

PROJECT
THIRD PARTY AUDIT 2011 - 2012
MORANBAH GAS PROJECT
QUEENSLAND

PREPARED FOR
ARROW ENERGY LTD

DATE
DECEMBER 2012

RTI DL Release

**+GILBERT
SUTHERLAND**

DOCUMENT CONTROL

DOCUMENT 11081_AUD_REH1F.docx

TITLE Third Party Audit 2011-2012, Moranbah Gas Project, Queensland

PROJECT MANAGER

AUTHOR(S) sg3 73

CLIENT Arrow Energy Ltd

CLIENT CONTACT

CLIENT REFERENCE – 2011 – 2012 Third Party Audit

SYNOPSIS This document constitutes the October 2011 to October 2012 third party environmental compliance audit for works undertaken under Environmental Authorities PEN100015907, for the Moranbah Gas Project, Queensland. This report summarises the findings of audit interviews and site inspections conducted by Gilbert & Sutherland between 20 and 22 November 2012.

REVISION HISTORY

REVISION #	DATE	EDITION BY	APPROVED BY
1	7/12/2012	<input type="text"/>	<input type="text"/>

DISTRIBUTION

REVISION NUMBER										
Distribution	1	2	3	4	5	6	7	8	9	10
Arrow Energy Ltd	1									
DEHP	1									
G&S library and file	2									

Brisbane Sydney Melbourne and regions

20/115 Wickham Street Fortitude Valley **Brisbane** QLD 4006 | GPO Box 9856, Brisbane QLD 4001
Phone 07 3852 3999 | Email brisbane@access.gs | www.access.gs

Agriculture. Water. Environment.

SUMMARY

Arrow Energy Ltd (herein Arrow) commissioned Gilbert & Sutherland (G&S) to undertake a third party environmental compliance audit of works conducted at Arrow's Moranbah Gas Project (MGP), Queensland. Works undertaken for the MGP are governed by the following Environmental Authorities issued by the Department of Environment and Heritage Protection (formerly the Department of Environment and Resource management);

- Environmental Authority PEN100015907 for Petroleum Leases (PL) 191 and 196 and Petroleum Pipeline Lease (PPL) 115.



The Third Party Audit was conducted from 20 to 22 November 2012 and included a series of audit interviews with various Arrow representatives and inspections of relevant areas of the MGP.

Overall, the Audit indicated that works undertaken for the MGP are largely compliant with the Conditions stipulated in the relevant Environmental Authorities. However, a number of areas of partial compliance and non-compliance were noted. Additionally, a number of Conditions within the Environmental Authorities were noted to be 'not-applicable' at the time of the audit.

The findings of the audit were communicated verbally to Arrow Site Representative ss 73 during the audit process. A formal written notice summarising the findings and recommendations of the audit was provided to Arrow on 4 December prior to submission of the Audit report on 7 December 2012.

CONTENTS

1	Introduction	7
1.1	Scope and objectives	7
2	Methodology.....	8
2.1	Determination of compliance.....	8
3	Findings of the audit.....	9
3.1	Schedule A.....	9
3.1.1	Condition A7: Operational Plan	9
3.1.2	Condition A9: Operational Plan	9
3.2	Schedule B	9
3.2.1	Condition B3: Erosion and sediment control	9
3.2.2	Condition B10: Watercourses, wetlands & springs	10
3.2.3	Condition BC8: Quality of contaminants released from the sewage treatment works	10
3.2.4	Condition BC9: Quality of contaminants released from the sewage treatment works	10
3.2.5	Condition B15: Floodplains	11
3.2.6	Condition BC5: Release of treated sewage effluent contaminants to land	11
3.3	Schedule C	11
3.3.1	Condition C1: Regulated dams.....	11
3.3.2	Condition C2: Regulated dams.....	11
3.3.3	Condition C3: Regulated dam register	12
3.3.4	Condition C5: Regulated dam register	12
3.3.5	Condition C6: Regulated dam register	12
3.3.6	Condition C13: Construction and operational requirements for new dams	12
3.3.7	Condition C16: Construction and operational requirements for new dams	13
3.3.8	Condition C20: Mandatory reporting level	13
3.3.9	Condition C19: Mandatory reporting level	13
3.3.10	Condition C26: Requirements for existing dams ...	13
3.3.11	Condition C27: Requirements for existing dams ...	13
3.3.12	Condition C28: Requirements for existing dams ...	14

3.4	Schedule D	14
3.4.1	Condition D18: Soil management	14
3.4.2	Condition D26: Chemical and fuel storage	14
3.4.3	Condition D27: Chemical and fuel storage	15
3.4.4	Condition D28: Chemical and fuel storage	15
3.5	Schedule F	15
3.5.1	Condition F1: Air	15
3.5.2	Condition F3: Air	15
3.5.3	Condition F4: Air	16
3.6	Schedule G	16
3.6.1	Condition G14: Water release reduction strategy ..	16
3.6.2	Condition G15: Water release reduction strategy ..	16
3.7	Schedule I	16
3.7.1	Condition I1: General	16
3.7.2	Condition I8: General	16
3.7.3	Condition I18: Air monitoring (point source)	17
3.7.4	Condition I19: Air monitoring (point source)	17
4	Limitations of reporting	18
5	Appendix 1 – Audit questionnaire	19
6	Appendix 2 – Statutory declarations	20

ACRONYMS

TERM	MEANING
CPESC	Certified Professional in Erosion and Sediment Control
CSG	Coal Seam Gas
DEHP	Department of Environment and Heritage Protection (formerly DERM)
EA	Environmental Authority
ERA	Environmentally Relevant Activity
ESA	Environmentally Sensitive Area
ESCP	Erosion and Sediment Control Plan
MCSTD	Moranbah Camp Sewage Treatment Dam
MGP	Moranbah Gas Project
MRL	Mandatory Reporting Level
PL	Petroleum Lease
TEP	Transitional Environmental Program

1 Introduction

Arrow Energy Ltd (herein Arrow) commissioned Gilbert & Sutherland (G&S) to undertake a third party environmental compliance audit for works undertaken under

- Environmental Authority PEN100015907 for Petroleum Leases (PL) 191 and 196 and Petroleum Pipeline Lease (PPL) 115

53 73

The Environmental Authorities listed above are issued to CH4 Pty Ltd of which Arrow Energy Ltd is the parent company. References within this Audit to Arrow Energy should be taken to also mean references to CH4.

The listed tenements are located near Moranbah in Central Queensland and form part of Arrow's Moranbah Gas Project.

1.1 Scope and objectives

This environmental audit is required in order to satisfy Conditions (A13) to (A19) of the Environmental Authorities listed above. To fully satisfy these conditions, the environmental audit will include assessment of the Proponent's compliance with the following documents:

1. Environmental Authority PEN100015907 for PL 191, PL196 and PPL115 including an assessment of the following activities;
 - ERA 8 (3)(a) – Chemical Storage

- ERA 9 (c) – Hydrocarbon gas refining
- ERA 15 – Fuel burning (500kg/hour or more)
- ERA 60 (1)(d) – Waste disposal
- ERA 63 (2)(b) – Sewage treatment

This report details the findings of the environmental compliance audit carried out between November 20 and 22, 2012 covering operations and activities undertaken within the current period of the Operational Plan being October 2011 to October 2012.

2 Methodology

The Third Party Audit was undertaken from 20 to 22 November 2012 by [REDACTED] of Gilbert & Sutherland Pty Ltd (G&S). Both staff are certified Environmental Auditors with RABQSA International.

The nominated Arrow Site Representative's assisting with the Audit were [REDACTED] (Environmental Engineer North) and [REDACTED] (Field Environmental Advisor).

The audit consisted of the following components:

- Opening meeting
- Audit interview
- Site inspection
- Closing meeting.

The opening meeting was used to introduce members of the audit team and outline the intended procedure for the audit.

The audit interview was conducted over a number of days and involved interviews with staff from various areas of the Arrow operations including

- [REDACTED] – Environmental Engineer North
- [REDACTED] – Field Environmental Advisor North
- [REDACTED] – Ecologist North
- [REDACTED] – Water Technician

The interview process involved working through the Audit Questionnaire (Section 4), discussion of

responses and sighting of records and verification documents.

The interview process was undertaken progressively with site inspections conducted at intervals throughout the process. The site inspections involved examination of relevant areas of the works and observations of various operations relevant to the requirements of the Environmental Authorities. Where possible, photographs were taken in support of the observations made.

For safety and procedural reasons, the Auditors were accompanied by an Arrow employee at all times during the inspections.

Following the completion of all audit interviews and site inspections, a summary of any areas where further information or documentation was required in order to assess compliance was provided to the nominated Site Representatives.

2.1 Determination of compliance

Compliance with the relevant requirements of the EA's was determined throughout the audit process. Compliance was accepted on the basis of verification by at least two of the following measures:

- Interviews with relevant personnel
- Review of relevant documentation
- Observations made during the site inspections.

3 Findings of the audit

The following sections constitute a summary of the non-compliances and partial compliances identified by the Third Party Audit of the Moranbah Gas Project (MGP). The findings are presented in order of the Schedules contained within the Environmental Authorities (EA).

The Conditions contained within each EA are largely identical and thus the majority of findings below apply to all 3 EAs.

Where Conditions vary, the relevant EA and Petroleum Lease is stated under the heading of the condition.

3.1 Schedule A

3.1.1 Condition A7: Operational Plan

Applicable to;
PL191 and PL196, <input type="text"/>
Evaluation – Partial compliance
<p>Condition A7 requires that the Operational Plan include detailed information in relation to numerous aspects of the site operations.</p> <p>Whilst the Operational Plan addresses the majority of requirements, information relating to proposed clearing/disturbance of Environmentally Sensitive Areas (ESAs) and any progressive rehabilitation carried out on site lacks sufficient detail.</p> <p>Additionally, the Operational Plan does not include details with regard to calculation of the Financial Assurance.</p> <p>It is recommended that additional details regarding possible future disturbance of ESAs and the calculation of Financial Assurance be included in the Plan. This will ensure the Operational Plan fully complies with the conditions of the EAs.</p>

3.1.2 Condition A9: Operational Plan

Applicable to;
PL191 and PL196, <input type="text"/>
Evaluation – Non compliant
<p>Condition A9 requires that revised Operational Plans be submitted to the administering authority not less than three months prior to the expiry of the current plan.</p> <p>The current Operational Plan was not submitted within the required timeframe.</p> <p>It is recommended that future Plans be submitted within the stipulated timeframe.</p>

3.2 Schedule B

3.2.1 Condition B3: Erosion and sediment control

Applicable to;
PL191 and PL196, <input type="text"/>
Evaluation – Partial compliance
<p>Condition B3 requires that erosion and sediment control plans be prepared and implemented for all stages of the petroleum activities.</p> <p>An example of an erosion and sediment control plan (ESCP) for a well pad was provided for review during the audit. Whilst the plan was fit for purpose and certified by a CPESC (Certified Professional in Erosion and Sediment Control), observations made during the site inspection indicated that the plan was only partially implemented onsite. Specifically, the required sediment fences were not installed. It is understood from discussions with the Arrow Representative that discussions are ongoing regarding the practicality and necessity of installation of these sediment fences.</p> <p>It is recommended that the ESCP for the well pad sites be reviewed and modified if necessary. Until such time, the recommended sediment fences should be installed to ensure compliance with the current ESCP.</p>

3.2.2 Condition B10: Watercourses, wetlands & springs

Applicable to; PL191 and PL196, ss 73
Evaluation – Non compliant
<p>Condition B10 requires that sediment control measures be implemented within watercourses affected by petroleum activities to minimise increases in water turbidity.</p> <p>No sediment control measures were observed at the Isaac River Crossing #2. It is noted from discussions with the Arrow Site Representative that works have been undertaken in the last 12 months to improve compliance with DEHP's <i>'Guideline – Activities in a watercourse, lake or spring associated with mining operations'</i>.</p> <p>It is also noted that the risk of sediment release from these works is low for the majority of the year (due to no water flows), and is only an issue in low flow periods.</p> <p>It is understood from discussions with the Arrow Site Representative that discussions to determine the appropriate sediment control measures for this environment are ongoing.</p> <p>It is recommended that appropriate sediment controls be installed prior to the commencement of the wet season and maintained throughout periods of flow within the Isaac River to ensure downstream water quality is protected.</p>

3.2.3 Condition BC8: Quality of contaminants released from the sewage treatment works

Applicable to; PL191 and PL196
Evaluation – Partial compliance
<p>Condition BC8 requires that the quality of treated effluent complies with the specified release limits.</p> <p>Results of treated effluent monitoring were reviewed during the audit process. This review found that not all results were compliant. It is</p>

understood from discussions with the Arrow Site Representative that actions have been taken to improve compliance. Results following the installation of these remediation measures have improved the level of compliance.

It is recommended that Arrow continue to closely monitor the quality of treated effluent. If continuing non-compliances arise, then further investigation into the likely causes and potential remediation measures should be undertaken.

3.2.4 Condition BC9: Quality of contaminants released from the sewage treatment works

Applicable to; PL191 and PL196
Evaluation – Partial compliance
<p>Condition BC9 requires that the release of contaminants to land be monitored at the specified frequency and achieve compliance with the specified standards.</p> <p>Arrow Site representatives indicated that monitoring is conducted at the required frequency. Results derived from this monitoring were reviewed during the audit process, however results for the months of April and July 2012 were missing from the dataset and unavailable for review.</p> <p>Not all results were found to be compliant with the specified criteria. However, it is understood from discussions with the Arrow Site Representative that actions have been taken to improve compliance. Results following the installation of these remediation measures have improved the level of compliance.</p> <p>It is recommended that Arrow continue to closely monitor the quality of treated effluent. If continuing non-compliances arise, then further investigation into the likely causes and potential remediation measures should be undertaken.</p> <p>Additionally, it is recommended that Arrow implement a system to ensure that all data is saved in a centralised location and available for</p>

review upon request.

3.2.5 Condition B15: Floodplains

Applicable to;

PL191 and PL196,

Evaluation – Non-compliant

Condition B15 requires that petroleum activities do not significantly concentrate, divert or increase the duration of flood flow, or increase the risks associated with flooding.

In order to minimise changes to natural flooding patterns, all petroleum activities must be appropriately assessed and planned (involving flood modelling or equivalent).

Site Representatives indicated that areas of the MGP impacted upon by river or creek flooding are mapped and recorded in their GIS system. However, no evidence was provided that showed that the impact of the CSG operations on existing flood patterns had been considered.

It is recommended that the impacts of the CSG operations upon flooding pathways and regimes be considered and formerly assessed in all future planning for petroleum activities.

3.2.6 Condition BC5: Release of treated sewage effluent contaminants to land

Applicable to;

PL191 and PL196

Evaluation – Partially compliant

Condition BC5 requires that the contaminant release area/s be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.

In order to maintain the release area in such a condition, a comprehensive maintenance plan must be developed and implemented.

A draft 'Moranbah Gas Project Sewage Treatment

System Operations, Maintenance and Surveillance Plan' was reviewed during the audit process.

It is understood from discussions with the Arrow Site Representative that the final version of this Plan, detailing maintenance requirements, is currently being developed.

It is recommended that this Plan be finalised as a matter of priority.

3.3 Schedule C

3.3.1 Condition C1: Regulated dams

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition C1 requires that the name of each regulated dam be clearly signed at the dam location.

Dams 2, 5, 12 and the Moranbah Camp Sewage Treatment Dam (MCSTD) were visited during the site inspections. Not all dams were visited during the audit due to time and site access constraints.

Whilst Dam 2 is currently undergoing major remediation works and is the subject of a Transitional Environmental program (TEP) and signage for Dams 5 and 12 was adequate at the time of the inspection, the MCSTD was not signed.

It is recommended that all Dams be inspected to ensure they have adequate signage in place.

3.3.2 Condition C2: Regulated dams

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition C2 requires that construction or modification of high or significant hazard category dams is prohibited unless the required design plan details have been entered into the Regulated Dam Register and approved by the Chief Executive Officer. Dams 1 to 6, 8, and 10 to 13 are classified

as a significant or high hazard. With the exception of Dam 2, no modifications have been undertaken on these dams in the previous 12 months.

The remediation and modification works undertaken on Dam 2 were the subject of a TEP arrangement with DEHP. The TEP and Certificate of Approval were reviewed during the audit.

The Dam register does not appear to have been updated to include the design plan details.

3.3.3 Condition C3: Regulated dam register

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition C3 requires the holder of the EA to maintain a Register of Regulated Dams included various design and construction details.

A number of the required details are not incorporated or were incomplete in the Register including;

- Dam dimensions (i.e. length and width)
- Date of certification
- Qualifications of certifier
- Inspection dates were included but were not up to date
- Date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority is not included for all dams

It is recommended that the Dam Register be amended to ensure it includes each of the required details in Condition C3.

3.3.4 Condition C5: Regulated dam register

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition C5 requires that the Register be kept up to date.

Review of the register indicated that a number of details including inspection dates was not up to

date at the time of the audit.

It is recommended that the Dam Register be kept up to date.

3.3.5 Condition C6: Regulated dam register

Applicable to;

PL191 and PL196,

Evaluation – Non compliant

Condition C6 requires that the Register is up to date on any given day.

Review of the register indicated that a number of details including inspection dates was not up to date at the time of the audit.

It is recommended that the Dam Register be kept up to date.

3.3.6 Condition C13: Construction and operational requirements for new dams

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition C13 requires that design plans and Certifications be submitted to the administering authority for the construction of all new regulated dams.

A certification notice for Dam 12 was reviewed as part of the audit. Correspondence from DEHP dated 14 November 2012 indicated that the certification letter did not include all required information and should be rectified and resubmitted by 11 December 2012.

The Dam 14 certification was reviewed as part of the audit. The Certification indicated that the Dam was designed prior to the issue of the 2012 Manual and as such was designed and assessed in accordance with the 2010 Manual.

It is recommended that the Certification notice for Dam 12 be amended and resubmitted to DEHP by the given date.

It is recommended that future assessments of Dam14's hazard category be undertaken in accordance with the latest version of the Dam Manual.

3.3.7 Condition C16: Construction and operational requirements for new dams

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition 16 requires 'as constructed drawings' and certification advice be provided to DEHP.

As noted above, the Certification letter for Dam 12 has been submitted however DEHP has advised that the certification does not include all required information.

It is recommended that the Certification notice for Dam 12 be amended and resubmitted to DEHP by the given date.

3.3.8 Condition C20: Mandatory reporting level

Applicable to;

PL191 and PL196,

Evaluation – Partial compliance

Condition 20 requires that the administering authority be notified immediately if the level of any Dam reaches the Mandatory Reporting Level (MRL).

Arrow Site Representatives confirmed that no Dams have reached their respective MRL's during the current audit period.

Graphs showing the measured pond water levels in comparison to the Design Storage Allowance (roughly equivalent to the MRL) from November 2011 to November 2012 were reviewed as part of the audit. These graphs indicated that Ponds 1 to 12 had not reached the MRL during this time. Information for Dams 13 and 14 was not provided for review and as such, compliance or otherwise for these Dams could not be assessed.

3.3.9 Condition C19: Mandatory reporting level

Applicable to;

PL191 and PL196, PL223,

Evaluation – Non compliant

Condition C19 requires the Mandatory Reporting Level be marked on each Regulated Dam.

Dams 2, 5, 12 and the Moranbah Camp Sewage Treatment Dam (MCSTD) were visited during the site inspections. Not all dams were visited during the audit due to time and site access constraints.

MRL signage was observed at Dam 12 but was not evident at Dams 2, 5 and the MCSTD.

It is recommended that all Dams be inspected to ensure they have adequate signage in place.

3.3.11 Condition C27: Requirements for existing dams

Applicable to;

PL191 and PL196

Evaluation – Partial compliance

Condition C27 requires that all existing aggregation

dams be appropriately lined and fitted with leak detections systems as of 1 October 2011.

The Dam Register indicates that each of the aggregation dams (Dams 1 to 10 and the Moranbah Camp Sewage Treatment Dam) and Dam 11 are lined with high-density polyethylene (HDPE) or have a compacted clay liner and that Dam 11 is also fitted with a leak detection system.

The Dam register indicates that none of the aggregation dams currently have leak detection systems in place.

3.3.12 Condition C28: Requirements for existing dams

Applicable to;
PL191 and PL196

Evaluation – Non compliant

Condition C28 requires that by 1 October 2010, all existing CSG aggregation dams including Dam 11 must be operated so that during any period of thirty (30) days, the total volume of water leaving the dam other than by evaporation must not be less than 85% of the volume of water that has entered the dam.

The Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Plan was reviewed during the audit. No specific reference to this operational requirement was found within the Plan and thus compliance with this condition could not be demonstrated.

It is recommended that the requirement outlined in Condition C28 be included in the Dam operations plan and, if not occurring already, all dams should be operated in accordance with this condition.

3.4 Schedule D

3.4.1 Condition D18: Soil management

Applicable to;
PL191, PL196, sg3 73

Evaluation – Partial compliance

Condition D18 requires that soil management procedures be developed and implemented for area to be disturbed by the petroleum activities.

Whilst a generalised Soil Management Procedure (SMP) has been developed for the site, the baseline soil investigations required by this procedure (and Condition D18) have not yet been undertaken.

It is understood from discussions with the Arrow Site Representative that a baseline soil investigation is scheduled to be undertaken by Soil Horizons, following which a site-specific SMP will be developed.

It is recommended that this investigation be completed as a matter of priority, to allow for the development and implementation of a detailed and formalised SMP.

3.4.2 Condition D26: Chemical and fuel storage

Applicable to;
PL191, PL196,

Evaluation – Non compliant

Condition D26 requires that hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids be stored in accordance with the relevant Australian Standards.

Whilst onsite it was noted that a number of chemical storage areas are not maintained in accordance with relevant Australian Standards, including areas with no roofing and inadequate bund capacity. It is understood from discussions with the Arrow Site Representative, that a TEP is currently being prepared in relation to these areas, under continuing liaison with DEHP.

It recommended that this TEP be finalised and submitted for approval by DEHP as a matter of urgency, with the aim of moving toward compliance with Condition D26 as soon as practicable.

3.4.3 Condition D27: Chemical and fuel storage

Applicable to; PL191, PL196, <input type="text" value="sg3 73"/>
Evaluation – Non compliant
<p>Condition D27 require that any liquids stored onsite that have the potential to cause environmental harm be stored in an appropriate manner.</p> <p>A Chemical Management Procedure has been developed for the Moranbah Gas Project, and was provided during the audit process. Whilst the procedure is fit for purpose, observations made during the site inspection indicate that the procedure does not appear to be implemented in full. For example, whilst onsite it was noted that a number of chemical storage areas had no roofing and inadequate bund capacity.</p> <p>As stated for Condition 26, it is understood from discussions with the Arrow Site Representative, that a TEP is currently being prepared in relation to these areas, under continuing liaison with DEHP.</p> <p>It recommended that this TEP be finalised and submitted for approval by DEHP as a matter of urgency with the aim of moving toward compliance with Condition D27 as soon as practicable.</p>

3.4.4 Condition D28: Chemical and fuel storage

Applicable to; PL191, PL196, <input type="text"/>
Evaluation – Non compliant
<p>Condition 28 requires that all containment systems be designed to minimise rainfall collection within the system.</p> <p>As stated for Conditions D26 and D27, a number of chemical storage areas onsite have no roofing. It is understood from discussions with the Arrow Site Representative, that a TEP is currently being prepared in relation to these areas, under</p>

continuing liaison with DEHP.

It recommended that this TEP be finalised and submitted for approval by DEHP as a matter of urgency with the aim of moving toward compliance with Condition D28 as soon as practicable.

3.5 Schedule F

3.5.1 Condition F1: Air

Applicable to; PL191 and PL196, <input type="text"/>
Evaluation – Non compliant
<p>Condition F1 requires that releases from fuel burning or combustion equipment comply with specified release criteria.</p> <p>No air quality monitoring is currently being undertaken at the Arrow Compression Plant due to the absence of sampling ports on the compressor stacks.</p> <p>A TEP has been prepared for the Compression Plant and liaison with DEHP is ongoing. It is understood that the compressor stacks are to be retrofitted to enable monitoring.</p> <p>It is recommended that the requirements of the TEP be adhered to with the aim of moving toward compliance with Condition F1 as soon as practicable.</p>

3.5.2 Condition F3: Air

Applicable to; PL191 and PL196, <input type="text"/>
Evaluation – Partial compliance
<p>Condition F3 requires that a Register for Fuel Burning or Combustion Equipment be maintained.</p> <p>A Register has been prepared for this purpose and includes equipment names, locations, stack heights and theoretical information for efflux velocities and mass emission rates. Information for the Gas Generator and TEG Reboiler A and B</p>

is incomplete.

It is recommended that the Register be completed as soon as possible.

3.5.3 Condition F4: Air

Applicable to;

PL191 and PL196,

Evaluation – Non compliant

Condition F4 requires that information within the Register is complete on any given day.

The Register was not up to date at the time of the audit.

It is recommended that the Register be updated and maintained to ensure future compliance with this condition.

3.6 Schedule G

3.6.1 Condition G14: Water release reduction strategy

Applicable to;

Applicable to PL191 and PL196,

5373

Evaluation – Non compliant

This condition requires that a Release Reduction Strategy be prepared and implemented to minimise releases of CSG water to the environment.

Information reviewed during the audit including the Coal Seam Gas Water Management Plan prepared in September 2011 and the 2011 to 2012 Annual Return indicates that a Water Release Reduction Strategy has not been prepared.

A Water Release Reduction strategy is essential for long-term water management at the site and it is recommended that the strategy be prepared as a matter of urgency.

3.6.2 Condition G15: Water release reduction strategy

Applicable to;

PL191 and PL196,

Evaluation – Non compliant

Condition G15 requires that a progress report on the Water Release Reduction Strategy be prepared and included in the Annual Return.

The required progress report was not included in the 2011 to 2012 Annual Return.

A Water Release Reduction strategy is essential for long-term water management at the site and it is recommended that the strategy be prepared as a matter of urgency and that all future Annual Returns include the required progress report.

3.7 Schedule I

3.7.1 Condition I1: General

Applicable to;

PL191, PL196,

Evaluation – Partial compliance

Condition I1 requires that a monitoring program be developed and implemented at the site.

It was noted during the audit that Arrow currently operates a series of monitoring programs that, in combination, address the monitoring requirements of this EA. However full compliance will not be achieved until these separate plans are compiled into a single monitoring program document as required by the Condition.

Prior to G&S' engagement to provide auditing services to Arrow, G&S had been separately commissioned to prepare an overarching monitoring program that details all monitoring requirements in a single document. The overarching monitoring program document, once approved and adopted by Arrow, will constitute the document required to achieve compliance with this Condition.

3.7.2 Condition I8: General

Applicable to;

PL191, PL196, <input type="text" value="sg3 73"/>
Evaluation – Partial compliance
<p>Condition I8 requires that any monitoring plans, systems or programs be reviewed annually.</p> <p>It is understood that currently, all management plans and systems are reviewed on an as-required basis.</p> <p>In order to achieve full compliance with Condition I8, it is recommended that a formal process be implemented to ensure reviews are conducted on an annual basis.</p>

As stated for Condition I18, there is currently no air quality monitoring program in place at the Moranbah Gas Project. However, it is understood from discussions with the Arrow Site Representative that air quality monitoring is governed by a TEP.

It is recommended that the conditions of this TEP be adhered to, with the aim of moving toward compliance with Condition I19.

3.7.3 Condition I18: Air monitoring (point source)

Applicable to; PL191 and PL196, <input type="text"/>
<input type="text"/>
Evaluation – Non compliant
<p>Condition I18 requires that monitoring of contaminants released to air be undertaken.</p> <p>No air quality monitoring is currently being undertaken at the Arrow Compression Plant due to the absence of sampling ports on the compressor stacks.</p> <p>A TEP has been prepared for the Compression Plant and liaison with DEHP is ongoing. It is understood that the Compressor stacks are to be retrofitted to enable monitoring.</p> <p>It is recommended that the requirements of the TEP be adhered to with the aim of moving toward compliance with Condition I18 as soon as practicable.</p>

3.7.4 Condition I19: Air monitoring (point source)

Applicable to; Applicable to PL191 and PL196, <input type="text"/>
Evaluation – Non compliant
Condition I19 outlines the requirement to prepare an air monitoring program.

4 Limitations of reporting

Gilbert & Sutherland Pty Ltd has made every effort to ensure that the information provided in this report is accurate. The interpretation of scientific data, however, involves professional judgement and as such is open to error.

In recognizing the potential for errors in scientific interpretation, Gilbert & Sutherland Pty Ltd does not guarantee that the information is totally accurate or complete and clients are advised not to rely solely on this information when making commercial decisions. Any representation, statement, opinion or advice, expressed or implied

is made in good faith and on the basis that the authors, Gilbert & Sutherland Pty Ltd, their agents or employees are not liable (whether by reason of lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.

Furthermore, this information should not be relied upon by any persons other than the client for whom it has been compiled. This information reflects the specific brief and the budget of the client concerned, who enjoys an individual tolerance of risk.

RTI DL Release

5 Appendix 1 – Audit questionnaire

RTI DL Release

ASPECT	REQUIREMENT	EVALUATION & CRITERIA	COMMENTS
--------	-------------	-----------------------	----------

ENVIRONMENTAL AUTHORITY PEN100015907 – MORANBAH GAS PROJECT PETROLEUM LEASES 191 AND 196 AND PETROLEUM PIPELINE LEASE 115

Schedule A – General Conditions

A1 Applicable to; PL191 and 196	Authorised Petroleum Activities In the carrying out of the petroleum activity(ies), the holder of this environmental authority must not exceed the numbers and maximum size(s) for each of the specified petroleum activities listed in Schedule A – Table 1 for each petroleum tenure.	Evaluation C	Site representatives confirmed during the audit interview that the numbers and maximum size(s) for each of the specified petroleum activities do not exceed the specifications in Table1.																																												
	<table><tr><th colspan="4">Schedule A – Table 1</th></tr><tr><th>Tenure No.</th><th>Petroleum activity</th><th>Number</th><th>Maximum size (where applicable)</th></tr><tr><td rowspan="13">PL191</td><td>Seismic</td><td>0</td><td>Not applicable</td></tr><tr><td>Core well</td><td>0</td><td>Not applicable</td></tr><tr><td>Exploration well</td><td>10</td><td>Not applicable</td></tr><tr><td>Production Well</td><td>26</td><td>Not applicable</td></tr><tr><td>Compressors</td><td>2</td><td>>500kg/hr fuel burning</td></tr><tr><td>Regulated dam(s) <400 megalitres</td><td>1</td><td><400ML</td></tr><tr><td>Regulated dam(s) >400 megalitres</td><td>0</td><td>>400 ML</td></tr><tr><td>Evaporation dam</td><td>0</td><td>Not applicable</td></tr><tr><td>Reverse osmosis Plant</td><td>0</td><td>Not applicable</td></tr><tr><td>Encapsulation Facility</td><td>0</td><td>Not applicable</td></tr><tr><td>Sewerage treatment plant(s) <21EP</td><td>0</td><td>Not applicable</td></tr><tr><td>Sewerage treatment plant(s) >21 EP</td><td>0</td><td>Not applicable</td></tr></table>	Schedule A – Table 1				Tenure No.	Petroleum activity	Number	Maximum size (where applicable)	PL191	Seismic	0	Not applicable	Core well	0	Not applicable	Exploration well	10	Not applicable	Production Well	26	Not applicable	Compressors	2	>500kg/hr fuel burning	Regulated dam(s) <400 megalitres	1	<400ML	Regulated dam(s) >400 megalitres	0	>400 ML	Evaporation dam	0	Not applicable	Reverse osmosis Plant	0	Not applicable	Encapsulation Facility	0	Not applicable	Sewerage treatment plant(s) <21EP	0	Not applicable	Sewerage treatment plant(s) >21 EP	0	Not applicable	Criteria I
Schedule A – Table 1																																															
Tenure No.	Petroleum activity	Number	Maximum size (where applicable)																																												
PL191	Seismic	0	Not applicable																																												
	Core well	0	Not applicable																																												
	Exploration well	10	Not applicable																																												
	Production Well	26	Not applicable																																												
	Compressors	2	>500kg/hr fuel burning																																												
	Regulated dam(s) <400 megalitres	1	<400ML																																												
	Regulated dam(s) >400 megalitres	0	>400 ML																																												
	Evaporation dam	0	Not applicable																																												
	Reverse osmosis Plant	0	Not applicable																																												
	Encapsulation Facility	0	Not applicable																																												
	Sewerage treatment plant(s) <21EP	0	Not applicable																																												
	Sewerage treatment plant(s) >21 EP	0	Not applicable																																												

s.73. 73

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
s. 73. 73				
<div>A2</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div><div></div></div>	<div>Prevent or Minimise Likelihood of Environmental Harm</div> <div>This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm</div>	<div>Evaluation</div> <div>C</div> <div>Criteria</div> <div>I, R</div>	<div>Compliance with the conditions of this EA is supported by Arrow Energy's Environmental Policy, awareness of the EA conditions is created through tool-box talks and general site inductions.</div> <div>Arrows Environmental Policy was provided during the audit interview and reviewed by the Auditors.</div>	
<div>A3</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div><div></div></div>	<div>Maintenance of Measures, Plant and Equipment</div> <div>The holder of this environmental authority must;</div> <div>(a)install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;</div> <div>(b)maintain such measures, plant and equipment in their proper and effective condition; and</div> <div>(c)operate such measures, plant and equipment in a proper and effective manner.</div>	<div>Evaluation</div> <div>C</div> <div>Criteria</div> <div>I, R</div>	<div>Arrow operates an electronic system – SCADA, which monitors equipment and notifies staff of any malfunctions or servicing requirements.</div> <div>Arrow operates a 'Permit to Work' system to ensure staff are appropriately trained to operate equipment.</div> <div>Pre-start meetings are conducted prior to the commencement of works to ensure staff are aware of appropriate operating procedures.</div>	
<div>A4</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div><div></div></div>	<div>Maintenance of Measures, Plant and Equipment</div> <div>No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.</div>	<div>Evaluation</div> <div>C</div> <div>Criteria</div> <div>I, R</div>	<div>Acknowledged by Arrow Site Representatives.</div> <div>Arrow follows a Management of Change Procedure, which manages requirements during changes to plant, operations, procedures or the acquisition or divestment of assets. A Risk Assessment is included as part of this procedure.</div>	
<div>A5</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div><div></div></div>	<div>Operational Plan</div> <div>The holder of this environmental authority must develop an Operational Plan (the Plan) that provides detailed information about the activities to be carried out under this environmental authority.</div>	<div>Evaluation</div> <div>C</div> <div>Criteria</div> <div>I, R</div>	<div>An Operational Plan (OP) has been developed for each of the PL's and was provided to the Auditors for review.</div>	
<div>A6</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div><div></div></div>	<div>Operational Plan</div> <div>The activities identified in the Plan must incorporate, but not be limited to, the petroleum activities set out in the approved Development Plan for the relevant petroleum authorities as required under the <i>Petroleum Act (1923)</i> or the <i>Petroleum and Gas (Production and Safety) Act 2004</i>.</div>	<div>Evaluation</div> <div>C</div> <div>Criteria</div> <div>I, R</div>	<div>The OP incorporates a list of operational activities necessary to explore for, test for and produce CSG. The Development Plan was not reviewed as part of the audit.</div>	

ASPECT	REQUIREMENT	EVALUATION & CRITERIA		COMMENTS
A7 Applicable to; PL191 and PL196 <div>s.73, 73</div>	Operational Plan The Plan must be consistent with the requirements of this environmental authority and include but not be limited to; (a) a stated period, not exceeding three (3) years to which the Plan applies; (b) a description of the existing infrastructure for conducting the petroleum activity(ies); (c) a description of proposed infrastructure that will be developed during the term of the Plan (d) a map or maps that I. record the location of the infrastructure in place for conducting the petroleum activity(ies) that exists at the commencement of the period of the Plan, including but not limited to; <ul style="list-style-type: none">regulated damswellstransmission flow linesgas processing facilities; andwater treatment facilities. II. Record the location of the approved additional infrastructure that will be developed for the conduct of the petroleum activities during the period of the Plan. (e) For proposed disturbance or vegetation clearing in an Environmentally Sensitive Area (ESA) provide details on the scale and extent of the disturbance or clearing and if required, a commitment to provide an environmental offset (f) For each site to be disturbed, a description of the rehabilitation activities to be performed during the period of the Plan, including but not limited to; I. Location (e.g. tenure, coordinates) and disturbance type (e.g. well lease, flow line, access track); II. Area to be rehabilitated III. Use of reference sites; IV. Species compositions; and V. Post disturbance land use; (g) A description of progressive rehabilitation carried out including performance in relation to the requirements set out in the environmental authority and the proposed rehabilitation activities set out in the period of the Plan. (h) The calculation of the financial assurance for the proposed maximum disturbance expected during the period of the plan	Evaluation PC	Points (a), (b), (c), (d) are addressed in the OP. Point (e) – The plan notes that clearing within ESA's may be required however no details are included with regard to the scale and extent as specifics are yet to be finalised. (Point f) – as above Point (g) –no details are included with regard to progressive rehabilitation carried out. The plan notes that this ill be included in the Annual Return. Point (h) - The Plan includes the following statement in Section 6.0. ' <i>Financial assurance has been calculated and provided to EHP with the current application for the amendment to EA conditions to incorporate multiple EA's into a single Moranbah Gas Project EA. Therefore, these details are not included in this interim document</i> '.	
		Criteria I, R		
A8 Applicable to; PL191 and PL196 <div></div>	Operational Plan The initial Plan must be submitted to the administering authority within three months after the granting of this environmental authority.	Evaluation NA	Not applicable to the current audit period.	
		Criteria NA		
A9 Applicable to; PL191 and PL196 <div></div>	Operational Plan Revised Plans must be submitted to the administering authority not less than three months prior to the expiry of the current Plan.	Evaluation NC	The revised plan was not submitted to the administering authority within the designated timeframe.	
		Criteria I, R	The revised OP was completed during late November and Site Representatives advised that the Plan would be submitted to DEHP in the following week.	
A10 Applicable to; PL191 and PL196 <div></div>	Financial assurance The holder of this environmental authority must: (a)provide to the administering authority financial assurance in the amount and form required from time to time by the administering authority for the authorised petroleum activity(ies); and (b)review and maintain the amount of financial assurance based on the activities and rehabilitation to be undertaken during the period of the Plan.	Evaluation A	Site Representatives advised that Financial assurance is reviewed as part of the annual revision of the OP. Site Representatives confirmed that Financial Assurance has been provided to the administering authority.	
		Criteria I, R	A bank guarantee with Citi Bank constituting part of the Financial Assurance sum was sited by the Auditors during the Audit interview. The value/sum of the Financial assurance was not reviewed/assessed as part of this audit.	

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
				The Operational Plan includes the following statement in Section 6.0. 'Financial assurance has been calculated and provided to EHP with the current application for the amendment to EA conditions to incorporate multiple EA's into a single Moranbah Gas Project EA. Therefore, these details are not included in this interim document'.
A11 Applicable to; PL191 and PL196 	Financial assurance The calculation of financial assurance must be in accordance with the most recent version of the Department of Environment and Resource Management's Guideline "Financial assurance for petroleum activities".	Evaluation	-	As above. Compliance with this condition was not assessed as part of this audit.
		Criteria	-	
A12 Applicable to; PL191 and PL196 	Financial assurance The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.	Evaluation	-	Acknowledged by Site Representatives. Compliance with this condition is not readily assessable.
		Criteria	-	
A13 Applicable to; PL191 and PL196 	Third Party Audit Compliance with the conditions of this environmental authority must be audited by an appropriately qualified third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, for each period of the Operational Plan required under Conditions A5 – A9.	Evaluation	C	This document constitutes the Third Party Audit for the current period of the OP. The nominated auditors (being Gilbert & Sutherland) were accepted by the administering authority on November 16 in correspondence received from Gillian Naylor – Principal Environmental Officer, Energy Assessments.
		Criteria	I, R	
A14 Applicable to; PL191 and PL196 	Third Party Audit Notwithstanding Condition A13, the holder of this environmental authority may, prior to undertaking the third party audit, negotiate with the administering authority the scope and content of the third party audit.	Evaluation	-	Compliance with this condition was not assessed.
		Criteria	-	
A15 Applicable to; PL191 and PL196 	Third Party Audit The report of the third party auditor for the relevant prior period must be submitted to the administering authority by the holder of this environmental authority with each revised Operational Plan submitted in accordance with Condition A8 and Condition A9.	Evaluation	NA	Acknowledged by Site Representatives. Compliance or otherwise with this condition cannot be determined at this time.
		Criteria	NA	
A16 Applicable to; PL191 and PL196 	Third Party Audit The third party auditor must certify (including a statutory declaration) the findings of the audit in the report.	Evaluation	-	A statutory declaration is provided in Appendix 1.
		Criteria	-	
A17 Applicable to; PL191 and PL196 	Third Party Audit The financial cost of the third party audit is to be borne by the holder of this environmental authority.	Evaluation	C	Acknowledged by Site Representatives. Gilbert & Sutherland have been engaged by Arrow to undertake this audit.
		Criteria	I, R	

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
A18 Applicable to; PL191 and PL196 <div>73. 73</div>	Third Party Audit The holder of this environmental authority must immediately act upon any recommendations arising from the audit report by: (a)Investigating any non-compliance issues identified; and (b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.	Evaluation NA	Compliance or otherwise with this condition cannot be determined at this time.	
		Criteria NA		
A19 Applicable to; PL191 and PL196 <div></div>	Third Party Audit Subject to Condition A18, and not more than three (3) months following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the: (a)actions taken by the holder of this environmental authority to ensure compliance with this environmental authority; and (b)actions taken to prevent a recurrence of any non-compliance issues identified.	Evaluation NA	Compliance or otherwise with this condition for the current audit period cannot be determined at this time. An Environmental Improvement Plan (EIP) for the previous audit was reviewed during the audit.	
		Criteria NA		
A20 Applicable to; PL191 and PL196 <div></div>	Cultural Heritage In the carrying out of the petroleum activity(ies) the holder of this environmental authority must not adversely impact on the cultural heritage values of any place registered on the Queensland Cultural Heritage Register.	Evaluation C	A search of the Queensland Heritage Register returned no results for the Moranbah area. Cultural Heritage identification and protection procedures are implemented as part of Arrow's Land Access Review and site specific Access and Approval Conditions.	
		Criteria I, R		
A21 Applicable to; PL191 and PL196	Existing petroleum activities Conditions (D2) to (D15) in Schedule D – Land relating to disturbance and Condition (B6) Schedule B- Water relating to infrastructure in or within buffers around wetlands, lakes, springs or watercourses do not apply to petroleum activity(ies) (including associated operation and maintenance activities) undertaken directly in relation to infrastructure which was established prior to August 2010 as identified in Figure 2 – Existing Infrastructure on 9 August 2010.	Evaluation -	Acknowledged by Arrow Site Representatives. Compliance or otherwise with this condition cannot be readily assessed.	
		Criteria -		
Schedule B - Water				
B1 Applicable to; PL191 and PL196 <div></div>	Contaminant Release Contaminants must not be directly or indirectly released to any waters except as permitted under this environmental authority.	Evaluation C	Site Representatives stated that no CSG water was released to any waters during the audit period and no emergency release of water from site dams was required during the audit period. The potential for release of contaminants from the washdown and workshop areas is minimised by their physical separation from local water sources (drains and the compressor station separate the washdown/workshop from local water sources). Arrow's Environmental Policy was provided during the audit interview. This policy establishes programs to reduce environmental impacts and reduce waste and pollution. These programs are communicated to staff in 'toolbox talks' and other training sessions. A register of 'toolbox talks' was viewed during the audit interview.	
		Criteria I, O, R		
B2 Applicable to; PL191 and PL196 <div></div>	Erosion and Sediment Control Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contaminated stormwater to waters.	Evaluation C	During the audit process erosion and sediment control measures were observed across the site, including bunding and hydromulching. It is understood from discussions with Site Representatives that soil stabilisation sprays (for dust control) are also used.	
		Criteria I, R, O		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
B3 Applicable to; PL191 and PL196 <div>s.73. 73</div>	Erosion and Sediment Control An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activity(ies) and which has been certified by a professional with appropriate experience and/or qualifications accepted by the administering authority and must include but not be limited to: (a)diverting uncontaminated stormwater run-off around areas disturbed by petroleum activity(ies) or where contaminants or wastes are stored or handled that may contribute to stormwater; (b)contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority; (c)roofing or minimising the size of areas where contaminants or wastes are stored or handled; (d)revegetating the disturbed area as soon as practicable after the completion of works; (e)using alternate materials and/or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters; (f) erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters; (g)an inspection and maintenance program for the erosion and sediment control features; (h)provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March; (i) erosion and sediment control measures for construction of wells and pipelines on slopes >10%; and (j) identification or remedial actions that would be required to ensure compliance with the conditions of this environmental authority.	Evaluation PC	Arrow's Site Representatives provided an example of an erosion and sediment control plan during the audit. The plan shows the location and details of required controls for a well pad site. The plan was certified by an external CPESC (Certified Professional in Erosion and Sediment Control). Site Representatives confirm that individual plans are developed and certified for all petroleum activity(ies) on site. An Arrow document detailing how to prepare erosion and sediment control plans was reviewed during the audit. During the audit process an example well site was visited. The plan was generally well implemented at this location, however, it was noted that sediment fences (as included on the Plan) were not in place. Arrow is currently in discussions as to the necessity of these sediments fences.	
		Criteria I, O, R		
B4 Applicable to; PL191 and PL196 <div></div> B5 Applicable to; PL191 and PL196 <div></div>	Erosion and Sediment Control Plan A copy of the Erosion and Sediment Control Plan must be submitted to the administering authority upon request.	Evaluation C	An example of an erosion and sediment control plan for a well pad site was reviewed during the audit process. Site Representatives confirm that individual plans are developed and certified for all petroleum activity(ies) on site and that these plans would be made available to the administering authority upon request.	
		Criteria I, R	No plans were requested by the administering authority during the audit period.	
	Maintenance and Cleaning The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where the resultant contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.	Evaluation C	Only minor maintenance to site vehicles is performed onsite. This maintenance is performed in a designated workshop area and, along with the vehicle wash-down, does not drain to any waters, roadside gutter or stormwater drainage system.	
		Criteria I, O	Site Representatives confirm that all major maintenance to vehicles and other plant equipment is performed offsite.	
B6 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs In the carrying out of the petroleum activity(ies) the holder of this environmental authority must not clear vegetation, excavate or place fill, except for the construction of roads and pipelines, in or within; (a)200 metres from any natural significant wetland; (b)100 metres from any natural wetland, lake or spring; or (c) 100 metres of the high bank of any other watercourse.	Evaluation C	Works for the construction of a pipeline were conducted within a watercourse during the audit period. Site Representatives confirm that the Land Access Review (LAR) process was completed prior to commencement of this work. Examples of LAR based documentation were reviewed during the audit.	
		Criteria I, R		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
B7 Applicable to; PL191 and PL196 <div>s. 73. 73</div>	Watercourses, wetlands and springs The holder of this environmental authority must not excavate or place fill in a way that interferes with the flow of water in a watercourse, wetland, or spring, including works that divert the course of flow of the water or works that impound the water.	Evaluation A	Criteria I, O	The Isaac River Crossing #2 was visited during the audit process. This site has recently been excavated down to bed level (following advice from G&S provided on 13 and 23 April 2012), to ensure that the road fill will not obstruct the flow of the river.
B8 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs Despite Condition (B7) pipeline and road construction works may be undertaken in watercourses, wetlands or springs where there is not practicable alternative such as the use of horizontal directional drilling methods, for a maximum period of ten (10) days, provided that the works are conducted in accordance with the following order of preference: (a) conducting work in times of no flow; and (b) using all reasonable and practical measures to reduce impacts in times of flow.	Evaluation C	Criteria I, R	Works for the construction of a pipeline were conducted within a watercourse during the audit period. Site Representatives confirm that the LAR process was completed prior to commencement of this work. Examples of LAR based documentation were reviewed during the audit. Email correspondence between Arrow staff discussing the completion of works within a 10-day period was reviewed during the audit.
B9 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs Activities or works resulting in significant disturbance to the bed or banks of a watercourse or wetland, or spring must; (a) only be undertaken where necessary for the construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activity(ies) and no reasonable alternative is feasible; (b) be no greater than the minimum area necessary for the purpose of the significant disturbance; (c) be designed and undertaken by a suitably qualified and experienced person taking into account the matters listed in Section 5 Planning Activities and Section 6 Impact Management During Activities of DERM'S "Guideline – Activities in a watercourse, lake or spring associated with mining operations" dated April 2008, or more recent editions as such become available; and (d) upon cessation of the activities or works, commence rehabilitation immediately such that the final rehabilitation is to a condition that will ensure the ongoing physical integrity and the natural ecosystem values of the site.	Evaluation A	Criteria I, R	Works for the construction of a pipeline were conducted within a watercourse during the audit period. Other works within a watercourse included the excavation of a road crossing down to bed level. These works were conducted following advice from G&S (provided on 13 and 23 April 2012), to ensure that the road fill will not obstruct the flow of the river. The advice provided by G&S considered DERM'S (now DEHP) "Guideline – Activities in a watercourse, lake or spring associated with mining operations". No evidence was sited during the audit that verified the qualifications and experience of the staff involved in the above-mentioned works. However, site representatives confirm that staff involved were appropriately qualified and experienced.
B10 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs Sediment control measures must be implemented to minimise any increase in water turbidity due to carrying out petroleum activities in the bed or banks of a watercourse or wetland, or a spring.	Evaluation NC	Criteria I, O	No sediment control measures were observed in place at Isaac River Crossing #2. However, it is recognised that the risk of sediment release is low for the majority of the year, and is only an issue in low flow periods. Works have been conducted in the last 12 months to improve compliance with DERM'S (now DEHP) "Guideline – Activities in a watercourse, lake or spring associated with mining operations. Discussions are ongoing, within Arrow to determine the appropriate sediment control measures to put in place.
B11 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs Routine, regular and frequent visual monitoring must be undertaken while carrying out construction work and/or any maintenance of completed works in a watercourse, wetland or spring. If, as a result of the petroleum activity(ies), water turbidity increases in the watercourse, wetland or spring outside contained areas, works must cease and the sediment control measures must be rectified to limit turbidity before activities recommence.	Evaluation PC	Criteria I	Site Representatives confirm that frequent visual monitoring is undertaken while construction work and/or maintenance work is being completed in onsite watercourses. However, currently there is no formalised process for this monitoring. It is recommended that an inspection schedule and observation checklist be developed for construction/maintenance periods. Arrow has commissioned G&S to undertake the preparation of such documents.
B12 Applicable to; PL191 and PL196 <div></div>	Watercourses, wetlands and springs Petroleum activity(ies) must not be carried out in River Improvement Trust Asset Areas without the approval of the relevant River Improvement Trust.	Evaluation NA	Criteria NA	No 'River Improvement Trust Asset Areas' are located within the Moranbah Gas Project area.
B13 Applicable to; PL191 and PL196 <div></div>	Groundwater The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to any spring, wetland or other surface waters.	Evaluation --	Criteria --	Compliance with this condition cannot be readily assessed.

FDL Release

ASPECT REQUIREMENT		EVALUATION & CRITERIA					COMMENTS																																			
BA2 Applicable to; PL191 and PL196	Contaminant Release The release of contaminants to waters must not exceed the release limits stated in Schedule BA, Table 2 – Contaminant Release Limits for Release Point RP1 and RP2 when measured at the monitoring points specified in Schedule BA, Table 1 – Contaminant Release Points, Sources and Receiving Waters for each quality characteristic. Schedule BA Table 2 – Contaminant Release Limits for Release Point RP1 and RP2						Evaluation NA	No CSG water was discharged at the designated release points during the audit period. Monitoring was therefore not conducted during the audit period.																																		
	<table><tr><th>Physicochemical Parameters</th><th>Release Limits</th><th>Limit Type</th><th>Monitoring Frequency</th></tr><tr><td>Electrical conductivity (µS/cm)</td><td>No limit</td><td>NA</td><td rowspan="10">Daily during discharge events and for two days after cessation of discharge</td></tr><tr><td>pH</td><td>6.5-8.5</td><td>Range</td></tr><tr><td>Dissolved oxygen (mg/L)</td><td>2</td><td>Minimum</td></tr><tr><td>Turbidity (NTU)</td><td>25</td><td>Maximum</td></tr><tr><td>Chloride (mg/L)</td><td>22-120</td><td>Range</td></tr><tr><td>Sulfate (mg/L)</td><td>3 9</td><td>Range</td></tr><tr><td>Calcium (mg/L)</td><td>>5</td><td>Minimum</td></tr><tr><td>Magnesium (mg/L)</td><td>>1</td><td>Minimum</td></tr><tr><td>Sodium (mg/L)</td><td>50</td><td>Maximum</td></tr><tr><td>Chlorophyll-a (µg/L)</td><td>5</td><td>Maximum</td></tr></table>								Physicochemical Parameters	Release Limits	Limit Type	Monitoring Frequency	Electrical conductivity (µS/cm)	No limit	NA	Daily during discharge events and for two days after cessation of discharge	pH	6.5-8.5	Range	Dissolved oxygen (mg/L)	2	Minimum	Turbidity (NTU)	25	Maximum	Chloride (mg/L)	22-120	Range	Sulfate (mg/L)	3 9	Range	Calcium (mg/L)	>5	Minimum	Magnesium (mg/L)	>1	Minimum	Sodium (mg/L)	50	Maximum	Chlorophyll-a (µg/L)	5
	Physicochemical Parameters	Release Limits	Limit Type	Monitoring Frequency																																						
	Electrical conductivity (µS/cm)	No limit	NA	Daily during discharge events and for two days after cessation of discharge																																						
	pH	6.5-8.5	Range																																							
	Dissolved oxygen (mg/L)	2	Minimum																																							
	Turbidity (NTU)	25	Maximum																																							
	Chloride (mg/L)	22-120	Range																																							
	Sulfate (mg/L)	3 9	Range																																							
	Calcium (mg/L)	>5	Minimum																																							
Magnesium (mg/L)	>1	Minimum																																								
Sodium (mg/L)	50	Maximum																																								
Chlorophyll-a (µg/L)	5	Maximum																																								
BA3 Applicable to; PL191 and PL196	Contaminant Release The release of contaminants to waters from the release points must be monitored at the locations specified in Table 1 – Contaminant Release Points, Sources and Receiving Waters for each quality characteristic and at the frequency specified in Table 2 – Contaminant Release Limits for Release Point RP1 and RP2.						Evaluation NA																																			
							Criteria NA																																			
BA4 Applicable to; PL191 and PL196	Contaminant release The holder must install, operate and maintain a stream flow gauging station(s) as specified in Schedule BA Table 3 – Contaminant Release during Flow Events to determine and record stream flows at the locations upstream of each Release Point(s) as shown in Schedule BA Table 1 – Contaminant Release Points, Sources and Receiving Waters for any receiving water into which a release occurs.						Evaluation NA	Not applicable at this stage of work as Arrow is currently not permitted to discharge water at the designated release points. Site Representatives confirm that once approval is received, a stream flow gauging station will be installed. Currently, in the event of an emergency release, data from the 'DERM' (now DEHP) stream flow gauge is used for monitoring and analysis.																																		
							Criteria NA																																			
BA5 Applicable to; PL191 and PL196	Contaminant Release Notwithstanding any other condition of this environmental authority, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Schedule BA Table 3 – Contaminant Release during Flow Events for the contaminant release point(s) specified in Schedule BA Table 1 – Contaminant Release Points, Sources and Receiving Waters. Schedule BA, Table 3 – Contaminant Release during Flow Events						Evaluation NA	No CSG water was discharged at the designated release points during the audit period. Monitoring was therefore not conducted during the audit period.																																		
	<table><tr><th>Receiving water description</th><th>Gauging station description</th><th>Latitude or northing (GDA94)</th><th>Longitude or easting (GDA94)</th><th>Minimum flow in receiving water required for a release event</th><th>Flow recording frequency</th></tr><tr><td>Isaac River</td><td>Gauging station 1</td><td>-21°57'37"</td><td>148°2'17"</td><td>≥5m³/sec</td><td>Continuous (minimum daily)</td></tr></table>						Receiving water description		Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency	Isaac River	Gauging station 1	-21°57'37"	148°2'17"	≥5m³/sec	Continuous (minimum daily)																							
	Receiving water description	Gauging station description	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency																																				
Isaac River	Gauging station 1	-21°57'37"	148°2'17"	≥5m³/sec	Continuous (minimum daily)																																					
						Criteria NA																																				
BA6 Applicable to; PL191 and PL196	Contaminant release The total volume released through the release points must not exceed 0.023m³/s and 2ML/day.						Evaluation NA	No CSG water was discharged at the designated release points during the audit period.																																		
							Criteria NA																																			

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
BA7 Applicable to; PL191 and PL196	Contaminant release The environmental authority holder must install and maintain a measuring device to measure/meter the volume of treated CSG water released under this environmental authority.	Evaluation NA	Criteria NA	Not applicable at this stage of work as Arrow is currently not permitted to discharge water at the designated release points. Site Representatives confirm that once approval is received, a stream flow gauging station (to measure/metre the volume of water released) will be installed. Currently, in the event of an emergency release, data from the 'DERM' (now DEHP) stream flow gauge is used for monitoring and analysis.
BA8 Applicable to; PL191 and PL196	Contaminant release The measuring device/meter must be installed prior to commencement of release of treated CSG water and its installation must comply with the most recent version of 'Draft standards and specifications for measuring/metering disposal of treated CSG water'	Evaluation NA	Criteria NA	As above.
BA9 Applicable to; PL191 and PL196	Contaminant release Upon practical completion of the meter installation, the environmental authority holder must provide a completed 'Meter Installation Form' signed by the installer and the environmental authority holder confirming that the installation complies with the manufacturer's specifications and/or national standards and/or DERM's metering standards.	Evaluation NA	Criteria NA	As above.
BA10 Applicable to; PL191 and PL196	Contaminant release The environmental authority holder must provide the administering authority with safe access to facilitate inspections and comply with the manufacturer's instructions or best practice for the operation of the pump and meter installation.	Evaluation NA	Criteria NA	As above.
BA11 Applicable to; PL191 and PL196	Contaminant release The releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.	Evaluation NA	Criteria NA	Not applicable at this stage of work as Arrow is currently not permitted to discharge water at the designated release points.
BA12 Applicable to; PL191 and PL196	Characterisation of other contaminants Prior to the release of water, the environmental authority holder must have prior written approval from the Office of the Water Supply Regulator (OWSR).	Evaluation NA	Criteria NA	Arrow is currently not permitted to discharge water at the designated release points. A permit to release is currently being processed by the OWSR.
BA13 Applicable to; PL191 and PL196	Characterisation of other contaminants If water has been released from authorised release points listed in Schedule BA, Table 1 – Contaminant Release Points, Sources and Receiving Waters authorised release points, the environmental authority holder must undertake an annual assessment of the contaminants of the contaminant of treated CSG water to determine the risk of environmental harm from release of treated CSG water to surface waters. This should consider the contaminants mentioned in the ANZECC & ARM CANZ 2000 guidelines. This annual assessment must be included in the Annual Return.	Evaluation NA	Criteria NA	No CSG water was discharged at the designated release points during the audit period. Monitoring and an assessment of contaminants was therefore not conducted during the audit period.
BA14 Applicable to; PL191 and PL196	Notification of release event exceedance If the release limits defined in Schedule BA, Table 2 – Contaminant Release Limits for Release Point RP1 and RP2 are exceeded, the holder of the environmental authority must notify the administering authority within twenty-four (24) hours of receiving the results.	Evaluation NA	Criteria NA	No CSG water was discharged at the designated release points during the audit period.
BA15 Applicable to; PL191 and PL196	Notification of release event exceedance The environmental authority holder must, within twenty-eight (28) days of a release that exceeds the conditions of this environmental authority, provide a report to the administering authority detailing; (a) the reason for the release;	Evaluation NA		As above.

ASPECT	REQUIREMENT	EVALUATION & CRITERIA		COMMENTS
	(b) the location of the release; (c) all water quality monitoring results; (d) any general observations; (e) all calculations; (f) measures taken to prevent a repeat of the exceedance taking place; and (g) any other matters pertinent to the water release event.		Criteria NA	
BA16 Applicable to; PL191 and PL196	Event based surface water monitoring Each monitoring and release point as specified in Schedule BA – Table 1 and Schedule BA – Table 3 must be marked and readily identifiable from the banks of the Isaac River.	Evaluation NA		Not applicable at this stage of work as Arrow is currently not permitted to discharge water at the designated release points. Site Representatives confirm that once approval is received monitoring and release points will be formalised and signage put in place.
		Criteria NA		
BA17 Applicable to; PL191 and PL196	Event based surface water monitoring The water quality of the Isaac River must be monitored for the physiochemical parameters and at the frequency specified in Schedule BA – Table 2 Contaminant Release Limits for Release Point RP1 and RP2 at a monitoring point 50 – 100 metres upstream, in addition to 200 metres and 1000 metres downstream of release point R2.	Evaluation NA		No CSG water was discharged at the designated release points during the audit period. Monitoring was therefore not conducted during the audit period.
		Criteria NA		
BA18 Applicable to; PL191 and PL196	Event based surface water monitoring The holder of this environmental authority must keep records of all discharge events to the Isaac River. The records must include, but not be limited to: (a) the volume of water released through the release point(s); (b) the release rate (c) date and time of discharge (d) flow rate at Gauging Station 1 during the discharge event; (e) water quality characteristics monitoring results; and (f) details of any observed impacts.	Evaluation NA		As above.
		Criteria NA		
BA19 Applicable to; PL191 and PL196	Water general The release of contaminants directly or indirectly to waters; (a) must not produce and visible discolouration of receiving waters; (b) must not produce and slick or other visible or odorous evidence of oil, grease or petrochemicals, nor contain visible floating oil, grease, scum, litter or other objectionable matter.	Evaluation NA		No CSG water was discharged at the designated release points during the audit period. Current dam management reduces the likelihood of the release of contaminants via overtopping or leakage. The site's Dam Operation, Maintenance and Surveillance Plans were reviewed during the audit process. Potential for release of contaminants from workshop and wash-down areas is minimised by their physical separation from local water sources.
		Criteria NA		
BC1 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land The peak design capacity of the sewage treatment plant must not exceed 216 equivalent persons based on a waste water generation rate of 250L/person/day	Evaluation C		The site sewage treatment plant has a maximum capacity of 216 equivalent people (250L/person/day), as specified in the system description section of the 'Sewage Treatment System Operation, Maintenance and Surveillance Plan'. This plan was reviewed during the audit process.
		Criteria R		
BC2 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land Sewage pump stations must be fitted with a stand-by pump and a visible or audible high level alarm.	Evaluation C		The sewage pump stations were viewed during the audit process. Each pump station is fitted with an internal stand-by pump (as confirmed by the Site Representatives) and a visible high-level alarm, which was sited during the audit inspection.
		Criteria I, O		
BC3 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land Treated effluent may only be released to land at the designated, fenced and delineated contaminant release area/s.	Evaluation C		The effluent irrigation area was visited during the audit process. Site Representatives stated that treated effluent is either irrigated into the designated and fenced area of land, or stored in fenced dams, if irrigation is not possible.
		Criteria I, O		

ASPECT REQUIREMENT		EVALUATION & CRITERIA				COMMENTS	
BC4 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land Treated effluent must not be released to land within 100 metres of any residential area, watercourse, wetland, spring or protection area.	Evaluation A				The effluent irrigation area was observed during the audit process. A review of aerial photography on Google Earth (2011) shows that this area is not within 100 metres of any residential area, watercourse, wetland or spring.	
		Criteria I, O				No evidence was sited during the audit that showed that an assessment of protection areas in the vicinity of the effluent disposal had been conducted. However, the positioning of the effluent release area is covered under Condition A21.	
BC5 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land The contaminant release area/s must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.	Evaluation PC				A detailed 'Moranbah Gas Project Sewage Treatment System Operations, Maintenance and Surveillance Plan' is currently being developed. A Draft version of this Plan was reviewed during the audit process. Site Representatives indicated that he final version of this Plan will specify the maintenance requirements for the contaminant release area/s. It is recommended that this Plan be finalised as a matter of priority.	
		Criteria I, R					
BC6 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land Treated effluent must not be applied by spray irrigation and must be applied in a manner that does not cause damming or runoff of effluent beyond the contaminant release area/s	Evaluation A				The irrigation system was inspected during the audit process. Effluent is currently applied via a modified spray irrigation system. Arrow is investigating an alternative irrigation system.	
		Criteria I, O				No damming or run-off was observed beyond the contaminant release area/s during the audit inspection. Effluent irrigation is governed by a Transitional Environmental Program (TEP) and consultation with DEHP is ongoing.	
BC7 Applicable to; PL191 and PL196	Release of treated sewage effluent contaminants to land When weather conditions or soil conditions preclude the release of contaminants, for example, during and immediately after rainfall, the contaminants must be directed to on-site storage or lawfully disposed of off-site.	Evaluation C				Site Representatives confirm that when weather/soil conditions prevent effluent irrigation, effluent is directed to an onsite storage dam. This dam was observed during the audit process.	
		Criteria I, O				No ponding of water was observed during the inspection.	
BC8 Applicable to; PL191 and PL196	Quality of contaminants released from the sewage treatment works Treated effluent must comply at the sampling and in-situ measurement point(s), with each of the release limits specified in Schedule BC – Table 1 – Treated Sewage Effluent Standards for each quality characteristic.	Evaluation PC				Monitoring results were reviewed during the audit process. Not all results were found to be compliant. It is understood that actions have been taken to improve compliance. Results since installation of these remediation measures have improved.	
		Criteria I, R					
BC9 Applicable to; PL191 and PL196	Quality of contaminants released from the sewage treatment works The release of the contaminants to land must be monitored at the frequency and at the sampling and in-situ measurement point specified in Schedule BC – Table 1 – Treated Sewage Effluent Standards and records of the monitoring results kept for at least 5 years and made available to the administering authority upon request. Schedule BC Table 1 – Treated Sewage Effluent Standards	Evaluation PC				Monitoring results were reviewed during the audit process. The months of April and July were missing from this data set. Results since the commencement of monitoring are stored electronically. Site Representatives confirm that they would be made available to the administering authority upon request.	
		Criteria I, R					
		Quality characteristic	Sampling and in-situ measurement point location	Limit type	Release limit	Frequency	
		5-day Biochemical Oxygen Demand (inhibited)	Release pipe from sewage treatment plant after disinfection	Maximum	20mg/L	Monthly	
		Suspended solids		Maximum	30mg/L		
		pH		Range	6.0 to 9.0		
		E-coli		80 percentile	1000 cfu per 100 mL		
				Maximum	10000 cfu per 100 mL		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
Schedule C – Regulated Dams				
C1 Applicable to; PL191 and PL196 <div>s. 73. 73</div>	The name of each regulated dam must be clearly signed at the dam location at all times.	Evaluation PC	Dams 2, 5, 12 and the Moranbah Camp Sewage Treatment Dam (MCSTD) were visited during the site inspections. Not all dams were visited during the audit due to time and site access constraints.	
		Criteria I, O	Dam 2 is currently undergoing major remediation works and is the subject of a TEP. Dams 5 and 12 were adequately signed at the time of the inspection. The MCSTD was not signed at the time of the inspection.	
C2 Applicable to; PL191 and PL196 <div></div>	Construction of any dam or modifications to an existing dam determined to be in the high hazard or significant hazard category in accordance with the most recent version "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" is prohibited unless the required design plan details have been entered into the Regulated Dam Register and approved by the chief executive officer for the holder of the environmental authority, or their delegate, as being accurate and correct.	Evaluation PC	Dams 1 to 6, 8, and 10 to 13 are classified as a significant or high hazard. With the exception of Dam 2, no modifications have been undertaken on these dams in the previous 12 months.	
		Criteria I, R	The remediation and modification works undertaken on Dam 2 were the subject of a TEP arrangement with DEHP. The TEP and Certificate of Approval were reviewed during the audit. The Dam register does not appear to have been updated to include the design plan details. No new dams are scheduled to be constructed at this point in time.	
C3 Applicable to; PL191 and PL196 <div></div>	Regulated Dam Register The holder of this environmental authority must maintain a Register of Regulated Dams that must include, as a minimum the following information for each Regulated Dam: (a) dam name, the coordinates for its location and date of entry in the register; (b) dam purpose and its proposed/actual contents; (c) hazard category assessed using the most recent version of the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" (d) details of the composition and construction of any liner; (e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam; (f) maximum operational volume (megalitres) (g) design storage allowance at 1 November each year (megalitres) (h) mandatory reporting level (metres) (i) date construction was certified as compliant with the design plan; (j) name and qualifications of certifier; (k) dates on which the dam was inspected for structural and operational adequacy; (l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority; (m) date on which the dam was inspected for the detection of leakage through any liner; and (n) dates on which the dam was inspected for the purpose of annually ascertaining the available storage capacity on the 1 November each year.	Evaluation PC	Points (a), (b), (d) and (f) are addressed in the Dam Register. The following points are incomplete or require updating: (c) Hazard categories have been included for all dams. Arrow site representatives confirmed that hazard categories are defined using the manual. The assessment of hazard categories was not reviewed as part of this audit. (e) Dimensions of each dam i.e. length and width in metres, do not appear to be included in the register. (i) Some information included however the date of certification is not clearly stated in the register. (j) name of certifier is stated in the register however qualifications have not been included	
	Criteria I, R	(k) last date of inspection included in register is June 2011, it is understood that further inspections have since been undertaken but have not been added to the register as yet. (l) Dates not available for all dams. (m) last date of inspection included in register is June 2011, it is understood that further inspections have since been undertaken but have not been added to the register as yet. (n) last date of inspection included in register is September 2011, it is understood that further inspections have since been undertaken but have not been added to the register as yet.		
C4 Applicable to; PL191 and PL196 <div></div>	Regulated Dam Register The holder of this environmental authority must provisionally enter the required information in the Register of Regulated Dams when a design plan for a Regulated Dam is submitted to the administering authority.	Evaluation C	Dams 12 and 14 were constructed during the current audit period. Arrow Site Representatives indicated that design plans were submitted during the previous audit period (2010-2011).	
		Criteria I, R	Information for Dams 12 and 14 is included in the Register.	
C5 Applicable to; PL191 and PL196 <div></div>	Regulated Dam Register The holder of this environmental authority must make a final entry of the required information in the Register of Regulated Dams once compliance with Condition C16 has been achieved.	Evaluation PC	Each Dam in PL191 and 196 has been entered into the Register however information was not up to date at the time of the audit.	
		Criteria I, R		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
C6 Applicable to; PL191 and PL196 <div>73</div>	Regulated Dam Register The holder of this environmental authority must ensure that the information contained in the Register of Regulated Dams is complete and current on any given day.	Evaluation NC	Criteria I, R	Information within the Registers with regard to inspections was not up to date at the time of the audit.
C7 Applicable to; PL191 and PL196 <div></div>	Regulated Dam Register The holder of this environmental authority must submit the Register of Regulated Dams or information contained in the Register available to the administering authority at each annual return and when requested to do so in the form requested by the administering authority.	Evaluation C	Criteria I, R	A copy of the Register was included in the 2010 -2011 Annual Return. A copy of the Register is available onsite and Site Representatives confirmed that a copy is available at the request of the Administering Authority.
C8 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams All aggregation dams must: (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam and enable the repair of the containment system or its decommissioning and rehabilitation.	Evaluation NA	Criteria NA	No aggregation dams were constructed during the current audit period.
C9 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams All new aggregation dams must be designed and operated so that during any period of thirty (30) days, following the first ninety (90) days of operation of the dam, the total volume of water leaving the dam other than by evaporation must not be less than 85% of the volume of water that has entered the dam.	Evaluation NA	Criteria NA	No new aggregation dams were commissioned or constructed during the current audit period.
C10 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams By 1 October 2011, all brine dams must; (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam, enable the repair of the containment system or its decommissioning and rehabilitation; and (c) the collection and proper disposal of any contaminants that move beyond the bounds of the containment system.	Evaluation C	Criteria I, R, O	Dam 12 was constructed during the current audit period. Dam 12 was inspected during the audit. The HDPE liner and leak detection system was observed as part of the inspection. Dam 11 was not inspected however the Register indicates that the Dam is lined and has a leak detection system in place. This was confirmed by Arrow Site Representatives. The Dam Integrity Reports from inspections conducted during October by Aecom during were not yet completed and thus unavailable for review at the time of the audit.
C11 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams All Regulated Dams must be designed in accordance with the requirements of the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams" and constructed under the supervision of a suitable qualified and experienced person.	Evaluation C	Criteria I, R	Dam 12 was constructed during the current audit period, however the design was undertaken during the previous audit period. A certification notice for Dam 12 was reviewed as part of the audit. The Certification was completed by <div>72</div> of Stafford Adamson & Associates Pty Ltd who is a Registered Professional Engineer in Queensland (RPEQ 3684).
C12 Applicable to; PL191 and PL196	Construction and operational requirements for new dams The hazard category of any dam must be determined by a suitably qualified and experienced person, prior to its design and construction, upon any change in its purpose or its stored contents and at least once in each two (2) year period after its construction.	Evaluation PC	Criteria	The Dam register indicates the hazard category for each dam, however it is not clear from the Register when these categories were assigned to the Dams and whether or not they were due for re-assessment.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
s.73. 73			R	
C13 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams The construction and operation of all new regulated Dams, excluding dam 11, is prohibited unless the holder of this environmental authority has submitted to the administering authority a copy of the design plan, together with the certification of a suitable qualified and experienced person that the regulated dam: (a) will deliver the performance stated in the design plan; (b) has had its category assessed and been designed in accordance with the requirements of the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams"; and (c) when constructed and operated, will be compliant in all respects with the relevant conditions of this environmental authority.	Evaluation PC	Criteria I, R	A certification notice for Dam 12 was reviewed as part of the audit. The Certification was completed by <div></div> of Stafford Adamson & Associates Pty Ltd who is a Registered Professional Engineer in Queensland (RPEQ 3684). Correspondence from DEHP dated 14 November 2012 indicated that the certification letter did not include all required information and should be rectified and resubmitted by 11 December 2012. The Dam 14 certification was reviewed as part of the audit. The Certification was completed by <div></div> of GHD Pty Ltd who is a Registered Professional Engineer in Queensland (RPEQ 7468). The Certification indicates that Points (a) and (c) have been achieved. With regard to Point (b) the Certification states the Pond was designed prior to the issue of the 2012 Manual and as such was designed in accordance with the 2010 Manual.
C14 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams The design plan must include but not be limited to: (a) a statement of the relevant legislation, regulatory documents and engineering practice relied upon in the design plan; (b) a statement of the facts and data being used in the design plan and the limitations to the application and interpretation of that material; (c) an assessment of the hazard category of the proposed dam based on the identification of potential impacts on any sensitive receptors for any applicable dam failure scenarios, including the cumulative impact should all dams fail at once; (d) detailed specifications for the design, operation, maintenance and decommissioning of the dam(s); (e) an operational plan that includes contingency/emergency response procedures designed to avoid/minimise discharges resulting from any overtopping or loss of structural integrity of the dam; (f) design, specification and operational rules for any related structures and systems used to prevent the overtopping of the proposed dam; (g) a detailed plan for the decommissioning and rehabilitation of the dam at the end of its operational life; (h) any other matter required by the certifying suitably qualified and experienced person; and (i) evidence supporting the claims of the certifier that they are a suitably qualified and experienced person.	Evaluation NA	Criteria NA	Arrow Site Representatives indicated that no design plans have been submitted during the current audit period. Design plans for Dams 12 and 14 were prepared and submitted to DEHP during the previous audit period.
C15 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams If, within the 20 business days following the lodgement of a certified design plan the administering authority notifies the holder of this environmental authority, in writing, that the design plan is not compliant with either; (a) the conditions of this environmental authority; or (b) the requirements set out in the most recent version of the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams". Then the construction and operation of the regulated Dam is prohibited until the administering authority provides written advice that its construction may proceed.	Evaluation NA	Criteria NA	Arrow Site Representatives indicated that no design plans have been submitted during the current audit period.
C16 Applicable to; PL191 and PL196 <div></div>	Construction and operational requirements for new dams When construction of any Regulated Dam is complete, the holder of this environmental authority must submit to the administering authority one hard copy and one electronic copy of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and at the time of certification it is compliant in all respects with the conditions of this environmental authority.	Evaluation PC	Criteria I, R	Certifications and 'as constructed drawings for Dam 12 and 14 were reviewed during the Audit. A certification notice for Dam 12 was reviewed as part of the audit. The Certification was completed by <div></div> of Stafford Adamson & Associates Pty Ltd who is a Registered Professional Engineer in Queensland (RPEQ 3684). Correspondence from DEHP dated 14 November 2012 indicated that the certification letter did not include all required information and should be rectified and resubmitted by 11 December 2012. The Dam 14 certification was reviewed as part of the audit. The Certification was completed by <div>72</div> of GHD Pty Ltd who is a Registered Professional Engineer in Queensland (RPEQ 7468). The Certification indicates that Points (a) and (c) have been achieved. With regard to Point (b) the Certification states the Pond was designed prior to the issue of the 2012 Manual and as such was designed in accordance with the 2010 Manual.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
C17 Applicable to; PL191 and PL196 <div>s.33. 73</div>	Construction and operational requirements for new dams Each Regulated Dam must be maintained and operated in a manner that is consistent with the design plan and the certified 'as constructed' drawings for the duration of its operational life until decommissioned and rehabilitated.	Evaluation A	Criteria I, R	The Moranbah Gas Project Dam 1 to 11 Operations, Maintenance & Surveillance Plan was reviewed during the audit. This document aims to ensure that all dams are operated and maintained as designed. Annual integrity inspections are also used to ensure compliance with this condition. Dam Integrity Reports from the inspections conducted during October 2012 were not yet completed at the time of the audit and thus unavailable for review. Maintenance and remediation works were conducted on Dam 2 during the current audit period under a transitional Environmental Program and consultation with DEHP.
C18 Applicable to; PL191 and PL196 <div></div>	Livestock and wildlife The holder of this environmental authority must ensure reasonable and practicable control measures are in place to ensure that harm is not caused to livestock or wildlife through the construction and operation of a Regulated Dam.	Evaluation C	Criteria R, I, O	A Wildlife and Stock Management Procedure (WSMP) and the Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Pan were provided to the Auditors for review. Both plans contain management measures to ensure the potential for harm to stock and wildlife is minimised. Fencing of dams to exclude cattle was observed at Dams 2, 5, 12 and the Moranbah Camp Sewage Treatment Dam during the site inspection.
C19 Applicable to; PL191 and PL196 <div></div>	Mandatory Reporting Level The Mandatory Reporting Level must be marked on each Regulated Dam in such a way that it is clearly observable during routine inspections of each dam.	Evaluation NC	Criteria I, O	Signage indicating the Mandatory Reporting Level (MRL) was not evident at Dam 5 or the Moranbah Camp Sewage Treatment Dam at the time of the inspection however, signage indicating levels was observed at Dam 12. Due to time and access constraints, the remaining dams were not observed as part of this audit. Discussions with Arrow Site Representatives indicated that a number of dams are non-compliant with this condition.
C20 Applicable to; PL191 and PL196 <div></div>	Mandatory Reporting Level The holder of this environmental authority must notify the administering authority immediately when the level of the contents of any Regulated Dam reaches the Mandatory Reporting Level, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.	Evaluation PC	Criteria I, R	Arrow Site Representatives confirmed that no Dams have reached their respective MRL's during the current audit period. The Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Plan was reviewed during the audit. The document includes operating guides to minimise the likelihood of dams reaching the MRL and the appropriate actions to take if the MRL is reached. Graphs showing the measured pond water levels in comparison to the Design Storage Allowance (roughly equivalent to the MRL) from November 2011 to November 2012 were reviewed as part of the audit. These graphs indicated that Ponds 1 to 12 had not reached the MRL during this time. We note that information for Dams 13 and 14 was not provided for review and as such, compliance or otherwise for these Dams could not be assessed.
C21 Applicable to; PL191 and PL196 <div></div>	Annual Inspection and Report Each Regulated Dam must be inspected annually by a suitably qualified and experienced person.	Evaluation C	Criteria I, R	Dams are inspected annually, the most recent inspection was undertaken during October by Aecom. Inspections were undertaken by URS during the previous audit period. Reports from this period were provided for review during the audit.
C22 Applicable to; PL191 and PL196 <div></div>	Annual Inspection and Report At each annual inspection, the condition and adequacy of each Regulated Dam must be assessed for dam safety and against the necessary structural, geotechnical and hydraulic performance criteria contained in the certified design plan.	Evaluation --	Criteria --	Dams are inspected annually, the most recent inspection was undertaken during October by Aecom. Dam Integrity reports were not yet complete at the time of the audit and were thus unavailable for review. Dam Integrity reports for the previous audit period were provided to the Auditors for review.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
				Inspection reports were incomplete at the time of the audit and were thus unavailable for review.
C23 Applicable to; PL191 and PL196 <div></div>	Annual Inspection and Report An assessment of the adequacy of the available storage in any Regulated Dam is to be made, based on an actual dam level observed in the month of October in each year, and the resultant estimate of the level in that dam as at 1 November in each year must be equal to or less than the design storage allowance for the dam.	Evaluation --		As above.
		Criteria --		
C24 Applicable to; PL191 and PL196 <div>s.73. 73</div>	Annual Inspection and Report Where the assessment of the adequacy of the available storage in any Regulated Dam indicates that the design storage allowance will be exceeded, or at any other time the holder of this environmental authority becomes aware that the design storage allowance has been or will be exceeded, the holder of this environmental authority must notify the administering authority within 24 hours, and immediately act to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.	Evaluation -		As above.
		Criteria		
C25 Applicable to; PL191 and PL196 <div></div>	Annual Inspection and Report For each annual inspection, a copy of a report on the condition and adequacy of each Regulated Dam, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of each Regulated Dam, must be provided to the administering authority upon request.	Evaluation --		Dams are inspected annually, the most recent inspection was undertaken during October by Aecom. Inspection reports were not yet complete at the time of the audit and were thus unavailable for review. Arrow Site Representatives indicated that no requests for these documents had been received at the time of the audit, but confirmed that copies would be provided upon request.
		Criteria --		
C26 Applicable to; PL191 and PL196 <div></div>	Annual Inspection and Report The holder of this environmental authority must, upon receipt of the annual inspection report, consider the report and its recommendations, take action to ensure that each Regulated Dam will safely perform its intended function and within one month of receiving the report, notify the administering authority in writing of the recommendations of the inspection report and the actions taken to ensure the integrity of each Regulated Dam.	Evaluation --		Dam Integrity reports for the current audit period were not yet complete at the time of the audit. Compliance or otherwise with this condition could not be determined at the time of the audit. The Final Dam Integrity report for the previous audit period was provided during the Audit for review. The report outlines the findings of the dam inspections and the recommendations and actions taken to ensure the integrity of each regulated dam.
		Criteria --		
C27 Applicable to; PL191 and PL196	Requirements for existing dams By 1 October 2011, all existing aggregation dams including Dam 11 must; <div>(a) Have a floor and sides constructed with material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and (b) Have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam; and (c) Either be capable of repair to rectify any passage of the wetting front through the floor or sides of the dam or be decommissioned and rehabilitated.</div>	Evaluation PC		The Dam Register indicates that each of the aggregation dams (Dams 1 to 10 and the Moranbah Camp Sewage Treatment Dam) are lined with HDPE or CCL and that Dam 11 is fitted with a leak detection system. The Dam register indicates that none of the aggregation dams currently have leak detection systems in place.
		Criteria I, R, O		
C28 Applicable to; PL191 and PL196	Requirements for existing dams By 1 October 2010, all existing CSG aggregation dams including Dam 11 must be operated so that during any period of thirty (30) days, the total volume of water leaving the dam other than by evaporation must not be less than 85% of the volume of water that has entered the dam.	Evaluation NC		Arrow Site Representatives confirmed that no Dams have reached their respective MRL's during the current audit period. The Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Plan was reviewed during the audit. No specific reference to this operational requirement was found within the Plan.
		Criteria I, R		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS														
C29 Applicable to; PL191 and PL196	Specific authorisation for Dam 11	Evaluation NA	Construction of Dam 11 was not constructed during the current audit period. Arrow Site Representatives confirmed that the Dam meets the specified conditions.															
	Despite Condition D8, dam 11 may be constructed within Category B and C ESA buffer zones provided that the dam is located within the control points (CP) listed in Schedule C – Table 1	Criteria NA																
	Schedule C, Table 1 – Control Points for Dam 11																	
	<table><tr><th>Control Point</th><th>Latitude</th><th>Longitude</th></tr><tr><td>1</td><td>-21.9433</td><td>148.0067</td></tr><tr><td>2</td><td>-21.9436</td><td>148.0104</td></tr><tr><td>3</td><td>-21.9485</td><td>148.066</td></tr><tr><td>4</td><td>-21.9484</td><td>148.0105</td></tr></table>			Control Point	Latitude	Longitude	1	-21.9433	148.0067	2	-21.9436	148.0104	3	-21.9485	148.066	4	-21.9484	148.0105
	Control Point			Latitude	Longitude													
	1			-21.9433	148.0067													
2	-21.9436	148.0104																
3	-21.9485	148.066																
4	-21.9484	148.0105																
Schedule D - Land																		
D1 Applicable to; PL191 and PL196 <div></div>	General Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.	Evaluation C	Arrow's Environmental Policy was provided during the audit interview. This policy establishes programs to reduce environmental impacts and reduce waste and pollution. These programs are communicated to staff in 'toolbox talks' and other training sessions. A register of 'toolbox talks' of viewed during the audit interview. Arrow works to reduce potential for contaminant release to land through the use of bunding and drainage systems, dam management (Dam Operations, Maintenance and Surveillance Plans) and effluent treatment (Sewage Treatment System Operation, Maintenance and Surveillance Plan). Additionally, all line checking is performed with potable water.															
		Criteria I, R, O																
D2 Applicable to; PL191 and PL196 <div>5.73. 73</div>	Disturbance to Land – General Prior to conducting petroleum activity(ies) that involve significant disturbance to land, an assessment must be undertaken of the condition, type and ecological value of any vegetation in such areas where the activity is proposed to take place.	Evaluation C	Site Representatives confirmed that prior to conducting petroleum activities, all sites to be disturbed are surveyed by the Moranbah Gas Project ecologists. This survey is conducted in line with the Arrow Energy 'Ecological Impact Assessment Procedure' (EIAP) and determines the condition, type and ecological value of any vegetation in such areas where an activity is proposed to take place. This procedure was reviewed during the audit interview.															
		Criteria I, R																
D3 Applicable to; PL191 and PL196 <div></div>	Disturbance to Land – General The assessment required by Condition D2 must be undertaken by a suitably qualified person and include the carrying out of field validation surveys, observations and mapping of any category A, B or C Environmentally Sensitive Areas (ESA's) and the presence of species classed as endangered, vulnerable, rare or near threatened under the Nature Conservation Act 1992.	Evaluation C	The EIAP specifies the requirements of field validation surveys, observations and reporting. As part of the EIAP, the site's qualified ecologists produce a number of reports (EDT Report, Ecological Constraints Mapping, Site Validation Report and Environmental Summary Report) which detail the presence of species classed as endangered, vulnerable, rare or near threatened and include mapping of ESAs.															
		Criteria I, R																
D4 Applicable to; PL191 and PL196 <div></div>	Disturbance to Land – General The holder of this environmental authority, when carrying out a petroleum activity(ies) must: (a) avoid, minimise or mitigate (in order of preference) any impacts on areas of vegetation or other areas of ecological value; (b) minimise the risk of injury, harm, or entrapment to wildlife or stock; (c) minimise disturbance to land that ma otherwise result in land degradation; (d) ensure that for land that is to be significantly disturbed by petroleum activity(ies) I. the top layer of the soil profile is removed; II. stockpiled in a manner that will preserve its biological and chemical properties; and III. used for rehabilitation purposes (in accordance with Condition H6) and (e) prior to carrying out field based activities, make all relevant staff, contractors or agent carrying out those activities, aware of the location of any category A, B or C ESA's and the requirements of this environmental authority.	Evaluation C	Arrow works to avoid impacts on areas of ecological value and minimise the risk of injury, harm or entrapment to wildlife/stock through its EIAP. This procedure was reviewed during the audit. Arrow work to minimise disturbance to land and effectively manage disturbed land through its Erosion and Topsoil Management Procedure. This procedure was reviewed during the audit. Arrow conducts pre-start meetings involving all relevant staff at which the site ecologists communicate about any ecologically and culturally sensitive areas. In these meetings, field staff are provided with access to ecological maps of the area, highlighting boundaries and areas of protection. The electronic scheduling for a number of pre-start meetings was reviewed during the audit.															
		Criteria I, R																

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
D5 Applicable to; PL191 and PL196 <div>5.23. 73</div>	Disturbance to Land – General In accordance with Condition D4, if significant disturbance to land is unavoidable, the holder of this environmental authority must not clear vegetation, excavate or place fill: (a) in a way which significantly isolates, fragments or dissects tracts of vegetation resulting in a reduction in the current level of ecosystem functioning, ecological connectivity (i.e. stepping stone or contiguous bioregional/local corridor networks) and/or results in an increase in threatening processes (e.g. potential impacts associated with edge effects or introduced species); (b) on slopes greater than 10% for activities other than pipelines and wells; or (c) in discharge areas.	Evaluation C	Site Representatives stated that prior to disturbance, relevant staff are involved in a pre-planning workshop to determine the most appropriate area for works. This system allows for work to be planned around vegetation, slopes and discharge areas, if a viable alternative is available. The electronic scheduling for a number of pre-planning workshops was reviewed during the audit.	
		Criteria I, R		
D6 Applicable to; PL191 and PL196 <div></div>	Disturbance to Land – General Clearing of remnant vegetation shall not exceed ten (10) metres in width for the purpose of establishing tracks and 20 metres in width for dual carriageway roads unless otherwise approved by the administering authority in writing.	Evaluation C	Site Representatives stated that prior to disturbance, relevant staff are involved in a pre-planning workshop to determine the most appropriate area for works. This system allows for work to be planned around remnant vegetation. The electronic scheduling for a number of pre-planning workshops was reviewed during the audit. Activities that require clearing of remnant vegetation are assessed through the EIAP/LAR process. Areas of allowable clearing are then stipulated in the Access and Approval Conditions and communicated to relevant staff at the pre-start meeting. The electronic scheduling for a number of pre-start meetings was reviewed during the audit.	
		Criteria I, R		
D7 Applicable to; PL191 and PL196 <div></div>	Disturbance to Land – General Cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements.	Evaluation C	Arrow is currently drafting a Vegetation Clearing and Site Preparation Procedure, which details that cleared vegetation must be stockpiled in a manner that facilitates respreading or salvaging and does not impede vehicle, stock or wildlife movements. This procedure was viewed during the audit. Stockpiled vegetation was not observed during the audit inspection, but Site Representatives confirm that this condition is adhered to.	
		Criteria I, R, O		
D8 Applicable to; PL191 and PL196 <div></div>	Disturbance to land – Environmentally Sensitive Areas Notwithstanding Conditions D2 and D7 inclusive, the holder of this environmental authority must ensure that the petroleum activity(ies); (a) are not conducted in or within 200 metres of any listed category A, B or C ESA's; and (b) do not involve activities other than (a) limited petroleum activity(ies) within 1km of a listed category A ESA, or within 500m of a listed category B or C ESA.	Evaluation C	Site Representatives stated that prior to disturbance, relevant staff are involved in a pre-planning workshop to determine the most appropriate area for works. This system allows for work to be planned around ESAs. The electronic scheduling for a number of pre-planning workshops was reviewed during the audit. Following this the EIAP/LAR process begins, which involves a desktop assessment and field validation survey. As part of the EIAP, the site's qualified ecologists produce a number of reports, which detail the presence of species classed as endangered, vulnerable, rare or near threatened and include mapping of ESAs.	
		Criteria I, R		
D9 Applicable to; PL191 and PL196 <div></div>	Disturbance to Land – General (a) limited petroleum activity(ies) carried out in accordance with Condition D8(b) must ne preferentially located in pre-existing areas of clearing or significant disturbance to the greatest practicable extent.	Evaluation C	Site Representatives stated that prior to disturbance, relevant staff are involved in a pre-planning workshop to determine the most appropriate area for works. This system allows for work to be planned in pre-existing areas of clearing or significant disturbance. The electronic scheduling for a number of pre-planning workshops was reviewed during the audit.	
		Criteria I, R		
D9A Applicable to; PL191 and PL196	Disturbance to Land – General Despite conditions B6 and D8 of this environmental authority, the following infrastructure (and associated necessary construction, operational and maintenance activities) listed in Schedule D – Table 1 is authorised within the specified location as described in Schedule D – Table 1. Table not included – Refer to EA PEN100015907 for details)	Evaluation C	Site Representatives confirm that no further infrastructure has been constructed in ESA areas, in addition to the infrastructure listed in Schedule D – Table 1. This is ensured through the EIAP/LAR process. Example EIAP/LAR documentation was reviewed during the audit process.	
		Criteria I, R		
D9B Applicable to;	Despite Condition B6 and D8 of this environmental authority, the groundwater monitoring bores (and associated necessary construction, operational and maintenance activities) listed in Schedule D – Table 2 are authorised.	Evaluation C	Site Representatives confirm that no further bores have been constructed in ESA areas, in addition to the bores listed in Schedule D – Table 1. This is ensured through the EIAP/LAR	

<p>carried out in areas according to the following order of preference:</p> <ul style="list-style-type: none"> disturbed areas less than 200m from an Endangered/Of Concern RE; Endangered/Of concern RE; <p>within an endangered or concern regional ecosystem (e.g. areas where undertaken within a regional ecosystem, and/or areas containing high has inhibited re-colonisation of native growth);</p> <p>concern regional ecosystem is unavoidable;</p> <p>ern RE or associated buffer zone must not exceed any of the following areas:</p> <p>concern regional ecosystem as ground trothed and mapped before any activity of this environmental authority for the life of the project; or</p> <p>o; or</p> <p>uction purposes; and</p> <p>minimise the area cleared and to avoid the clearing of mature trees, which risk assessment to determine the minimum amount of disturbance possible.</p>	<p>Criteria L, R</p>	<p>valida which and i proc Area comm Arrow comm provi prote audit</p>
<p>ional Ecosystems</p> <p>of Endangered or Of Concern regional ecosystems, along with a record of ept and submitted to the administering authority upon request.</p>	<p>Evaluation NA</p>	<p>Site l 200m proc</p>
	<p>Criteria NA</p>	
<p>ional Ecosystems</p> <p>that an ecosystem mapped as Endangered or Of Concern regional r conservation value classification and the holder of this environmental of the lower conservation value they must notify the administering authority in</p>	<p>Evaluation NA</p>	<p>Site l class</p>
	<p>Criteria NA</p>	

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
D15 Applicable to; PL191 and PL196 <input type="text"/>	Disturbance to Land – Endangered and Of Concern Regional Ecosystems The holder of this environmental authority must comply with any environmental offset agreement made in accordance with the conditions of this environmental authority.	Evaluation NA	Criteria NA	Site Representatives confirm that there were no environmental offset agreements made during the audit period.
		Evaluation NA		
D16 Applicable to; PL191 and PL196 <input type="text"/>	Disturbance to Land – State Forests and Timber Reserves Despite Condition D8, activities may be undertaken within State Forests or Timber Reserves provided the holder of the environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.	Evaluation NA	Criteria NA	Site Representatives confirm that no activities have occurred within State Forests or Timber Reserves during the audit period. This is assessed through the EIAP/LAR process. Example EIAP/LAR documentation was reviewed during the audit process.
		Evaluation NA		
D17 Applicable to; PL191 and PL196 <input type="text"/>	Disturbance to Land – State Forests and Timber Reserves Where activities are to be undertaken in a State Forest or Timber Reserve that are also Endangered or Of Concern Regional Ecosystems, such activities may be undertaken in accordance with Condition D10 of this environmental authority, provided the holder of this environmental authority has written approval from the authority responsible for the administration of the Forestry Act 1959.	Evaluation NA	Criteria NA	Site Representatives confirm that no activities have occurred within State Forests or Timber Reserves during the audit period. This is assessed through the EIAP/LAR process. Example EIAP/LAR documentation was reviewed during the audit process.
		Evaluation NA		
D18 Applicable to; PL191 and PL196 <input type="text"/>	Soil Management The holder of this environmental authority must develop and implement soil management procedures for areas to be disturbed by (a) petroleum activity(ies) prior to commencement of (a) petroleum activity(ies) in these areas to prevent or minimise the impacts of soil disturbance. These procedures must include but not be limited to' <ul style="list-style-type: none"> (a) establishment of baseline soil information for areas to be disturbed including soil depth, pH, electrical conductivity (EC), chloride, cations (calcium, magnesium and sodium), phosphorus, potassium, sulphur and micronutrients); (b) a soils monitoring program outlining parameters to be monitored, frequency of monitoring and maximum limits for each parameter; (c) identification of soil units within areas to be disturbed by petroleum activities at a scale of 1:00000, in accordance with the 'Guidelines for Surveying Soil and Land Resources, 2nd Edition' (McKenzie et al. 2008), "Australian Soil and Land Survey Handbook, 3rd Edition" (National Committee on Soil and Terrain 2009) and "The Australian Soil Classification" (Isbell 2002); (d) development of soil descriptions that are relevant to assessment for agricultural suitability, topsoil assessment, erodibility and rehabilitation, for example: <ul style="list-style-type: none"> I. shallow cracking clay soils; II. deep cracking clay soils; III. deep saline and/or sodic cracking clay soils with melonholes; IV. thin surface, sodic duplex soils; V. medium to thick surface (say >15cm), sodic duplex soils; and VI. non-sodic duplex soils; (e) detailed mitigation measures and procedures to manage the risk of adverse soil disturbance in the carrying out of the petroleum activity; and (f) for areas of good quality agricultural land, detailed methods to be undertaken to minimise potential impacts. 	Evaluation PC	Criteria I, R	A Soil Management Procedure (SMP) has been developed and was provided to the Auditors for review. The SMP provides guidance for undertaking the baseline soil investigations. It is understood from discussions with the Site Representatives that baseline soil investigations are currently being undertaken by Soil Horizons and that site specific SMP's will be developed following completion of these investigations. Email correspondence between Arrow and Soil Horizons regarding these investigations was reviewed during the audit process.
		Evaluation PC		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
s. 73. 73				
D19 Applicable to; PL191 and PL196 <div></div>	Soil Management A copy of the soil management procedures must be made available to the administering authority upon request.	Evaluation C Criteria I, R	A SMP has been developed and was provided to the Auditors for review. The SMP provides guidance for undertaking the baseline soil investigations. Site Representatives confirm that this would be made available to the administering authority upon request.	
D20 Applicable to; PL191 and PL196 <div></div>	Acid sulfate soils The holder of this environmental authority must, when clearing in areas with acid sulfate soils or potential acid sulfate soils, develop and implement an acid sulphate soil environmental management plan prepared in accordance with Appendix 4 of the "State Planning Policy 2/02 Guideline Acid Sulfate Soils" and the Department of Environment and Resource management's "Queensland Acid Sulfate Soil Technical Manual" (Version 2.2 September 2004) or more recent editions or supplements to these documents as such become available.	Evaluation NA Criteria NA	Site Representatives confirm that there has been no need to investigate Acid Sulfate Soils (ASS) or Potential Acid Sulfate Soils (PASS) during the audit period. The sites location – distance from the coast and elevation above sea level – make the disturbance of ASS/PASS during petroleum activities highly unlikely.	
D21 Applicable to; PL191 and PL196 <div></div>	Fauna Management The holder of this environmental authority must develop and implement fauna management procedures for the carrying out of the petroleum activity(ies), in particular pipeline construction, construction and use of dams, to prevent or minimise harm or the potential risk of causing harm to fauna.	Evaluation C Criteria I, R	A Wildlife and Stock Management Procedure (WSMP) has been developed and provided to the Auditors for review. The WSMP meets the specified requirements. A number of detailed fauna management procedures were also reviewed during the audit process, including the Relocating Wildlife Procedure and the Fauna Spotter Catcher Procedure.	
D22 Applicable to; PL191 and PL196 <div></div>	Fauna Management The fauna management procedures must include training and awareness of staff and contractors and ensure that any planned fauna handling is undertaken by a suitably qualified person.	Evaluation C Criteria I, R	The WSMP includes provisions for training and awareness. Additionally, Arrow's ecology team is trained in Venomous Snake Handling and Ethics Wildlife (DEEDI); with a number of members also trained in wildlife caring (Wildlife Carer Orientation Program, Caring for Native Birds, Caring for Reptiles and Caring for Mammals). All Moranbah Gas Plant staff are offered snake awareness training.	
D23 Applicable to; PL191 and PL196 <div></div>	Fauna Management A copy of the fauna management procedures must be made available to the administering authority upon request.	Evaluation C Criteria I, R	The administering authority has not requested a copy of the fauna management procedures during the audit period. However, Site Representatives confirm that this would be made available to the administering authority upon request.	
D24 Applicable to; PL191 and PL196 <div></div>	Pest Management In carrying out the petroleum activity(ies) the holder of this environmental authority must develop and implement an effective pest management program that includes but is not limited to the following; <div><div>(a) identification of pest species and infestation areas;</div><div>(b) prevents and/or minimises the introduction and/or spread of pests; and</div><div>(c) control and management of pest outbreaks as a result of petroleum activities.</div></div>	Evaluation C Criteria I, O, R	A Weed and Pathogen Management Procedure (WPMP) has been developed and provided to the Auditors for review. The WPMP meets the requirements of Condition D24 (a), (b) and (c). 'Weed watch' posters were observed in the Arrow Site Office, detailing the prevalent weed species onsite. Additionally, weeds are identified and managed through the LAR process.	

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
D25 Applicable to; PL191 and PL196 <div>s.33. 73</div>	Pest Management A copy of the pest management program must be made available to the administering authority upon request.	Evaluation C	The administering authority has not requested a copy of the pest management procedures during the audit period. However, Site Representatives confirm that this would be made available to the administering authority upon request.	
		Criteria I, R		
D26 Applicable to; PL191 and PL196 <div></div>	Chemical and Fuel Storage All explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids (including petroleum products and associated piping and infrastructure) must be stored and handled in accordance with the relevant Australian Standard where such is available.	Evaluation NC	Whilst onsite it was noted that a number of chemical storage areas are not maintained in accordance with relevant Australian Standards, including areas with no roofing and inadequate bund capacity. Site Representatives stated that a TEP is currently being prepared in relation to these areas and that liaison with DEHP is ongoing.	
		Criteria I, O		
D27 Applicable to; PL191 and PL196 <div></div>	Chemical and Fuel Storage Notwithstanding the requirements of any Australian Standard, any liquids stored on site that have the potential to cause environmental harm must be stored in or serviced by an effective containment system that is impervious to the materials stored and management to prevent the release of liquids to waters or land. Where no relevant Australian Standard is available, the following must be applied: (a) storage tanks must be banded so that the capacity and construction of the bund is sufficient to contain at least 110% of a single storage tank or 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and (b) drum storages must be banded so that the capacity and construction of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.	Evaluation NC	A Chemical Management Procedure has been developed and provided to the Auditors for review. However, this procedure does not appear to be implemented in full. For example, whilst onsite it was noted that a number of chemical storage areas had no roofing and inadequate bund capacity.	
		Criteria I, O		
D28 Applicable to; PL191 and PL196 <div></div>	Chemical and Fuel Storage All containment systems must be designed to minimise rainfall collection within the system.	Evaluation NC	A number of chemical storage areas were not under cover. Site Representatives stated that a TEP is currently being prepared in relation to these areas and that liaison with DEHP is ongoing.	
		Criteria I, O		
D29 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation Hydraulic fracturing fluids must not contain benzene, ethylbenzene, toluene, xylene, naphthalene, phenanthrene or diesel.	Evaluation NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period.	
		Criteria NA		
D30 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation A hydraulic fracturing chemical risk assessment is required to be carried out and submitted to the administering authority prior to hydraulic fracturing.	Evaluation NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no chemical risk assessments have been required during the current audit period.	
		Criteria NA		
D31 Applicable to;	Well Drilling, Completion and Stimulation A hydraulic fracturing chemical risk assessment required by Condition D30 must be reviewed:	Evaluation NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no review of chemical risk assessments has been required.	

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
PL191 and PL196 <div>s. 73. 73</div>	<div>a) when new or additional toxicological information becomes available for the chemicals used; and</div> <div>b) when new chemicals, chemical concentrations or mixtures are used in hydraulic fracturing fluids.</div>	Criteria NA		
D32 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation The updated risk assessment required by Condition 31(a) must be submitted to the administering authority upon request.	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no chemical risk assessments have been required.
D33 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation The updated risk assessment required by Condition D31(b) must be submitted to the administering authority prior to the use of the new chemicals, chemical concentrations or mixtures for hydraulic fracturing on PL191 and PL196.	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no updating of chemical risk assessments has been required.
D34 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation The holder of this environmental authority must monitor for the chemicals used in hydraulic fracturing fluids used and keep a record of the groundwater quality in any landholders bore, subject to access being permitted by the landholder, that is located within a one (1) kilometre radius of a well subject to hydraulic fracturing.	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted on PL191 or PL196 during the audit period. Therefore, no monitoring has been required.
D35 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation The monitoring required under Condition D24 must be undertaken at least: <div>(a) within 2 months of hydraulic fracturing being undertaken;</div> <div>(b) weekly for the first month subsequent to hydraulic fracturing being undertaken;</div> <div>(c) monthly for the first six (6) months subsequent to hydraulic fracturing.</div>	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted on PL191, PL196 or <div></div> during the audit period. Therefore, no monitoring has been required.
D36 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation The results of the monitoring required by Conditions D34 and D35 must be made available upon request to: <div>(a) the administering authority; and</div> <div>(b) the landholder.</div>	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no monitoring has been required.
D37 Applicable to; PL191 and PL196 <div></div>	Well Drilling, Completion and Stimulation If the results of the monitoring required by Conditions D34 and D35 indicate that there has been a material impact caused by petroleum activities on groundwater quality, the holder of this environmental authority must notify: <div>(a) the administering authority within 24 hours; and</div> <div>(b) any affected landholders within 24 hours; and</div> <div>(c) any affected landholders within 24 hours or as per written agreement between the holder of this environmental authority and the landholder.</div>	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period. Therefore, no monitoring has been required.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS																																																																														
D38 Applicable to; PL191 and PL196 <div>s.33. 73</div>	Well Drilling, Completion and Stimulation The holder of this environmental authority must ensure that the hydraulic fracturing process is carried out in such a manner that hydraulic fractures are only contained within the target coal seam.	Evaluation NA	Criteria NA	Site Representatives confirm that no hydraulic fracturing has been conducted within the PL's during the audit period.																																																																														
Schedule E – Environmental Nuisance																																																																																		
E1 Applicable to; PL191 and PL196 <div></div>	Odour, Dust and other Airborne Contaminants The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activity(ies) must not cause an environmental nuisance at any sensitive place or commercial place.	Evaluation A	Criteria I, R	An Air Emissions Procedure (AEP) has been developed and contains management/mitigation measures aimed at controlling odour, dust and fuel burning emissions. No works are currently undertaken at night and thus a procedure for light management has not been developed and is not considered necessary at this time.																																																																														
E2 Applicable to; PL191 and PL196	Noise In the event of a complaint about noise from the carrying out of the petroleum activity(ies) being made to the administering authority and that the administering authority considers is not frivolous nor vexatious not based on mistaken belief, then the emission of noise from the licenced place must not result in total noise levels at any sensitive or commercial place greater than those specified in Schedule E, Table 1 – Noise limits or Schedule E, Table 2 – Noise Limits for Main NQGP Compressor Station. Schedule E, Table 1 – Noise limits <table><tr><td>Time period</td><td>Noise level at a sensitive place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$</td></tr><tr><td>7am – 6pm</td><td>Background noise level plus 5dB(A)</td></tr><tr><td>6pm – 10pm</td><td>Background noise level plus 5dB(A)</td></tr><tr><td>10pm – 7am</td><td>Background noise level plus 3dB(A)</td></tr><tr><td>Time period</td><td>Noise level at a commercial place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$</td></tr><tr><td>7am – 6pm</td><td>Background noise level plus 10dB(A)</td></tr><tr><td>6pm – 10pm</td><td>Background noise level plus 10dB(A)</td></tr><tr><td>10pm – 7am</td><td>Background noise level plus 8dB(A)</td></tr></table> General note: in no case is the background noise level, $L_{A90, 15\text{mins}}$ to be less than 25 dB(A). In the event that measured background noise level is less than 25 dB(A), then 25 dB(A) is to be used. Schedule E, Table 2 – Noise Limits for Main NQGP Compressor Station <table><tr><td>Noise level dB(A) measured as</td><td colspan="3">Monday to Saturday</td><td colspan="3">Sundays and Public Holidays</td></tr><tr><td></td><td>7am – 6pm</td><td>6pm – 10pm</td><td>10pm – 7am</td><td>9am – 6pm</td><td>6pm – 10pm</td><td>10pm – 9am</td></tr><tr><td colspan="7">Noise measured at a Noise Sensitive Place in Zones 1, 2, 4, 5, 9, 12, 13*</td></tr><tr><td>L_{A10}, adj. 10 mins</td><td>40</td><td>35</td><td>28</td><td>40</td><td>35</td><td>28</td></tr><tr><td>L_{A1}, adj. 10 mins</td><td>45</td><td>40</td><td>33</td><td>45</td><td>40</td><td>33</td></tr><tr><td colspan="7">Noise measured at a Commercial Place in Zones 1, 2, 4, 5, 9, 12, 13*</td></tr><tr><td>L_{A10}, adj. 10 mins</td><td>45</td><td>40</td><td>33</td><td>45</td><td>40</td><td>33</td></tr><tr><td>L_{A1}, adj. 10 mins</td><td>50</td><td>45</td><td>38</td><td>50</td><td>45</td><td>38</td></tr><tr><td colspan="7">Noise Measured at a 'Noise Sensitive Place in Zones 3, 6, 7, 8, 10, 11, 14*</td></tr></table>	Time period	Noise level at a sensitive place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$	7am – 6pm	Background noise level plus 5dB(A)	6pm – 10pm	Background noise level plus 5dB(A)	10pm – 7am	Background noise level plus 3dB(A)	Time period	Noise level at a commercial place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$	7am – 6pm	Background noise level plus 10dB(A)	6pm – 10pm	Background noise level plus 10dB(A)	10pm – 7am	Background noise level plus 8dB(A)	Noise level dB(A) measured as	Monday to Saturday			Sundays and Public Holidays				7am – 6pm	6pm – 10pm	10pm – 7am	9am – 6pm	6pm – 10pm	10pm – 9am	Noise measured at a Noise Sensitive Place in Zones 1, 2, 4, 5, 9, 12, 13*							L_{A10} , adj. 10 mins	40	35	28	40	35	28	L_{A1} , adj. 10 mins	45	40	33	45	40	33	Noise measured at a Commercial Place in Zones 1, 2, 4, 5, 9, 12, 13*							L_{A10} , adj. 10 mins	45	40	33	45	40	33	L_{A1} , adj. 10 mins	50	45	38	50	45	38	Noise Measured at a 'Noise Sensitive Place in Zones 3, 6, 7, 8, 10, 11, 14*							Evaluation NA Criteria NA	Arrow Site Representatives stated no noise complaints have been received during the audit period, however one enquiry regarding noise was received A copy of the Stakeholder Consultation Log was reviewed during the audit and confirmed that a noise enquiry was received on August 24, 2012. Arrow conducted investigations following the enquiry, which indicated that the noise was unlikely to be related to any activities being undertaken by Arrow. The results of the investigation were reported to the stakeholder. No further action was considered necessary. No noise complaints have subsequently been received.
		Time period	Noise level at a sensitive place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$																																																																															
7am – 6pm	Background noise level plus 5dB(A)																																																																																	
6pm – 10pm	Background noise level plus 5dB(A)																																																																																	
10pm – 7am	Background noise level plus 3dB(A)																																																																																	
Time period	Noise level at a commercial place measured as the Adjusted Maximum Sound Pressure Level $L_{A \max \text{ adj } T}$																																																																																	
7am – 6pm	Background noise level plus 10dB(A)																																																																																	
6pm – 10pm	Background noise level plus 10dB(A)																																																																																	
10pm – 7am	Background noise level plus 8dB(A)																																																																																	
Noise level dB(A) measured as	Monday to Saturday			Sundays and Public Holidays																																																																														
	7am – 6pm	6pm – 10pm	10pm – 7am	9am – 6pm	6pm – 10pm	10pm – 9am																																																																												
Noise measured at a Noise Sensitive Place in Zones 1, 2, 4, 5, 9, 12, 13*																																																																																		
L_{A10} , adj. 10 mins	40	35	28	40	35	28																																																																												
L_{A1} , adj. 10 mins	45	40	33	45	40	33																																																																												
Noise measured at a Commercial Place in Zones 1, 2, 4, 5, 9, 12, 13*																																																																																		
L_{A10} , adj. 10 mins	45	40	33	45	40	33																																																																												
L_{A1} , adj. 10 mins	50	45	38	50	45	38																																																																												
Noise Measured at a 'Noise Sensitive Place in Zones 3, 6, 7, 8, 10, 11, 14*																																																																																		

ASPECT	REQUIREMENT	EVALUATION & CRITERIA		COMMENTS
	L _{A10} , adj, 10 mins	45	45	
	L _{A10} , adj, 10 mins	50	50	
	L _{A10} , adj, 10 mins in sleeping areas (interior)	35		

*Refers to the Planning Scheme of the Shire of Belyando (Moranbah and environs) approved 23 February 1995

General note: In no case is the background noise level, L_{A90, 15mins} to be less than 25dB(A). In the event that measured background noise level is less than 25 dB(A), then 25dB(A) is to be used.

s. 73. 73	RTI DL Release		
-----------	----------------	--	--

E3 Applicable to; PL191 and PL196	Noise In the event of a complaint about noise from the carrying out of temporary petroleum activity(ies) being made to the administering authority and that the administering authority considers is not frivolous or vexatious nor based on mistaken belief, then total noise emitted from the temporary petroleum activities must not exceed the noise acoustic quality objective of 55dB(A) at any sensitive or commercial place between 7.00am and 6.00pm and background plus 3 dB(A) at other times.	Evaluation NA	No complaints were received during the current audit period.
		Criteria NA	

--	--	--	--

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
s. 73. 73				
<div>E4</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div></div>	<div>Noise</div> <div>In the event of a complaint about noise nuisance that the administering authority considers is not frivolous or vexatious then the holder of the environmental authority must prepare and submit a noise management plan to the administering authority within the reasonable and practicable timeframe specified in writing y the administering authority.</div>	<div>Evaluation</div> <div>NA</div> <div>Criteria</div> <div>NA</div>	No complaints were received during the current audit period.	
<div>E4</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div>(Condition E5)</div> <div></div>	<div>Noise – Fixed activities</div> <div>The noise management plan must address, but not be limited to, the following matters;</div> <div><div>(a) Identification of component noise sources and activities at the place(s) which impact on noise sensitive areas;</div><div>(b) The measured and/or predicted noise level of these noise sources and activities at noise sensitive places;</div><div>(c) The reasonable and practicable control or abatement measures (including hours of operation) that can be undertaken to reduce identified intrusive noise sources;</div><div>(d) The level of noise at noise sensitive places that would be achieved from implementing these measures.</div><div>(e) The handling of future noise complaints;</div><div>(f) Community liaison and consultation; and</div><div>(g) Training of staff and contractors in noise management practices.</div></div>	<div>Evaluation</div> <div>NA</div> <div>Criteria</div> <div>NA</div>	No complaints were received during the current audit period.	
<div>E5</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div>(Condition E6)</div> <div></div>	<div>Noise – Fixed activities</div> <div>The holder of this environmental authority must commence implementation of the noise abatement measures recommended in the noise management plan not ore than 30 days following its submission to the administering authority, accounting for any comments made by the administering authority within that time.</div>	<div>Evaluation</div> <div>NA</div> <div>Criteria</div> <div>NA</div>	No complaints were received during the current audit period.	

s. 73. 73

RTI DL Release

s.73. 73

Schedule F – Air

<div>F1</div> <div>Applicable to;</div> <div>PL191 and PL196</div> <div></div>	<div>Air</div> <div>Fuel burning or combustion equipment that is capable of burning at least 500kg of fuel in an hour must only release contaminants to the atmosphere as provided for in Schedule F – Table 1.</div>	<div>Evaluation</div> <div>NC</div> <div>Criteria</div> <div>I, R</div>	<div>Arrows Compression Plant is classified as capable of burning 500kg of fuel in an hour.</div> <div>No air quality monitoring is currently undertaken due to the absence of sampling ports on the compressor stacks.</div> <div>A TEP has been prepared for the Compression Plant and liaison with DEHP is ongoing. It is understood that the Compressor stacks are to be retrofitted to enable monitoring.</div>																																																																																				
<div>F2</div> <div>Applicable to;</div> <div>PL191 and PL196</div>	<div>Air</div> <div>Contaminants must be directed vertically upwards.</div> <div>Schedule F – Table 1 (release of contaminants)</div> <table><tr><th colspan="2">Release point number</th><th>Minimum release height (meters)</th><th>Minimum velocity (m/sec)</th><th>NOx Maximum release limit (g/sec)</th><th>CO Maximum release limit</th></tr><tr><td>A1</td><td>Node 1 compressor stack</td><td>8</td><td>25</td><td>0.25</td><td>NA</td></tr><tr><td>A2</td><td>Node 1 compressor stack</td><td>8</td><td>25</td><td>0.25</td><td>NA</td></tr><tr><td>A3</td><td>Node 1 Compressor stack</td><td>8</td><td>25</td><td>0.25</td><td>NA</td></tr><tr><td>A4</td><td>Node 2 compressor stack</td><td>6.94</td><td>31.1</td><td>0.62</td><td>1.09</td></tr><tr><td>A5*</td><td>Node 3 compressor stack</td><td>TBA</td><td>TBA</td><td>TBA</td><td>TBA</td></tr><tr><td>A6*</td><td>Node 3 compressor stack</td><td>TBA</td><td>TBA</td><td>TBA</td><td>TBA</td></tr><tr><td>A7*</td><td>Node 3 compressor stack</td><td>TBA</td><td>TBA</td><td>TBA</td><td>TBA</td></tr><tr><td>A8*</td><td>Node 4 compressor stack</td><td>TBA</td><td>TBA</td><td>TBA</td><td>TBA</td></tr><tr><td>A9*</td><td>Node 4 compressor stack</td><td>TBA</td><td>TBA</td><td>TBA</td><td>TBA</td></tr><tr><td>A10</td><td>MGPF compressor stack</td><td>8</td><td>25</td><td></td><td>NA</td></tr><tr><td>A11</td><td>MGPF compressor stack</td><td>8</td><td>25</td><td></td><td>NA</td></tr><tr><td>A12</td><td>MGPF compressor stack</td><td>8</td><td>25</td><td></td><td>NA</td></tr><tr><td>A13</td><td>MGPF compressor stack</td><td>8</td><td>25</td><td></td><td>NA</td></tr></table> <div>* Planned at the date of authority issue</div> <div>1 The NOx and CO limits are applicable at all times except start-up, shut down and calibration of emission monitoring devices. The maximum start-up period allowed is 30 minutes.</div> <div>TBA Contaminant release parameters for each stack must be submitted to the administering authority prior to its construction.</div> <div>NA Data unavailable but must be provided for CO maximum release limit for release points A1, A2, A3, A10, A11, A12 and A13 by 22 December 2011.</div>	Release point number		Minimum release height (meters)	Minimum velocity (m/sec)	NOx Maximum release limit (g/sec)	CO Maximum release limit	A1	Node 1 compressor stack	8	25	0.25	NA	A2	Node 1 compressor stack	8	25	0.25	NA	A3	Node 1 Compressor stack	8	25	0.25	NA	A4	Node 2 compressor stack	6.94	31.1	0.62	1.09	A5*	Node 3 compressor stack	TBA	TBA	TBA	TBA	A6*	Node 3 compressor stack	TBA	TBA	TBA	TBA	A7*	Node 3 compressor stack	TBA	TBA	TBA	TBA	A8*	Node 4 compressor stack	TBA	TBA	TBA	TBA	A9*	Node 4 compressor stack	TBA	TBA	TBA	TBA	A10	MGPF compressor stack	8	25		NA	A11	MGPF compressor stack	8	25		NA	A12	MGPF compressor stack	8	25		NA	A13	MGPF compressor stack	8	25		NA	<div>Evaluation</div> <div>-</div> <div>Criteria</div> <div>-</div>	<div>The TEP indicates that emissions are directed horizontally rather than vertically.</div> <div>No monitoring is currently undertaken to enable an evaluation of compliance with these criteria.</div> <div>See comments in F1.</div>
Release point number		Minimum release height (meters)	Minimum velocity (m/sec)	NOx Maximum release limit (g/sec)	CO Maximum release limit																																																																																		
A1	Node 1 compressor stack	8	25	0.25	NA																																																																																		
A2	Node 1 compressor stack	8	25	0.25	NA																																																																																		
A3	Node 1 Compressor stack	8	25	0.25	NA																																																																																		
A4	Node 2 compressor stack	6.94	31.1	0.62	1.09																																																																																		
A5*	Node 3 compressor stack	TBA	TBA	TBA	TBA																																																																																		
A6*	Node 3 compressor stack	TBA	TBA	TBA	TBA																																																																																		
A7*	Node 3 compressor stack	TBA	TBA	TBA	TBA																																																																																		
A8*	Node 4 compressor stack	TBA	TBA	TBA	TBA																																																																																		
A9*	Node 4 compressor stack	TBA	TBA	TBA	TBA																																																																																		
A10	MGPF compressor stack	8	25		NA																																																																																		
A11	MGPF compressor stack	8	25		NA																																																																																		
A12	MGPF compressor stack	8	25		NA																																																																																		
A13	MGPF compressor stack	8	25		NA																																																																																		

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
s. 73. 73				
F3 Applicable to; PL191 and PL196 <div></div>	Air The holder of this environmental authority must maintain a Register of Fuel Burning or Combustion Equipment that is capable of burning at least 500kg of fuel in an hour and must include, as a minimum, the following information for each item of equipment: <div>(a) fuel burning or combustion equipment name and location; (b) stack emission height(meters) (c) minimum efflux velocity (metres/sec); and (d) mass emission rates (g/s)/contaminant concentrations (mg/Nm³ @5% O₂)</div>	Evaluation PC	A Fuel Burning Register has been prepared and was reviewed by the Auditors. Standard information for points (a), (b), (c) and (d) are included in the register for all locations except the Gas Generator and TEG Reboiler A and B.	
		Criteria I, R	Compressor facilities are yet to be commissioned in <div></div>	
F4 Applicable to; PL191 and PL196 <div></div>	Air The holder of this environmental authority must ensure that the information contained in the Register of Fuel Burning or Combustion Equipment is complete and current on any given day.	Evaluation NC	The Fuel Burning Register was incomplete at the time of the Audit.	
		Criteria I, R		
F5 Applicable to; PL191 and PL196 <div></div>	Air The holder of this environmental authority must make the Register of Fuel Burning Equipment or information contained in the Register available to the administering authority upon request.	Evaluation C	Site Representatives confirmed that a copy of the Register is available upon request.	
		Criteria I		

Schedule G - Waste

G1 Applicable to; PL191 and PL196 <input type="text"/>	Waste – General All general waste must be removed from the site and sent to a recycling facility or disposal facility licenced to accept the waste.	Evaluation C	General waste, recycling and regulated waste bins were observed throughout the site. JJ Richards are the waste contractors for these types of waste. Arrow contracts Transpacific to manage waste generated from spills.
		Criteria I, O	

ASPECT	REQUIREMENT	EVALUATION & CRITERIA		COMMENTS
G2 Applicable to; PL191 and PL196 	Waste – General All regulated waste must be removed from the site by a person who holds a current authority to transport such waste under the provisions of the Environmental Protection Act 1994 and sent to a recycling facility or disposal facility licenced to accept the waste.	Evaluation C	Criteria I, O	As above.
G3 Applicable to; PL191 and PL196 	Waste – General Waste must not be burned or allowed to be burned on the licensed site.	Evaluation C	Criteria I, O	Site Representatives confirmed that no waste burning occurs on site. See comments in G1.
G4 Applicable to; PL191 and PL196 	Waste – General All waste fluids and muds resulting from drilling and exploration activities must be contained in a dam or containment structure for disposal, remediation or reuse where applicable.	Evaluation C	Criteria I, R	Arrow Site Representatives confirmed that muds are contained within the drill pit prior to removal offsite by licensed Veolia subcontractor –  . The subcontractor's licence was sited during the audit.
G5 Applicable to; PL191 and PL196 	Waste – General Oil based drilling muds must not be used in the carrying out of the petroleum activity.	Evaluation C	Criteria I, R	Site Representatives confirmed that oil based drilling muds are not used. An inventory of chemicals used during drilling was provided for review. Review of the information available in this inventory indicated that none of the noted products contained a petroleum product (such as diesel) as their base fluid.
G6 Applicable to; PL191 and PL196 	Waste – General Synthetic based drilling muds must not be used in the carrying out of the petroleum activity other than with the written approval of the administering authority.	Evaluation C	Criteria I, R	Site Representatives confirmed that synthetic based drilling muds are not used. An inventory of chemicals used during drilling was provided for review. Review of the information available in this inventory indicated that none of the noted products contained synthetic oils as their base fluid.
G7 Applicable to; PL191 and PL196 	Waste – General The holder of this environmental authority must ensure that coal seam gas water is contained, is not released to land or waters unless used for purposes specifically authorised: (a) under this environmental authority; or (b) under Section 186 of the Petroleum and Gas (Production and Safety) Act 2004; or (c) under Section 86 of the Petroleum Act 1923; or (d) under an approval of resource for beneficial use as provided for under the Environmental Protection Act 1994.	Evaluation A	Criteria I, R	CSG water is contained within the Regulated Dams and managed under the Moranbah Gas Project Dam 1 to 11 Operations, Maintenance & Surveillance Plan. Under normal operation conditions, no CSG water is released to land or waters. Site Representatives confirmed that an incident occurred in November whereby approximately 16,350L of CSG water was spilled on a drill pad. DEHP was notified of the incident via an email to John Frankish and through the Pollution Hotline on November 13, 2012. It is reported that actions were undertaken to clean up the spill and soil sampling was undertaken on November 22 to assess for the presence of any residual contaminants. Email correspondence and details of actions taken were reviewed during the audit.
G8 Applicable to;	Coal seam gas water use for dust suppression CSG water produced from the authorised petroleum activities may be used for dust suppression within tenures covered by this	Evaluation C		CSG water is not directly used for dust suppression, however CSG water treated through the RO plant is used.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS		
PL191 and PL196	environmental authority, provided the water quality meets the limits specified in Schedule G, Table 1 – Road dust suppression water contaminant release limits for each of the water quality characteristics.	Criteria I, R, O	The RO plant was visited during the site inspection and water quality results were viewed using the electronic SCADA system. Operation of the plant and water quality results were discussed with RO Plant water technician whilst onsite. The results sited within the SCADA system and discussions onsite confirm that the quality of water produced by the RO plant complies with the conditions in Schedule G, Table 1.			
	Schedule G, Table 1 – Road dust suppression water contaminants release limits.					
Water quality characteristics	Unit				Limit	Limit type
pH	pH units				6.0 to 9.0	Range
Suspended Solids	mg/L				30	maximum
Total dissolved Salts	mg/L	2000	maximum			
Total Petroleum Hydrocarbons	Mg/L	10	maximum			
s. 73						
G9	Coal seam gas water use for dust suppression	Evaluation	CSG water is not directly used for dust suppression. A water cart undertaking dust suppression of access tracks was observed during the site inspection. Based on observations of the activity, no evidence of (a), (b), (c) or (f) was noted. Water was not being applied excessively at the time of the inspection and thus deep drainage was unlikely to be occurring. As only treated CSG water and water from Eungella Dam is used for dust suppression, the quality of shallow aquifers is unlikely to be affected.			
Applicable to; PL191 and PL196	Use of CSG water for dust suppression activities must be carried out in a manner that' (a) vegetation is not damaged; (b) soil erosion and soil structure damage is avoided; (c) there is no surface damming of the CSG water; (d) minimises deep drainage below the root zone of any vegetation; (e) quality of shallow aquifers is not adversely affected; and (f) there are no releases of CSG waters to any surface waters.	C				
		Criteria				
		I, O				
G10	Coal seam gas water use for dust suppression	Evaluation	CSG water is not currently used for domestic or stock purposes. Dams are fenced to ensure exclusion of stock.			
Applicable to; PL191 and PL196	The holder of this environmental authority must ensure that the coal seam gas water to be used for domestic or stock purposes meets the ANZECC 2000 Water Quality Guidelines, or subsequent versions thereof, for stock and domestic purposes.	NA				
		Criteria				
		NA				
G11	Coal seam gas water use for dust suppression	Evaluation	See comments for Condition G7.			
Applicable to; PL191 and PL196	Coal seam gas water released to the environment in accordance with Condition G7 must not have any properties that could cause, nor contain any contaminants in concentrations that are capable of causing environmental harm.	A				
		Criteria				
		I, R				
G12	Third Party Use	Evaluation	The arrangement with Millenium Coal Mine remains in place, however no wastewaters have been piped to the Mine during the current audit period.			
Applicable to; PL191 and PL196	Wastewater generated from the authorised activities may be piped to Millennium Coal Mine ML70313 and ML7012 for use in coal washing and dust suppression.	-				
		Criteria				
		-				

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
G13 Applicable to; PL191 and PL196 <div></div>	Third Party Use The authority holder when discharging to Millennium Coal Mine must record daily the following details: <div><div>(a) time and date of the discharge;</div><div>(b) TDS and pH levels of the discharge; and</div><div>(c) Total volume discharged.</div></div>	Evaluation NA	Criteria NA	Site Representatives indicated that no discharges to Millenium Coal Mine occurred during the current audit period.
G14 Applicable to; PL191 and PL196 <div></div>	Water Release Reduction Strategy As part of the Coal Seam Gas Water Management Plan ((CSGWMP) contained within the Environmental Management Plan)), the holder of the environmental authority must develop and implement an ongoing Release Reduction Strategy to maximise CSG water use and minimise any release to waters. The strategy must address the following matters: <div><div>(a) implementation of schemes to achieve maximum use of the water;</div><div>(b) specific targets for achieving use of CSG water both treated and untreated;</div><div>(c) a market analysis at least every three (3) years to identify existing and future opportunities for water use"</div><div>(d) ongoing- review of emerging technologies and/or reuse options that could achieve significant reductions in mass loads of contaminants released to the environment;</div><div>(e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and</div><div>(f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.</div></div>	Evaluation NC	Criteria R	The Coal Seam Gas Water Management Plan prepared in September 2011 was provided for review during the audit. Section 7.10 of the Plan indicates that this strategy is currently being developed. No indication of a completion date is provided.
G15 Applicable to; PL191 and PL196 <div>s.73. 73</div>	Water Release Reduction Strategy A progress report on the strategy required by Condition G14 is to be included in the Annual Return and address at least the following matters: <div><div>(a) detail of the specific options, practices and procedures investigated;</div><div>(b) details of new practices, procedures and programs implemented since the last reporting period and targets met;</div><div>(c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and</div><div>(d) details of the option(s) yet to be implemented, including the timeframes for implementation and justification for the chosen option(s).</div></div>	Evaluation NC	Criteria R	The 2011-2012 Annual Return was reviewed during the Audit. As indicated in Condition G14, a Release Reduction Strategy has not been prepared. The Annual Return included the following statement with regard to this; "....the CSG water from PL191 and PL196 is being currently stored within dams on PL191 and no water release occurring during the period of this Annual Return, a Release Reduction Strategy to maximise CSG water use is not applicable at this time. A Water Release Reduction strategy is essential for long term water management at the site and is recommended that the strategy be prepared as a matter of urgency and that all future Annual Return include the required progress report.
G16 Applicable to; PL191 and PL196 <div></div>	Water Release Reduction Strategy Where any inconsistency exists between the conditions of this environmental authority and the Coal Seam Gas Water Management Plan, the conditions of this environmental authority prevail.	Evaluation -	Criteria -	Site Representatives acknowledge this Condition. Compliance with this Condition is not readily assessable.
G17 Applicable to; PL191 and PL196 <div></div>	Salt Management – Brine Salt Reuse, Recycle or Off site Disposal Following cessation of petroleum activities, any residual brine or solid salt present in a CSG water dam must be removed and transported to a facility that can lawfully reuse, recycle or dispose of such waste.	Evaluation NA	Criteria NA	Petroleum activities are ongoing, no brine dams are currently being decommissioned.

ASPECT		REQUIREMENT		EVALUATION & CRITERIA		COMMENTS	
Schedule H - Rehabilitation							
H1	Applicable to; PL191 and PL196 <div>5.73</div>	Rehabilitation	The holder of this environmental authority must not abandon any dam but must decommission each dam so as to prevent and/or minimise any environmental harm.	Evaluation	No dams have been abandoned or decommissioned in the audit period.		
				Criteria			
H2	Applicable to; PL191 and PL196 <div></div>	Rehabilitation	As a minimum, decommissioning must be conducted such that each dam either: <div>(a) becomes a stable landform similar to that of surrounding undisturbed areas, that no longer contains substances that will migrate into the environment; or (b) is approved or authorised by the administering authority for use by the landholder following cessation of the petroleum activities.</div>	Evaluation	Site representatives confirm that no dams have been abandoned or decommissioned in the audit period. Therefore, no rehabilitation programs are required at this stage.		
H3	Applicable to; PL191 and PL196 <div></div>	Rehabilitation	Progressive rehabilitation of disturbed areas must commence as soon as practicable following the completion of any construction or operational works associated with he petroleum activity(ies).	Criteria			
				NA	Site Representatives confirm that no wells, pipelines, dams or other infrastructure has yet been decommissioned. Therefore, no rehabilitation programs are required at this stage.		
				NA	Arrow has developed a formal Rehabilitation Procedure to be implemented upon decommissioning of petroleum activity(ies). This procedure was provided for review during the audit process.		
H4	Applicable to; PL191 and PL196 <div></div>	Rehabilitation	As soon as practicable, but no alter than twelve (12) months (or a longer period agreed in writing by the administering authority) after the end of the petroleum activity(ies) causing significant disturbance to land, the holder of this environmental authority must: <div>(a) remediate contaminated land (e.g. dams containing salt); (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas; (c) on all significantly disturbed land, take all reasonable and practicable measures to: I. re-establish surface drainage lines; II. reinstate the top layer of the soil profile; and III. promote establishment of vegetation. (d) Undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or treated so as to not be likely to cause environmental harm; and (e) Decommission all inactive buried pipelines in accordance with the requirements of AS2885 and ensuring that there will not be any subsequent subsidence of land along the pipeline route.</div>	Evaluation	Site Representatives confirm that no wells, pipelines, dams or other infrastructure has yet been decommissioned. Therefore, no rehabilitation programs are required at this stage. Arrow has developed a formal Rehabilitation Procedure to be implemented upon decommissioning of petroleum activity(ies). This procedure was provided for review during the audit process.		
				Criteria			
				NA			
				NA			

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
H5 Applicable to; PL191 and PL196 <div></div>	Rehabilitation All significantly disturbed land caused by the carrying out of the petroleum activity(ies) must be rehabilitated to: (a) a stable landform and with a self-sustaining vegetation cover and species that are similar to adjoining undisturbed areas; (b) ensure that all land is reinstated to the pre-disturbed land use and suitability class; (c) ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activity(ies); and (d) ensure that the water quality of any residual void or waterbodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm.	Evaluation NA	Criteria NA	Site Representatives confirm that no wells, pipelines, dams or other infrastructure have been decommissioned. Therefore, no rehabilitation programs are required at this stage.
H6 Applicable to; PL191 and PL196 <div></div>	Rehabilitation Maintenance of rehabilitated areas must take place to ensure and demonstrate: (a) stability of landforms (b) erosion control measures remain effective; (c) stormwater runoff and seepage from rehabilitated areas does not negatively affect the environmental values of any waters; (d) plants show healthy growth and recruitment is occurring; and (e) rehabilitated areas are free of any declared pest plants.	Evaluation NA	Criteria NA	As above.
H7 Applicable to; PL191 and PL196 <div></div>	Rehabilitation Rehabilitation can be considered successful when: (a) the site can be managed for its designated land-use (e.g. similar to that of surrounding undisturbed areas); (b) no greater management input than for other land in the area being used for a similar purpose is required and there is evidence that the rehabilitation has been successful for at least three (3) years; (c) the rehabilitation is carried out in accordance with the goals, objectives, indicators and completion criteria as specified in Schedule H, Table 1 – Planned rehabilitation specifications; or (d) written agreement is obtained from the landowner/holder and administering authority. Refer to EA PEN100015907 and PEN 100251408 for Schedule H, Table 1 and Schedule G, Table 1 respectively.	Evaluation NA	Criteria NA	As above.
Schedule I – Monitoring Programs				
I1 Applicable to; PL191 and PL196 <div></div>	General The holder of this environmental authority must develop and implement a monitoring program, the result of which will demonstrate compliance with the conditions of this environmental authority.	Evaluation PC	Criteria I, R	It was noted during the audit that Arrow currently operates a series of monitoring programs that, in combination, address the monitoring requirements of this EA. However full compliance will not be achieved until these separate plans are compiled into a single monitoring program document as required by the Condition.
				Prior to G&S' engagement to provide auditing services to Arrow, G&S had been separately commissioned to prepare an overarching monitoring program that details all monitoring requirements in a single document. The overarching monitoring program document, once approved and adopted by Arrow, will constitute the document required to achieve compliance with this Condition.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
I2 Applicable to; PL191 and PL196 s.33. 73	General All monitoring under this environmental authority must be conducted by a suitably qualified person.	Evaluation C	I, R	Arrow maintains an environmental training register to track the qualifications of staff involved in monitoring. This register was reviewed during the audit process.
		Criteria		
I3 Applicable to; PL191 and PL196	General All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this environmental authority must be calibrated and operated and maintained effectively.	Evaluation C	I, R	Arrow maintains calibration records for site monitoring equipment. These records were reviewed during the audit process.
		Criteria		
I4 Applicable to; PL191 and PL196	General The method of water sampling required by this environmental authority must comply with the most recent edition of the Department of Environment and Resource management – Water Quality Sampling manual.	Evaluation C	I, R	Water sampling onsite is conducted in accordance with the Arrow developed Water Quality Sampling Manual. This manual was prepared with reference to the <i>Monitoring and Sampling Manual 2009 Environmental Protection (Water) Policy 2009 Version 2 September 2010</i> . This manual was reviewed during the audit process.
		Criteria		
I5 Applicable to; PL191 and PL196	General All determinations of water quality must be; (a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements; and (b) made in accordance with methods prescribed in the latest edition of the Department of Environment and Resource Management – Water Quality Sampling Manual; and (c) carried out on representative samples.	Evaluation C	I, R	Arrow maintains an environmental training register to track the qualifications of staff involved in monitoring. This register was reviewed during the audit process. All water sampling onsite is conducted in accordance with the Arrow developed Water Quality Sampling Manual. This manual was prepared with reference to the <i>Monitoring and Sampling Manual 2009 Environmental Protection (Water) Policy 2009 Version 2 September 2010</i> . This manual was reviewed during the audit process.
		Criteria		
I6 Applicable to; PL191 and PL196	General All analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority.	Evaluation C	I, R	All laboratory testing of soil and water samples is conducted by Australian Laboratory Services (ALS). A Chain-Of-Custody document detailing the analyses requested of ALS was reviewed during the audit process. ALS is NATA accredited.
		Criteria		
I7 Applicable to; PL191 and PL196	General If monitoring conducted in accordance with this environmental authority indicated a condition or contaminant level that has caused, or has potential to cause environmental harm, the environmental authority holder must; (a) as soon as practicable, take the necessary actions to rectify the condition or contaminant level so as to avoid or minimise environmental harm; and (b) notify the administering authority of the condition or contaminant level and the actions taken to rectify it.	Evaluation --	--	Currently, only two rounds of groundwater monitoring have been undertaken. Trigger levels have not been defined at this time. Results are currently compared to ANZECC defined trigger levels. A number of exceedences to these guideline levels are noted. These results were provided to DEHP as part of the Annual Return. This document was reviewed during the audit process. With limited monitoring completed, there is no current understanding of background quality levels and thus the ability to assess the current impacts of the works on groundwater quality is limited. Compliance or otherwise with this condition cannot be assessed at this time.
		Criteria		
I8 Applicable to; PL191 and PL196	General Any management or monitoring plans, systems or programs required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended if required on an annual basis.	Evaluation PC	I	Currently any management or monitoring plans, systems or programs are reviewed on an as-needs-basis only. It is recommended that a formal process for review be created. This may include, for example, an electronic review register or document control system.
		Criteria		
I9 Applicable to;	General The holder of this environmental authority must record, compile and keep for a minimum of five years all monitoring results required by this	Evaluation --		Arrow has been monitoring onsite for approximately 2 years. Records from this monitoring are stored electronically. These records were viewed during the audit process. Site Representatives

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
PL191 and PL196 s. 73. 73	environmental authority and make available for inspection all or any of these records upon request by the administering authority.	Criteria --		confirm that these results would be made available to the administering authority upon request. As a 5 year period of monitoring has not yet occurred, this condition cannot be assessed at this time.
I10 Applicable to; PL191 and PL196	General An annual monitoring report must be prepared each year and presented to the administering authority when requested. This report shall include but not be limited to; <ul style="list-style-type: none"> (a) a summary of the previous twelve (12) months monitoring results obtained under any monitoring programs required under this environmental authority and, a comparison of the previous twelve (12) months monitoring results to both the limits set in this environmental authority and to relevant prior results; and (b) an evaluation/explanation of the data derived from any monitoring programs; and (c) a summary of any record of quantities of releases required to be kept under this environmental authority; and (d) an outline of actions taken or proposed to minimise the risk of environmental harm from any condition or elevated contaminant level identified by the monitoring or recording programs. 	Evaluation C Criteria I, R		A groundwater monitoring report was included in the most recent Annual Return. The report addressed points (a), (b) and (d) of condition I10. The report did not address point (c) of the condition, however this point was found to not be relevant during the current audit period due to no releases being recorded. This report was reviewed during the audit process.
I11 Applicable to; PL191 and PL196	Groundwater monitoring The holder of this environmental authority must prepare and implement a groundwater monitoring program within 40 business days of this environmental authority taking effect.	Evaluation C Criteria I, R		A Groundwater Monitoring Program (GWMP) has been prepared for each of the PL's. A copy of these programs was provided to the Auditors for review. Initial preparation of the GWMP's occurred outside of the current audit period.
I12 Applicable to; PL191 and PL196	Groundwater monitoring The groundwater monitoring program must be developed and implemented by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater sampling design.	Evaluation A Criteria I		The GWMP was prepared by the Arrow groundwater team in conjunction with Worley Parsons. No evidence was sited during the audit that verified the qualifications and experience of the staff involved in creation of the GWMP. However, site representatives confirm that staff involved were appropriately qualified and experienced.
I13 Applicable to; PL191 and PL196	Groundwater monitoring The groundwater monitoring program must be able to detect any significant risks and changes to groundwater quality caused by petroleum activity(ies) authorised under this environmental authority. As a minimum the program must include; <ul style="list-style-type: none"> (a) a groundwater monitoring network designed to and installed for the petroleum activities; and (b) a sufficient number of monitoring sites to provide information on the following; <ul style="list-style-type: none"> I. seepage to groundwater and surrounding soils from any regulated dam authorised under this environmental authority and its effect on groundwater and soils; II. background monitoring sites (i.e) groundwater quality in representative bore(s) that have not been affected by the activities authorised under this environmental authority). (c) The location of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, trigger values; and (d) The development of procedures to establish background groundwater quality. 	Evaluation C Criteria I, R		The GWMP includes provisions that meet the requirements outlined in points I13 (a), (b), (c) and (d). With respect to trigger values, the report includes interim trigger values only, with a commitment to establishing trigger values following the first 12 months of monitoring.
I14 Applicable to; PL191 and PL196	Groundwater monitoring The groundwater monitoring program must provide for monitoring of groundwater quality as often as necessary to detect impacts of the petroleum activities authorised under this environmental authority, but not less frequently than biannually for the first year of carrying out the petroleum activities and annually thereafter.	Evaluation C Criteria I, R		The GMP specifies quarterly monitoring for the first 12 months of the GMP to establish background conditions with annual monitoring thereafter. This plan has been approved by the Department Environment and Heritage Protection (Formerly the Department of Environment and Resource Management).

ASPECT	REQUIREMENT	EVALUATION & CRITERIA		COMMENTS					
I15 Applicable to; PL191 and PL196 <div>s.73. 73</div>	Groundwater monitoring If groundwater contamination caused by the petroleum activities is encountered, the following must be considered to satisfy requirements Condition I17 <div>(a) the level of environmental harm caused as a result of such contamination to soils and groundwater; (b) the conduct of a geodetic survey of all monitoring bores to determine the relative water surface elevations of each bore and reported in metres relative to Australian Height Datum; and (c) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.</div>	Evaluation --	Currently, only two rounds of groundwater monitoring have been undertaken. Trigger levels have not been defined at this time. Results are currently compared to ANZECC defined trigger levels. A number of exceedences to these guideline levels are noted. These results were provided to DEHP as part of the Annual Return. This document was reviewed during the audit process.						
		Criteria --	With limited monitoring completed, there is no current understanding of background quality levels and thus the ability to assess the current impacts of the works on groundwater quality is limited. Compliance or otherwise with this condition cannot be assessed at this time.						
I16 Applicable to; PL191 and PL196 <div></div>	Groundwater monitoring The holder of this environmental authority must ensure that the groundwater monitoring data gathered in accordance with this environmental authority is analysed and interpreted to assess the nature and extent of any environmental impact of the environmentally relevant activity. The data, analysis and assessment must be submitted to the administering authority with each Annual Return.	Evaluation C	A groundwater monitoring report was included in the most recent Annual Return. This report was reviewed during the audit process.						
		Criteria I, R							
I17 Applicable to; PL191 and PL196 <div></div>	Groundwater monitoring If groundwater monitoring indicates that any significant changes in groundwater quality caused by petroleum activities are detected, then information must be submitted to the administering authority within ten (10) business days of receipt of the analysis indicating these changes including any proposed actions to mitigate the changes in groundwater quality.	Evaluation --	Currently, only two rounds of groundwater monitoring have been undertaken. Trigger levels have not been defined at this time. Results are currently compared to ANZECC defined trigger levels. A number of exceedences to these guideline levels are noted. These results were provided to DEHP as part of the Annual Return. This document was reviewed during the audit process.						
		Criteria --	With limited monitoring completed, there is no current understanding of background quality levels and thus the ability to assess the current impacts of the works on groundwater quality is limited. Compliance or otherwise with this condition cannot be assessed at this time.						
I18 Applicable to; PL191 and PL196 <div></div>	Air monitoring (Point source) The holder of this environmental authority must conduct a monitoring program of contaminants released to the atmosphere at each release point recorded in the Register of Fuel Burning or Combustion Equipment (Condition F3) for the contaminants and at the frequency listed in Schedule I – Table – Monitoring Frequency for Contaminants. <div>Schedule I – Table – Monitoring Frequency for Contaminants.<table><tr><th>Contaminant</th><th>Monitoring frequency</th></tr><tr><td>NOx as Nitrogen Dioxide</td><td>Within 3 months after commissioning of the fuel burning equipment; and</td></tr><tr><td>Carbon monoxide</td><td>Twice a year for the first two (2) years of operation; and thereafter annually.</td></tr></table></div>	Contaminant	Monitoring frequency	NOx as Nitrogen Dioxide	Within 3 months after commissioning of the fuel burning equipment; and	Carbon monoxide	Twice a year for the first two (2) years of operation; and thereafter annually.	Evaluation NC	There is currently no air quality monitoring program in place to address condition I18. However, it should be noted that air quality monitoring is governed by a Transitional Environmental Program (TEP).
		Contaminant	Monitoring frequency						
NOx as Nitrogen Dioxide	Within 3 months after commissioning of the fuel burning equipment; and								
Carbon monoxide	Twice a year for the first two (2) years of operation; and thereafter annually.								
Criteria I, R									
I19 Applicable to; PL191 and PL196 <div></div>	Air monitoring (Point source) The monitoring program must comply with the following; <div>(a) Monitoring provisions for the release points must comply with the most recent edition of AS4323.1 Stationary source emissions method 1: Selection of sampling provisions. (b) The following tests must be performed for each sample taken at each release point specified in the Register of Fuel Burning or Combustion Equipment (Condition F3).<div>I. Gas velocity, volume and mass flow rate. II. Temperature III. Water vapour concentration (for non-continuous sampling)</div> (c) Samples taken must be representative of the contaminants discharged when operating under maximum operating conditions. (d) During the sampling period the following additional information must be gathered;<div>I. Production rate II. Plant status</div> (e) Monitoring of contaminant release must be carried out in accordance with the latest edition of the administering authority's Air Quality Sampling Manual.</div>	Evaluation NC	There is currently no air quality monitoring program in place to address condition I19. However, it should be noted that air quality monitoring is governed by a Transitional Environmental Program (TEP).						
		Criteria I, R							

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
I20 Applicable to; PL191 and PL196 <div>s. 73. 73</div>	Noise monitoring The holder of this environmental authority must undertake noise monitoring when requested by the administering authority to investigate a complaint of environmental nuisance at a sensitive or commercial place within the reasonable and practicable timeframe nominated by the administering authority and report the results to the administering authority within three (3) business days of completion of the monitoring.	Evaluation NA	Criteria NA	Site Representatives confirm that the administering authority has not requested noise monitoring during the audit period. Arrow has developed an Environmental Noise and Vibration Management Procedure, to be implemented upon request. This procedure was provided for review during the audit process.
I21 Applicable to; PL191 and PL196 <div></div>	Noise monitoring Noise monitoring and recording must include the following descriptor, characteristics and matters; (a) $L_{A,N,T}$ (where N equals the statistical levels of 1, 10 and 90 and T = 15 mins) (b) Background noise $L_{A90,T}$ (c) The level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels; (d) Atmospheric conditions including temperature, relative humidity and wind speed and directions; (e) Effects due to any extraneous factors such as traffic noise; (f) Location, date and time of monitoring; (g) If the complaint concerns low frequency noise, Max $L_{PZ, 15mins}$; and (h) If the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.	Evaluation NA	Criteria NA	Site Representatives confirm that noise monitoring has not been required during the audit period.
I22 Applicable to; PL191 and PL196 <div></div>	Noise monitoring The method of measurement and reporting of noise levels and background sound pressure levels must comply with the latest edition of the administering authority's Noise Measurement Manual or the most recent version of AS1055 Acoustics – description and measurement of environmental noise.	Evaluation NA	Criteria NA	As above.
I23 Applicable to; PL191 and PL196 <div></div>	Nuisance monitoring (other than noise) When the administering authority advises the holder of this environmental authority of a complaint alleging nuisance other than noise, the holder must investigate the complaint and advise the administering authority in writing of the action proposed or undertaken to resolve the complaint.	Evaluation NA	Criteria NA	Site Representatives confirm that nuisance monitoring has not been required during the audit period.
I24 Applicable to; PL191 and PL196 <div></div>	Nuisance monitoring (other than noise) When requested by the administering authority, the holder of this environmental authority must undertake monitoring as specified by the administering authority, within a reasonable and practical timeframe nominated by the administering authority to investigate any complaint of environmental harm at any sensitive or commercial place.	Evaluation NA	Criteria NA	As above.
I25 Applicable to; PL191 and PL196 <div></div>	Nuisance monitoring (other than noise) The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures implemented must be provided to the administering authority within ten (10) business days of completion of the investigation, or receipt of the monitoring results, whichever is the latter.	Evaluation NA	Criteria NA	Site Representatives confirm that nuisance monitoring has not been required during the audit period and therefore no abatements measures have been deemed necessary.
I26 Applicable to;	Nuisance monitoring (other than noise) If monitoring in accordance with Condition I24 and I25 indicates that emissions exceed the limits set in this environmental authority or are	Evaluation NA		Site Representatives confirm that nuisance monitoring has not been required during the audit period.

ASPECT REQUIREMENT		EVALUATION & CRITERIA		COMMENTS
PL191 and PL196 s.33. 73	causing environmental nuisance, then the holder of this environmental authority must; (a) address the complaint including the use of alternative dispute resolution services if required; and/or (b) as soon as practicable implement abatement or attenuation measures so that light, dust, particulate or odour emissions from the authorised activities do not result in further environmental nuisance.	Criteria NA		
I27 Applicable to; PL191 and PL196	Annual water monitoring reporting The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return: (a) the date on which samples were taken; (b) the time at which the sample was taken; (c) the monitoring point at which the sample was taken; (d) the measured or estimated daily quantity of the contaminants released from all release points; (e) the release flow rate at the time of sampling for each release point (f) the results of all monitoring and details of any exceedences with the conditions of this environmental authority; and (g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.	Evaluation C Criteria I, R		Site representatives confirm that no CSG water has been discharged via the designated release points during the audit period. Therefore monitoring has not been conducted at the release points. Groundwater monitoring was conducted during the audit period and reported in the most recent Annual Return. This report was reviewed during the audit.
Schedule J- Community Issues				
J1 Applicable to; PL191 and PL196	The holder of this environmental authority must maintain a record of complaints and incidents causing environmental harm and actions taken in response to the complaint or incident.	Evaluation C Criteria I, R		A copy of the stakeholder consultation log, which includes a record of any complaints received, was reviewed during the audit. Arrow maintains a company wide incident recording system called the Fountain system. The system was sited during the Audit.
J2 Applicable to; PL191 and PL196	The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority upon request; (a) name, address and contact number for complainant; (b) time and date of complaint (c) reasons for the complaint as stated by the complainant; (d) investigations undertaken in response to the complaint (e) conclusions formed; (f) actions taken to resolve the complaint; (g) any abatement measures implemented to mitigate the cause of the complaint and (h) name and contact details of the person responsible for resolving the complaint.	Evaluation C Criteria I, R		A copy of the stakeholder consultation log, which includes a record of any complaints received, was reviewed during the audit. The required details are recorded through the system.
J3 Applicable to; PL191 and PL196	The holder of this environmental authority must retain the record of complaints required by this condition for five (5) years.	Evaluation C Criteria I, R		Site Representatives confirmed that the system is continuous and records entered are not deleted. Records for the previous 12 months were reviewed during the audit.
Schedule K – Notification procedures				
K1 Applicable to; PL191 and PL196	The holder of this environmental authority must telephone the administering authority's Pollution Hotline (1300 130 372) or local office and the landholder or their nominated representative within 24 hours of becoming aware of any release of contaminants not in accordance with the conditions of this environmental authority or any event where environmental harm has been caused or may be caused.	Evaluation C Criteria I, R		A Statutory Notifications Matrix is displayed within the Arrow Site Office. The matrix outlines the notification procedures outlined in Condition K1.

ASPECT	REQUIREMENT	EVALUATION & CRITERIA	COMMENTS
K2 Applicable to; PL191 and PL196 <div data-bbox="136 304 311 357" style="border: 1px solid black; padding: 2px;">s. 73. 73</div>	Subject to condition K1, the holder of this environmental authority is required to report in the case of uncontained spills of contaminants (including but not limited to hydrocarbon, CSG water or mixtures of both) of the following volumes or kind; (a) releases of any volume of contaminants to water; and (b) releases of volumes of contaminants greater than 200 litres of hydrocarbon, 2000 litres of brine or 10,000 litres of coal seam gas water to land; and (c) releases of any volumes of contaminants where potential serious or material environmental harm has occurred or may occur.	Evaluation C Criteria I, R	Site Representatives confirmed that an incident occurred in November whereby approximately 16, 350L of CSG water was spilled on a drill pad. DEHP was notified of the incident via an email to John Frankish and through the Pollution Hotline on November 13, 2012.
K3 Applicable to; PL191 and PL196 <div data-bbox="136 488 293 547" style="border: 1px solid black; height: 37px;"></div>	The notification of emergencies or incidents as required by Conditions K1 and K2 must include but not be limited to the following information; (a) the environmental authority number and name of the holder of this environmental authority; (b) the name and telephone number of the designated contact person; (c) the location of the emergency or incident; (d) the date and time of release; (e) the time the holder of this environmental authority became aware of the emergency or incident; (f) the estimated quantity and type of any substances involved in the incident; (g) the actual or potential suspected cause of the release; (h) a description of the effects of the incident including any environmental harm that has occurred or may occur as a result of the release; (i) any sampling conducted or proposed, relevant to the emergency or incident; and (j) actions taken to prevent any further release and mitigate any environmental harm caused by the release.	Evaluation C Criteria I, R	Site Representatives confirmed that an incident occurred in November whereby approximately 16, 350L of CSG water was spilled on a drill pad. DEHP was notified of the incident via an email to John Frankish and through the Pollution Hotline on November 13, 2012. Email correspondence including details for points (a) to (j) of Condition K3 was reviewed during the audit.
K4 Applicable to; PL191 and PL196 <div data-bbox="136 879 302 933" style="border: 1px solid black; height: 34px;"></div>	Within ten (10) business days following the initial notification of an emergency or incident or receipt of monitoring results, whichever is the later, a written report must be provided to the administering authority, including the following; (a) results and interpretation of any samples taken at the time of the incident and analysed; (b) the outcomes of actions taken at the time of the incident to prevent or minimise environmental harm; (c) proposed actions to prevent a recurrence of the emergency or incident.	Evaluation C Criteria I, R	Site Representatives indicated that this procedure is adhered to. This procedure is also outlined in the Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Plan and Sewage treatment System Operations, Maintenance & Surveillance Plan. With regard to the incident outlined in Condition K3, soil sampling was undertaken on November 22, 2012. Site Representatives confirmed that reporting will occur following receipt of these results
K5 Applicable to; PL191 and PL196 <div data-bbox="136 1075 313 1129" style="border: 1px solid black; height: 34px;"></div>	As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, which results in the release of contaminants not in accordance, or reasonable expected to be not in accordance with the conditions of this environmental authority, a written report on the results of any such monitoring must be provided to the administering authority.	Evaluation C Criteria I, R	Site Representatives indicated that this procedure is adhered to. This procedure is also outlined in the Moranbah Gas Project Dam 1 to 11 Operations, Maintenance and Surveillance Plan and Sewage Treatment System Operations, Maintenance & Surveillance Plan.

6 Appendix 2 – Statutory declarations

RTI DL Release

ENVIRONMENTAL IMPROVEMENT PLAN (EIP)

Report on an EIP to address non-compliance issues identified in Third Party Audit completed in October 2011.

As part of requirements of Environmental Authorities:

PEN 100015907 (A18), (A19)

53 73

ARROW ENERGY PTY LTD
MORANBAH QLD

December 2011

Contents

1	Introduction	3
1.1	Objective and Scope.....	4
2	EIP actions to address non-compliance issues	4
2.1	Schedule A – General Conditions.....	5
2.1.1	Maintenance of Measures, Plant and Equipment.....	5
2.1.2	Operational Plan	5
2.1.3	Financial Assurance.....	5
2.2	Schedule B: Water	6
2.2.1	Contaminant Release	6
2.2.2	Erosion and Sediment Control	7
2.2.3	Watercourses, Wetlands and Springs	7
2.2.4	Release of Treated Sewage Effluent Contaminants to Land.....	7
2.3	Schedule C: Regulated Dams	8
2.3.1	Regulated Dams Register	8
2.3.2	Construction and Operational Requirements for New Dams	9
2.4	Schedule D: Land	10
2.4.1	General.....	10
2.4.2	Disturbance to Land – General, Environmentally Sensitive Areas and Endangered and Of Concern Regional Ecosystems	10
2.4.3	Soil Management	11
2.4.4	Acid Sulfate Soil Management.....	11
2.4.5	Fauna Management	12
2.4.6	Chemical and Fuel Storage	12
2.4.7	Well Drilling, Completion and Stimulation	12
2.5	Schedule F: Air (PEN100015907 ss 73)	13
2.6	Schedule G: Waste 	13
2.6.1	General.....	13
2.6.2	Water Release Reduction Strategy / Coal Seam Gas Water Management.....	13
2.7	Schedule H: Rehabilitation (Schedule G in PEN100251408).....	14
2.8	Schedule I: Monitoring Programs Error! Bookmark not defined.	
2.8.1	Groundwater Monitoring	Error! Bookmark not defined.
2.8.2	Air Monitoring	Error! Bookmark not defined.
2.8.3	Annual Water Monitoring Reporting	Error! Bookmark not defined.

1 Introduction

Arrow Energy Pty Ltd (Arrow) is the parent company of CH4 Pty Ltd (CH4). References to Arrow Energy in this Environmental Improvement Plan (EIP) should be taken to mean references to CH4.

In September 2011, Exis Sustainable Systems Pty Ltd (Exis Sustainable Systems) completed a third party Environmental Authority (EA) Compliance Audit in accordance with the provisions of the EA.

The Environmental Authorities that were audited were:

Environmental Authority	Tenement Covered	Effective Date	Anniversary Date
PEN100015907	PL191, PL196, PPL115, PPL116	8 th July 2011	1 st October

sc3 73

Arrow Energy has prepared this EIP in accordance with EA Condition (A19) and 4T Consultants Pty Ltd was engaged to assist in the report preparation.

This report should be read in conjunction with the Exis Sustainable Systems audit report entitled "Audit of Compliance to Environmental Authorities PEN100015907, [REDACTED] [REDACTED] dated 24th October 2011.

Sections of the Environmental Authorities for PL191/196 (PEN10015907), [REDACTED] [REDACTED] that are relevant to the purpose of this EIP include:

(A18) The holder of this environmental authority must immediately act upon any recommendations arising from this audit report by:

- (a) Investigating any non-compliance issues identified; and*
- (b) As soon as practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority*

(A19) Subject to Condition A18, and not more than three months following the submission of the audit report, the holder of this environmental authority must provide a written report to the administering authority addressing the:

- (a) Actions taken by the holder of this environmental authority to ensure compliance with this environmental authority; and*
- (b) Actions taken to prevent a recurrence of any non-compliance issues identified.*

It should be noted that the Exis Sustainable Systems audit did not consider Transitional Environmental Programs (TEP) that were in draft at the time of the audit (refer Section 1.5 of the Audit).

1.1 Objective and Scope

The objective of this EIP is to identify actions being planned or undertaken to address the non-compliances as detailed in the Exis Sustainable Systems (Exis) third party audit of Arrow (North) Environmental Authorities (EA).

This EIP details actions to address compliance issues based on the findings of the Third Party Audit from Exis Sustainable Systems titled '*Audit of Compliance to Environmental Authorities PEN10015907, PEN100317009, and PEN100251408 Sept 2011*'.

The EIP only refers to issues identified in the third party audit.

2 EIP actions to address non-compliance issues

The third party auditor's comments are presented in *italics*, followed by a summary of the actions to be taken under the Arrow EIP (this Plan), (See example below)

- *PEN100015907 –BA4*
- *PEN100015907 –BA7*

Whilst it was reported that no authorised discharge had occurred in the current Operational Plan period (other than under a TEP), there was no capacity to measure flow in the Isaac River at the time of the audit. Given that the wet season will begin soon after this audit report is finalised, it is considered critical that a stream flow gauging station be installed upstream of Release Point 1 (at the Isaac River Crossing 2) as required by this condition of the EA.

The RO plant is not yet complete and the discharge point has not been installed. Once this has been completed, a gauging station will be installed in accordance with Condition BA4 of the EA. Similarly, once the RO plant and associated infrastructure is completed, a measuring device will be installed to measure the quantity of treated CSG water that is released.

2.1 Schedule A – General Conditions

2.1.1 Maintenance of Measures, Plant and Equipment

- PEN100015907 – A3

sg3 73

The Groundwater Monitoring Program is not implemented to the level required by the EA.

A stream flow gauging station is required to be installed upstream of Release Point 1 (at the Isaac River Crossing 2) by Condition BA4. However this has not yet been installed. Refer to s.2.2 for further details.

A Groundwater Monitoring Program is a live document and is reviewed as petroleum activities expand and new activities commence. A Groundwater Monitoring Program has been developed and implementation will continue over the life of the project as the Program is revised. There are additional monitoring bores to be installed and this work is underway. Construction of the identified groundwater monitoring bores is scheduled to be completed by 30 April 2012.

Stream flow gauging station. No discharges have occurred under these EAs and the final site for the discharge point will be subject to an amendment to the EA and DERM approval. The station will be installed once the discharge points are finalised and approved.

2.1.2 Operational Plan

- PEN100015907 – A6, A7(c), A7(d)(ii), A7(e), A7(f), A7(g)

The Operational Plan does not comply with the requirements of the Environmental Authority. It does not provide detail of locations of approved additional infrastructure, or the scale or extent of proposed disturbances in environmentally sensitive areas, or detail any requirements of offsets. The Operational Plan discusses rehabilitation generally, but does not detail specific areas or methods as required by the EA. The description of progressive rehabilitation carried out does not include performance in relation to requirements of the EA.

Operations Plans have been submitted to DERM. The Plans contain information on the currently approved infrastructure. Approved infrastructure is that which has been agreed with the landholder under a Land Access and Compensation Agreement. Hence information such as area of disturbance and species is not available for all proposed infrastructure to be constructed under the Plan at this time. These aspects have been discussed at length with DERM and the content has previously been confirmed as acceptable.

2.1.3 Financial Assurance

- PEN100015907 – A7(h), A10(b), A11

The calculation of financial assurance does not appear to include all the approved disturbances in the inventory of approved additional infrastructure proposed during the term of the plan. The EA requires the calculation of financial assurance to be done in accordance with the most recent version of the Department of Environment and Resource Management (DERM) Guideline – Financial Assurance for Petroleum Activities. The March 2011 Guideline requires the financial assurance to be calculated using realistic third party costs to rehabilitate all land disturbed by the petroleum activities. The derivation of the unit costs of rehabilitation was unable to be verified. As the unit costs are rounded to the nearest \$1000, it would appear that realistic third party costs have not been used in determination of these costs.

The financial assurance is calculated as part of an amendment to the EAs. The application documents contain a Schedule of Disturbance and calculation of Financial Assurance based on DERM's table of costs for third party rehabilitation. The financial assurance was approved and requested by DERM. The requirement under the EP Act and the EA is that the amount of financial assurance held by DERM must be sufficient to cover the cost of rehabilitation for existing disturbance. Arrow is not required to submit a revised amount of financial assurance until such time as the level of disturbance changes and a new amount is required. Such revision will occur on commencement of new operations. Arrow is compliant with this condition.

2.2 Schedule B: Water

2.2.1 Contaminant Release

- *PEN100015907 – B1, BA1*

sg 73

As a result of the current infrastructure setup, there exists the potential for CSG water to be discharged to waters from low point relief valves and scour valves.

An incident in June 2011 resulted in release of CSG water to an ephemeral creek from a pipeline joint coupling on PL191. This incident represented a breach of conditions of EA conditions, which require that CSG water not be directly or indirectly released to waters unless authorised by the EA (and a breach of condition BA1 in PEN100015907 which requires that CSG water only be released from specified release points).

The incident referred to in the audit report was reported, investigated and appropriate action taken. Controlled discharges that were undertaken under the Transitional Environmental Program (TEP) were compliant with all conditions in the TEP.

- *PEN100015907 –BA4*
- *PEN100015907 –BA7*

Whilst it was reported that no authorised discharge had occurred in the current Operational Plan period (other than under a TEP), there was no capacity to measure flow in the Isaac River at the time of the audit. Given that the wet season will begin soon after this audit report is finalised, it is considered critical that a stream flow gauging station be installed upstream of Release Point 1 (at the Isaac River Crossing 2) as required by this condition of the EA.

The RO plant is not yet complete and the discharge point has not been installed. Once this has been completed, a gauging station will be installed in accordance with Condition BA4 of the EA. Similarly, once the RO plant and associated infrastructure is completed, a measuring device will be installed to measure the quantity of treated CSG water that is released. Arrow is compliant with this condition.

2.2.2 Erosion and Sediment Control

- PEN100015907 – B2, B3

5373

Erosion and sediment control is not performed to the level required by the Environmental Authority, or to the level required by internal procedures (e.g. Teviot Creek crossing). While some erosion and sediment controls were sighted at the Dam 14 construction, these controls were not sufficient to indicate compliance with relevant EA conditions. In addition, the Erosion and Sediment Control Plan for the Dam 14 construction does not contain sufficient detail to comply with the requirements of the erosion and sediment control conditions in the EA.

Erosion and Sediment Control Plans and Standard Operating Procedures (SOP) will be reviewed and updated to be consistent with DERM guidelines and all sections of Condition B3 in the EAs.

The SOPs are under review and due for completion in March 2012.

The Erosion and Sediment Control Plan and procedures are being reviewed by and due for completion in April 2012.

Key points of the reviews:

- SOP to be consistent with the DERM Guideline on *Activities in a Watercourse, Lake or Spring associated with Mining Activities*.
- All major construction projects to have an Erosion and Sediment Control Plan (ESCP).
- Review construction project designs to ensure that erosion and sediment control measures are incorporated into the plan.
- Conduct site audits to ensure EA compliance and ensure ESCP is being followed.

Once completed, the revised SOPs and ESCP for projects will be available to DERM during site inspections.

In addition, AE is developing a short course and training materials on erosion and sediment control to be provided to all relevant personnel and contractors in Arrow Energy.

2.2.3 Watercourses, Wetlands and Springs

- PEN100015907 – B10, B11

The Erosion and Topsoil Management Procedure requires that all activities within watercourses must be done following the DERM Guideline – *Activities in a Watercourse, Lake or Spring*. No examples of this guideline having been followed were identified. It was reported that no recent disturbances in a water course have been submitted to the LAR process.

Refer to Section 2.2.2 for EIP actions. The erosion and sediment control training outlined in Section 2.2.2 is relevant to ensure personnel are competent to assess ESCP and EA compliance.

In addition, AE Health, Safety and Environment (HSE) personnel participate in risk assessments for works to be carried out in a watercourse.

2.2.4 Release of Treated Sewage Effluent Contaminants to Land

- PEN100015907 – BC3, BC5, BC6, BC7, BC8, BC9

The sewage treatment process is not being performed in accordance with the requirements of the EA. Irrigation of treated effluent does not occur within a fenced or delineated area. Monitoring of the irrigation

area to determine assimilation, percolation, evaporation and transpiration has not occurred. The treated effluent is not monitored for the water quality characteristics or at the frequency required by the EA.

The new high level alarm has been purchased. Installation has been approved and is scheduled for the next following weeks.

The effluent irrigation area is delineated and fenced. Gates will be locked to restrict access to the area.

An Environmental Management Plan (EMP) was completed on 25th August 2011 and procedures are currently being followed. The EMP is held at Arrow Moranbah offices.

An external consultant is to be engaged to assess:

- proximity to watercourses,
- assimilative and percolation capacity of the soils
- transpiration and evaporative volumes from the irrigation area.

The consultant will also provide information on procedures to assess whether pooling and/or runoff of treated effluent is occurring, and methods to minimise the risk of this occurring.

Treated effluent is now monitored on a monthly schedule for the parameters in condition BC9 of the EA. Records are kept at Arrow Moranbah and will be made available to the administering authority on request.

2.3 Schedule C: Regulated Dams

2.3.1 Regulated Dams Register

- PEN100015907 – C3, C5, C6



The current Dams Register is incomplete and does not contain all information required by these conditions of the EAs. Specifically, the following sections are incomplete:

- b) dam purpose and its proposed/actual contents;
- c) hazard category assessed using the most recent version of "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams";
- e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam;
- g) design storage allowance at 1 November each year (mega litres);
- h) mandatory reporting level (metres); and
- j) name and qualifications of certifier.

The following sections are not included at all:

- i) date construction was certified as compliant with the design plan;
- l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority; and
- m) dates on which the dam was inspected for the detection of leakage through any liner.

A Dam Assessment Report was completed on 10th December 2011 and addresses the following audit non-compliances:

- C3(b) dam purpose and its proposed/actual contents.
- C3(c) hazard category.

- C3(e) dimensions (metres) and surface area (hectares) measured at the footprint of the dam
- C3(g) design storage allowance as at November 2011.
- C3(h) mandatory reporting level (MRL).
- C3(j) name and qualifications of the certifier.

The following issues indicated as non compliant in the audit report are completed/compliant and recorded in the Dam Register (Held at AE Brisbane):

- C3(i) date construction was certified as compliant with the design plan;
- C3(l) date on which the report of the annual structural and operational adequacy inspection was provided to the administering authority; and
- C3(m) dates on which the dam was inspected for the detection of leakage through any liner.

The AE Dam Assessment Report provides an improvement plan, actions and timelines to address the non compliant and other improvement issues.

2.3.2 Construction and Operational Requirements for New Dams

- PEN100015907 – C8

sg3 73

Dams 1 and 2 (which are considered 'legacy' dams) are not lined. However these were constructed prior to the current EAs. It was reported that there is no system to detect passage of wetting front or entrained contaminants through the floor or sides of the dam on any dams.

This condition only applies to the construction and operation of new dams ie after the commencement of this EA. Despite this, a project has commenced to design and install leak detection systems in all dams and also incorporate dam level sensors/equipment. Shallow groundwater monitoring bores are also scheduled to be drilled by end February 2012.

2.4 Schedule D: Land

2.4.1 General

- PEN100015907 – D1

53 73

As a result of the current infrastructure setup, CSG water continues to be discharged to land from low point relief valves and scour valves. This is a direct breach of conditions of all three EA's, which require that CSG water be contained and not released to land unless authorised by the EA.

The CSG water referred to in the third party audit is actually condensate and is not released but is the result of unintentional leakage. All CSG water leakage is treated as an environmental incident, an investigation is completed, repairs implemented (where applicable) and procedures reviewed to minimise the risk of future similar incidents. Further, discussions with DERM have confirmed that low point drains that release condensate are not of immediate concern. Options for the management of low point drains are currently being reviewed.

2.4.2 Disturbance to Land – General, Environmentally Sensitive Areas and Endangered and Of Concern Regional Ecosystems

- PEN100015907 – D6, D7, D8, D10

The procedures and processes for managing disturbance in or near Environmentally Sensitive Areas or Endangered or Of Concern Regional Ecosystems do not specifically relate to the conditions in the Environmental Authority. Records of activities approved by previous environmental authorities are not easily distinguishable from records of activities conducted under the current EA.

Arrow Energy has well established procedures for managing disturbance in or near ESA and 'Of Concern' RE areas:

- 99-V-PR-0030 (0) Ecological Impact Assessment Procedure – Upstream Activities
- 99-V-FM-0018 Environmental Desktop Assessment for infrastructure
- 99-V-FM-0019 Environmental Desktop Assessment for linear infrastructure such as pipelines, powerlines etc.
- 99-V-FM-0020 Ecology Field Survey Form

To provide information for the above ecological assessments and plans the following information searches are completed:

- Environmentally Sensitive area (ESA) searches and maps from DERM. The Arrow GIS system is updated using this data so that infrastructure plans can be overlaid on maps to determine distances to ESA and required buffer allowances.
- An ESA search of the location will be conducted on the DERM ESA website search tool to verify all the Arrow GIS layers conform to DERM's assessment.
- Other environmental constraints, including any land features and potential sensitive receptors indicated on satellite imagery, topography, acid sulfate soil potential, watercourses, wetlands, potential for forest products permit, HERBRECS records, and remnant and regrowth vegetation.
- Online searches: EPBC protected matters search for assessing Matters of National Environmental Significance and DERM's Wildlife online.
- Vegetation samples may be sent to Queensland Herbarium for identification.

Buffer distances are clearly defined in the Environmental Desktop Study (EDT) (Form No: 99-V-FM-0008). Ecologists are present during the initial site development, and a 'spotter' is engaged to watch for fauna.

Arrow has implemented a system of recording compliance with the requirements of the EA and other ecology obligations. This system provides clear evidence of 'ecology clearances' undertaken prior to site selection and disturbance. DERM have reviewed documentation from Arrow in relation to historical infrastructure and this issue was closed out via issue of a Warning Letter for 5 wells constructed within an ESA and a subsequent amendment to the EA to authorise the activities.

2.4.3 Soil Management

- PEN100015907 – D18

sg3 73

Soil management procedures in place at the time of the audit do not address all the requirements of this condition, and are not implemented directly or indirectly through other processes (e.g. Land Access Request process). Specifically no evidence of a baseline soils assessment (as required by the EA) of the disturbance at Dam 14 was identified, and no evidence of soil monitoring requirements, or results were identified.

Baseline soil investigations for Dam 14 are included in the groundwater monitoring bore installation program. In addition, geotechnical reports are prepared prior to construction activities include soil structure information.

2.4.4 Acid Sulfate Soil Management

- PEN100015907 – D20

Potential acid sulfate soils were reportedly identified during the Environmental Desktop Report process for the RO to Dam 14 disturbance. The EA requires that an Acid Sulfate Management Plan be developed and implemented prior to disturbance of acid sulfate soils or potential acid sulfate soils. No evidence of soils monitoring determining that acid sulfate soils were not actually present, and no evidence of an Acid Sulfate Management Plan having been developed and implemented was identified.

Actions to be taken to manage ASS include:

- The State Planning Policy 2/02, as referenced in the EA, does not apply to areas above 20 m AHD, therefore no ASS investigations were required to be conducted for Dam 14.
- The LAR process will continue to incorporate the desktop assessment of ASS, however, confirmatory investigations will only be conducted in accordance with State Planning policy, as required.

2.4.5 Fauna Management

- PEN100015907 – D21, D22, D23

5373

Final versions of fauna management procedures were unavailable at the time of the audit, and the draft versions sighted do not address the training and awareness requirements in the EA.

Dams and significant infrastructure are fenced to prevent entry by large animals such as wallabies, kangaroos and deer.

Fauna assessments are conducted during ecological studies and reported on the Environmental Summary Report (99-V-FM-0100).

Fauna spotters are deployed on site during clearing of vegetation – Fauna Spotter Catcher Procedure (99-V-PR-0036).

Environmental Protection and Biodiversity Conservation (EPBC) searches are carried out for the designated disturbance area as part of the ecological studies.

Actions to improve fauna management include:

- Wildlife Management Plan (in draft form) to be completed by end March 2012
- Wildlife Management Guidelines (in draft form) to be completed by end March 2012.

2.4.6 Chemical and Fuel Storage

- PEN100015907 – D26, D27, D28

Hydrocarbon and other hazardous material storage is inconsistent with requirements of relevant standards (e.g. AS 1940) and the EAs. Site inspection revealed several examples of chemical and fuel storages without secondary containment, contributing to a significant potential for environmental harm to be caused in the event of a spill or leak.

The audit identified non compliant issues at some fuel stores and a work program has been developed to bring the fuel and chemical stores up to Australian Standards (e.g. AS 1940) and will therefore be compliant with the EA conditions.

2.4.7 Well Drilling, Completion and Stimulation

- PEN100015907 – D30

The evidence available at the time of the audit suggests that hydraulic fracturing activities occurred prior to the submission of the Hydraulic Fracturing Risk Assessment to DERM. The EA requires that such communication must occur prior to hydraulic fracturing activities occurring.

In addition to general statutory requirements governing hydraulic stimulation under Hydraulic fracturing took place prior to the petroleum and environmental legislation, CH4 undertook risk assessments condition being included in accordance with the EA conditions imposed in September 2010 prior to undertaking any hydraulic stimulation. The risk assessments focused on the chemical components and potential environmental impacts of hydraulic stimulation. The chemical risk assessments have previously been provided to the DERM as required by the EA. In addition, to ensure that CH4 identifies and mitigates the risks associated with hydraulic stimulation processes, CH4 has a defined process in place which deals with well construction, injection, flow back water and general groundwater management. Further information in relation to management of hydraulic fracturing can be obtained from AE's

submission to DERM of 25 November 2011. Further information on AE management of fraccing was submitted to DERM.

2.5 Schedule F: Air (PEN100015907 53 73)

- PEN100015907 – F1, F3, F4, I18, I19

Monitoring of emissions of fuel burning equipment has reportedly not occurred. The fuel burning register is subsequently incomplete for data that would be derived from such monitoring.

Actions are being taken to install emissions monitoring equipment as required under EA Schedule F. The planned upgrades will enable monitoring of the parameters in Schedule F – Table 1 of the above EAs.

2.6 Schedule G: Waste

2.6.1 General

- PEN100015907 – G7

CSG water continues to be released to land and waters via low point valves and scour valves which is not authorised by this clause (see Schedule B: Water and Schedule D: Land for details).

Water released at scour pits is directed to a constructed containment structure. On one occasion in 2011, a scour pit containment structure overflowed due to human error, and the matter was reported to DERM. Corrective actions to prevent reoccurrence, as previously reported to DERM were implemented. Any further releases from a scour pit containment structure would be investigated on a case by case basis.

Water released to land from low point drains represents condensate water collected at low points in the gas pipe lines. This water is required to be released to reduce pressure in the pipelines. Based on the results of water quality investigations conducted in 2011, the water released to ground from low point drains is fresh and considered to present a negligible risk to the environment. Notwithstanding, options for the management of this identified compliance matter are being assessed, including options for the containment of the water to prevent release to land and/or amendments to the EA to redefine condensate water to allow for the low risk activity. Arrow will be continuing to work with DERM to resolve this compliance matter.

2.6.2 Water Release Reduction Strategy / Coal Seam Gas Water Management

- PEN100015907 – G14

The CSG Water Management Plan (CSGWMP) does not meet all requirements of these clauses of the EAs. Specifically, the CSGWMP does not include:

- a) implementation of schemes to achieve maximum use of the water;
- b) specific targets for achieving increased use of CSG water both treated and untreated;
- c) a market analysis at least every three (3) years to identify existing and future opportunities for water use; and

- f) programs to implement feasible options to achieve increased water use and reduction in contaminant loads, including actions and timeframes for completion.

The Coal Seam Gas Water Management Plan (CSGWMP) is reviewed by the Water Team, Arrow Energy Corporate Environment Department (Brisbane) as further progress in relation to beneficial use is made. As Arrow does not currently release water, a release reduction strategy is not applicable. In relation to identification of further opportunities for beneficial use, Arrow continues to engage with various commercial entities in and around Moranbah to keep abreast of new developments. Off takes will be subject to approvals outside of the EAs.

2.7 Schedule H: Rehabilitation

- PEN100015907 – H6

sg373

Other than a draft procedure, there is no process for monitoring rehabilitated areas to determine if rehabilitation requirements of the EA are being achieved.

The draft Rehabilitation Monitoring Procedure has been completed and rehabilitation monitoring has commenced in order to meet the conditions in Schedule H of the EA.

The Erosion and Sediment Control Plan (Refer Section 2.2.2 of this report) and the Groundwater Monitoring Program (Section 2.8.1 of this report) will provide information for some of the indicators in Schedule H – Table 1.

The Rehabilitation Monitoring Procedure will address other indicators in Schedule H – Table 1.

2.8 Schedule I: Monitoring Programs

All conditions for general monitoring (EA I1 to I10) are being met.

Arrow ensures that all environmental monitoring is completed by suitably qualified personnel and that samples are analysed in NATA accredited facilities.

2.8.1 Groundwater Monitoring

- PEN100015907 – I11, I12, I13

The Groundwater Monitoring Program is not implemented to the level required by the EA. Many wells referred to in the Groundwater Monitoring Program have not been constructed within the required timeframe as required by conditions I13/H13, and as such Arrow Energy does not have the capacity to detect any significant risks and changes to groundwater quality caused by petroleum activity/ies. Requirements of the EA regarding qualifications and experience of those with the accountability of developing and implementing the program are not addressed. The groundwater conditions of the EA refer to soils. However there is no reference to soils in the Groundwater Monitoring Program. Similarly, the Program does not detail procedures to determine background water quality.

An initial Groundwater Monitoring Program to address EA Conditions (I11) to (I17) was prepared in mid 2011 and submitted to DERM. A revised Groundwater Monitoring Program was submitted for each EA on 25 November 2011. The associated groundwater monitoring bore installation program is near complete, planned to be completed by April 2012.

The implementation of the groundwater sampling program has commenced. All bores will be sampled prior to April 2012.

A Groundwater Monitoring Program is a live document and is reviewed as petroleum activities expand and new activities commence. A Groundwater Monitoring Program has been developed and implementation will continue over the life of the project as the Program is revised. There are additional monitoring bores to be installed and this work is underway. Construction of the groundwater monitoring bores identified in AE's submission to DERM of 25 November 2011 are scheduled to be completed by 30 April 2012.

DERM have committed to providing a definition of the term 'implemented' for the purposes of the EA condition.

2.8.2 Air Monitoring

- PEN100015907 – I18, I19

ss 73

The third party audit summary did not refer to air quality, but the auditors did indicate non compliance (See Appendix 1).

Plans are in place to install emissions monitoring equipment at all relevant compressor stacks as per EA Schedule F – Table 1. The emissions monitoring equipment is scheduled to be installed by August 2012.

2.8.3 Annual Water Monitoring Reporting

- PEN100015907 – I1

The standard monitoring spreadsheet does not contain all the fields required to satisfy this condition in the EA. Specifically, the time a sample was collected and the estimated daily quantity of contaminants released from all release points are not included.

Contaminants are not currently released from the site under the EA, therefore no discharge monitoring is currently required. These conditions will be met for any future water release as per the conditions of the EA.