
21/02/2003	MW25				51,000	57,000	6,100	37,000	150,000	17,000	1,700	720	169,420
29/04/2004	MW25	2.664	4,063		11,000	25,000	1,800	11,400	50,000	15,000	1,400	200	66,600
11/01/2011	MW25	2.109	4,618		143	145	14	180	720	12,100	1,090	100	14,010
1/05/2012	MW25	1.845	4,882		1,280	3	296	1,273	1,020	2,540	960		4,520
21/02/2003	MW26				500	<1	26	98	650	110	<100	<100	760
29/04/2004	MW26	1.84	3,522		150	270	260	1,130	1,800	1,300	200	<100	3,300
11/01/2011	MW26				2	<LOR	<LOR	<LOR	20	<LOR	<LOR	<LOR	20
21/02/2003	MW27				29,000	28,000	2,100	11,700	71,000	4,100	<100	<100	75,100
29/04/2004	MW27	1.094	3,236		38,000	30,000	2,500	13,400	83,000	4,300	300	<100	87,600
11/01/2011	MW27				526	<LOR	29	133	1,000	220	280	80	1,580
21/02/2003	MW28				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW28	1.545	3,729		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW28				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
21/02/2003	MW29				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW29	1.92	3,14		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW29				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	620	110	730
9/01/2001	MW3	1.65			1,600	390	37	210	2,900	140	<100	<100	3,040
20/11/2001	MW3	1.943			860	140	32	100	1,300	40	<100	<100	1,340
21/05/2002	MW3	1.672			370	89	22	84	660	140	<100	<100	800
21/02/2003	MW3				3,100	1,100	140	760	5,600	190	190	<100	5,790
29/04/2004	MW3	1.773	3,966		580	<1	62	110	740	490	<100	<100	1,230
11/01/2011	MW3				1,110		455	1,573	4,140	1,800	550	70	6,560
21/02/2003	MW30				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW30	1.99	3,291		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW30				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	220	120	340
9/01/2001	MW4	1.65			9	6	<1	4	120	<20	<100	<100	120
20/11/2001	MW4	2.012			3	2	<1	<3	90	<20	<100	<100	90
21/05/2002	MW4	1.677			3	<1	<1	3	50	50	<100	<100	100
21/02/2003	MW4				3	2	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW4	1.785	4,033		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW4				56	<LOR	17	120	2,670	1,460	490	140	4,760
9/01/2001	MW5	2.1			1,000	420	130	670	3,100	260	<100	<100	3,360
20/11/2001	MW5	2.235			9	38	130	600	10,900	360	<100	<100	10,360
21/05/2002	MW5	2.146			2,000	240	150	650	3,400	70	<100	<100	3,470
21/02/2003	MW5				1,500	280	61	347	2,200	160	<100	<100	2,360
29/04/2004	MW5				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW5				NR	NR	NR	NR	NR	NR	NR	NR	NR
9/01/2001	MW6	1.67		10									
20/11/2001	MW6	1.852		366									
21/05/2002	MW6	1.457			33,000	31,000	4,900	39,000	138,000	69,000	13,300	368	220,668
21/02/2003	MW6				18,000	21,000	2,000	16,600	59,000	32,000	5,400	1,100	975,000
29/04/2004	MW6	1.665	5,061		20,000	30,000	1,800	27,900	79,000	18,000	700	<100	97,700
11/01/2011	MW6				408	1,140	296	1,500	6,380	7,800	1,520	100	15,800
1/05/2012	MW6	0.924	5,802		3		5	5		30	110		140
20/11/2001	MW7	1.768			<1	<1	<1	<3	<20	<20	<100	<100	<240
21/05/2002	MW7	1.243			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW7				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW7	1.525	4,150		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW7				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
20/11/2001	MW8	1.634			340	42	77	210	820	280	<100	<100	1,100
21/05/2002	MW8	1.196			4,600	510	810	2,410	9,300	1,300	<100	<100	10,600
21/02/2003	MW8				3,200	1,300	340	1,600	8,200	1,200	<100	<100	9,400
29/04/2004	MW8	1.22	4,859		48,000	35,000	2,300	12,200	98,000	6,100	400	<LOR	104,500
11/01/2011	MW8				6,050	5,360	870	4,370	18,400	2,420	290	<LOR	21,110
20/11/2001	MW9	1.933			35	38	8	53	180	40	<100	<100	220
21/05/2002	MW9	1.901			290	1	5	26	420	<20	<100	<100	420
21/02/2003	MW9				820	160	37	123	2,600	<20	<100	<100	2,600
29/04/2004	MW9	1.7	4,192		27	8	1	10	50	<20	<100	<100	80
11/01/2011	MW9				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR

RTI DL RELEASE - EHP

Release

TABLE 1
CURRENT AND HISTORICAL GROUNDWATER ELEVATIONS
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

Well ID	Date	Depth to PSH (m)	PSH Thickness (Ht) (m)	Depth to Water (WTm) (m)	Corrected DtoW (WTc) (m)	Elevation TOC (mAHD)	GW Elevation (mAHD)
MW-1	1/05/2012	-	-	0.873	0.873	6.253	5.380
	27/06/2011	Unable to take DTW measurement (rainwater entered to the well from below).					
	19/01/2011	-	-	0.759	0.759	6.253	5.494
	5/01/2011	-	-	0.385	0.385	6.253	5.868
	18/11/2010	-	-	1.732	1.732	6.253	4.521
	16/09/2010	-	-	1.307	1.307	6.253	4.946
	2/09/2010	-	-	1.328	1.328	6.253	4.925
	29/07/2010	-	-	0.912	0.912	6.253	5.341
	17/06/2010	-	-	1.528	1.528	6.253	4.725
	21/04/2010	-	-	1.122	1.122	6.253	5.131
	11/01/2010	1.669	0.001	1.670	1.669	6.253	4.584
MW-2	1/05/2012	-	-	0.973	0.973	6.085	5.112
	27/06/2011	-	-	1.493	1.493	6.085	4.592
	19/01/2011	-	-	0.844	0.844	6.085	5.241
	5/01/2011	-	-	1.831	1.831	6.085	4.254
	18/11/2010	-	-	2.029	2.029	6.085	4.056
	16/09/2010	-	-	1.274	1.274	6.085	4.811
	2/09/2010	-	-	1.333	1.333	6.085	4.752
	29/07/2010	-	-	1.560	1.560	6.085	4.525
	13/07/2010	-	-	1.528	1.528	6.085	4.557
	17/06/2010	-	-	1.476	1.476	6.085	4.609
	21/04/2010	-	-	0.936	0.936	6.085	5.149
	11/01/2010	-	-	1.784	1.784	6.085	4.301

RTI DL RELEASE - EHP

Release

TABLE 1
CURRENT AND HISTORICAL GROUNDWATER ELEVATIONS
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

Notes:
- measures taken on the 7/12/2010 may not be representative as it rained 150mm during the previous 7 days
- "-" denotes that no PSH was present;
- "" groundwater elevation was unable to be calculated;
- Elevation TOC denotes the surveyed elevation of the Top Of Casing (TOC) of each well. Survey data was obtained from Coffey Environments 2008 Groundwater Monitoring Event report;
- DTW correction for PSH as follows: **WTc = WTm - (Ht x SGp)** WTc = Corrected depth to water WTm = Measured depth to water (mTOC). As all wells are nearly flush to ground level, mTOC is approximately m Below Ground Surface (mBGS). Ht = Measured

RTI DL RELEASE - EHP

Release

TABLE 1
CURRENT AND HISTORICAL GROUNDWATER ELEVATIONS
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

MW-6	1/05/2012	-	-	0.924	0.924	6.726	5.802
	27/06/2011	-	-	1.760	1.760	6.726	4.966
	19/01/2011	-	-	0.956	0.956	6.726	5.770
	5/01/2011	-	-	3.080	3.080	6.726	3.646
	18/11/2010	-	-	2.921	2.921	6.726	3.805
	16/09/2010	-	-	1.340	1.340	6.726	5.386
	21/04/2010	-	-	0.772	0.772	6.726	5.954
	11/01/2010	-	-	2.060	2.060	6.726	4.666
MW-13	1/05/2012	-	-	1.227	1.227	5.108	3.881
	27/06/2011	-	-	1.530	1.530	5.108	3.578
	20/01/2011	-	-	1.211	1.211	5.108	3.897
	5/01/2011	-	-	1.164	1.164	5.108	3.944
	18/11/2010	-	-	1.463	1.463	5.108	3.645
	16/09/2010	-	-	1.284	1.284	5.108	3.824
	2/09/2010	-	-	1.585	1.585	5.108	3.523
	29/07/2010	-	-	2.538	2.538	5.108	2.570
	13/07/2010	Inaccessable at time of gauging. Vehicle parked over well					
	21/04/2010	-	-	1.105	1.105	5.108	4.003
	11/01/2010	-	-	2.159	2.159	5.108	2.949

RTI DL RELEASE - EHP

Notes:
- measures taken on the 7/12/2010 may not be representative as it rained 150mm during the previous 7 days
- "-" denotes that no PSH was present;
- "" groundwater elevation was unable to be calculated;
- Elevation TOC denotes the surveyed elevation of the Top Of Casing (TOC) of each well. Survey data was obtained from Coffey Environments 2008 Groundwater Monitoring Event report;
- DTW correction for PSH as follows: **WTc = WTm - (Ht x SGp)** WTc = Corrected depth to water WTm = Measured depth to water (mTOC). As all wells are nearly flush to ground level, mTOC is approximately m Below Ground Surface (mBGS). Ht = Measured

Release

TABLE 1
CURRENT AND HISTORICAL GROUNDWATER ELEVATIONS
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

MW-18	1/05/2012	-	-	0.873	0.873	4.944	4.071
	27/06/2011	-	-	1.136	1.136	4.944	3.808
	20/01/2011	Not available					
	5/01/2011	Inaccessable at time of gauging. Vehicle parked over well					
	18/11/2010	Inaccessable at time of gauging. Vehicle parked over well					
	8/10/2010	Inaccessable at time of gauging - well flooded					
	16/09/2010	-	-	1.057	1.057	4.944	3.887
	13/07/2010	Inaccessable at time of gauging. Vehicle parked over well					
	21/04/2010	-	-	0.908	0.908	4.944	4.035
	11/01/2010	-	-	1.768	1.768	4.944	3.176
MW-24	1/05/2012	-	-	1.536	1.536	6.743	5.207
	27/06/2011	-	-	1.569	1.569	6.743	5.174
	19/01/2011	-	-	0.834	0.834	6.743	5.909
	5/01/2011	-	-	1.835	1.835	6.743	4.908
	18/11/2010	Well dry. Unable to gauge				6.743	
	16/09/2010	-	-	1.467	1.467	6.743	5.276
	2/09/2010	-	-	1.564	1.564	6.743	5.179
	13/07/2010	Well dry. Unable to gauge				6.743	*
	17/06/2010	-	-	1.215	1.215	6.743	5.528
	21/04/2010	-	-	1.193	1.193	6.743	5.550
	11/01/2010	Well dry. Unable to gauge				6.743	*

RTI DL RELEASE - EHP

Notes:

- measures taken on the 7/12/2010 may not be representative as it rained 150mm during the previous 7 days
- "-" denotes that no PSH was present;
- "*" groundwater elevation was unable to be calculated;
- Elevation TOC denotes the surveyed elevation of the Top Of Casing (TOC) of each well. Survey data was obtained from Coffey Environments 2008 Groundwater Monitoring Event report;
-

Release

TABLE 1
CURRENT AND HISTORICAL GROUNDWATER ELEVATIONS
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

MW-25	1/05/2012	-	-	1.845	1.845	6.727	4.882
	27/06/2011	-	-	2.109	2.109	6.727	4.618
	19/01/2011	-	-	2.083	2.083	6.727	4.644
	5/01/2011	-	-	2.852	2.852	6.727	3.875
	18/11/2010	-	-	3.165	3.165	6.727	3.562
	16/09/2010	-	-	2.037	2.037	6.727	4.690
	2/09/2010	-	-	2.112	2.112	6.727	4.615
	29/07/2010	-	-	3.197	3.197	6.727	3.530
	17/06/2010	-	-	2.390	2.390	6.727	4.337
	21/04/2010	-	-	1.848	1.848	6.727	4.879
	11/01/2010	-	-	2.635	2.635	6.727	4.092
MW-39	15/05/2012	-	-	2.102	2.102	TBD	TBD
MW-40	15/05/2012	-	-	1.585	1.585	TBD	TBD

Notes:
- measures taken on the 7/12/2010 may not be representative as it rained 150mm during the previous 7 days
- "-" denotes that no PSH was present;
- "*" groundwater elevation was unable to be calculated;
- "TBD" denotes groundwater elevation not determined yet as level survey has not been performed;
- Elevation TOC denotes the surveyed elevation of the Top Of Casing (TOC) of each well. Survey data was obtained from Coffey Environments 2008 Groundwater Monitoring Event report.

RTI DL RELEASE - EHP

O'Connor Gary

From: Mack Dreyer [mack@birchwoodenviro.com.au]
Sent: 28 May 2012 2:59 PM
To: O'Connor Gary
Subject: FW: Tables
Attachments: Analytical Tables.xlsx; May2012 benzene results.pdf

Gary

Please find attached the results for the last round of monitoring at the Maroochydore site. In general the groundwater petroleum hydrocarbon concentrations have decreased as compared to the June 2011 event with the exception of MW1, MW18 and MW24. I do note that this decrease in groundwater hydrocarbon concentration is generally associated with an increase in water table elevation (at least in the immediate vicinity of the wells – I note that in an unconfined system the higher the water table elevations generally means lower TPH concentrations). This increase in water table elevation is probably the result of the system being turned off (no draw down) or it may be associated with some heavy rainfall events in the area around the time of sampling.

I have drawn the benzene results on a Figure from the last report, scanned it and attached it to this email for your reference. I note there are some inconsistencies in the water levels between Table 1 and Table 2 in the Otek spread sheet. I will get them to correct this.

Please give me a call if you have any questions.

Regards

Mack

Mack Dreyer
Principal
P : (07) 3711 5088 M : sch4p4(6) Personal information F : (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

birchwood
ENVIRONMENTAL SERVICES PTY LTD

RTI DL RELEASE - EHP

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: Adam Breen [mailto:ABreen@otek.com.au]
Sent: Monday, 28 May 2012 1:37 PM
To: luis.cifuentes@exxonmobil.com
Cc: Mack Dreyer (mack@birchwoodenviro.com.au)
Subject: Tables

Luis,

Please find attached recent sampling of selected wells that previously contained the highest hydrocarbon concentrations. Please be aware this wasn't a planned GME but was in response to concerns that the remediation system had been off for some time.

Regards

Adam Breen
Senior Remediation Scientist
T +61 7 3426 5200 D +61 7 3426 5220 F +61 7 3426 5299
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105
E abreen@otek.com.au
M sch4p4(6) Personal information
W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs). We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return e-mail.

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

RTI DL RELEASE - EH

TABLE 2
CURRENT ANALYTICAL SUMMARY - GROUNDWATER SAMPLES (TRH and BTEX)
NEUMANN SERVICE STATION
116-118 SUGAR ROAD, MAROOCHYDORE, QUEENSLAND

	BTEXN (µg/L)						TRH (µg/L)			
	Benzene	Toluene	Ethylbenzene	o- Xylenes	m- p- Xylenes	Naphthalene	TRH (C6-C10) F1	TRH (>C10-C16)	TRH (>C16-C34)	TRH (>C34-C40)
SSTL (Unrestricted Land-Use) [µg/L]	430	20,000	1,730,000	63,000		660	15,000	na	na	na

Sample ID	Groundwater Depth (m)	Date Sampled										
MW-1	0.873	1/05/2012	11	<2	10	<2	12	16	30	300	2030	160
MW-2	0.973	1/05/2012	277	371	245	327	766	57	1070	310	110	<100
MW-6	0.924	1/05/2012	3	<2	5	2	3	<5	30	110	<100	<100
MW-13	1.227	1/05/2012	26	9	27	37	56	19	300	560	460	<100
MW-18	0.873	1/05/2012	984	356	162	514	627	30	840	1920	160	<100
MW-24	1.536	1/05/2012	548	240	138	756	4260	39	2310	900	210	<100
MW-25	1.845	1/05/2012	1280	8	206	11	1260	60	1020	2540	960	<100
MW-39	2.102	15/05/2012	<1	<2	<2	<2	<2	<5	<20	150	100	<100
MW-41	1.585	15/05/2012	713	17	407	4	29	253	970	3240	460	<100

Notes:
- Sample ID: MW-# denotes a water sample obtained from a groundwater Monitoring Well;
- '<#' indicates analyte not detected above laboratory Limit Of Reporting (LOR);
- 'µg/L' indicates micrograms of analyte per litre of water;
- Site Specific Target Levels (SSTL's - Unrestricted Land Use) as derived in OTEK report - Revision of Site Specific Target Levels , dated 17 May 2012;
- 'NA' denotes no criteria available, and
- Shading indicates concentration in excess of relevant SSTL

RTI DL RELEASE - EHP

O'Connor Gary

From: O'Connor Gary
Sent: 28 May 2012 10:06 AM
To: Delzoppo Lindsay
Cc: Ready Kelli
Subject: FW: Mobil Sugar Road Maroochydore

Lindsay

sch4p4(6) Personal information I'm endeavouring to make sure priority sites are managed appropriately. This site is on the CLR and activity has "slowed" a bit. I'm keen to see Mobil do some more recovery work and will inspect the site on Wednesday with the TPR. I'll get a lift with Mack.

cheers

goc

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

From: Cifuentes, Luis /C [mailto:luis.cifuentes@exxonmobil.com]
Sent: 28 May 2012 9:16 AM
To: Mack Dreyer; 'Brendan Ebzery'; AHunt@kleinfelder.com
Cc: 'Adam Breen'; 'Marc Andrews'; O'Connor Gary
Subject: RE: Mobil Sugar Road Maroochydore

Hi Mack,

I understand the injection will start this Wednesday and I am planning to be on site as well. This will be a good opportunity to meet up.

Kind Regards,

Luis Eduardo Cifuentes
CTC Program Manager
ExxonMobil Environmental Services - Mobil Oil Australia Pty Ltd
12 Riverside Quay, Southbank, VIC 3006.
Phone: +61 3 9622 7824 / Mobile: sch4p4(6) Personal information

---

From: Mack Dreyer [mailto:mack@birchwoodenviro.com.au]
Sent: Monday, 28 May 2012 9:11 AM
To: 'Brendan Ebzery'; Cifuentes, Luis /C; AHunt@kleinfelder.com
Cc: 'Adam Breen'; 'Marc Andrews'; O'Connor Gary
Subject: RE: Mobil Sugar Road Maroochydore

Brendan

RTI DE-RELEASE - EHP

Can you please advise me when the surfactant injection is occurring. I would like to do a site inspection while this is being done.

Gary would like to inspect the site as well. I could pick you up on the way through.

Regards

Mack

Mack Dreyer
Principal
P : (07) 3711 5088 sch4p4(6) Personal information F : (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

birchwood
ENVIRONMENTAL SERVICES PTY LTD

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: Brendan Ebzery [mailto:BEbzery@otek.com.au]
Sent: Monday, 28 May 2012 8:52 AM
To: Mack Dreyer; Cifuentes, Luis /C; AHunt@kleinfelder.com
Cc: Adam Breen; Marc Andrews
Subject: RE: Mobil Sugar Road Maroochydore

Mack

Three additional wells were installed in the source area approx 4 weeks ago. Sampling of selected wells was completed approx 3 weeks ago. System maintenance has been performed. The surfactant injection is occurring this week with the system being restarted next week. Adam will provide details of the results of the works undertaken in the near future. Thank you.

Regards

OTEK Practical Environmental Solutions

Brendan Ebzery
National Remediation Manager
Senior Principal Remediation Scientist
T +61 7 3426 5200 D +61 7 3426 5216 F +61 7 3426 5299 M sch4p4(6) Personal information
A Level 1, 9/44 Station Road, Yeerongpilly QLD 4105
E bebzery@otek.com.au
W www.otek.com.au

National | Melbourne | Sydney | Brisbane | Perth | Adelaide | Beijing

PLEASE CONSIDER THE ENVIRONMENT BEFORE YOU PRINT THIS E-MAIL!
The information in this email is confidential. If you are not the intended recipient, you must not read, use, copy, disclose or disseminate this email, any attachments or information contained in this email and must delete it. The responsibility for virus detection is the recipients and we do not accept any responsibility for any loss or damage arising in any way from the use of this email or any attachments. We are covered by the Federal Privacy Act and its National Privacy Principles (NPPs). We have a Privacy Policy that deals with how we collect, use and disclose personal information. If you would like to view our Privacy Policy please visit our Web-Site or request a copy by return e-mail.

Winner of the Australia-China Business Award 2011 - Austrade Business Promotion Award.

RTI DL RELEASE - EHP

O'Connor Gary

From: O'Connor Gary
Sent: 25 May 2012 3:39 PM
To: 'Mack Dreyer'; 'luis.cifuentes@exxonmobil.com'
Cc: 'AHunt@kleinfelder.com'; 'bebzery@otek.com.au'; 'MAndrews@otek.com.au'
Subject: RE: Mobil Sugar Road Maroochydore
Importance: High

Mack & Luis

I note that it has been a month since our last communications If you could please advise of the results of the GME and the status of the recommissioning of the system.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

From: O'Connor Gary
Sent: 30 April 2012 9:36 AM
To: 'Mack Dreyer'
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com; bebzery@otek.com.au; MAndrews@otek.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Thanks Mack

I agree with your recommendation for a GME prior to recommissioning of the system These matters (the GME and recommissioning) should be attended to Mobil without delay.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

From: Mack Dreyer [mailto:mack@birchwoodenviro.com.au]
Sent: 27 April 2012 5:59 PM
To: O'Connor Gary
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com; bebzery@otek.com.au; MAndrews@otek.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Gary

Thank you for your enquiry. I understand that Kleinfelder/Otek will be providing me a response to your queries shortly. However, the following is a quick summary from my perspective.

It is my understanding that the remediation system at the site is still to be re commissioned following its shutdown in June/July 2011 (as per my correspondence of 16 November). Otek are conducting some maintenance works on the system and I have been advised that it will be up and running soon. Clearly the length of time the system has been off-line is unacceptable for a site that is on the CLR with a Remediation Notice.

The last GME on the site was in June 2011 and I have a copy of the report for this monitoring event. Attached are Figures with the benzene and TPH results from this monitoring event. (Please note my view is that the inferred contours on the Figures aren't reliable but I guess the real story is the actual results on the Figures.) I have recommended that another GME or at least a partial GME be conducted at the site before the system is recommissioned to at least get an understanding as to what sort of rebound we have at the site following the system shut down, noting that the majority of the wells where the highest impacts are observed are also extraction wells.

Otek have undertaken a risk assessment at the site to develop groundwater site specific remediation criteria. This report has been reviewed by Jackie Wright and comments supplied to Otek. Yesterday I spoke to the Otek risk assessor who was addressing Jackie's comments and I understand the report should be available for review in the very near future (this afternoon I did have a missed call from the Otek project manager regarding the delivery of the risk assessment report).

Otek have prepared a proposal to undertake a surfactant injection program at the site that I am currently reviewing, but I must admit the fact that we are still pulling approximately 7kgs of hydrocarbon from the site per day prior to the system being shut down does concern me (I think we have a fair way to go – I have asked for tank and line testing to be undertaken but there is an issue in that the site is no longer owned by Mobil). Otek have reported that 4,965 kg of product has been removed from the site since the current system was commissioned in October 2009.

Please contact me if you have any questions and I will forward you Kleinfelder/Otek's response to your questions when it is available. I will also let you know if I can get agreement to a GME prior to the recommissioning of the system.

Regards

Mack.

Mack Dreyer
Principal

RTI DL RELEASE - EHP

P : (07) 3711 5088 sch4p4(6) Personal information F : (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Friday, 27 April 2012 3:56 PM
To: Mack Dreyer
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com
Subject: Mobil Sugar Road Maroochydore

Mack

As you are aware the former project manager for the above site, Greg O'Brien, sch4p4(6) Personal information following through on a number of matters and request an update, in your role as TPR, on the status of the above site.

In particular I request information on:

The status of hydrocarbon extraction system, including the amount of hydrocarbon recovered;
The most recent groundwater monitoring results;
The results of any recent tank integrity testing; and
The progress of Mobil towards completion of the RAP, as set out under the Remediation Notice.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone. 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile sch4p4(6) Personal information

RTI DL RELEASE - EHP

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.

Release

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.

RTI DL RELEASE - EHP

O'Connor Gary

From: O'Connor Gary
Sent: 30 April 2012 9:36 AM
To: 'Mack Dreyer'
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com; bebzery@otek.com.au; MAndrews@otek.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Thanks Mack

I agree with your recommendation for a GME prior to recommissioning of the system. These matters (the GME and recommissioning) should be attended to Mobil without delay.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

From: Mack Dreyer [mailto:mack@birchwoodenviro.com.au]
Sent: 27 April 2012 5:59 PM
To: O'Connor Gary
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com; bebzery@otek.com.au; MAndrews@otek.com.au
Subject: RE: Mobil Sugar Road Maroochydore

Gary

Thank you for your enquiry. I understand that Kleinfelder/Otek will be providing me a response to your queries shortly. However, the following is a quick summary from my perspective.

It is my understanding that the remediation system at the site is still to be re commissioned following its shutdown in June/July 2011 (as per my correspondence of 16 November). Otek are conducting some maintenance works on the system and I have been advised that it will be up and running soon. Clearly the length of time the system has been off-line is unacceptable for a site that is on the CLR with a Remediation Notice.

The last GME on the site was in June 2011 and I have a copy of the report for this monitoring event. Attached are Figures with the benzene and TPH results from this monitoring event. (Please note my view is that the inferred contours on the Figures aren't reliable but I guess the real story is the actual results on the Figures.) I have recommended that another GME or at least a partial GME be conducted at the site before the system is recommissioned to at least get an understanding as to what sort of rebound we have at the site following the system shut down, noting that the majority of the wells where the highest impacts are observed are also extraction wells.

Otek have undertaken a risk assessment at the site to develop groundwater site specific remediation criteria. This report has been reviewed by Jackie Wright and comments supplied to Otek. Yesterday I spoke to the Otek risk assessor who was addressing Jackie's comments and I understand the report should be available for review in the very near future (this afternoon I did have a missed call from the Otek project manager regarding the delivery of the risk assessment report).

Otek have prepared a proposal to undertake a surfactant injection program at the site that I am currently reviewing, but I must admit the fact that we are still pulling approximately 7kgs of hydrocarbon from the site per day prior to the system being shut down does concern me (I think we have a fair way to go – I have asked for tank and line testing to be undertaken but there is an issue in that the site is no longer owned by Mobil). Otek have reported that 4,965 kg of product has been removed from the site since the current system was commissioned in October 2009.

Please contact me if you have any questions and I will forward you Kleinfelder/Otek's response to your questions when it is available. I will also let you know if I can get agreement to a GME prior to the recommissioning of the system.

Regards

Mack.

Mack Dreyer
Principal
P : (07) 3711 5088 | M : sch4p4(6) Personal information | F : (07) 3711 5248
PO Box 2342 Sunnybank Hills 4109

birchwood
ENVIRONMENTAL SERVICES PTY LTD

RTI DLRELEASE - EHP

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Friday, 27 April 2012 3:56 PM
To: Mack Dreyer
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com
Subject: Mobil Sugar Road Maroochydore

Mack

As you are aware the former project manager for the above site, Greg O'Brien, sch4p4(6) Personal information following through on a number of matters and request an update, in your role as TPR, on the status of the above site.

In particular I request information on:

The status of hydrocarbon extraction system, including the amount of hydrocarbon recovered,
The most recent groundwater monitoring results;
The results of any recent tank integrity testing; and
The progress of Mobil towards completion of the RAP, as set out under the Remediation Notice.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

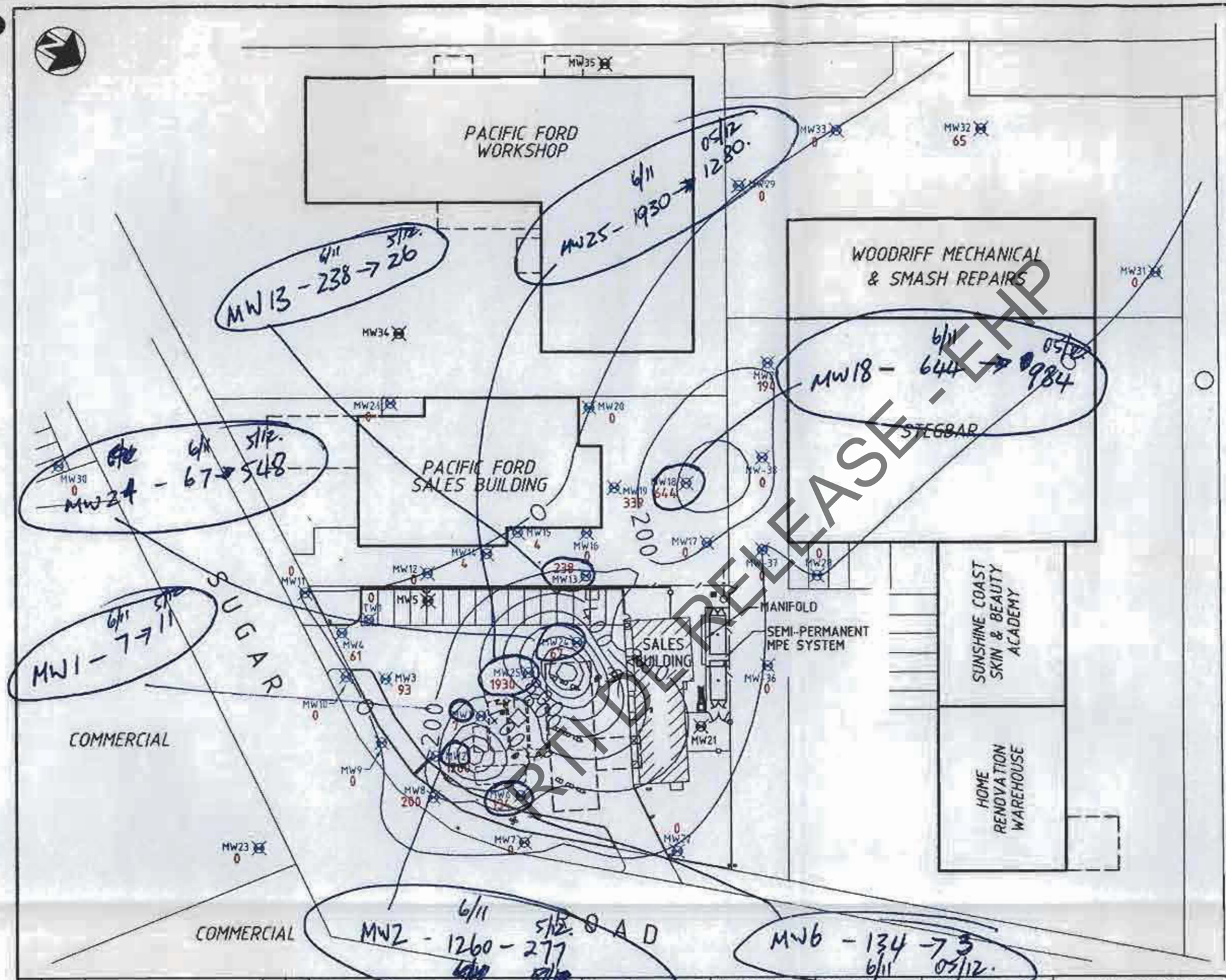
The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt of this material.

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.

RTI DL RELEASE - EHP

Release



	m	m.
DTW(m)	06/11	05/12.
MW1	NA RAINWATER ENTERED	0.873
MW2	1.493	0.973
MW6	1.760	0.924
MW13	1.53	1.227
MW18	1.136	0.873
MW24	1.569	1.536
MW25	2.109	1.845.

LEGEND

- INDICATES BUILDINGS
- FENCE
- MW## EXISTING MONITORING WELL
- MW## LOST/DESTROYED MONITORING WELL
- #.# GROUNDWATER BENZENE CONTOUR INTERVAL @ 200 ug/L
- ## TOTAL BENZENE CONCENTRATION (ug/L)

METRES 0 2.5 5 7.5 10 20
SCALE 1:600

ISSUE	DATE	AMENDMENTS	DRN	CKD
01	31.08.11	ORIGINAL ISSUE	REM	AB

"COMMERCIAL IN CONFIDENCE"

OTEK
ABN 32 054 371 598

MELBOURNE	BRISBANE	ADELAIDE
TEL (03) 9525 5155	TEL (07) 3426 5200	TEL (08) 8423 4480
FAX (03) 9593 8555	FAX (07) 3426 5299	FAX (08) 8423 4500
SYDNEY	PERTH	BEIJING
TEL (02) 9417 4499	TEL (08) 9227 9000	TEL (+86) 10 8840 0302
FAX (02) 9417 2314	FAX (08) 9227 9009	FAX (+86) 10 8840 0209

www.otek.com.au

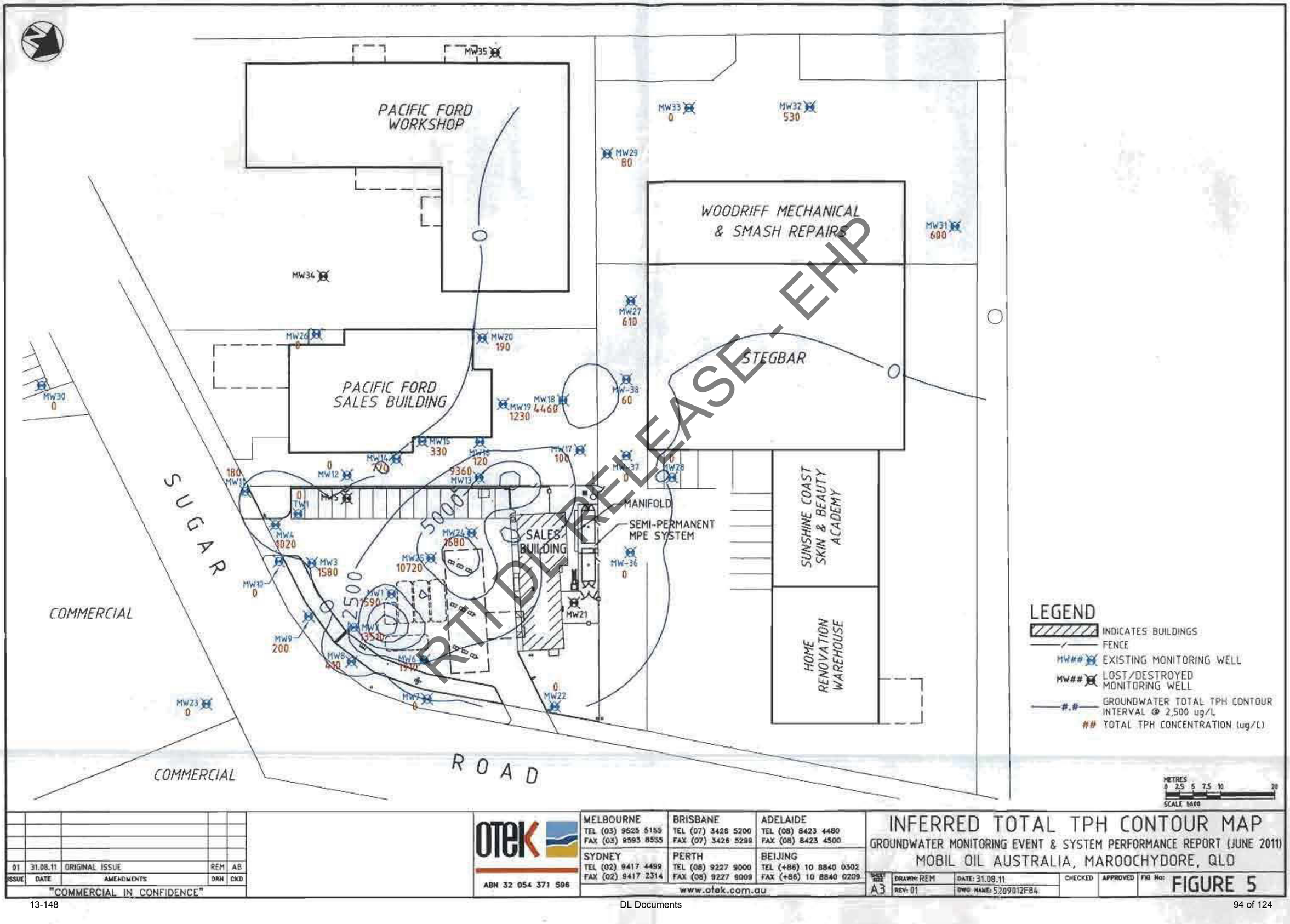
INFERRED BENZENE CONTOUR MAP

GROUNDWATER MONITORING EVENT & SYSTEM PERFORMANCE REPORT (JUNE 2011)

MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SHEET SIZE A3 | DRAWN: REM | REV: 01 | DATE: 31.08.11 | DWG NAME: 5209012F83 | CHECKED | APPROVED | FIG No: FIGURE 4

Release



ISSUE	DATE	AMENDMENTS	DRN	CKD
01	31.08.11	ORIGINAL ISSUE	REM	AB

"COMMERCIAL IN CONFIDENCE"

OTEK
ABN 32 054 371 596

MELBOURNE TEL (03) 9525 5155 FAX (03) 9593 8555
BRISBANE TEL (07) 3426 5200 FAX (07) 3426 5288
ADELAIDE TEL (08) 8423 4480 FAX (08) 8423 4500
SYDNEY TEL (02) 9417 4499 FAX (02) 9417 2314
PERTH TEL (08) 9227 9000 FAX (08) 9227 9009
BEIJING TEL (+86) 10 8840 0302 FAX (+86) 10 8840 0209
www.otek.com.au

INFERRED TOTAL TPH CONTOUR MAP

GROUNDWATER MONITORING EVENT & SYSTEM PERFORMANCE REPORT (JUNE 2011)
MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SHEET SIZE	DRAWN: REM	DATE: 31.08.11	CHECKED	APPROVED	FIG No:
A3	REV: 01	DWG NAME: 5209012F84			FIGURE 5

O'Connor Gary

From: Mack Dreyer [mack@birchwoodenviro.com.au]
Sent: 27 April 2012 5:59 PM
To: O'Connor Gary
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com; bebzery@otek.com.au; MAndrews@otek.com.au
Subject: RE: Mobil Sugar Road Maroochydore
Attachments: 5209012 GME_SPR JUNE 2011 rev A F83 (1).pdf; 5209012 GME_SPR JUNE 2011 rev A F84 (1).pdf

Gary

Thank you for your enquiry. I understand that Kleinfelder/Otek will be providing me a response to your queries shortly. However, the following is a quick summary from my perspective.

It is my understanding that the remediation system at the site is still to be re commissioned following its shutdown in June/July 2011 (as per my correspondence of 16 November). Otek are conducting some maintenance works on the system and I have been advised that it will be up and running soon. Clearly the length of time the system has been off-line is unacceptable for a site that is on the CLR with a Remediation Notice.

The last GME on the site was in June 2011 and I have a copy of the report for this monitoring event. Attached are Figures with the benzene and TPH results from this monitoring event. (Please note my view is that the inferred contours on the Figures aren't reliable but I guess the real story is the actual results on the Figures.) I have recommended that another GME or at least a partial GME be conducted at the site before the system is recommissioned to at least get an understanding as to what sort of rebound we have at the site following the system shut down, noting that the majority of the wells where the highest impacts are observed are also extraction wells.

Otek have undertaken a risk assessment at the site to develop groundwater site specific remediation criteria. This report has been reviewed by Jackie Wright and comments supplied to Otek. Yesterday I spoke to the Otek risk assessor who was addressing Jackie's comments and I understand the report should be available for review in the very near future (this afternoon I did have a missed call from the Otek project manager regarding the delivery of the risk assessment report).

Otek have prepared a proposal to undertake a surfactant injection program at the site that I am currently reviewing, but I must admit the fact that we are still pulling approximately 7kgs of hydrocarbon from the site per day prior to the system being shut down does concern me (I think we have a fair way to go – I have asked for tank and line testing to be undertaken but there is an issue in that the site is no longer owned by Mobil). Otek have reported that 4,965 kg of product has been removed from the site since the current system was commissioned in October 2009.

Please contact me if you have any questions and I will forward you Kleinfelder/Otek's response to your questions when it is available. I will also let you know if I can get agreement to a GME prior to the recommissioning of the system.

Regards

Mack.

RTI DL RELEASE - EHP

Mack Dreyer
Principal
P : (07) 3711 5088 | sch4p4(6) Personal information | F : (07) 3711 5348
PO Box 2342 Sunnybank Hills 4109

Note: Privileged/confidential information may be contained in this message and may be subject to legal privilege. Access to this e-mail by anyone other than the intended is unauthorised. If you are not the intended recipient (or responsible for delivery of the message to such person), you may not use, copy, distribute or deliver to anyone this message (or any part of its contents) or take any action in reliance on it. In such case, you should destroy this message, and notify us immediately. If you have received this email in error, please notify us immediately by email or telephone and delete the email from any computer. All reasonable precautions have been taken to ensure no viruses are present in this email. As out company cannot accept responsibility for any loss or damage arising from the use of this email or attachments we recommend that you subject these to your virus checking procedures prior to use.

From: O'Connor Gary [mailto:Gary.O'Connor@derm.qld.gov.au]
Sent: Friday, 27 April 2012 3:56 PM
To: Mack Dreyer
Cc: luis.cifuentes@exxonmobil.com; AHunt@kleinfelder.com
Subject: Mobil Sugar Road Maroochydore

Mack

As you are aware the former project manager for the above site, Greg O'Brien, sch4p4(6) Personal information I'm following through on a number of matters and request an update, in your role as TPR, on the status of the above site.

In particular I request information on:

The status of hydrocarbon extraction system, including the amount of hydrocarbon recovered;
The most recent groundwater monitoring results;
The results of any recent tank integrity testing; and
The progress of Mobil towards completion of the RAP, as set out under the Remediation Notice.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

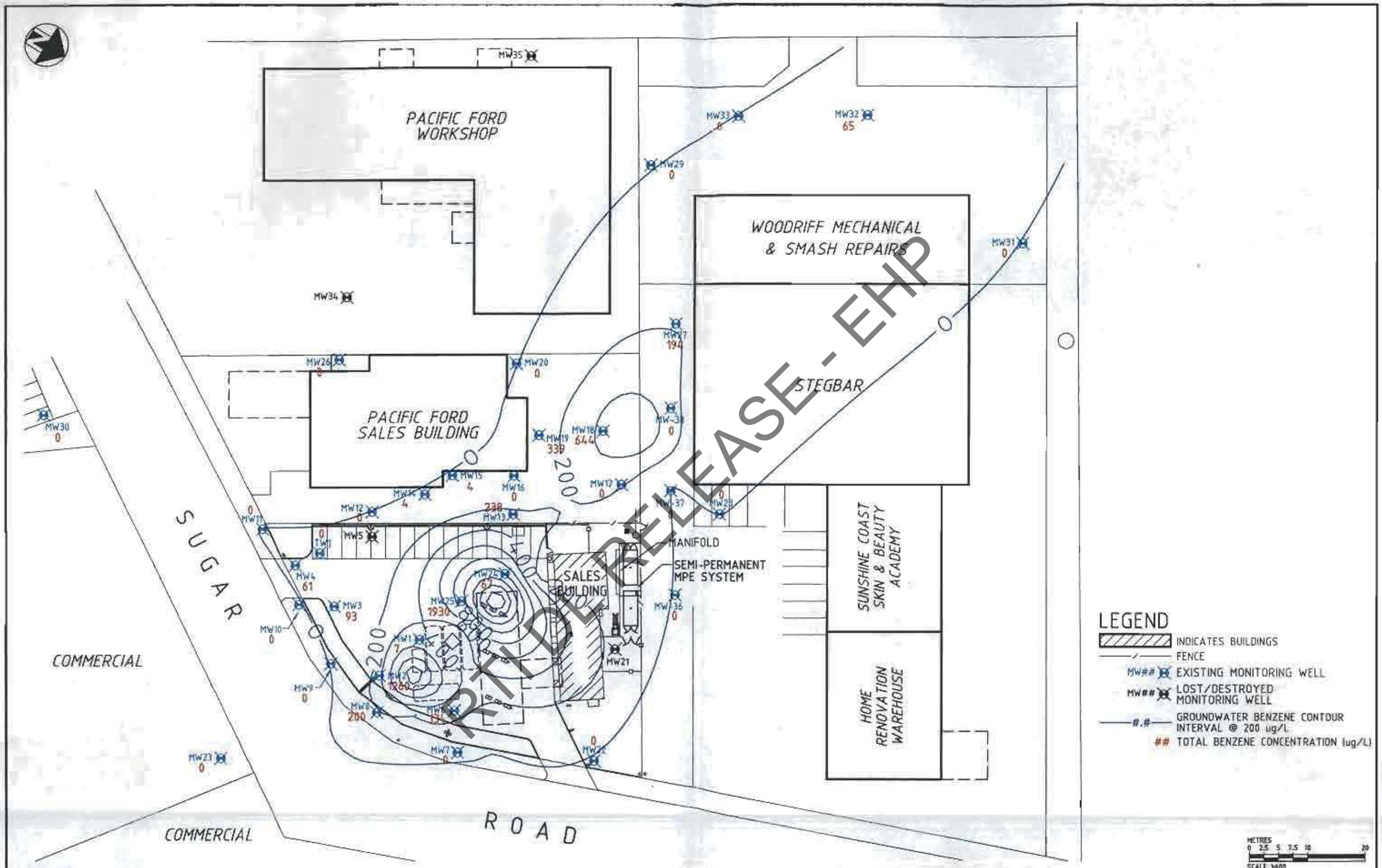
The information in this email together with any attachments is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. There is no waiver of any confidentiality/privilege by your inadvertent receipt

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.

RTI DL RELEASE - EHP



LEGEND

- INDICATES BUILDINGS
- FENCE
- MW## EXISTING MONITORING WELL
- MW## LOST/DESTROYED MONITORING WELL
- #.# GROUNDWATER BENZENE CONTOUR INTERVAL @ 200 ug/L
- ## TOTAL BENZENE CONCENTRATION (ug/L)

METRES 0 2.5 5 7.5 10 20
SCALE 1:600

ISSUE	DATE	AMENDMENTS	DRN	CKD
01	31.08.11	ORIGINAL ISSUE	REM	AB

"COMMERCIAL IN CONFIDENCE"

otek
ABN 32 054 371 586

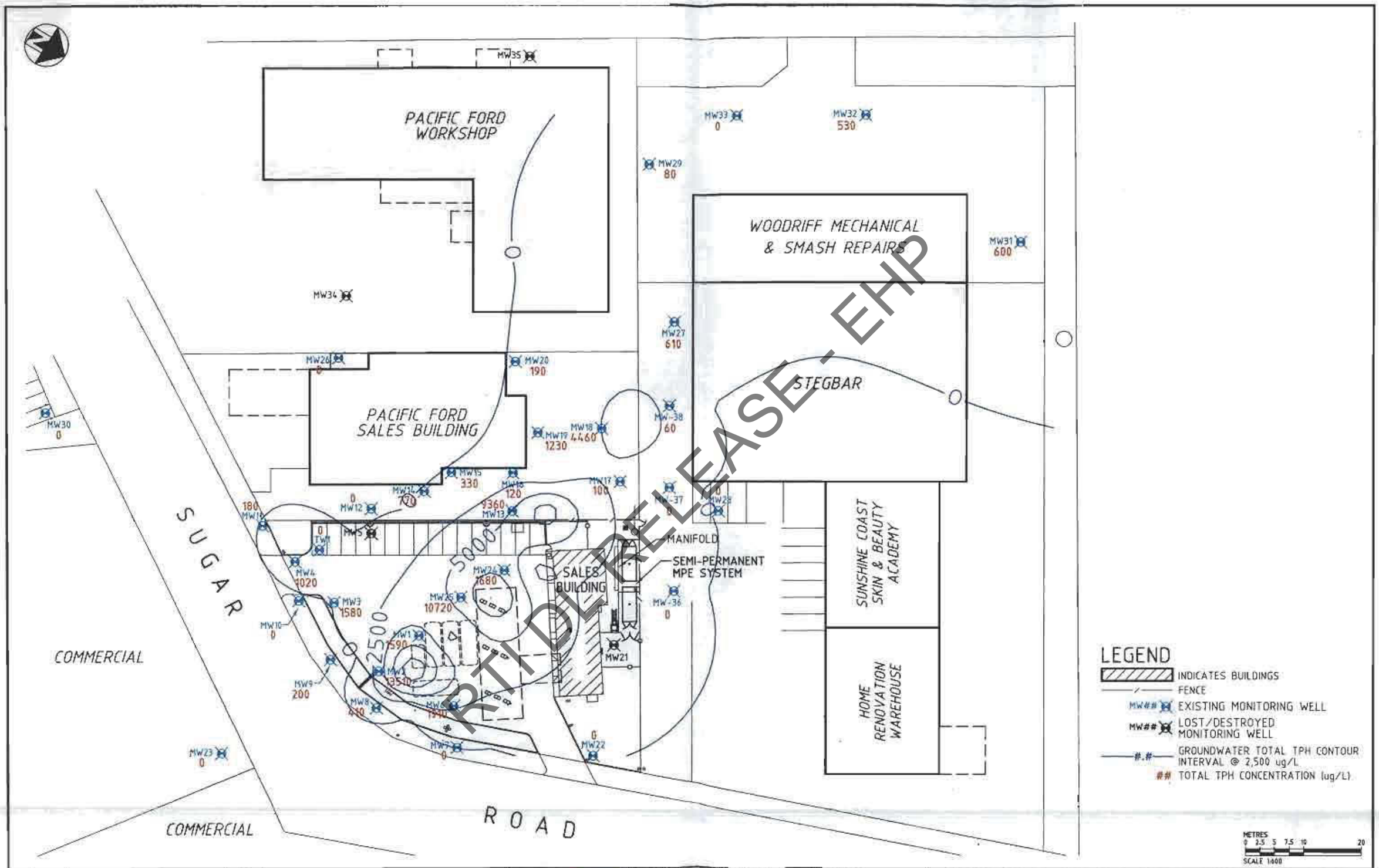
MELBOURNE TEL (03) 9525 5155 FAX (03) 9593 8555
BRISBANE TEL (07) 3426 5200 FAX (07) 3426 5299
ADELAIDE TEL (08) 8423 4480 FAX (08) 8423 4500
SYDNEY TEL (02) 9417 4499 FAX (02) 9417 2314
PERTH TEL (08) 9227 9000 FAX (08) 9227 9009
BEIJING TEL (+86) 10 8840 0302 FAX (+86) 10 8840 0209
www.otek.com.au

INFERRED BENZENE CONTOUR MAP

GROUNDWATER MONITORING EVENT & SYSTEM PERFORMANCE REPORT (JUNE 2011)
MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SHEET SIZE	DRAWN: REM	DATE: 31.08.11	CHECKED	APPROVED	FIG No:
A3	REV: 01	DWG NAME: 5209012F83			FIGURE 4

Release



RTI DISCLOSURE - EHP

ISSUE	DATE	AMENDMENTS	DRN	CKD
01	31.08.11	ORIGINAL ISSUE	REM	AB

"COMMERCIAL IN CONFIDENCE"

OTEK
ABN 32 054 371 596

MELBOURNE TEL (03) 9525 5155 FAX (03) 9593 8555
BRISBANE TEL (07) 3426 5200 FAX (07) 3426 5299
ADELAIDE TEL (08) 8423 4480 FAX (08) 8423 4500
SYDNEY TEL (02) 9417 4499 FAX (02) 9417 2314
PERTH TEL (08) 9227 9000 FAX (08) 9227 9009
BEIJING TEL (+86) 10 8840 0302 FAX (+86) 10 8840 0209
www.otek.com.au

INFERRED TOTAL TPH CONTOUR MAP

GROUNDWATER MONITORING EVENT & SYSTEM PERFORMANCE REPORT (JUNE 2011)
MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SHEET SIZE	DRAWN: REM	DATE: 31.08.11	CHECKED	APPROVED	FIG No:
A3	REV: 01	DWG NAME: 5209012F84			FIGURE 5

O'Connor Gary

From: O'Connor Gary
Sent: 27 April 2012 3:56 PM
To: 'Mack Dreyer'
Cc: 'luis.cifuentes@exxonmobil.com'; 'AHunt@kleinfelder.com'
Subject: Mobil Sugar Road Maroochydore

Mack

As you are aware the former project manager for the above site, Greg O'Brien, sch4p4(6) Personal information I'm following through on a number of matters and request an update, in your role as TPR, on the status of the above site.

In particular I request information on:

The status of hydrocarbon extraction system, including the amount of hydrocarbon recovered;
The most recent groundwater monitoring results;
The results of any recent tank integrity testing; and
The progress of Mobil towards completion of the RAP, as set out under the Remediation Notice.

Regards

Gary O'Connor
Manager, Project Support
Environmental Performance and Coordination Branch

Telephone: 67 7 3330 5708
Facsimile: 61 7 3330 5754
Mobile: sch4p4(6) Personal information

RTI DL RELEASE - EHP

Memorandum

To File | File Reference

From Goe

Subject Summary 120 Sugar Rd Maroochydore | Date 24/4/12.

Initial ESA Dec - Jan 2001 | Notes / gradient at 12mm/m / 3.124/sec

3 BH MW, 20 soil borings

PSH in MW2 & MW6 3.5cm - 1cm — 2001 a dry year

Up to 35 mg/L Benzene & 3mg/L toluene

Additional wells 16/17/10/01 — bores screened below water table

PSH in MW2, 6 & 13 ~~0 37cm~~ 37cm

MPE conducted ~~18/~~ 3/8/2001

Additional bores installed in Oct 2001

(Vacuum truck on MW2 & MW6 for 4hrs)

PSH rose after

~~July~~ Additional bores installed - March 2002

~~GW~~ MW13 thickness 7.2cm

high BTEX conc.

Site listed on CLR 8/10/02 & Remed notice

served Oct 2002 - requirement for RAP so

that land no longer constitute serious env harm

with sufficient info to remove Lot 2 from

CLR & EMR (TRR requirement) + MD /

with complet of RAP within 60 days

RAP submitted 11/11/02

Notice extended to 30/6/05.

IT Env report April 2003 provides figures

with gradients — RAP

MW13 incd 63cm Oct 2002

Feb 2003 MW13 - 16 cm MW7 2.3cm

Sheen on MW6 MW18 MW20

SVE trial late Nov 2002

Draw down tests conducted hydraulic

conductivity 70m/day

$v = K.i$

Report sets out Remedial strategies

interception trench — collect PSH

Sunshine Coast Airport 0408161

RTI DL RELEASE - EHP

Release

Memorandum

(2)

To file

File Reference BNE 9548

From GW

Subject Sugar Rd Summary cont.

Date

Notes

treatment of g/w by air sparging / pulsing
under consulting, MW13 2-8 years old
petrol (likely leaded petrol
Seal of g/w system installed 2004
Chart 5/ PSH thickness in MW13 in Status
report 5/ 30/5/03.

Trench actually put in April 2005

OTEK MPE installed in 2004
& reasonable quantity 5/ material removed

Rang TPR for update will request
view/email

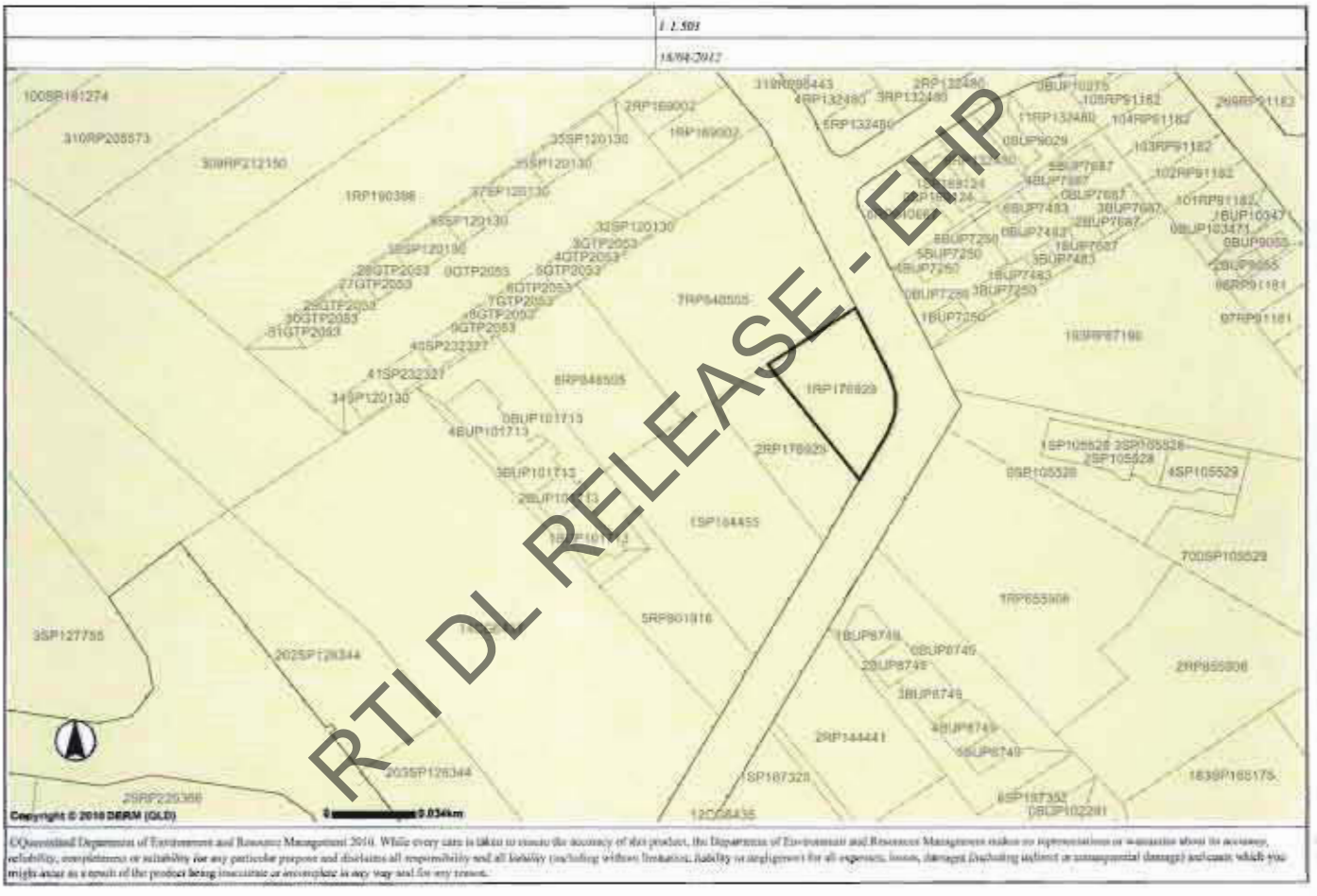
RTI DL RELEASE - EHP

Date	BH No.	SWL mbgl	GW level mAHD	PSH (mm)	Benzene	Toluene	Ethyl benzene	Xylene	C6-9	C10-14	C15-28	C29-36	TPH
9/01/2001	MW1	2.05			35,000	43,000	4,700	27,000	155,000	13,000	1,450	<100	169,450
20/11/2001	MW1	2.543			21,000	28,000	2,500	15,000	76,000	9,000	1,750	264	87,614
21/05/2002	MW1	2.059			29,000	34,000	3,800	23,600	100,000	4,600	360	<100	104,960
21/02/2003	MW1				21,000	26,000	1,800	10,800	80,000	7,500	900	<100	88,400
29/04/2004	MW1	2.038	4.215		3,400	3,600	620	3,600	13,000	4,600	600		18,200
11/01/2011	MW1				37,500	75,500	4,470	31,400	171,000	465,000	46,400	<100	682,400
20/11/2001	MW10	1.97			9	61	13	100	220	80	<100	<100	300
21/05/2002	MW10	1.616			53	9	<1	<3	90	<20	<100	<100	90
21/02/2003	MW10				23	9	2	11	49	<20	<100	<100	49
29/04/2004	MW10	1.715	4.045		<1	<1	<1	<3	640	<20	<100	<100	640
11/01/2011	MW10				<1	3	<1	<3	20	<20	<100	<100	20
20/11/2001	MW11	1.92			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/05/2002	MW11	1.575			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW11				9	8	3	11	30	<20	<100	<100	30
29/04/2004	MW11	1.673	3.739		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW11				<1	<1	<1	<3	<20	<20	<100	<100	<220
20/11/2001	MW12	1.83			1	6	<1	18	60	<20	<100	<100	60
21/05/2002	MW12	1.506			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW12				44	82	8	55	190		<100	<100	190
29/04/2004	MW12	1.352	3.76		28	<1	7	37	240	130	<100	<100	370
11/01/2011	MW12				<50	<50	67	748	2,080	800	270	<100	3,150
20/11/2001	MW13	2.215		365									
21/05/2002	MW13	1.637		72									
21/02/2003	MW13			PSH									
29/04/2004	MW13	1.462	3.646		30,000	57,000	2,800	19,600	110,000	41,000	4,000	900	15,900
11/01/2011	MW13				2,110	10,400	3,130	36,000	212,000	91,200	8,530	<500	313,730
21/05/2002	MW14	1.548			20,000	10,000	1,900	9,700	46,000	2,400	<100	<100	48,400
21/02/2003	MW14				16,000	7,400	1,100	6,100	33,000	1,800	<100	<100	34,800
29/04/2004	MW14	1.515	3.728		42,000	17,000	1,600	9,400	71,000	2,200	400	100	75,700
11/01/2011	MW14				1	<2	5	5	100	290	180	50	620
21/05/2002	MW15	1.617			21,000	3,300	1,600	8,600	27,000	1,400	<100	<100	28,400
21/02/2003	MW15				19,000	4,800	1,100	4,800	32,000	1,700	<100	<100	33,700
29/04/2004	MW15	1.619	3.735		23,000	540	1,100	5,400	31,000	1,800	300	<100	33,100
11/01/2011	MW15				6	<2	30	153	350	510	490	140	1,490
21/05/2002	MW16	1.592			11,000	9,100	910	4,800	29,000	1,100	<100	<100	30,100
21/02/2003	MW16				3,900	2,500	230	1,090	8,300	150	<100	<100	8,450
29/04/2004	MW16	1.495	3.63		8,700	4,900	430	1,690	17,000	1,200	400	<100	18,600
11/01/2011	MW16				2,580	1,040	1,360	10,120	33,600	45,600	8,850	790	88,840
21/05/2002	MW17	1.504			2,800	2,300	200	1,280	7,500	280	<100	<100	7,780
21/02/2003	MW17			PSH									
29/04/2004	MW17	1.305	3.563		19,000	9,900	1,200	4,700	36,000	2,000	3,000	200	41,200
11/01/2011	MW17				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/05/2002	MW18	1.413			8,300	2,400	560	2,670	16,000	1,100	<100	<100	17,100
21/02/2003	MW18				6,000	1,600	320	1,190	9,800	1,100	<100	450	11,350
29/04/2004	MW18	1.438	3.506		16,000	7,200	1,100	4,700	32,000	6,500	4,800	100	43,400
11/01/2011	MW18				2,390	740	274	1,600	8,030	650	550	280	9,510
21/05/2002	MW19	1.687			9,600	3,000	890	4,200	19,000	1,500	<100	<100	20,500
21/02/2003	MW19				12,000	8,600	1,400	7,500	31,000	2,400			33,400
29/04/2004	MW19	1.406	3.538		14,000	7,900	1,300	6,700	32,000	3,300	200	<100	35,500
11/01/2011	MW19												
9/01/2001	MW2	1.65		35									
20/11/2001	MW2	1.742		375									
21/05/2002	MW2	1.667			59,000	80,000	8,100	53,000	217,000	25,000	2,260	118	244,378
21/02/2003	MW2				36,000	42,000	36,000	22,700	110,000	37,000	2,200	630	149,830
29/04/2004	MW2	1.787	4.298		53,000	58,000	5,000	23,800	140,000	28,000	2,200	600	170,800
11/01/2011	MW2				3,440	2,500	1,480	4,630	14,500	5,480	1,130	70	21,180
21/05/2002	MW20	1.729			920	<10	47	200	1,300	70	<100	<100	<220
21/02/2003	MW20				160	240	180	890	2,400	1,600			4,000
29/04/2004	MW20	1.783	3.399		170	3	6	46	320	150	<100	<100	470
11/01/2011	MW20				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
21/05/2002	MW21	0.778			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW21				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW21				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW21				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/05/2002	MW22	0.971			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW22				6	5	2	7	20	<20	<100	<100	20
29/04/2004	MW22	1.615	6.5		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW22				<LOR	210	<LOR	<LOR	1,810	60	340	240	2,450
21/05/2002	MW23	1.676			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW23				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW23				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW23				NR	NR	NR	NR	NR	NR	NR	NR	NR
21/02/2003	MW24				480	370	68	590	1,700	810	<100	<100	2,510
29/04/2004	MW24	2.69	4.053		700	<1	<1	<3	700	360	300	<100	1,360
11/01/2011	MW24				Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
21/02/2003	MW25				31,000	57,000	6,100	37,000	150,000	17,000	1,700	720	169,420
29/04/2004	MW25	2.664	4.063		11,000	25,000	1,800	11,400	50,000	15,000	1,400	200	66,600

RTI DL RELEASE - EHP

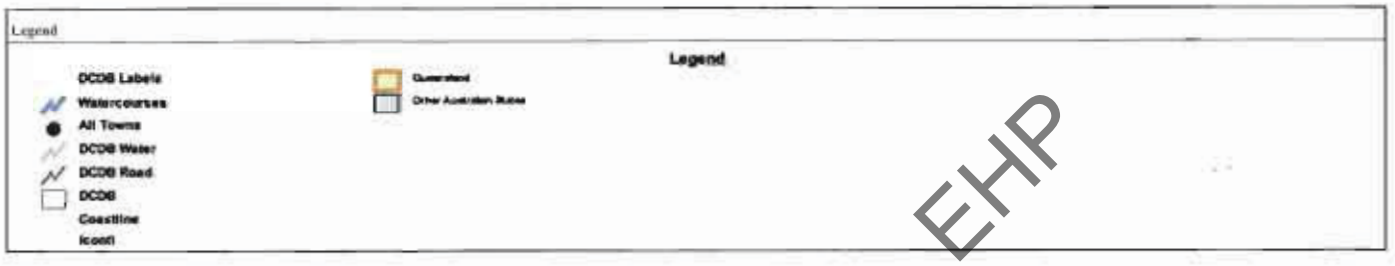
11/01/2011	MW25				143	145	14	180	720	12,100	1,090	100	14,010
21/02/2003	MW26				500	<1	26	98	650	110	<100	<100	760
29/04/2004	MW26	1.84	3.522		150	270	260	1,130	1,800	1,300	200	<100	3,300
11/01/2011	MW26				2	<LOR	<LOR	<LOR	20	<LOR	<LOR	<LOR	20
21/02/2003	MW27				29,000	28,000	2,100	11,700	71,000	4,100	<100	<100	75,100
29/04/2004	MW27	1.994	3.236		38,000	30,000	2,500	13,400	83,000	4,300	300	<100	87,600
11/01/2011	MW27				526	<LOR	29	133	1,000	220	280	80	1,580
21/02/2003	MW28				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW28	1.545	3.729		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW28				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
21/02/2003	MW29				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW29	1.92	3.14		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW29				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	620	110	730
9/01/2001	MW3	1.65			1,600	390	37	210	2,900	140	<100	<100	3,040
20/11/2001	MW3	1.943			860	140	32	100	1,300	40	<100	<100	1,340
21/05/2002	MW3	1.672			370	89	22	84	660	140	<100	<100	800
21/02/2003	MW3				3,100	1,100	140	760	5,600	190	190	<100	5,790
29/04/2004	MW3	1.773	3.966		580	<1	62	110	740	490	<100	<100	1,230
11/01/2011	MW3				1,110		455	1,573	4,140	1,800	550	70	6,560
21/02/2003	MW30				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW30	1.99	3.791		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW30				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	220	120	340
9/01/2001	MW4	1.65			9	6	<1	4	120	<20	<100	<100	120
20/11/2001	MW4	2.012			3	2	<1	<3	90	<20	<100	<100	90
21/05/2002	MW4	1.677			3	<1	<1	3	50	<20	<100	<100	100
21/02/2003	MW4				3	2	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW4	1.785	4.033		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW4				56	<LOR	133	920	1,670	1,460	490	140	4,760
9/01/2001	MW5	2.1			1,000	420	130	670	3,100	260	<100	<100	3,360
20/11/2001	MW5	2.235			9	38	130	600	10,000	360	<100	<100	10,360
21/05/2002	MW5	2.146			2,000	240	150	660	3,400	70	<100	<100	3,470
21/02/2003	MW5				1,500	280	61	347	2,200	160	<100	<100	2,360
29/04/2004	MW5				NR	NR	NR	NR	NR	NR	NR	NR	NR
11/01/2011	MW5				NR	NR	NR	NR	NR	NR	NR	NR	NR
9/01/2001	MW6	1.67		10									
20/11/2001	MW6	1.852		366									
21/05/2002	MW6	1.457			33,000	51,000	4,800	39,000	138,000	69,000	13,300	368	220,668
21/02/2003	MW6				16,000	21,000	2,000	16,600	59,000	32,000	5,400	1,100	975,000
29/04/2004	MW6	1.665	5.061		20,000	30,000	1,800	27,900	79,000	18,000	700	<100	97,700
11/01/2011	MW6				408	1,140	296	1,500	6,380	7,800	1,520	100	15,800
20/11/2001	MW7	1.768			<0.5	<1	<1	<3	<20	<20	<100	<100	<240
21/05/2002	MW7	1.243			<1	<1	<1	<3	<20	<20	<100	<100	<220
21/02/2003	MW7				<1	<1	<1	<3	<20	<20	<100	<100	<220
29/04/2004	MW7	1.523	4.856		<1	<1	<1	<3	<20	<20	<100	<100	<220
11/01/2011	MW7				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
20/11/2001	MW8	1.634			340	42	77	210	820	280	<100	<100	1,100
21/05/2002	MW8	1.196			4,000	510	810	2,410	9,300	1,300	<100	<100	10,600
21/02/2003	MW8				7,200	1,300	340	1,600	8,200	1,200	<100	<100	9,400
29/04/2004	MW8	1.22	4.859		48,000	35,000	2,300	12,200	98,000	6,100	400	<LOR	104,500
11/01/2011	MW8				6,050	5,360	870	4,370	18,400	2,420	290	<LOR	21,110
20/11/2001	MW9	1.973			25	38	8	53	180	40	<100	<100	220
21/05/2002	MW9	1.591			290	1	3	26	420	<20	<100	<100	420
21/02/2003	MW9				820	160	37	121	2,600	<20	<100	<100	2,600
29/04/2004	MW9	1.7	4.192		27	8	1	10	50	<20	<100	<100	50
11/01/2011	MW9				<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
11/01/2011													
11/01/2011													
11/01/2011													

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP

©Queensland Department of Environment and Resource Management 2010. While every care is taken to ensure the accuracy of this product, the Department of Environment and Resource Management makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.



RTI DL RELEASE - EHP

O'Connor Gary

From: Mack Dreyer [mdreyer@butlerpartners.com.au]
Sent: 7 June 2010 2:57 PM
To: O'Brien Greg
Cc: Barry Kim
Subject: Sugar Road
Attachments: enquiries@butlerpartners.com.au_20100607_091924.pdf

Greg

Mobil have had Coffey undertake a risk assessment at the Sugar Road Maroochydore site. I have had Jackie Wright review it and after a bit of correspondence we are at a stage where Jackie is happy with the risk assessment. I have attached a copy of the conclusions of the risk assessment report (including the RBLs). I am happy enough with the outcomes of the risk assessment, but I guess the only thing that concerns me is that there has been an assumption that, as there is reticulated potable water in the area, then off-site groundwater use is not expected. Coffey have done an assessment based on this assumption and I do note that they have done a survey of the area, at this stage no one down gradient of the site is using groundwater. What do you think?

Otek did a GME in January (I have only just got the report) and if anything, the groundwater TPH and Benzene concentrations have increased (PSH was observed at MW1 – where it wasn't observed in the last GME). Otek are arguing that this is because a cone of depression has been created in the impacted area causing more hydrocarbon to be drawn in. Their argument hasn't really been supported by a discussion on the extent of the drawdown and I will get them to do this, but in saying this the fact of the matter is they are continuing to remove large amounts of hydrocarbon (vapour) so the system is working to some extent.

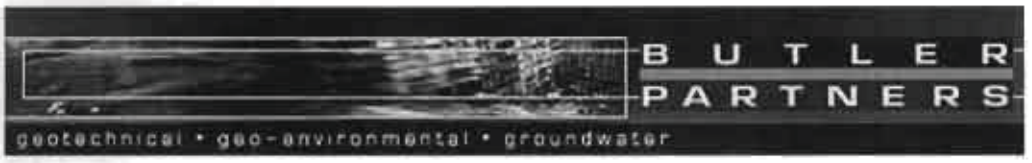
As the system performance data is up until 8 February I will try and get more up to date information. I will let you know when it arrives.

Let me know if you have any questions/issues.

Regards

Mack

RTI DL RELEASE - EHP



Mack Dreyer
Principal
Butler Partners Pty Ltd
79 Doggett Street, Newstead
P.O. Box 2267, Fortitude Valley BC
Queensland, Australia 4006
Ph: +61 (7) 3852 3800
Fax: +61 (7) 3852 3808
Email: mdreyer@butlerpartners.com.au
www.butlerpartners.com.au

The contents of this electronic message and any attachments are intended only for the addressee and may contain privileged or confidential information. They may only be used for the purposes for which they were supplied. If you are not the addressee, you are notified that any transmission, distribution, downloading, printing or photocopying of the contents of this message or attachments is strictly prohibited. The privilege of confidentiality attached to this message and attachments is not waived, lost or destroyed by reason of mistaken delivery to you. If you receive this message in error please notify the sender by return email or telephone.

This footnote also confirms that this message has been swept to the best of our current abilities for the presence of computer viruses. You should NOT take this as any guarantee or warrant that such material is virus free, and should apply virus detection techniques appropriate to your security requirements BEFORE using any material attached to this message.

RTI DL RELEASE - EHP

12 CONCLUSION

A quantitative HERA has been conducted by Coffey Environments to evaluate the potential impacts on human health posed by petroleum hydrocarbon impacted media currently identified on-site and off-site inferred to be associated with the Former Mobil Maroochydore Service Station (QL3815).

Based on available data and constraints of the assessment model, groundwater fate and transport modelling indicates that when the groundwater plume reaches stabilised conditions, marine ecological water quality guidelines (ANZECC & ARMCANZ, 2000) for benzene (500µg/L), toluene (180µg/L), ethylbenzene (5µg/L) and xylene (425µg/L – sum of xylene isomers) may be exceeded up to distances of 45m, 60m, 60m, and 40m (respectively) hydraulically down-gradient of the source zone. As the closest marine water system is a lagoon located approximately 500m to the south-west of the site, marine ecosystems are unlikely to be impacted as a result of the identified impact. Note that for the purpose of this assessment, these transport distances should be applied hydraulically down-gradient from the leading edge of the migrated LNAPL body, which was assumed to be at MW13.

Groundwater modelling requires a number of assumptions regarding the site conceptual model, aquifer characteristics and source composition. Parameter estimates introduce uncertainty in groundwater models. The current model had three calibration points of known contaminant concentrations and measured aquifer properties. The model calibrated well with expected values, therefore there is considered to be confidence in the model predictions.

Given COPC concentrations within the groundwater plume exceed criteria established for potable and recreational use, groundwater on-site and off-site within the area of investigation may not be suitable for extractive uses. No known registered or unregistered groundwater extraction bores currently exist within the current known extent of the groundwater contaminant plume and there is a reticulated water supply in the area. Therefore, future extractive use of groundwater is considered unlikely. However, extraction of groundwater within the current / future extent of the hydrocarbon plume should be restricted until such time as impact is reduced to acceptable levels.

Based on available data, exposure assumptions and constraints of the exposure assessment model, it was considered that measured COPC concentrations in groundwater, as presented in this report, may pose an unacceptable health risk to:

- potential future off-site residential occupants within a slab-on-ground residential dwellings at 120 Sugar Road where vapours emitted within the sub-surface migrate into a slab-on-ground structure;
- potential future off-site residential occupants within a single level basement structure at 120 Sugar Road where vapours emitted within the sub-surface migrate into a basement structure;
- off-site maintenance workers within a sub-surface maintenance trench where workers come into direct contact with petroleum hydrocarbon impacted groundwater, and/or inhale COPC vapours emitted from impacted groundwater within the trench; and
- off-site construction workers within a single level basement excavation at 120 Sugar Road where workers come into direct contact with petroleum hydrocarbon impacted groundwater, and/or inhale COPC vapours emitted from impacted groundwater within the excavation.

RTI DL RELEASE - EIP

RBLs – 120 Sugar Road

The property at 120 Sugar Road, which is immediately south of the site, is unlikely to be redeveloped in the future to a residential land use but this land use setting is likely to be the criteria against which potential removal of the site from the EMR is to be assessed. The RBLs derived for 120 Sugar Road are presented in the table below.

COPC	Slab-on-ground Residential Dwelling [mg/L]	Single Level Residential Basement with Passive Ventilation [mg/L]	
		Carpark	Storeroom
	Vapour Inhalation	Vapour Inhalation	Vapour Inhalation
Benzene	1.0 (1)	2.1 (1)	1.1 (1)
	1.3 (2)	2.8 (2)	3.5 (2)
Toluene	54	100 (2)	123 (2)
Ethylbenzene	>Sol	>Sol	>Sol
Xylenes	>Sol	>Sol	>Sol
Naphthalene	0.97 (2)	4.2 (2)	4.6 (2)
1,2-dichloroethane (3)	442 (2)	1,310 (2)	1,660 (2)
TPH C_6-C_9 Aliphatic	>Sol	3.5 (2)	4.4 (2)
TPH C_{10}-C_{14} Aromatic	10 (2)	24 (2)	>Sol
TPH C_{10}-C_{14} Aliphatic	>Sol	>Sol	>Sol

COPC	Sub-surface Maintenance Trench [mg/L]		Single Level Basement Construction Excavation [mg/L]	
	Vapour Inhalation	Direct Contact	Vapour Inhalation	Direct Contact
Benzene	3.5 (1)	5.4 (1)	51 (1)	40 (1)
	5.4 (2)	8.0 (2)	2.6 (2)	2.0 (2)
Toluene	261 (2)	978 (2)	129 (2)	244 (2)
Ethylbenzene	>Sol	257 (2)	>Sol	64 (2)
Xylenes	>Sol	101 (2)	>Sol	25 (2)
Naphthalene	0.52 (2)	2.5 (2)	0.36 (2)	0.63 (2)
1,2-dichloroethane (3)	636 (2)	19 (1)	>Sol	141 (1)
TPH C_6-C_9 Aliphatic	>Sol	13 (2)	>Sol	3.2 (2)
TPH C_{10}-C_{14} Aromatic	>Sol	5.1 (2)	16 (2)	1.3 (2)
TPH C_{10}-C_{14} Aliphatic	>Sol	83 (2)	3.8 (2)	21 (2)
TPH C_{15}-C_{28} Aromatic	N/A	22 (2)	N/A	5.6 (2)
TPH C_{16}-C_{28} Aliphatic	N/A	946 (2)	N/A	236 (2)
TPH C_{29}-C_{36} Aromatic	N/A	17 (2)	N/A	4.2 (2)
TPH C_{29}-C_{36} Aliphatic	N/A	946 (2)	N/A	236 (2)

N/A Not applicable – not considered as a COPC for the exposure scenario.

>Sol The calculated RBL is greater than the saturated concentration of the chemical in water.

1 Carcinogenic (non-threshold) toxicological end-point for benzene.

2 Non-carcinogenic (threshold) toxicological end-point for benzene.

3 Also known as ethylene dichloride and 1,2-DCA

RTI DL RELEASE - EHP

Release

Application of RBLs – 120 Sugar Road

The RBLs were derived in order to be protective of human health and it is important to note that for some substances other impacts may require assessment should acceptable health endpoints be met. These may include aesthetic considerations (including odour impacts), ecological impacts or impacts to soil due to absorption and adsorption. Considerations other than human health have not been considered in this assessment.

Given the complexity associated with assessing mixtures, where more than one non-threshold COPC is reported in a sample, the HI must be calculated using a weighed approach. This approach is consistent with the HERA process for addressing potential additivity of non-threshold COPC in a contaminant mixture.

Where TPH fraction data is not separated into aromatic/aliphatic fractions, as a conservative measure it is recommended that the aromatic RBL be adopted.

The HERA has been limited to addressing the impacts of selected substances, to an assumed receptor population under specific exposure scenarios, based on information available at the time of the assessment. The risk assessment approach presented does not consider a fully probabilistic estimate of risk, but presents conditional estimates based on a number of assumptions regarding exposure and toxicity consistent with the nationally endorsed regulatory approach. Further assessments are required to properly assess risk where site uses vary from the assumed site conditions and/or exposure settings used in this risk assessment.

This report must be read in conjunction with the attached 'Important Information about Coffey Environments Report for Mobil'.

RTI DL RELEASE - EHP

O'Connor Gary

From: Mack Dreyer [mdreyer@butlerpartners.com.au]
Sent: 3 February 2010 4:50 PM
To: Greg O'Brien
Subject: Sugar Road
Attachments: enquiries@butlerpartners.com.au_20100203_155814.pdf; enquiries@butlerpartners.com.au_20100203_164838.pdf; enquiries@butlerpartners.com.au_20100203_164901.pdf

Greg

Just to keep you in the loop, I have had a meeting with Mobil and Otek regarding Sugar Road. The remediation system is continuing to operate and they are still recovering 20 to 30 kgs hydrocarbon mass per day with upwards of 2,750 kg removed in total (I have attached a Figure I was presented with at the meeting). I did express concern that these numbers seem to be very high considering the impact that was identified on the site and Otek are adamant that the results are real. They say they have spot checked their equipment with duplicate instruments and the results are reproducing well.

I also asked that if this is the case then what is happening to the vapour from the system. Basically they didn't have an answer for this other than to say it was being put up the stack (I thought they had activated carbon polishing on the stack but apparently they don't). Consequently I have asked for a risk assessment and Ausplume model to establish if further off gas treatment is required. Mobil have agreed that this assessment needs to be undertaken.

Otek undertook a limited GME in early January and as a result of this GME Otek have turned off the vacuum to five of the peripheral wells (results generally approaching LOR) . I was advised that the wells turned off were MW9, 10, 14, 15 and 20. This is the first I had heard of this and at this stage I don't have a big drama with it although I am not sure I entirely agree with MW15 being turned off.

Removing these wells from the system has increased the vacuum at the remaining wells and this resulted in a slight increase in recovery as shown on the graph in late January early February. I should point out that MW16 is not currently connected to the system but it is being connected at the moment and they should be able to pull from it shortly.

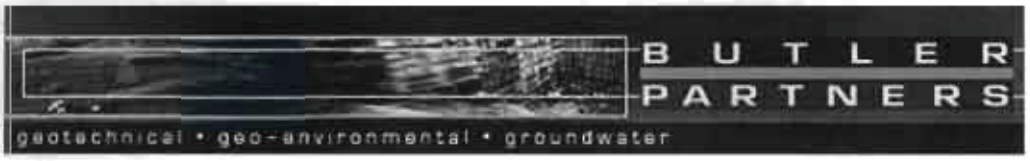
It is also worth noting that on-site groundwater TPH/BTEX results appear to have increased (as observed in the January monitoring round) as a result of the remediation works (impact being mobilised?) which probably means we still have some way to go to have this problem addressed.

Give me a call if you have any questions.

Regards

Mack

RTI DL RELEASE - EHP

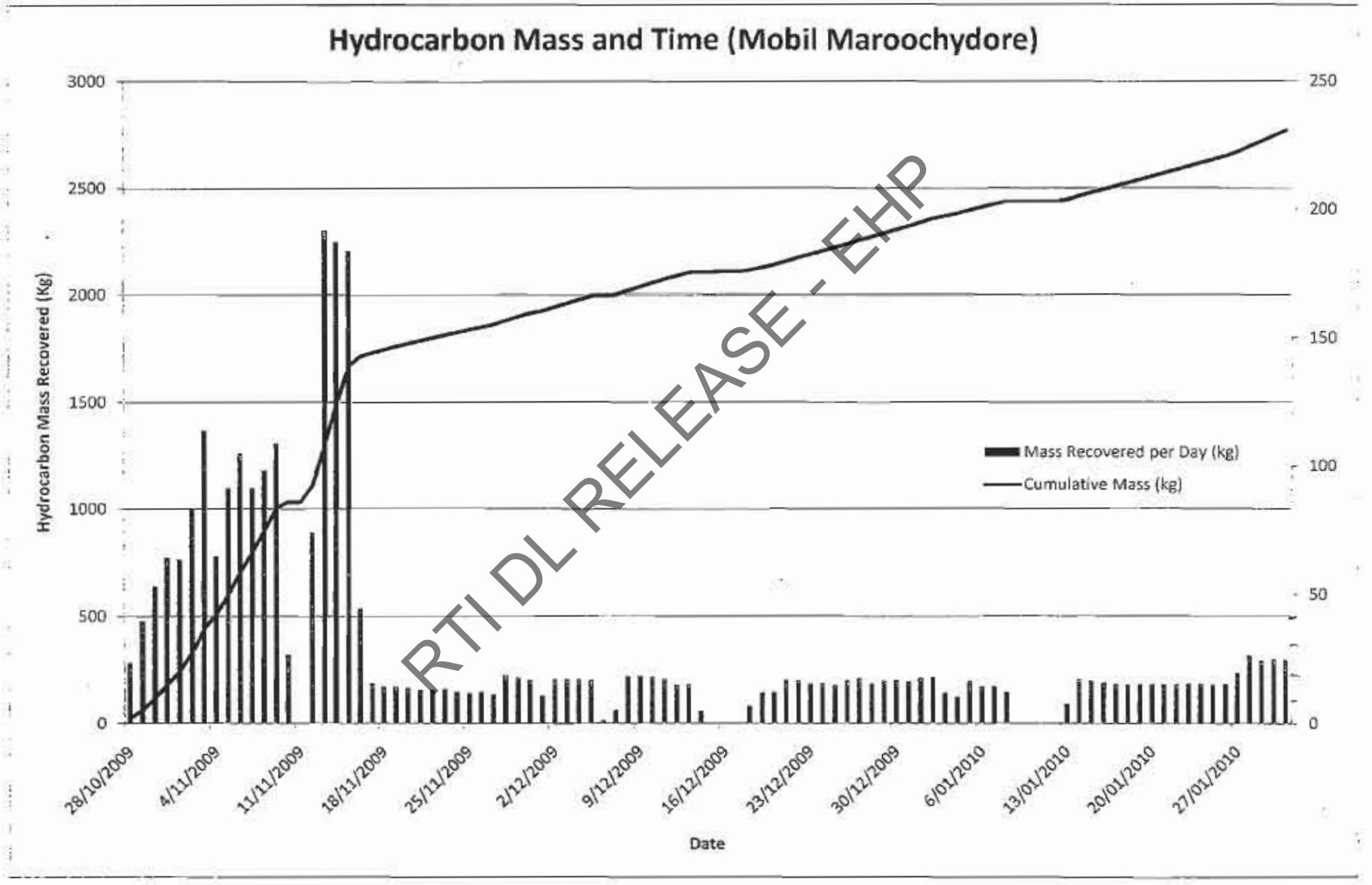


Mack Dreyer
Principal
Butler Partners Pty Ltd
79 Doggett Street, Newstead
P.O. Box 2267, Fortitude Valley BC
Queensland, Australia 4006
Ph: +61 (7) 3852 3800
Fax: +61 (7) 3852 3808
Email: mdreyer@butlerpartners.com.au
www.butlerpartners.com.au

The contents of this electronic message and any attachments are intended only for the addressee and may contain privileged or confidential information. They may only be used for the purposes for which they were supplied. If you are not the addressee, you are notified that any transmission, distribution, downloading, printing or photocopying of the contents of this message or attachments is strictly prohibited. The privilege of confidentiality attached to this message and attachments is not waived, lost or destroyed by reason of mistaken delivery to you. If you receive this message in error please notify the sender by return email or telephone.

This footnote also confirms that this message has been swept to the best of our current abilities for the presence of computer viruses. You should NOT take this as any guarantee or warrant that such material is virus free, and should apply virus detection techniques appropriate to your security requirements BEFORE using any material attached to this message.

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP

TABLE 3
CURRENT ANALYTICAL SUMMARY - GROUNDWATER SAMPLES (TPH and BTEX)
Mobil Oil Australia
Neumann Service Station - Maroochydore, Queensland (QL3815)

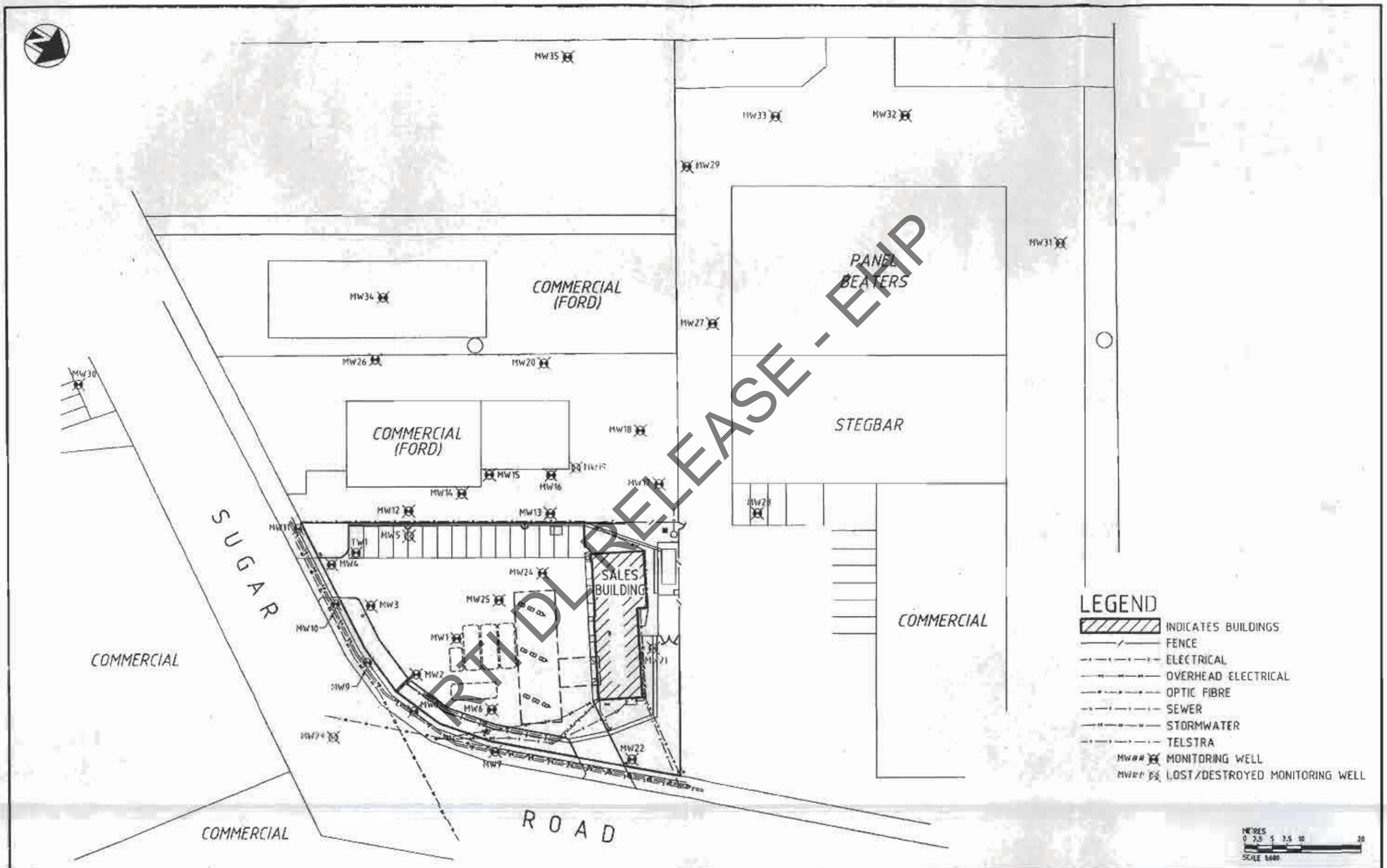
OTEK
Practical Environmental Solutions

		TPH					BTEX				
		TPH C_6-C_9 Fraction	TPH C_{10}-C_{14} Fraction	TPH C_{15}-C_{28} Fraction	TPH C_{29}-C_{36} Fraction	Total TPH	Benzene	Toluene	Ethylbenzene	o-Xylene	m,p-Xylene
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LOR		20	50	100	50	^	1	2	2	2	2
Anzecc Guidelines (2000)		Refer to comments below.					950	180	80	200	350
Sample ID	Date Sampled										
MW-1	11-January-2010	171000	465000	45400	<2570	682400	37500	75500	4470	22500	6900
MW-2	11-January-2010	14500	5480	1130	70	21180	3440	2500	1480	3420	1210
MW-3	11-January-2010	4140	1800	530	70	6560	1110	<50	455	1500	73
MW-4	11-January-2010	2670	1460	490	140	4760	56	<50	133	920	<50
MW-6	11-January-2010	6380	7800	1520	100	15800	408	1140	296	1020	493
MW-7	11-January-2010	<20	<50	<100	<50	nd	<1	<2	<2	<2	<2
MW-8	11-January-2010	18400	2420	280	<50	21110	6050	6360	870	3110	1260
MW-9	11-January-2010	<20	<50	<100	<50	nd	<1	<2	<2	<2	<2
MW-10	11-January-2010	20	<50	<100	<50	20	<1	3	<2	2	<2
MW-11	11-January-2010	<20	<50	<100	<50	nd	<1	<2	<2	<2	<2
MW-12	11-January-2010	2080	800	270	<50	3150	<50	<50	67	748	<50
MW-13	11-January-2010	212000	93200	8530	<490	313730	2110	10400	3130	25400	10600
MW-14	11-January-2010	100	290	180	50	620	1	<2	5	5	<2
MW-15	11-January-2010	350	510	490	140	1490	6	<2	30	145	8
MW-16	11-January-2010	33600	45600	8650	790	88640	2580	1040	1360	7350	2770
MW-17	11-January-2010	Inaccessable at time of sampling due to vehicle being parked over well									
MW-18	11-January-2010	8030	650	550	280	9510	2390	740	274	1220	381
MW-20	11-January-2010	<20	<50	<100	<50	nd	<1	<2	<2	<2	<2
MW-22	11-January-2010	1810	60	340	240	2450	<50	210	<50	<100	<50
MW-24	11-January-2010	Well dry. Unable to be sampled									
MW-25	11-January-2010	720	12100	1090	100	14010	143	145	14	124	59
MW-26	11-January-2010	20	<50	<100	<50	20	2	<2	<2	<2	<2
MW-27	11-January-2010	1000	120	280	80	1580	526	<2	29	102	31
MW-28	11-January-2010	<20	<50	<100	<50	nd	<1	<2	<2	<2	<2
MW-29	11-January-2010	<20	<20	620	110	730	<1	<2	<2	<2	<2
MW-30	11-January-2010	<20	<50	220	120	340	<1	<2	<2	<2	<2
MW-31	11-January-2010	<20	<50	130	110	240	<1	<2	<2	<2	<2
MW-32	11-January-2010	60	<50	<100	<50	60	5	<2	<2	18	<2
MW-33	11-January-2010	<20	<50	250	120	370	<1	<2	<2	<2	<2
TW-1	11-January-2010	50	<50	480	720	1250	<1	<2	<2	<2	<2

RTI DL RELEASE - EHP

Notes:
- Sample ID: MW# and TW-1 denotes a discrete groundwater sample obtained from a monitoring well;
- "<#" or "nd" indicates analyte not detected above laboratory Limit Of Reporting (LOR);
- ^denotes that LOR is not applicable for summed totals of analyte groups;
- ug/L indicates milligrams of analyte per litre of water;
- Semi volatile analyte LORs were raised for samples MW-1 and MW-13 as dilution was required during laboratory analysis due to the presence of high concentrations of contaminants;
- Volatile analyte LORs were raised for samples MW-3, MW-4, MW-6 and MW-12 as dilution was required during laboratory analysis due to the presence of high concentrations of contaminants;
- Analytical results have not been compared to Site Specific Target Level (SSTL) criteria as none have yet been approved for this site. Upon approval of SSTLs this data may be compared to SSTL criteria; and
- ANZECC do not specify threshold concentrations for TPH compounds in waters. Where elevated TPH concentrations are detected, the results are assessed based on TPH concentrations and the relative ratio of TPH fractions present. Where TPH compounds are detected and oil or grease is the suspected source of the TPH, analysis of the sample for oil and grease may be warranted. The NSW Clean Waters Act 1970 and NSW Protection of the Environment Operations Act 1997 and associated regulations prohibit the pollution of waters by any grease or oil, although licensed discharges under the Clean Waters Act are required to be "visually free" of oil and grease. NSW EPA (1994) suggest that "visually free" is approximately equivalent to an oil and grease concentration of <10,000 ug/L.

Release



RTI DL RELEASE - EHP

ISSUE	DATE	AMENDMENTS	DRN	CKD
01	21.01.10	ORIGINAL ISSUE	REM	SET

otek
ABN 32 054 371 596

MELBOURNE TEL (03) 9525 5155 FAX (03) 9525 5555
BRISBANE TEL (07) 3426 5200 FAX (07) 3426 5299
SYDNEY TEL (02) 9417 4499 FAX (02) 9417 2314
PERTH TEL (08) 9227 9000 FAX (08) 9227 9009
www.otek.com.au

SITE LAYOUT & MONITORING WELL LOCATIONS

MOBIL OIL AUSTRALIA, MAROOCHYDORE, QLD

SHEET SIZE	DRAWN: REM	DATE: 21.01.10	CHECKED	APPROVED	FIG No:
A3	REV: 01	DWG NAME: 5209012F02			FIGURE 2

O'Connor Gary

From: Mack Dreyer [mdreyer@butlerpartners.com.au]
Sent: 11 January 2010 10:49 AM
To: Greg O'Brien
Subject: Sugar Road
Attachments: Maroochydore Recovery Data (2).xls

Greg

I hope you had a good break.

Just to keep you in the loop I have asked Mobil/Otek to give me an update on progress at Sugar Road. It looks like I will be meeting with Otek and Mobil (including Melbourne based Mobil reps) on either the 3rd or 4th of Feb to get a complete rundown. In the mean time they have provided me with the information attached. I do not have the raw data to check the information provided but taking the data at face value the recoveries are substantial (to be honest the results look too big and if we were pulling this much mass out of the system I would have expected to have seen a lot more product on the site). In any event the system certainly appears to be pulling mass out of the site and appears to be a lot more effective than the old system.

If you have any questions give me a call. I will let you know how I go with this meeting in early February.

Regards

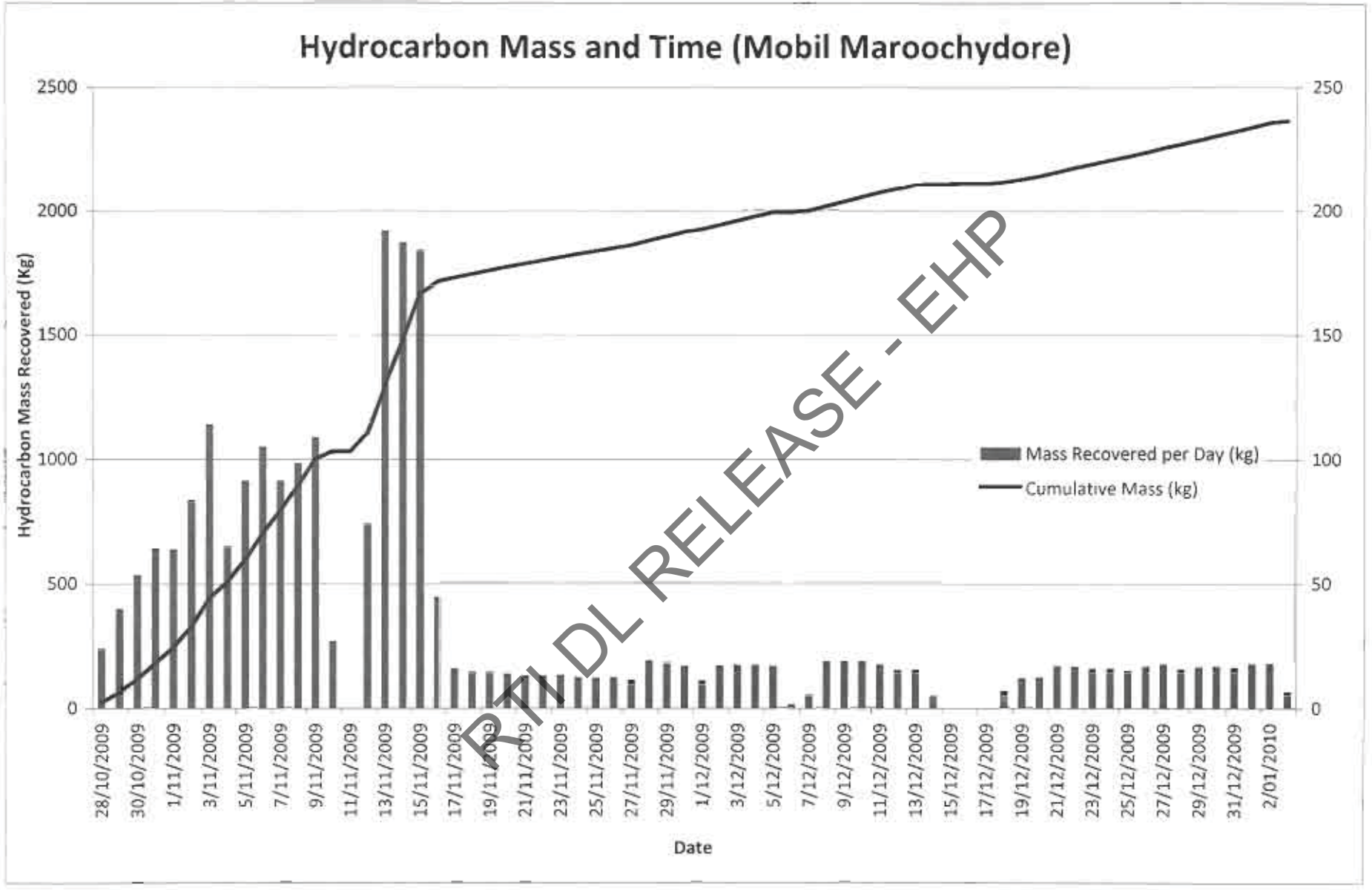
Mack

Mack Dreyer
Principal
Butler Partners Pty Ltd
79 Doggett Street, Newstead
P.O. Box 2267, Fortitude Valley BC
Queensland, Australia 4006
Ph: +61 (7) 3852 3800
Fax: +61 (7) 3852 3808
Email: mdreyer@butlerpartners.com.au
www.butlerpartners.com.au

The contents of this electronic message and any attachments are intended only for the addressee and may contain privileged or confidential information. They may only be used for the purposes for which they were supplied. If you are not the addressee, you are notified that any transmission, distribution, downloading, printing or photocopying of the contents of this message or attachments is strictly prohibited. The privilege of confidentiality attached to this message and attachments is not waived, lost or destroyed by reason of mistaken delivery to you. If you receive this message in error please notify the sender by return email or telephone.

This footnote also confirms that this message has been swept to the best of our current abilities for the presence of computer viruses. You should NOT take this as any guarantee or warrant that such material is virus free, and should apply virus detection techniques appropriate to your security requirements BEFORE using any material attached to this message.

RTI DL RELEASE - EHP



RTI DL RELEASE - EHP

O'Connor Gary

From: Mack Dreyer [mdreyer@butlerpartners.com.au]
Sent: 28 October 2009 11:17 AM
To: Greg O'Brien
Subject: Maroochydore

Greg

I hope you are feeling better.

Just as a bit of an update on the site inspection I did on Monday at Sugar Road:

- The new MPE system was up and running and had been running since Saturday. The equipment appears to have adequate capacity for the job at hand (pumps etc).
- Since Saturday they had removed 16000 L of water.
- They were pulling vapour at 240 m3/hr.
- The vapour had started off at 99% LEL but by Monday was down to 30% LEL.
- OTEK are going to be doing maintenance twice a week for the first couple of weeks and then this will be reduced as the system settles down.
- They are looking at doing a targeted groundwater monitoring event at the end of November. I have advised them to sit down with me to work out what wells they will be monitoring and how they do it. I do have some concerns with the fact that most of the monitoring wells are hooked up to the MPE system and as a result we may not get reliable information.
- I have asked OTEK to keep me informed on what they do with the depth of the stingers down the wells.

Overall I think this system should be more effective in removing impact than the previous system, but I may not be as optimistic as OTEK are. Mobil/Otek have offered to show you the system if you want. I might do another inspection late November/early December when they are doing the GME.

Give me a call if you have any questions.

Regards

Mack

RTI DL RELEASE - EHP

Mack Dreyer
Principal
Butler Partners Pty Ltd
79 Doggett Street, Newstead
P.O. Box 2267, Fortitude Valley BC
Queensland, Australia 4006
Ph: +61 (7) 3852 3800
Fax: +61 (7) 3852 3808
Email: mdreyer@butlerpartners.com.au
www.butlerpartners.com.au

The contents of this electronic message and any attachments are intended only for the addressee and may contain privileged or confidential information. They may only be used for the purposes for which they were supplied. If you are not the addressee, you are notified that any transmission, distribution, downloading, printing or photocopying of the contents of this message or attachments is strictly prohibited. The privilege of confidentiality attached to this message and attachments is not waived, lost or destroyed by reason of mistaken delivery to you. If you receive this message in error please notify the sender by return email or telephone.

This footnote also confirms that this message has been swept to the best of our current abilities for the presence of computer viruses. You should NOT take this as any guarantee or warrant that such material is virus free, and should apply virus detection techniques appropriate to your security requirements BEFORE using any material attached to this message.

RTI DL RELEASE - EHP

Release

O'Connor Gary

From: Mack Dreyer [mdreyer@butlerpartners.com.au]
Sent: 13 October 2009 11:35 AM
To: Greg O'Brien
Subject: Sugar Road Maroochydore

Greg

For something other than Binary, I thought I would give you an update on the Sugar Road site.

Mobil have parted ways with Coffey on the site and the remediation system that was installed by Coffey has been decommissioned. Essentially the system was unreliable (the system was off line for large periods of time over recent years) and while no significant detections of PSH had been made over the site in recent years, the installed system was having very limited success in controlling the dissolved phase plume (the system really was designed to remove PSH).

OTEK were commissioned earlier in the year to run a MPE trial on the site. This was done in June and a report on the trial produced in August. While I am not necessarily a big supporter of MPE on dissolved phase plumes it does appear that the trial was moderately successful (and removed more hydrocarbon from the site in a few days than had been achieved for some time with the old system). Mobil subsequently engaged OTEK to install a permanent MPE system on the site. This system was delivered last week and was to be up and running by early this week. I am still waiting for a call back to see if this did happen.

The new MPE system hooks up to the previous system's groundwater extraction network and will also be pulling from a series of off-site wells.

Coffey completed a risk assessment before they were kicked off the job. This has been submitted to me and I have sent it on to Jackie Wright to review. I am expecting her comments back in the next couple of days.

Mobil are going up to do an audit on the site (Andrew Hunt is coming up from Melbourne) on Monday 26 October and I figured that this might be a good time to go up and see how the system was operating as there will be representatives there from both OTEK and Mobil. They should also have a couple of weeks worth of operating data so I should be able to get a feel for how the system is going. Do you want to come up and have a look at the site as well (I could give you a lift), not that there will be much to see but it will at least raise the flag and let them know that we are serious about getting this matter resolved one way or the other.

Regards

Mack

PTI DL RELEASE - EHP

Mack Dreyer
Principal
Butler Partners Pty Ltd
79 Doggett Street, Newstead
P.O. Box 2267, Fortitude Valley BC
Queensland, Australia 4006
Ph: +61 (7) 3852 3800
Fax: +61 (7) 3852 3808
Email: mdreyer@butlerpartners.com.au
www.butlerpartners.com.au

The contents of this electronic message and any attachments are intended only for the addressee and may contain privileged or confidential information. They may only be used for the purposes for which they were supplied. If you are not the addressee, you are notified that any transmission, distribution, downloading, printing or photocopying of the contents of this message or attachments is strictly prohibited. The privilege of confidentiality attached to this message and attachments is not waived, lost or destroyed by reason of mistaken delivery to you. If you receive this message in error please notify the sender by return email or telephone.

This footnote also confirms that this message has been swept to the best of our current abilities for the presence of computer viruses. You should NOT take this as any guarantee or warrant that such material is virus free, and should apply virus detection techniques appropriate to your security requirements BEFORE using any material attached to this message.

RTI DL RELEASE - EHP

Release

Queensland Government

Enquiries Greg O'Brien
Telephone 32244514
Your reference DRH:DRH:VS:070684
Our reference BNE9848

Environmental Protection Agency
Incorporating the
Queensland Parks and Wildlife Service

13 March 2008

Donnie Harris
Roberts Nehmer McKee Lawyers
Level 1/111 Charters Towers road
Townsville Qld 4810

Dear Mr Harris

BEMEROO HOLDINGS PTY LTD, 120 SUGAR ROAD, ALEXANDRA HEADLAND

I refer to your letter faxed 28 February 2008 regarding negotiations to purchase the above property (the subject land).

The subject land has been impacted by an underground petroleum hydrocarbon fuel leak that occurred prior to 2003 on the adjacent service station site. The fuel leak has contaminated soil and groundwater on the service station site and on adjacent properties including the subject land.

In 2003 the Environmental Protection Agency (EPA) placed a Notice to remediate the site affected by contamination on Mobil Oil Australia under Section 391 of the Environmental Protection Act 1994. The Notice required, among other issues, remediation of the subject land to an extent that would enable its removal from the Contaminated Land Register (CLR).

After some access issues from the site lessee were resolved, a soil/vapour extraction (SVE) plant on the service station site was connected to a set of groundwater wells some of which are on the subject land. Other interception and remediation works were also undertaken. The SVE plant effectively places the grid of wells under vacuum drawing the petroleum contaminants and vapour into the plant for collection and treatment.

In order to enable the site businesses to keep operating, the wells were installed out of normal business hours. The SVE plant is able to run intermittently without interfering with the daily business activities on the affected lands.

While there has been progress in halting the spread of the contamination and for the SVE plant and natural biodegradation processes to remove and destroy contaminants, recent well sampling has shown that an unsatisfactory level of contamination remains in at least one well on the subject land. It can be inferred that the subject land is not satisfactorily decontaminated at this stage.

RTI DL RELEASE - EHP

160 Ann Street Brisbane
Queensland 4000 Australia
PO Box 15155 City East
Queensland 4002 Australia
Telephone 61 7 32244514
Facsimile 61 7 32277677
Website www.epa.qld.gov.au
ABN 87 221 158 786

Printed on 100% recycled paper

Release

The extraction and treatment program will continue to operate until such time as the land can be removed from the EMR.

Decontamination programs of this type have varied success and typically require long time frames over some years to reach a satisfactory outcome. The EPA has appointed an independent Third Party Reviewer under the Notice requirements to oversee the work of the consultant engaged by Mobil to address the remediation. The EPA is waiting on an update report on recent monitoring of the site and overall progress with site remediation from the TPR which will assist with future direction on the overall remediation plan.

The EPA maintains the view that the site is to be restored under the terms of the Notice but is aware of the complexities in application of suitable remediation technology, the long remediation timeframes and the maintenance of daily business activities on the affected lands. At this point the EPA considers that the land can be used for industrial uses provided no subsurface excavation is undertaken by the site owner or lessee without EPA approval.

Please contact the undersigned should you require any additional information.

Yours sincerely

Greg O'Brien
Chief Scientific Advisor

RTI DL RELEASE - EHP