PetroFrontier

COMPLETION & TESTING 2012

ENVIRONMENTAL MANAGEMENT PLANS (EMP)

EXECUTIVE SUMMARY

DRAFT

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1 INTRODUCTION

1.1 The Company

PetroFrontier Corp. is a publicly listed Canadian company focused on exploring and developing petroleum resources in the Georgina Basin in the Northern Territory. PetroFrontier Corp. operates in Australia through its wholly owned subsidiary, PetroFrontier (Australia) Pty Ltd (collectively referred to as PFC). PFC is the custodian of the EMP and has overall responsibility for its implementation.

1.2 PFC Corporate Environmental Policy

PFC undertakes all operations with an overriding commitment to health, safety and environmental management. In addition to the commitments outlined in PFC's Corporate Environmental Policy all activities associated with the 2012 completion and testing operations will comply with PFC's Health, Safety and Environment Management Plan (HSEMP) and contractor's safety and environment systems where applicable.

PFC's key environmental objectives are to:

- Minimise the total area of disturbance by using existing tracks, campsites and well sites.
- Minimise the risks of groundwater contamination.
- Ensure no additional clearing will take place for completion and testing operations.
- Minimise soil damage by operating during dry season and using dust abatement techniques if required.
- Minimise the chance of fauna deaths by vehicle strike.
- Minimise the potential for the introduction of weeds.
- Minimise the risk of fire.
- Minimise any adverse effects on amenity.
- Prevent land, surface water and groundwater contamination; and
- Promote effective rehabilitation of disturbed areas.

1.3 This Executive Summary

PFC's 2012 program involves the drilling of three horizontal wells which will then be completed (including hydraulically fracturing) and tested. Separate site specific EMPs are prepared for completion and testing. This Executive Summary provides an outline of the three completion and testing EMPs.

1.4 The EMPs

The EMPs are based on results from a flora, fauna and landscape surveys undertaken as part of the original drilling approvals.

Each EMP contains the following sections:

- Introduction
- Background
- Corporate Environment Policy
- Commonwealth & Territory requirements
- Description of the activity

- Description of the environment
- Assessment of the environmental effects and risks
- Performance objectives, standards and measurement criteria
- Implementation strategy
- Reporting
- Consultation process
- Rehabilitation Management Plan

1.5 The Proposed Works

Inclined pilot holes were drilled to evaluate the hydrocarbon potential prior to plugging back and drilling the horizontal sections

PFC proposes a multi-stage fracture stimulation over horizontal sections of its three wells, MacIntyre, Baldwin and Owen of approximately 1000 metres in order to stimulate hydrocarbon flow.

Works are anticipated to occur during September and October 2012.

PFC has engaged competent and experienced contractors as follows:

- Schlumberger for the hydraulic fracturing;
- Farley Riggs for the well testing;
- Wild Desert for the service rig; and
- Baker Hughes for the coil tubing unit.

1.6 Key Activities

The EMPs include all routine and non-routine operational activities for the PFC well completion and testing operations. The key activities include:

- Mobilisation of completion equipment, camp, personnel and supplies to existing well site and campsites using existing access tracks.
- Hydraulic fracturing of the well.
- Initial flow back.
- Post fracture clean out.
- Tubing installation and testing.
- Demobilisation of completion equipment, personnel and supplies; and
- Rehabilitation and monitoring of well site, campsite and access tracks not required for future production or by the pastoralists. Rehabilitation includes removing all infrastructure, including sumps and turkey nest dams once they have dried out, removing any gravel from drill pads, campsites and access tracks, re-spreading of topsoil and cleared vegetation and re-contouring the area to match the surrounding area.

Each well stimulation will be conducted as 10 separate small fractures, which reduces the size of each individual fracture and the maximum possible size and extent of each fracture set.

All surface activity will be restricted to the existing access tracks, well site and camp site areas and on designated roads.

Handling of chemicals and materials by PFC will be in accordance with the Material Safety Data Sheets, all applicable Australian Standards, the PFC Health Safety and Environment Management Plan (HSEMP) and the EMPs.

1.7 Objectives of the EMPs

This report has been written to meet the following objectives:

- Describe the environmental aspects of the hydraulic fracturing operations.
- Detail specific information on the environmental sensitivities of the receiving environment.
- Identify the potential environmental risks or impacts of the operations.
- Describe the control measures that will be implemented to minimise the environmental impact of the project.
- Evaluate the environmental hazards and potential consequences associated with hydraulic fracturing operations
- Assess the environmental risk levels and develop procedures to ensure risks are kept to an acceptable level; and
- To document this information for implementation by PFC employees and contractors and for use by regulatory authorities in the environmental assessment and approval process.

1.8 General Overview - Fresh Water Aquifers and Hydraulic Fracturing

PFC understands that there is currently a heightened level of anxiety regarding the possibility of contaminating fresh water aquifers when horizontal wells drilled in unconventional reservoirs are fracture stimulated.

The first key issue is the well design and construction process to protect fresh water sources, and secondly, the containment of induced fractures within the zone of interest and away from the fresh water formations.

The following two sections provide a summary of these two issues.

1.9 Protection of Fresh Water – Well Design and Construction ('Integrity')

It is important to ensure that groundwater is protected, not only in the first few stages of wellbore construction, but also during the full life cycle of the well. This is a regulated process, proven effective over many years and thousands of wells, whereby the owner of the well is required to ensure that conditions down hole do not degrade the wellbore integrity over time.

Well construction activities are engineered to ensure that groundwater bearing horizons are isolated from the wellbore. This process eliminates the potential for communication and possible contamination during subsequent drilling, completion and final production operations. To provide the protection necessary, usually a number of steps are completed to isolate the wellbore from the surrounding rock intervals that have been penetrated during the drilling process.

Perhaps the most important barrier between shallow fresh water horizons and the wellbore is the steel surface casing which is placed in the open hole just after it is drilled to just below the fresh water aquifers. The steel casing is then bonded to the rock with the use of special formulated and regulated oil well cement. Oil wells cements are much higher strength and have greater chemical stability than normal

construction cement and are purposely designed to ensure the casing and formations are bonded together and sealed, permanently.

The steel used in manufacturing the casing is also a special grade of material and must adhere to strict chemical and manufacturing processes, which ensure it is more resistant to corrosion and has sufficient strength to withstand the pressures necessary to frac and produce the well. The wells have cement bonded and sealed steel surface casing set. The production casing, which was run into the wells, was also cemented to surface as a further precaution. This design provides two sealed steel barriers between the produced fluids and the fresh water aquifers.

1.10 Protection of Fresh Water – Fracture Stimulation Design and Containment

Any stimulation fluids or pressures injected into the target formation are isolated from surface and fresh water zones by the various cemented casing strings set prior to hydraulic fracturing.

The horizontal well is separated into 10 sections of approximate equal length, using external casing packers. Each section is individually treated with high pressure fresh water (and thickening agents) to create fractures, which are predicted to reach a maximum 30 to 50m in height, above and below the wellbore, and are filled with sand to prevent them from closing completely. This will allow the gas or oil to flow through them into the wellbore. The result is that the distance between the fractures and surface water aquifers is at hundreds of meters vertically.

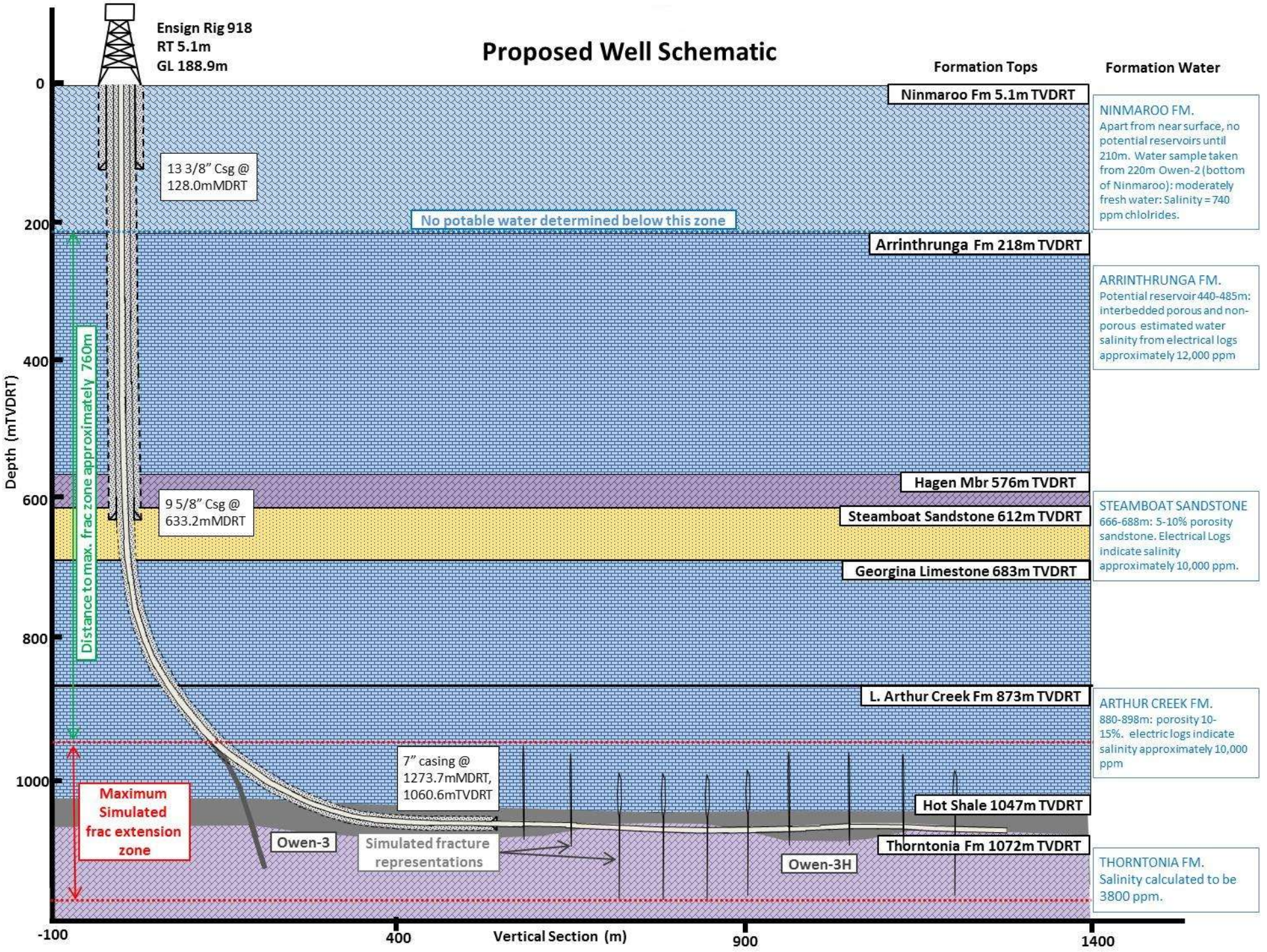
There are two additional natural phenomena that impede a fracture from rising too high. Firstly, the natural stress profile in the earth prevents fractures from growing vertically as they approach the surface, because the overburden pressure becomes less and less with shallower depths. Even if a fracture was attempting to grow upwards it becomes easiest for it to grow horizontally. The second natural phenomenon is the several impermeable rock layers between the hydrocarbon zones and the aquifers near surface which act as barriers to the fractures.

It is not possible to inadvertently pump too much water in a single fracture stimulation to cause a hypothetical fracture to propagate to surface, as the volume required would be hundreds if not thousands times larger than the planned stimulation.

Conventional reservoirs are routinely fracture stimulated and have been, for more than 50 years, using relatively large volumes of sand and water.

The wells PFC is fracturing, because they are horizontal and unconventional in nature, will see more individual fractures placed separately along the well, but of much smaller volume. Smaller fractures have smaller fracture height growth.

PFC has also taken steps to acquire earth stress data and conducted extensive mathematical modelling to predict the behaviour of the rock when it is stimulated and is confident the planned fractures will stay within the Arthur Creek formation.


Proposed Well Schematic
Ensign Rig 918
RT 5.1m
GL 188.9m
Formation Tops
Formation Water
Ninmaroo Fm 5.1m TVDRT
NINMAROO FM.
Apart from near surface, no potential reservoirs until 210m. Water sample taken from 220m Owen-2 (bottom of Ninmaroo): moderately fresh water: Salinity = 740 ppm chlolrides.
13 3/8" Csg @ 128.0mMDRT
No potable water determined below this zone
Arrinthrunga Fm 218m TVDRT
ARRINTHRUNGA FM.
Potential reservoir 440-485m: interbedded porous and non-porous estimated water salinity from electrical logs approximately 12,000 ppm
Distance to max. frac zone approximately 760m
Hagen Mbr 576m TVDRT
9 5/8" Csg @ 633.2mMDRT
Steamboat Sandstone 612m TVDRT
STEAMBOAT SANDSTONE
666-688m: 5-10% porosity sandstone. Electrical Logs indicate salinity approximately 10,000 ppm.
Georgina Limestone 683m TVDRT
L. Arthur Creek Fm 873m TVDRT
ARTHUR CREEK FM.
880-898m: porosity 10-15%. electric logs indicate salinity approximately 10,000 ppm
7" casing @ 1273.7mMDRT, 1060.6mTVDRT
Maximum Simulated frac extension zone
Hot Shale 1047m TVDRT
Owen-3
Simulated fracture representations
Thorntonia Fm 1072m TVDRT
Owen-3H
THORNTONIA FM.
Salinity calculated to be 3800 ppm.
Depth (mTVDRT)
0
200
400
600
800
1000
-100
400
900
1400
Vertical Section (m)

2 SUMMARY OF COMMITMENTS

A summary of commitments that PFC will adhere to when managing the environmental impacts of its completion and testing operations.

2.1 Table of Commitments

This table summarises the commitments and management strategies detailed throughout the EMPs and will form the basis of environmental audits.

Summary of Environmental Management Strategies and Commitments.

ID	Commitment	Responsibility	EMP Reference	Evidence of Action
BEFORE COMPLETION AND TESTING				
1	Conduct a desktop review and/or field based reconnaissance survey to check for declared rare and/or listed flora/fauna and other environmental sensitivities.	Low Ecological Services	Appendices 1-4	Reviews show no listed flora/fauna will be significantly impacted by the proposed completion and testing operations or associated activities. Operations will be limited to existing access tracks, campsite and well site, no additional clearing will occur.
2	Prepare camp and well site locations while minimising clearing of native vegetation and disturbance of native fauna and avoid protected species based on outcomes of desktop review and/or field studies.	PFC D&C Superintendent		Operations to use existing tracks, campsite and well site. Operations will be limited to existing footprint, no additional clearing will occur. Results of inspections / audit.
3	Conduct pre-completion ethno-graphic study (consultation and/or field survey) to check for indigenous and heritage sites.	Tim Hill Heritage Management and Planning	Section 6.9	Operations to use existing tracks, campsite and drill pad. Operations will be limited to existing footprint, so no additional clearing will occur and no sites disturbed. Results of inspections / audit.
4	Prepare well and camp site locations while minimising disturbance of indigenous heritage sites based on outcomes of ethnographic study.	PFC D&C Superintendent	Section 6.9	Report identifying cultural and heritage sensitivities within target drilling area. Existing infrastructure avoids known sites. Operations to use existing tracks, campsite and well site. Operations will be limited to existing footprint, no additional clearing will occur and no sites disturbed.
5	Conduct consultation prior to the operation with relevant stakeholders and incorporate outcomes of consultation into management strategy.	PFC D&C Superintendent	Section 11	Completion and Testing EMP document shows outcomes of stakeholder consultation.

ID	Commitment	Responsibility	EMP Reference	Evidence of Action
6	Obtain Hazard Analysis and Risk Assessment of operational aspects of the completion and testing program.	Manager Engineering	Section 7	Risk Matrix identifying, rating and mitigation of the specific operational risks of completion and testing.
7	Obtain written approval for completion and testing operations from relevant NT government departments.	PFC D&C Superintendent	Section 4.2	Letter of approval from DoR.
8	Inform public of proposed completion and testing works to minimise disturbance to traffic, landholders and local residents.	PFC D&C Superintendent	Section 11	PFC records of communication; and/or Results of a compliance audit.
9	Review contractors' HSE systems to ensure compliance with PFC HSEMP requirements.	PFC D&C Superintendent, Enterprise Risk Management Solutions	Section 9	PFC and contractor HSE systems are bridged to ensure alignment and consistency.
10	Conduct safety and environmental induction of all personnel, highlighting the environmental sensitivities of the target area, and appropriate management practices.	Operating Company Representative		Records show that safety and environmental induction of all PFC and contractor personnel carried out.
SITE PREPARATION				
11	Ensure vehicles and equipment are washed down, inspected and free of weeds and soil prior to mobilisation to well site.	PFC D&C Superintendent, Manager Engineering		Arrival Inspection records. Wash-down Checklist Results of a compliance audit.
12	Ensure that any cleared vegetation is stockpiled for site rehabilitation.	PFC D&C Superintendent, Civil Supervisor		No additional clearing will occur. Results of a compliance audit.
13	Ensure that topsoil and subsoil are stockpiled separately for site rehabilitation and in low profile mounds to minimise erosion.	PFC D&C Superintendent, Civil Supervisor		No additional clearing occurring. Results of a compliance audit.
14	Ensure a self bunded spill mat or drip tray is used during refuelling operations at the well site. A spill kit is to be available in the refuelling area(s) from construction until demobilisation and rehabilitation	Operating Company Representative		Results of a compliance audit. Daily inspection reports
15	Fire response equipment available during operations. All vehicles involved in operations will have a fire extinguisher in the vehicle. Fire response procedure contained within the ERP.	Operating Company Representative		Results of a compliance audit.

ID	Commitment	Responsibility	EMP Reference	Evidence of Action
DURING COMPLETION AND TESTING OPERATIONS				
16	Maintain written daily reports including details of any incidents, all relevant operational and technical data, list all personnel on-site, operational and standby activities, repair time due to breakdown, and other non-operational activities.	Operating Company Representative	Section 10	Daily Reports. Results of a compliance audit.
17	Ensure that all fracture proppants, chemical and debris remain underground and isolated and are disposed of into a PVC lined sump during fracture program. Returned fracturing fluids will be tested to determine suitable disposal methods with a preference for onsite treatment through evaporation where possible while meeting the appropriate quality and regulatory requirements. Where it is not viable to achieve onsite treatment of returned fluids they will be transported and disposed of by a licensed waste contractor. In addition produced hydraulic fracturing fluids may be re-injected into a suitable formation isolated from Production Aquifers in accordance with regulatory requirements and approvals	Operating Company Representative		Daily Reports. Results of a compliance audit.
18	Ensure that fuel, lubricants and chemicals are stored appropriately in lined and bunded areas and are transported, handled and used in accordance with relevant MSDS.	Operating Company Representative		Results of a compliance audit.
19	Ensure that the Emergency Response Plan, Spill Contingency Plan for fracturing operations and appropriate spill clean-up equipment are onsite and available in relevant areas.	Operating Company Representative		Results of a compliance audit.
20	Report as soon as practicable to DoR any spillages of hydrocarbons greater than 80 L in areas of inland waters and 300 L in other areas, and 500 m^3 if petroleum is in gaseous form as required under the Schedule.	Operating Company Representative		Records of incident reports.
21	Maintain a log of wastes generated including type and volumes.	Operating Company Representative		Records of wastes generated. Transport certificates.

ID	Commitment	Responsibility	EMP Reference	Evidence of Action
22	Ensure that all solid and industrial wastes are stored in animal-proof covered skips and disposed of by a licensed waste management contractor.	Operating Company Representative		Results of a compliance audit. Transport certificates.
23	Ensure that all liquid wastes are stored in appropriate containers and disposed of by a licensed waste management contractor.	Operating Company Representative		Results of a compliance audit.
24	Manage dust and fugitive emissions to minimise impacts on the surrounding environment. Manage surface water to minimise erosion and implement dust and erosion control measures if required.	Operating Company Representative		Results of a compliance audit.
25	Ensure that an environmental compliance audit against the commitments proposed in the EMPs takes place during PFC's completion and testing program. PFC will contract LES when this is required.	Operating Company Representative	Section 10	Results of a compliance audit.
AFTER COMPLETION AND TESTING				
26	Rehabilitate camp, access tracks and well site in accordance with, conditions as set out under the Schedule.	PFC D&C Superintendent, Civil Supervisor	Section 12	Results of a compliance audit. Rehabilitation Completion Report.
27	Continue monitoring rehabilitated sites in accordance with the Rehabilitation Management Plan – Section 12.	PFC D&C Superintendent	, Section 10, Section 12	Annual monitoring report.
28	Ensure that the site is inspected for the removal of all waste materials at the completion of operations.	Operating Company Representative		Final Daily Report. Results of a compliance audit.
29	Ensure that the results of the compliance audit are forwarded to DoR. The report will include statements describing environmental performance and any environmental incidents that occurred during the audit period.	PFC D&C Superintendent Low Ecological Services	Section 10	Results of a compliance audit.

2.2 Fracturing Fluids

A full listing of all the chemicals to be used in the fracture fluids is provided in the EMP with all chemicals referenced to their CAS number. No undisclosed proprietary chemicals will be used during operations. Full Australian Standard compliant MSDSs will be available on site for all constituent chemicals (in their

concentrated form) that are used in the fracture fluid. The material will be pumped into the reservoir and will consist primarily of water (87.47%) and proppant (11.97%). The bulk of the materials will remain in the reservoir.

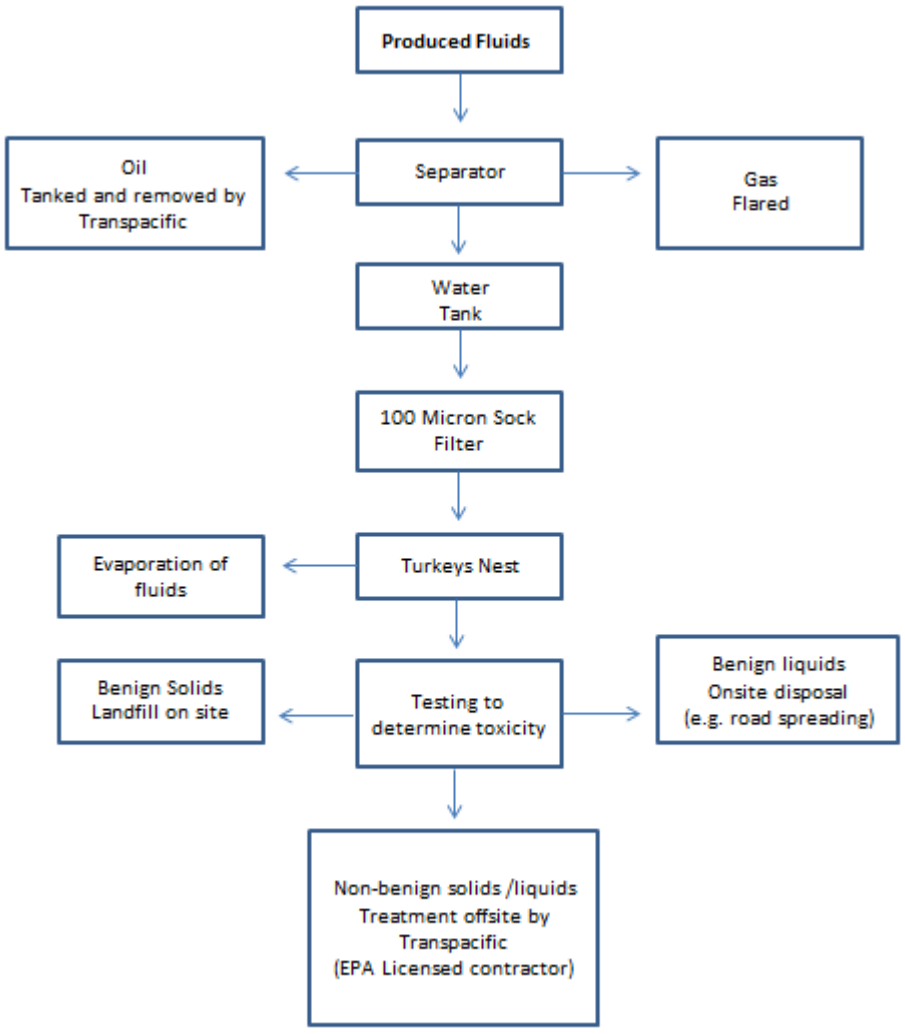
Fracturing fluids that return to the surface will initially pass through the separator which will separate oil, water and gas. Oil will be sold to Transpacific through their crude oil division and a flare stack will be used to flare any gas.

The remaining flowback fluid will then be tanked to allow further separation before being run through a 100 micron sock filter to remove any possible hydrocarbon sheen. The fluid will then be deposited into the turkeys nests (temporary storage ponds) where evaporation of some or all liquid will occur.

The solids (and any unevaporated liquid) will be tested to determine suitable disposal methods. Benign solids will remain onsite and be used as landfill. Benign liquids will be dispersed on site, preferably on roads.

Solids and liquids that would negatively impact the environment will be removed from site by Transpacific Industries Group in compliance with all waste management laws and regulations. The characteristics of the waste will determine which facility will receive the waste.

Treatment of Produced Fluid:



2.3 Chemicals

Chemicals to be used including their use, chemical components and known environmental hazards during transport and storage.

Product Name	Use	Components	Environmental Hazards
Breaker J134	Breaker	Hemicellulase enzyme	None known
Breaker J218	Breaker	Diammonium peroxydisulphate	None known
EB-Clean* J479 LT Encapsulated Breaker	Breaker	Diammonium peroxydisulphate	None known
pH Control J494	pH control	Inorganic salt	None known
Water Gelling Agent J580	Gel	Carbohydrate polymer	None
Crosslinker L10	Crosslinker	Boric acid	None known
Temporary Clay Stabiliser L64	Clay management	Tetramethylammonium chloride	No known aquatic organisms exist at depths of use. No aquatic habitats occur on drill site-chemicals at this stage diluted and at low concentrations.
Soda Ash M3	Buffer, stabiliser, solvent	Sodium carbonate	None known
BIOCIDE BPA 68915	Clay management, microbial control	Magnesium nitrate, reaction mass of: 5-chloro-2methyl-4-isothiazolin-3-one [EC no. 247-500-7] and 2-methyl-2h-isothiazol-3-one [EC no. 220-239-6]	No known aquatic organisms exist at depths of use. No aquatic habitats occur on drill site-chemicals at this stage diluted and at low concentrations.
L401 *	pH Buffer	Acetic Acid, Propan-2-ol	This product has no known eco-toxicological effects.
U042	Chelating Agent	Tetrasodium ethylenediaminetetraacetate,	Aquatic toxicity

		Sodium hydroxide, Trisodium nitrilotriacetate (impurity)	
L058	Iron Control	Sodium erythorbate	This product has no known eco-toxicological effects.
M275	Microbiocide	Magnesium nitrate reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one[EC no. 247- 500-7]and 2-methyl-2H-isothiazol-3-one [EC no. 220-239-6] (3:1)	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
J568	Friction Reducing Agent	Butyl diglycol	This product has no known eco-toxicological effects.
F110	EZEFLO* Surfactant	Methanol, Alcohol, C11 linear, ethoxylated	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Should not be released into the environment.
Aluminium Sulphate	Floculant	100% Aluminium Sulphate	Irritant, slightly corrosive. Will precipitate as aluminium hydroxide
Spectrachem Tracer	Non-radioactive fluid tracer	Proprietary, Chemical family: Sodium salt and water	Irritant

* chemical may be used depending on the conditions encountered

PFC requires vendors of hazardous chemicals to provide an MSDS in accordance with the Code of Practice on Preparation of Safety Data Sheets for Hazardous Chemicals which is an approved code of practice under the Work Health and Safety (National Uniform Legislation) Act 2011.

Purchase of Hazardous Substances and Dangerous Goods will comply with:

- Hazardous substances as defined by the National Occupational Health and Safety Commission's List of Designated Hazardous Substances [NOHSC: 10005, (1999)] and Safe Work Australia Hazardous Substance Information System.

- National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC: 1005, 1994] and National code of Practice for the Control of Workplace Hazardous Substances [NOHSC: 2007, 1994].

Where items are classified as Dangerous Goods, the supplier will be required to provide the following information (as defined by the "Australian Code for the Transport of Dangerous Goods by Road and Rail" ADG Code 7th Edition):

- Technical Name.
- United Nations (UN) Number.
- Hazchem Code.
- Dangerous Goods Class.
- Subsidiary Risk.
- Packaging Group.
- Manufacturer's Name.
- Manufacturer's Part Number.
- Manufacturer's MSDS.

The PFC Site Representative will maintain a Hazardous Materials Register containing a MSDS for each hazardous chemical on site which will be available to all personnel onsite.

Hazardous chemicals are stored in a bunded chemical storage area on the well site and in accordance with the requirements of the MSDS.

Spill kits will be available in areas where chemicals are stored and/or regularly used.

Chemicals to be used during hydraulic fracturing, including their use, chemical components and known environmental hazards (operational use).

Product Name	Use	Components	Environmental Hazards
Breaker J134	Breaker	Hemicellulase enzyme	None known
Breaker J218	Breaker	Diammonium peroxydisulphate	None known
EB-Clean* J479 LT Encapsulated Breaker	Breaker	Diammonium peroxydisulphate	None known
pH Control J494	pH control	Inorganic salt	None known
Water Gelling Agent J580	Gel	Carbohydrate polymer	None
Crosslinker L10	Crosslinker	Boric acid	None known
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Soda Ash M3	Buffer, stabiliser, solvent	Sodium carbonate	None known
BIOCIDE BPA 68915	Clay management, microbial control	Magnesium nitrate, reaction mass of: 5-chloro-2methyl-4-isothiazolin-3-one [EC no. 247-500-7] and 2-methyl-2h-isothiazol-3-one [EC no. 220-239-6]	No known aquatic organisms exist at depths of use. No aquatic habitats occur on drill site-chemicals at this stage diluted and at low concentrations.
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U042	Chelating Agent	Tetrasodium ethylenediaminetetraacetate, Sodium hydroxide, Trisodium nitrilotriacetate (impurity)	Aquatic toxicity

L058	Iron Control	Sodium erythorbate	This product has no known eco-toxicological effects.
M275	Microbiocide	Magnesium nitrate reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one[EC no. 247- 500-7]and 2-methyl-2H-isothiazol-3-one [EC no. 220-239-6] (3:1)	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
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F110	EZEFLO* Surfactant	Methanol, Alcohol, C11 linear, ethoxylated	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Should not be released into the environment.
Aluminium Sulphate	Floculant	100% Aluminium Sulphate	Irritant, slightly corrosive. Will precipitate as aluminium hydroxide
Spectrachem Tracers	Non-radioactive fluid tracers	Proprietary, chemical family: Sodium salt and water	Irritant
M091	Formation Cleaning	Sodium hydroxide and Sodium hypochlorite	Very toxic to aquatic organisms.
M298L	Antimicrobial	Tetrakis(hydroxymethyl)phosphonium sulfate	Very toxic to aquatic organisms

* this chemical may or may not be used depending on the conditions encountered

3 WATER

Water for operations will be obtained from existing adjacent water bores with additional supplies from regional water bores being trucked to the area if required.

Water will be pumped to the usage location via lay-flat hoses or via water trucks, where it will be stored in lined turkeys nests.

Total water requirements for the fracturing operation are estimated to be 4,000KL for each well.

Accommodation facilities require an estimated 2.5KL to 5KL a day, depending on the number of personnel on site.

PFC's has a structured plan to identify any impact of the operations on the water table.

3.1 Base Line Samples

A base line water sample and analysis was taken from bores used. The physical and chemical properties have been analysed and the results are included in the EMPs.

3.2 Concurrent Monitoring

PFC will monitor the water level in adjacent bores before, and hourly during the hydraulic fracturing operations.

3.3 Post-operation Monitoring

Water levels will be monitored and samples collected each month for three months following the hydraulic fracturing operations.

4. EMERGENCY PLANNING AND RESPONSE

PFC maintains up-to-date documents or alternatively has in place bridging documents linking to principal contractor's documents as outlined below:

- PFC Emergency Response Plan
- PFC Health, Safety and Environment Management Plan (HSEMP)
- PFC Site Specific Wellsite Completion and Testing Program
- PFC Site Specific Wellsite Completion and Testing Operations Environmental Management Plan.

A copy of each of the above documents will be maintained at the well site.

4.1 Emergency Facilities and Communication

Emergency medical evacuation (Medivac) will be via road to either Mt Isa or Alice Springs depending on which site operations are occurring. If required, medivac by helicopter from the well site or plane from one of two nearby Air Strips is available utilising charter aircraft from Alice Springs.

The nearest substantial hospital is located in Alice Springs. First aid facilities staffed by a fully trained and qualified emergency paramedic will be available at the wellsite. Independent separate satellite systems with portable backup and HF radios will provide communications at the rig site and camp site. In case of alarm, muster points will be defined for each well site and camp site.

5. ASSESSMENT OF THE ENVIRONMENTAL EFFECTS AND RISKS

5.1 Risk Assessment Methodology

Environmental risk assessment for potential events that may impact the environment during operational activities has been undertaken. The assessment identified hazards and developed risk-reducing measures to prevent and mitigate impacts to the environment from operational activities. An environmental hazard-type assessment was undertaken to identify, analyse and evaluate the environmental risks associated with operations and to recommend management actions to reduce the risk to as low as reasonably practicable (ALARP).

A Complete Well On Paper (CWOP) session was held in Brisbane on 6 and 7 June 2012. All contactors involved in the operation were represented at the CWOP and participated in the environmental risk assessment.

Environmental risk assessment for the operations is contained in the following table.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
USE OF ACCESS ROUTES AND WELL SITES						
• Removal of native vegetation and potential fauna habitat	• Loss of native vegetation • Destruction of fauna habitat • Loss of declared rare flora or priority species	• Onsite flora and fauna not previously determined during ecological assessment(s) • Uncontrolled vehicle access • Unauthorised clearing • Off-road driving to access sites	3	1	Low	• Desktop assessment indicates that declared flora unlikely to occur in proposed survey area • No additional clearing required for operations, except for potential regrowth on well site, camp site and access tracks • Only existing tracks to be used • No off-road driving • Parking limited to designated cleared areas
• Vehicle collision with fauna	• Fauna death or injury • Disturbance of nesting or breeding sites • Fauna entrapment in trenches associated with operations	• Unpredictable movement of animals • Vehicles travelling at high speeds • Vehicles travelling at dawn or dusk or in times of poor visibility	2	2	Low	• Induction of all personnel to include information on potential for fauna injury from vehicle collision • Awareness of fauna protection strategies highlighted at toolbox meetings • Limit vehicle activities to daylight hours when fauna are more visible or inactive and only drive at night in the event of an emergency • Limit vehicle speeds to 60 km/h on access trails and 40 km/h in difficult areas, except in the event

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						of an emergency. 10 km/h on well and camp sites • Ensure vehicles are inspected and have working lights and/or spot lights
• Soil disturbance	• Erosion and sedimentation • Compaction • Subsidence • Dust emissions	• Poor drainage control over cleared areas and topsoil/spoil stockpiles • Light compaction required for rig stability • Unstable subsoils	2	2	Low	• Rig area should be relatively flat with shallow drains to guide water to the sump if rain occurs or when washing down • Topsoil and spoil stockpiled separately • Stockpiles constructed with low profile and away from drainage lines to reduce erosion potential • Implement dust-control measures (e.g. water spraying) if dust generation exceeds acceptable levels • Sites rehabilitated as soon as practicable after the completion of program to minimise potential for erosion • Top soil replaced after project completion • Cleared vegetation respread over rehabilitated area to hold soil together and minimise erosion • Following the first wet season after decommissioning, the project area will be inspected to determine whether any soil disturbance issues persist during auditing and inspection program. Remediation actions initiated

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						if needed
• Disturbance of indigenous heritage site(s)	• Damage to indigenous heritage sites	• Onsite indigenous heritage sites not previously determined during ethnographic study • Personnel entering indigenous heritage site	4	1	Low	• Operations will use existing infrastructure, so no additional clearing required • No access to areas other than those cleared by CLC • Personnel prohibited from leaving cleared areas during induction • Ongoing consultation with CLC
• Introduction of noxious weeds and vermin, exotic species, flora and animal diseases	• Infection of soil with diseases and pathogens • Infestation of weeds in cleared areas • Exotic species could become invasive if introduced, with unpredictable consequences for native species • Encroachment into quarantine areas	• Weeds and contaminated soil on vehicles • Weeds introduced in imported materials • Transit through dieback affected areas • Animals attracted to food wastes and water source	4	2	Medium	• Equipment and vehicles (including bulldozer billy pans) cleaned in accordance with Wash-Down Checklist (Appendix 14) and inspected for soil, plant material and pest animal contamination prior to mobilisation • All imported material is locally sourced and weed free • All personnel trained/refreshed during induction in the need for weed hygiene management • Food scraps collected and disposed of in animal pest proof bins • Vehicles, including bulldozer billy pans, cleaned when leaving areas identified with weed infestations

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						• Following the first wet season after decommissioning, the project area will be inspected to determine whether any weed species have established during auditing and inspection program and remediation actions initiated if required. • Exotic species monitored during auditing and inspection program.
• Disruption of local traffic	• Inconvenience to local landholders, residents and other road users	• Movement of heavy machinery on public roads	1	2	Low	• Due to remote location, traffic volume is minimal • Pastoralists notified prior to the beginning of operations and informed of timing of major mobilisations • Gates to be left as found
• Ignition sources e.g. vehicle exhaust, smokers	• Loss of vegetation and native fauna	• Grass fires and bush fires in uncleared areas from sources of ignition	3	1	Low	• Induction to alert staff of smoking restrictions and fire hazards. • Adequate fire equipment located on-site • Only diesel vehicles used in operations • Spark arresters fitted to vehicles • Combustible materials to be cleared from the area surrounding the flare stack • Emergency response procedures followed as outlined in ERP.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
HYRDRUALIC FRACTURING						
• Well control event	• Contaminated soil, surface water and/or ground water • Uncontrolled fire • Air pollution	• Release of liquid hydrocarbons and/or fracturing chemicals to the environment • Release of gaseous hydrocarbons to the atmosphere	6	1	Medium	• API accredited blow out preventer/safety valves and casing used during fracturing and testing operations until the well is plugged and abandoned or when the well head is installed. • Flare stack will be continually monitored and will have pilot light and sparker to ensure it stays lit. • Spill Contingency Plan in place. • ERP in place and emergency response drills conducted regularly.
• Fracturing fluids	• Physical or chemical impacts of flora, fauna, soil, surface water or groundwater from released fluids • Chemical impacts on groundwater /aquifers/ surface water • Chemical impact on local bores	• Unplanned release of fracturing fluids outside reservoir • Spills while loading or transferring fluids for fracturing	4	1	Low	• Chemicals to be handled in bunded area, or over a large drip tray/containment area. • Fracturing fluids that return to the surface and will be collected in the lined storage dams. Returned fracturing fluids will be tested to determine suitable disposal methods with a preference for onsite treatment through evaporation where possible while meeting the appropriate quality and regulatory requirements. Where it is not viable to achieve onsite treatment of returned fluids they will be transported and disposed of by a licensed waste contractor. • Turkey's nest fenced to prevent fauna access

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						• Fracturing occurring at depths in excess of 500m from fresh water aquifer at Baldwin-2 and in excess of 700m at Owen-3 • Well and fracturing designed to remain within the target horizon • The well is designed with at least two sets of API grade steel casing between the target zone and any potential aquifer. The casing, cement and shoe are tested using ELOT procedure to ensure that the fracture zone is isolated from ground water. • Well sites are not located within sensitive environments. • The well, surface equipment and casing will be pressure tested and fracturing pressure will not exceed tested pressure. • Chemicals will be highly diluted when pumped down the well bore and all fracture fluids are fully disclosed with all components listed by CAS registry number[1] and concentration as ppm. • Any proprietary formulations supplied must be supplied with an Australian Standard MSDS and

[1] Corelabs, suppliers of chemical tracers do not provide a CAS registry number for intellectual property reasons. The concentrations are 0.075 ppm, or 0.0000075% by mass fraction. MSDSs are included in Appendix 9.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						the constituents must be included in the disclosures listed by CAS number so contents of all chemicals used are known. [2]
• Loss of fracture fluid or produced fluid at surface	• Physical or chemical impacts on flora, fauna, soil, surface water or groundwater from released fluids	• Exceeding tested pressure • Equipment failure	4	1	Low	• Pressure test well. • Fracturing pressure will not exceed pressure test. • Gas detection equipment at well head. • API accredited well control equipment shall be used during fracturing and testing operations until the well head is installed.
• Noise	• Disturbance to local residents, wildlife or adjacent activities	• Noise generated during routine operations	1	1	Low	• General area has low population density and is remote from high density populations. • Contact landowners prior to accessing station tracks and working on well sites. • Provide landowners with contact details of OCR.
• Facility lighting	• Disturbance to local residents, wildlife or adjacent activities	• Facility lighting required for safety during 24 hour operations	1	1	Low	• General area has low population density and is remote from high density populations. • Well sites not located within sensitive environments.

[2] As above.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						• Unnecessary lights turned off particularly during insect plagues and yellow lights used where appropriate.
• Visual amenity	• Disturbance to local residents	• Vertical elevation of drilling rig	1	1	Low	• General area has low population density and is remote from high density populations.
• Disturbance or damage to infrastructure and services	• Disruption of services to local residents e.g. power, telecommunication • Damage to fence lines and farm gates	• Unknown infrastructure located in the planned fracturing location • Human error	2	2	Low	• General area has low population density and is remote from high density populations, so little infrastructure present. • Gates to be left as found. • Re-instatement of all fences and affected infrastructure to pre-operational conditions as agreed with the relevant landowners.
• Third party access	• Potential interference with operations • Injuries from machinery to third parties	• Lack of signage, gates and/or vigilance	2	2	Low	• Access road will be gated • Adequate signage (e.g. no unauthorised access) on gates and access trails • Site will be manned constantly during operations
• Dust	• Excessive atmospheric dust pollution • Soil degradation	• Dust caused by driving to/from and around well sites and during	1	2	Low	• Area has low population density • If dust generation becomes a problem, campsite, drill pad and access tracks will be sprayed as required.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
	and loss	operations				• Minimise vehicle use along dirt roads/tracks • Reduce vehicle speeds along dirt roads/tracks • Contact landowners prior to accessing station tracks and working on well sites • Provide landowners with contact details of OCR
• Fuel, oil or chemical spills	• Contamination of soil, surface water and/or groundwater • Release of gaseous hydrocarbons into the atmosphere • Uncontrolled fire	• Lack of appropriate bunding around storage and refuelling areas • Inappropriate storage of fuel, oil or chemical containers • Inappropriate handling of fuel, oil or chemicals during use	2	3	Medium	• Fuel, oil and chemical storage areas appropriately segregated, labelled and bunded, as required. • Areas with fracturing chemicals bunded. • Containers checked to ensure that they are in sound order. • Fracturing crew trained in the correct procedures for use of materials, including refuelling, transport, mixing and clean-up procedures. • Well sites are not located within sensitive environments. • Fracturing not to proceed in creek lines or drainage line containing water to limit environmental risk to surface or groundwater • Drip trays or self bunded spill sheet used while refuelling. • ERP and Spill Contingency Plan in place and personnel trained in their implementation.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						• Clearly labelled and adequately stocked spill kits available in all relevant areas. • Clean up materials and wastes appropriately contained for offsite disposal.
• Unapproved gas flaring	• Contribution to global greenhouse gas emissions (with associated "knock-on" effects, i.e. global warming) • Potential for fire • Destruction of fauna habitat	• Flaring required during fracturing and well testing	3	1	Low	• Minimise volume of gas flared where possible. • Obtain approval from DoR and Bushfires NT permit to flare during restricted burn periods for flaring. • Gases are flared (in consultation with DoR) • Combustible materials cleared from the area surrounding the flare stack • Adequate fire equipment located on-site and personnel trained in its use
• Blowout during fracturing or well testing	• Gas ignites	• Loss of control of liquids or too much gas pressure	3	1	Low	• API certified well control equipment present on well, installed and tested according to program • Identified personnel to hold required Well Control Certification. • Blow out preventers turned on in the event of a blow out during well testing to seal off the well.
• Hydrocarbon contamination of area	• Physical or chemical impacts on flora,	• Loss of combustion of flare stack	2	2	Low	• Measures to ensure flare stack does not lose combustion (e.g. pilot light, automatic sparker)

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
surrounding flare stack	fauna, soil, surface water or groundwater from released fluids	• Failure to burn all fluids to flare stack				
WASTE DISPOSAL						
• Release of waste oils or chemicals into the environment. • Release of fracturing fluids that return to the surface.	• Soil, surface water and groundwater contamination • Mortality of flora and fauna from soil, surface and groundwater contamination • Fauna drinking water unsuitable	• Site wastes and chemicals not removed at end of fracturing program • Improper disposal of wastes • Seepage of wastes into ground and/or surface water • No storage for returned chemicals.	3 1	2 3	Medium Low	• All waste material must be contained within designated areas • Waste oils and chemicals clearly labelled and stored separately in a lined and bunded area for offsite disposal to licensed disposal site by licensed waste management contractor • Liquid waste that cannot go through the sewerage system will be stored in bunded containers for offsite disposal to licensed disposal site by licensed waste management contractor • Waste storage container(s) on location and all solid waste will be taken to the Alice Springs dump. • Fracturing fluids that return to the surface and will be collected in the lined storage dams. Returned fracturing fluids will be tested to determine suitable disposal methods with a preference for onsite treatment through evaporation where possible while meeting the

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						appropriate quality and regulatory requirements. Where it is not viable to achieve onsite treatment of returned fluids they will be transported and disposed of by a licensed waste contractor. • In addition, produced hydraulic fracturing fluids may be re-injected into a suitable formation isolated from Production Aquifers in accordance with regulatory requirements and approvals. Contaminated soils will be remediated on-site via land farming or bioremediation or removed from site for landfill disposal in consultation with the EPA
• Release of grey-water or sewage into the environment	• Soil, surface water or groundwater contamination	• Improper disposal of wastes • Inappropriate sewerage systems in place at the camp and well sites	2	2	Low	• On-site sewage treatment system in place or removal of sewage via vac truck for disposal in Alice Springs sewage system. • Effluent from the sewage treatment plant discharged in accordance with EPA Water Recycling Guidelines allowing pasture/fodder irrigation via surface sprinkler or sub-soil irrigation • Sewage sludge buried on-site covered with at least 250 mm of top soil and, where practicable, located above known flood levels • Grey-water friendly products used where applicable

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						• Grey water will be disposed of in a sump or treated in an onsite sewage treatment system for discharge in accordance with EPA Water Recycling Guidelines allowing pasture/fodder irrigation via surface sprinkler or sub-soil irrigation
• Litter	• Fauna eating waste products • Increased vermin or scavenger numbers • Visual amenity • Pollution	• Improper disposal of wastes	2	2	Low	• Landfill not established within 100 m of surface water or within 3m of groundwater • Food wastes disposed of in animal proof bins and/or skips and then put in animal proof landfill • Putrescible wastes will be disposed of at the onsite landfill or taken for disposal offsite • Solid wastes such as scrap wood, metal, packaging and litter segregated and stored in covered rubbish skips when necessary for disposal offsite • Regulated wastes such as waste mineral oils, tyres and batteries to be disposed of to a licensed treatment/disposal facility by a licensed waste contractor • Any temporary landfill covered/screened to prevent material escaping from the landfill • Landfill fenced to prevent cattle, dogs, cats and

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
						foxes from entering • Landfill checked daily to ensure that no material has been blown or washed out of the landfill • Escaped waste to be returned to landfill and corrective actions implemented to prevent reoccurrence • Program in place to minimise the volume of wastes generated, and to reuse and recycle where possible
DEMOBILISATION AND SITE RESTORATION						
• Disturbed sites abandoned without required rehabilitation	• Erosion by wind or water (rain or tides) • Failure of revegetated areas to return to pre-operation conditions. • Loss of native vegetation (% cover and diversity) • Threat to conservation values in the area	• Sites not progressively rehabilitated • Sites not monitored and assessed for rehabilitation success • Access track on to mudflat not adequately blocked or disguised • Access tracks and survey lines not	3	2	Medium	• Rehabilitation in accordance with Rehabilitation Management Plan in Section 12 • Rehabilitation of well site and access track to pre-operation condition. • Rehabilitation of cleared vegetation includes reinstatement of landform, respreading of topsoil and scattering of cleared vegetation prior to wet season. • Check banks in drainage depression. • Monitoring of rehabilitated sites and assessment of rehabilitation success against completion criteria.

RISK IDENTIFICATION			RISK ANALYSIS		RISK EVALUATION	RISK TREATMENT
Event / Incident	**Potential Impact**	**Causes**	**Severity**	**Likelihood**	**Risk Ranking**	**Safeguards / Management Methods**
	• Well site footprint increasing in area, particularly through erosion or sedimentation • Impact on the aesthetics of the area • Inappropriate third party access	adequately blocked or disguised to limit third party access.				• Continued monitoring and remediation works undertaken until the completion criteria have been achieved.

6. CONSULTATION

6.1 Stakeholders

Consultation has been undertaken with the following stakeholders regarding the completion and testing program and will continue during the operations:

Stakeholder	Consultation	Project Related Issues	Resolution
Pastoralists	Letter dated 23 February 2012. Access Agreement signed on 11 June 2012 Meetings in May 2012, July 2012:	Increase in traffic, Increase in road wear, water requirements for road construction and maintenance,	Presented information on fracturing process, road construction and maintenance and water and materials requirements. Reached agreement on all issues.
Central Land Council	Email/phone Meetings: CLC Alice Springs, Community meetings	Concerns regarding fracturing, water usage & potential for contamination.	Presented outline of fracturing processes and history of fracturing on CLC lands. No residual concerns expressed, considered fracturing usual part of completion operations at Mereenie and Palm Valley.
Department of Resources	Meetings/Email/phone	Completion Program, risks associated with fracturing and mitigation strategy	Provided extensive additional supporting documentation in addition to normal application. Prepared NOI for DoR to forward to NRETAS if required.

7 REHABILITATION

7.1 Rehabilitations Actions

Rehabilitation will be a two stage process:

Interim rehabilitation actions will commence at the latter of the conclusion of testing operations or the extended production test. The interim rehabilitation involves:

- Removal of all rubbish.
- Liquids evaporated or removed from turkeys nests
- Turkey nests, mud sumps and excavations will be fenced off until the sump and turkey nests are dry and toxicity testing has been completed. Testing will determine whether the solids in the sump and or turkey nests will be reburied on site, or remediated on or off site.

Final rehabilitation actions will commence at either well site if the well is abandoned.

Final Actions:

- Imported fill for well sites removed.
- Removal of all above ground structures
- Cleared areas re-contoured into the surrounding landform to approximate pre-existing contours with original soil and to a stable physical state. If the well site is located on a dune, the dune will require reshaping upon rehabilitation.
- Lightly scarify compacted soils following the removal of imported fill if required (i.e. ground noticeably firmer, or vegetation fails to re-establish).
- Top soil stock piles provide a source of seed and biological carbon which will be placed over the well sites and campsites with vegetation material.

These actions will be completed within 3 months of completion of the well abandonment subject to weather, ground conditions and contractor/equipment availability.

Rehabilitation is expected to take up to 3 weeks to complete for each well site.

If the wet season will prevent rehabilitation works, the top soil and vegetation will be re-spread and/or temporary bunding, whoa boys and check banks may be installed to reduce the risk of top soil loss and sediment laden runoff.

7.2 Rehabilitation Monitoring

Rehabilitation will be monitored as outlined in Table 7-1. Criteria to measure longer term success of rehabilitation are outlined in Table 7-2.

PFC will undertake annual monitoring of the progress of the rehabilitation until completion criteria are reached.

PFC has made a number of commitments in the EMPs to ensure that environmental management strategies are met.

7.3 Rehabilitation Reporting

A Rehabilitation Completion Report will be supplied to the DoR following rehabilitation, listing the areas disturbed by the project, areas rehabilitated and confirmation of meeting rehabilitation criteria.

Table 7-1: Rehabilitation Monitoring Schedule

Monitoring Period	Factors Assessed/Activities	Reason	Timing
Abandonment	Infrastructure remaining Rubbish Contamination	Identify whether rehabilitation earthworks can commence	Within 3 months of well abandonment, weather / wet season permitting
On completion of rehabilitation earthworks	Landform profile Surface finish Scarify	Assess quality of earthworks prior to pulling in edge soil and vegetation, and completing the rehabilitation process	Within 3 months of rehabilitation earthworks, weather / wet season permitting
After first wet season	Erosion Plant germination Bare areas Weeds	Assess early success of rehabilitation and identify issues to be remediated prior to full vegetation establishment (such as erosion or weed infestations) Assess need for additional monitoring	Within 3 months into the next dry season

Table 7-2: Long Term Completion Criteria

Factor	Criteria highly dependent on weather and rainfall history	Timing
Area Stability	No erosion present and no blocking/diversion of water flow.	Within 1 year of rehabilitation and demonstrated stability after a significant rain event or wet season
Vegetation characteristics	Vegetation re-growth species similar to those in the surrounding area	Within 3 years (noting that some species are more suited to growing/re-establishing in disturbed areas)
Percentage of ground cover	Percentage of ground cover increasing over time and similar to that of the surrounding area	Within 3 years of rehabilitation
No new noxious weeds	No new noxious weeds present on the well site or surrounding area	Within 1 year of rehabilitation