ENVIRONMENTAL ASSESSMENT REPORT

For

AUSTRALIAN RENEWABLE FUELS PICTON PTY LTD

May 2006

GLOSSARY OF TERMS/ ACRONYMNS

ARF	Australian Renewable Fuels Pty Ltd
AS	Australian Standards
ASTM	American Society for Testing Materials Standards
bar	unit of pressure measured by a barometer
CEN	European Committee for Standardisation
cfm	cubic feet per minute
CO	Carbon Monoxide
CO_2	Carbon Dioxide
Decantation	a process for the separation of mixtures, carefully pouring a solution from a container, leaving the precipitate (sediments) in the bottom
DoCEP	Department of Consumer and Employment Protection
DoE	Department of Environment
DMA	Decision Making Authority
Ester	a product of the reaction of an acid (usually organic) and an alcohol
Esterification	a chemical reaction in which two chemicals (typically an alcohol and an acid) form an ester as the reaction product
FAME	Fatty Acid Methyl Ester
FFA	Free Fatty Acid
Inert	not readily reactive with other elements; in a stable state
kg	kilograms
kL	kilolitres
KOH	Potassium Hydroxide
$L_{A\ max}$	an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time, pursuant to the EP (Noise) Regulations 1997
$L_{A\ Slow}$	the reading in decibels (dB) obtained using the "A" frequency-weighting characteristic and the "S" time-weighting characteristic as specified in AS1259.1-1990 with sound level measuring equipment that complies with the requirements of Schedule 4, pursuant to the EP (Noise) Regulations 1997
mm	millimetres
MW	megawatt (1 megawatt equals 1,000,000 watts)

NEPM	National Environmental Protection Measure
LGA	Local Government Authority
LPG	Liquefied Petroleum Gas
RIWI	Rights in Water and Irrigation Act 1914
SO_2	Sulphur Dioxide
Tallow	rendered beef or mutton fat, which was originally suet
Transesterification	the process of exchanging the alkoxy group of an ester compound by another alcohol
Triglyceride	containing 7-13% glycerine

LICENCE NUMBER: 8098/1
LICENCE FILE NUMBER: L15/02
APPLICATION DATE: 13/03/06
EXPIRY DATE: To be announced

PREMISES DETAILS

OCCUPIER

Australian Renewable Fuels Picton Pty Ltd
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PICTON WA 6229
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PREMISES

Australian Renewable Fuels Picton Pty Ltd
Lot 2009 on Plan 43721
Giorgi Road
PICTON WA 6229

PRESCRIBED PREMISES CATEGORY

Table 1. Prescribed Premises Category from Schedule 1 of the *Environmental Protection Regulations 1987*

Category number	Description	Production or Design Capacity	Nominated Rate of Throughput	Throughput Classification*
31	Chemical Manufacturing	(maximum plant capacity) 40,000 tonnes per year	(actual/ current) 40,000 tonnes per year	100 tonnes or more per year

* From Schedule 4 of the *Environmental Protection Regulations 1987*

This Environmental Assessment Report (EAR) has been drafted for the purposes of detailing information on the management and mitigation of emissions and discharges from the prescribed premises. The objective of the EAR is to provide a risk assessment of emissions and discharges, and information on the management of other activities occurring onsite that are not related to the control of emissions and discharges from the prescribed premises activity. It is important to note that the licence/ works approval is not a mechanism to regulate those activities that occur onsite that are not related to the prescribed premises activity.

Basis of Assessment

Category 31 is described as: -
"Chemical Manufacturing: premises (other than premises within category 32) on which chemical products are manufactured by a chemical process:"

ARF Limited will utilise a chemical process called 'transesterification', whereby a diesel–equivalent fuel is derived from a biological, triglyceride source (i.e. tallow and vegetable oils). Transesterification turns oils into esters (i.e. the combustible biodiesel), and separates the esters from the glycerine. The denser glycerine sinks to the bottom of the process vessel while the biodiesel floats on top, facilitating separation.

ARF Limited has a feedstock (tallow) supply agreement with Gardner Smith, Australia's market leader for the delivery and storage of fats. This material will be processed to produce biodiesel and two by-products (co-products) in the form of raw glycerine and sulphate of potash fertiliser (in paste form). The operation will produce 44.4 million litres of finished product (i.e. biodiesel) per annum, including 4,000 tonnes of raw glycerine and 1,200 tonnes of sulphate of potash per annum as by-products.

1.0 BACKGROUND

1.1 GENERAL COMPANY DESCRIPTION

Australian Renewable Fuels Pty Ltd (ARF) is a 100% owned subsidiary of American parent company Amadeus Energy Limited. Founded in 2001, ARF has entered into an agreement with a European technology provider to allow the company to hold technology licences for the production of a commercially renewable alternative to petroleum diesel (marketed as "biodiesel" in Europe and the USA). ARF is currently developing two major biodiesel plants within Australia, one in Largs Bay, South Australia and the other in Picton, Western Australia. The Largs Bay plant environmental assessment is complete and a licence has been issued. The environmental performance of this plant could be considered similar to the Picton plant.

In January 2002, the company proposed to construct a plant facility enabling the production of fatty acid methyl ester (FAME – or biodiesel) in the north west corner of Lot 49, Giorgi Road, Picton, Western Australia. The technology to be used is the proven Energea process, currently operating in Austria. ARF has an exclusivity agreement with Energea for the use of the technology in the Australian region, including manufacturing rights.

The site has been assessed under Part V of the *Environmental Protection Act 1986* (EP Act). A works approval was issued for construction of the site on 9 April 2002, subject to conditions. A Qualitative Risk Assessment was submitted to the DoE on 1 July 2002 by Combined Team Services.

Completion of the facility was delayed for an extended period of time due to inappropriate commercial conditions, and subsequent media speculation (in August 2003) fuelled debate that the company had shelved its' project in Picton. However, this was not the case and the expiring works approval was re-issued on 18 July 2005 for a period of one year. A compliance certificate for construction of the facility was submitted and approved by the DoE on 3 March 2006, authorising the commencement of commissioning. An "Application for Licence" was submitted to the Department on 13 March 2006. The above-mentioned documents will be assessed under Part V of the EP Act, with this report detailing the assessment.

1.2 BUSINESS PURPOSE

ARF will provide the first plant in Australia for the production of a commercially renewable, direct alternative to petroleum diesel at Largs Bay, South Australia. The second plant, of identical design, will be commissioned at Picton, Western Australia. Initial production capacity at the Picton facility is estimated to be 45 million litres of biodiesel per annum, with intent to sell into both the established European market and the emerging Australian market.

ARF's vision is to become "the pre-eminent biodiesel producer by managing a planned rollout of biodiesel plants within Australia". The company has an exclusive five-year contract with Godiver, a European trading house, allowing the option to sell up to 120,000 tonnes per annum of biodiesel (about 135 million litres). The Godiver contract will provide ARF with some security of sales from commencement of production. However, once production has commenced, ARF plans to quickly develop the Australian biodiesel market.

The Australian and New Zealand Standard Industrial Classification for this site is:

Division C – Manufacturing
Subdivision 25 – Petroleum, Coal, Chemical and Associated Product Manufacturing
254 – Other Chemical Manufacturing

1.2 LOCATION OF PREMISES

ARF's Picton site is located on Giorgi Road, bordering the City of Bunbury, in the Shire of Dardanup, South West of Western Australia (see Appendix A).

The legal land description of the original site issued in the first works approval was the "north west corner of AA Lot 49 fronting Giorgi Road, Picton, Western Australia". The proponent has since sub-divided this area of land, including a re-zoning by the Shire of Dardanup, pursuant to the local planning scheme. The legal land description of the property is currently Lot 2009 on Plan 43721.

The facility is located in the Enterprise Park industrial area (a general industrial zoned development area) on the outskirts of Bunbury. Enterprise Park is approximately 50%

tenanted, with two petroleum storage facilities, a heavy haulage and earthmoving contractor, a limestone brick manufacturing facility and several other service facilities already established, which attract considerable vehicular traffic to the area. The nearest residential neighbours are approximately 1.5 kilometres distant from the facility.

There is a large area of undeveloped farmland along the northern boundary of the property that has been zoned within the Preston Industrial Park (eg. Lots 4, 42 – 45 on Plan 232805). These lots have been zoned 'light industrial', pursuant to the City of Bunbury town planning scheme.

The property is not in a Public Drinking Water Source Area (PDWS) and no Environmental Protection Policies apply in the area.

1.3 PLANT AND PROCESS DESCRIPTION

The Picton plant is quite small by fuel production facility standards. The process facilities and storage occupy less than one hectare, and the processes involved are similar to those at an edible oil factory. Within the process plant the maximum pressure is less than 10 bar, the maximum temperature less than 80 degrees Celsius and most process pipelines are in the range 25 to 50mm in diameter. The overall process is carried out within completely sealed reactors, and all tank storage is under an inert (nitrogen) gas atmosphere.

To be marketed commercially as fuel biodiesel must meet the ASTM Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels (D6751-02). The production process will be based on the esterification and transesterification of recycled vegetable oils and animal fats (tallow), to produce fatty acid methyl esters ("FAME") – a renewable alternative to diesel fuel. It will also produce raw glycerine and sulphate of potash fertiliser as by-products. The chemistry of the proposed process is well known and overseas technologies utilising this chemistry are proven within the industry, having been in use for more than ten years.

The Picton and Largs Bay plants will be direct copies of a plant presently in operation at Zisterdorf, Austria. With the Largs Bay plant now commissioned, its initial operating performance will act as a test case for the Picton plant, allowing lessons learnt to be applied to the Picton plant.

1.3.1 Process Overview

The biodiesel process is called transesterification. Alcohol (typically methanol because of low-cost simplicity of the chemical process) is used to react with vegetable or animal oil in the presence of a caustic catalyst (sulphuric acid, H_2SO_4). The caustic catalyst causes the methanol to react with the oil forming glycerine and crude biodiesel. Approximately 90% of the input oil is converted into combustible biodiesel fuel. The products are then processed further ("chemically washed") to remove excess methanol and unreacted catalyst, which

will be reused. The main byproduct/ co-product of the process is glycerine, which will be re-used as a fuel for the process.

100% of the tallow input is converted to biodiesel and glycerine. The introduction of reagents (i.e. methanol and sodium hydroxide) causes the production of sulphate of potash - in affect, 105% output is achieved in relation to tallow input.

1.4 REGULATORY CONTEXT

1.4.1 Part V Environmental Protection Act 1986, Environmental Management

This facility has been assessed as a "prescribed premises" Category number 31: Chemical manufacturing, under Schedule 1 of the *Environmental Protection Regulations 1987*. Works approval number 3596 was issued by the DoE on 9 April 2002 for the construction of the ARF Plant, and renewed on 18 July 2005 for a period of one year. Construction is currently in the final stages, and before operation can take place a licence must be issued, which this environmental assessment is the precursor to.

1.4.2 Department of Consumer and Employment Protection

The storage, handling and containment of chemicals stored on site is regulated by the Department of Consumer and Employment Protection (DoCEP) under the *Explosives and Dangerous Goods Act 1961*. ARF currently hold a "Dangerous Goods Storage Licence" (DGS020403), which expires on 24 January 2007.

2.0 PRIMARY IMPACTS FROM EMISSIONS

SUBMISSIONS RECEIVED DURING 21 DAY PUBLIC COMMENT PERIOD

The Application for Licence details for this facility were advertised in the West Australian newspaper on 27 March 2006, as a means of advising stakeholders and to seek public comments. No submissions were received.

ARF Limited consulted two businesses in closest proximity to the facility on the proposed operation. Green Recycling and Leschenault Excavations Pty Ltd were consulted on 28 February and 3 March 2006, respectively. Both expressed interest and support of the proposed operations with no objections, with both offering future support and cooperation. The Shire of Dardanup and Bunbury City Council were consulted on 1 and 2 March 2006, respectively. Both expressed full support and approval.

3.0 EMISSIONS AND DISCHARGES ASSESSMENT

The DoE considers that conditions should focus on regulating emissions and discharges of significance. Where appropriate, emissions and discharges that are not significant should be managed and regulated by other legislative tools or management mechanisms.

3.1 AIR EMISSIONS

The operational process is designed to produce negligible air emissions, however discharge of the following two substances from the process have been assessed:

- Oxides of nitrogen from the 1MW gas powered steam boiler; and
- Methanol in non-condensable discharge from plant vacuum machines and plant upsets.

Oxides of nitrogen from the 1MW boiler: The project has a 1MW boiler that will be fuelled by natural gas (LPG). As a product of in-complete combustion of fuel, low concentrations of NO_x will be produced and present within the flue gas. ARF also propose to utilise glycerine co-product to supplement LPG as a boiler fuel during production – this may produce unknown concentrations of NO_x due to inefficient volatilisation of compounds.

Process steam will be produced from the boiler continuously as the plant will operate 24 hours a day, 7 days a week. The boiler will operate on an unattended basis and no management of emissions has been outlined. No predicted NO_x emissions have been supplied for the Picton plant, however the Largs Bay (identical design but larger boiler capacity of 3MW) plant has predicted by modelling using AUSPLUME the maximum ground level concentration of nitrogen dioxide (NO_2) in the immediate vicinity of the plant to be 0.0227 mg/m^3 (1 hour average). Standards for nitrogen dioxide in Western Australia are contained in the NEPM for Ambient Air Quality (NEPC 1998), shown in table 2.

Table 2. Nitrogen dioxide standards in the NEPM for Ambient Air Quality.

Nitrogen dioxide concentration	Averaging time	Maximum allowable exceedences
0.12 ppm (≈ 0.246 mg/m^3)	1 hour	1 day per year
0.03 ppm (≈ 0.062 mg/m^3)	1 year	none

The predicted ground level concentration of NO_2 for Largs Bay is well below the concentration outlined in the NEPM for Ambient Air Quality. However, the Picton plant will be using glycerine as a fuel, which may produce different concentrations. The boiler specifications under both LPG and glycerine fuel scenarios, supplied by the manufacturer (Thermic Industries) are shown in table 3.

Table 3. Manufacturer specifications for predicted flue gas emissions from a 1MW Thermic Industries W300 steam boiler, per fuel type.

Substance	Boiler Fuel (concentration of emission per hour)	
	Glycerine	LPG
O_2	3%	5.2%
CO_2	18%	9.5%
H_2O	13%	-
CO	<50 ppm	<50 ppm
NO_X	<30 ppm	<30 ppm
SO_X	Not detectable	Not detectable

Table 3 indicates double the NEPM concentration of NO_x from both fuel types when measured at the source. However, it is necessary to gather 'real' ground level modelling data for the use of glycerine as a fuel, in order to compare with the NEPM standards (outlined in table 3). This will be addressed through the imposition of licence conditions, requiring the installation of a stack monitoring port on the boiler. After the plant has achieved a stable operation status, the abovementioned sampling port will be used to produce a spatial NO_x model in order to justify a low/ minimal likelihood of environmental impact from the use of glycerine as a boiler fuel.

Methanol emissions (normal operations) Methanol is used widely throughout the process to react with the vegetable oil and tallow, forming glycerine and crude biodiesel. During normal operations the plant vacuum machines and the process drains will discharge methanol to two dedicated stacks.

No predicted methanol emissions have been supplied for the Picton plant, however the manufacturers of the biodiesel plant (Energea) have advised that plant methanol losses for the identical Largs Bay plant are:

- 5kg/hr (1.3889g/sec) from the vacuum units under normal operating conditions; and
- 2.5kg/hr (0.6944g/sec) from a separate drain vent (north vent)

There are no standards for methanol vapour in Western Australia, however guideline concentrations for South Australia are contained in the SA EPA guideline document 386/03, as shown in table 4.

Table 4. Methanol standards in the SA EPA guideline for Ambient Air Quality.

Reason for classification	Averaging time	Design criteria (mg/m^3)
Odour	3-minute	5.5
Toxicity	3-minute	8.7

The predicted ground level concentration of NO_2 for Largs Bay is well below the concentration outlined in the NEPM for Ambient Air Quality.

Methanol emissions (emergency release) There exists a slight possibility of failure of a rupture disc (see "over pressure protection vent emissions" section). Depending on the part of the plant where such a failure occurs, the pressure release would discharge via the enclosed drain to a $10m^3$ tank and then to an 18.5m drain stack. Upon failure of a rupture disc, the plant will automatically shut down. The maximum time of discharge from the drain relief stack would be 10 seconds.

The results from a model of the normal methanol emissions combined with the emergency release emissions of the Largs Bay plant indicate a maximum ground level concentration of 3.81 mg/m^3 methanol (3 minute average) about 300 m from the plant. This is below the SA EPA 386/03 design ground level concentration of 5.5 mg/m^3.

Over pressure protection emissions Four stacks at an elevation of 18.5m from the plant function as release vents to prevent overpressurisation. The function and composition of these vents are presented in table 5.

Table 5. Composition and function of the four vents from the process.

Vent location	Composition	Function	Flow Rate (kg/hr)	Duration (sec)	Release (kg)	Temp (°C)
North	Nitrogen-dry	Purge from biodiesel plant	2	Continuous	2kg/hr	8
2	Methanol vapour	Over pressure protection device	2389	2	1.327	67
3	Water vapour; trace methanol	Over pressure protection device	158	2	0.088	113
South	Nitrogen - dry	Over pressure protection device	1	2	0.001	17

Vents 2, 3 and South are over-pressure protection devices that operate as a second line of defence against the failure of the normal process control instrumentation. The North vent operates as a continuous purge of nitrogen at concentrations well below natural ambient concentrations. Table 5 illustrates the composition of each vent and the quantity to be released, if the device were to be activated.

3.1.1 Air Emissions Risk Assessment

From the limited data provided, the concentration of NO_x from the Largs Bay plant boiler (LPG fuel source) indicate a low environmental significance in comparison to the NEPM guideline concentrations for NO_x in Western Australia. However, the potential use of

glycerine as an alternate boiler fuel and the lack of NO_x modelling data from the Picton plant and real monitoring data from any similar plant mean that a conservative approach should be taken. This may include a plume dispersion model for NO_x emissions from the boiler during normal operations, for comparison with the standards outlined in the NEPM for Ambient Air Quality.

Standard air emission limits and targets for non-organic compounds in Western Australia are limited. The air quality guidelines for methanol in South Australia can be used as a guide/ comparison against advised emissions from the Picton plant. The results from modelling using AUSPLUME for the normal methanol emissions combined with the emergency release emissions from the Largs Bay plant indicate average ground level concentrations to be well within the South Australian EPA guidelines. Based on this information, methanol at the Picton plant is considered to be of low environmental significance. Should a problem arise at the Largs Bay plant or the Picton plant, this conclusion may be reviewed.

Over-pressure protection vents 2, 3 and South are not active during normal operations, therefore are of no risk. There are no standards or guidelines in Australia for nitrogen emissions, however Dr Peter Rye (Senior Environmental Officer – Air Quality Management Branch) advised (personal comment) that the rate of continuous purge from the North vent (2kg/hr) is well below natural ambient air concentrations and is highly insignificant.

In general, there will be no venting of greenhouse gas emissions from biodiesel storage tanks, as the biodiesel will be stored under a positive pressure. There are no smoke emissions from normal operations.

3.1.2 Recommended Strategy for Managing Air Emissions

Initial monitoring of NO_x emissions from the boiler stack will be required in order to validate that emissions are of low significance. As there has been no air emission modelling for predicted ground level NO_x concentrations from the boiler, licence conditions will require the installation of a sampling port on the boiler, allowing a plume dispersion model to be created after achieving stable operations. Methanol emissions under normal operating conditions are of low significance and do not require reference in the licence.

3.2 ODOUR EMISSIONS

The plant has been designed to reduce odour during unloading of unprocessed tallow, through the use of an enclosed pipe system and sealed process vessels. A vapour space tank will be connected to the delivery tanker by a sealed pipe during tanker discharge and any air/ vapour displaced from the tank during filling will be captured in the tanker. Liquip AP1555 couplers and vapour couplers are to be used.

No odour problems are expected during re-loading as the smell of the processed biodiesel product itself, resembles that of the input used to create it (eg. canola oil input would result in the finished product resembling a "fish 'n chip" smell).

3.3 NOISE EMISSIONS

The site is required to operate in accordance with the *Environmental Protection (Noise) Regulations 1997*, which the company has as one of their stated objectives. Energea Biodiesel Technology advise limits of noise from the plant of a maximum 87 dB(A) at 1 metre from high pressure pumps and centrifuges. This level of noise is within the $L_{A\ max}$ assigned level of 90 dB for 'industrial and utility premises' under the EP (Noise) Regulations 1997.

3.4 LIGHT EMISSIONS

The design of lighting at the facility will be based on the Australian Standard for the control of obtrusive outdoor lighting (AS 4282-1997). The nearest residential property (i.e. farmhouse) is approximately 1.5 km distant from the facility; therefore the risk is insignificant.

3.5 DISCHARGE TO WATER

Direct discharge to waterways, wetlands or groundwater does not apply to this site.

3.6 DISCHARGE TO LAND

Stormwater The operational area of the site will be contained and there will be no direct discharge to land other than controlled diversion of uncontaminated storm water. Stormwater runoff is estimated to average 8,500 kL per annum.

The stormwater drains on the premises are separate from the drains for process plant spillage and liquids storage area wastes. All uncontaminated stormwater will be directed to a lined infiltration pond before overflowing to an on site wetland basin.

Wastewater Limited wastewater will be produced from the process as most of the "washing" water will be recycled (separation of lipids and esters during transesterification stages) while a portion remains in the raw glycerine. It is not intended that any process water be discharged, however a sump will be provided to catch any unforseen spillage, which will be neutralised before discharge, if necessary.

There is the potential for a relatively low quantity (< 3,000 kL/yr) of liquid discharged from the process through washdown water, which will be directed through a gross pollutant trap and an oil-water separator (see below). Spillage within the truck loading/ unloading area is returned to the process.

Oily Water The discharge of all process waters will be directed to an oil-water separator, where oil is filtered and transported off site by a licensed oil recycler (Wren Oil). Filtered water will be diverted to the dedicated infiltration wetland basin. No detergents are used in washdown water.

Other potential discharges The process utilises KOH (Potassium Hydroxide) Bulka Bags that are washed after use, with all contaminated water returned to the process, presenting a very low risk of contamination.

3.6.1 Discharge to Land Risk Assessment

The production facility has been designed so that all stormwater run off and filtered/ treated process water will initially collect in the lined pond before discharge into the dedicated infiltration wetland basin that has the capacity to hold 1 in 100 year storm level for 72 hour duration. This pond will act as a contingency, in the event of a major contamination or spillage from the process area. The design of the plant presents minimal risk of contamination to ground and stormwater during normal operations.

Stormwater and associated wastewater that collects in the bunded areas, including oily process water, will be directed to the oil-water separator before discharge to the lined pond, to eliminate any risk of contamination.

3.6.2 Recommended Strategy for Managing Discharge to Land

The issue of discharge to land does not require regulation, as this does not occur from normal operations.

3.7 SOLID/ LIQUID WASTE DISCHARGES

There are no solid or liquid wastes produced from the process. The only wastes associated with this site are related to human and office waste.

3.7.1 Solid/ Liquid Waste Discharges Risk Assessment

Human wastes will be managed by Icon-Septech Turbojet wastewater treatment. This system utilises biological processes to produce crystal clear water from wastewater. For more information, visit www.icon-septech.com.au. Office waste will be recycled and all non-recyclables will disposed of offsite.

3.7.2 Recommended Strategy for Managing Solid/ Liquid Waste

The issue of solid/ liquid waste does not require regulation, as the environmental impact is insignificant.

3.8 FUEL STORAGE

The ARF facility requires bulk storage of the following raw materials and products:

Table 6. Storage of Reagents and Products at Giorgi Road, Picton

Reagent	Description	Quantity (tonnes)	HG Class
Lipids	Animal and Vegetable Fats & Oils in liquid state. Held in two 600m^3 totally enclosed tanks with an inert atmosphere	1200	
Potassium Hydroxide (KOH)	Flake form (1 tonne Bulka Bags)	70	HG Corrosive
Methanol (CH_3OH)	Liquid form, held in totally enclosed vessel with inert atmosphere	100	HG Flammable
Sulphuric Acid (H_2SO_4)	Liquid form, 98% concentrate	60	HG Corrosive
Natural Gas	Reticulated around the property using Alinta Gas mains supply		
Hot water/ saturated steam	Produced from on-site 1MW capacity, unmanned, gas fired boiler		
Nitrogen Manpacks	Liquid Nitrogen in 12 bottle manpacks		
Biodiesel	C2 Class combustible, held in totally enclosed tank with an inert atmosphere	1200	
Raw Glycerine	Semi-solid gel form	120	
Potassium Sulphate (K_2SO_4)	Semi-solid paste	70	

3.8.1 Fuel Storage Risk Assessment

Due to the nature of the stored chemicals, there is the potential for off-site risks such as:

- spillage or leakage from a container being transported to/ from the site;
- spillage or leakage from a container or pressurised pipeline on site;
- fire or explosion on site; and
- power failure.

A dangerous goods licence covers all reagents/ chemicals utilised in the process. The facility will comply with DoCEP's requirements for storage and handling of Dangerous Goods. The on site storage of chemicals will present a negligible risk.

3.8.2 Recommended Strategy for Managing Fuel/ Chemicals

The issue of fuel/chemical storage does not require regulation, as the environmental impact is better managed under DoCEP's Dangerous Goods Act.

4.0 ENVIRONMENTAL RISK ASSESSMENT

Using the preceding information and the environmental risk assessment table given in Appendix B, an overall risk assessment can be summarised as outlined in table 7.

Table 7. *Risk Assessment / Management Response Summary Table for Licence.*

Risk factor	Likelihood	Ecological Impact Consequence	Community / Human Impact Consequence	Management Response	Perceived community risk
Gaseous emissions	D not likely	III moderate or small impact	IV small	Y licence conditions (monitoring)	Low
Dust emissions	D not likely	V no impact	V very small	Z Nil	Low
Odour emissions	D not likely	V no impact	V very small	Z Nil	Low
Noise emissions	D not likely	IV little impact	V very small	Z Regs	Low
Light emissions	D not likely	V no impact	V very small	Z Nil	Low
Surface Water discharges	D not likely	III small	IV small	Z Nil	Low
Ground Water discharges	D not likely	III small	IV small	Z Nil	Low
Solid Wastes	D not likely	IV little impact	IV small	Z Nil	Low

Note 1. For "perceived community risk", a subjective low, medium or high rating is given. This is not directly used in calculating the management response level, but will affect the final detail (eg licence condition wording) within that management response level.

Note 2. The terminology, likelihood, ecological and human impact consequences rating, and the recommended management response, were determined using the "Environmental Risk Assessment" process given in Appendix C. This combines a "likelihood" rating with the highest of either an "Ecological Impact Consequence" or a "Community /Human Impact Consequence" to compile a reduction matrix, which contains the recommended management response. This process was run for each of the above risk factors.

Note 3. The community risk assessment is based on complaint history, but also reflects informal direct and indirect comments and concerns received by the Department and experience at other mineral sands operations using the number and types of complaints as indicators.

IMPORTANT NOTE: The impact risk assessment relates to the risk of impact off the licensed premises, that is, it assesses what is likely to cross the lease boundary. It does not relate to on-site worker health and welfare issues.

4.1 Recommended Strategy for Managing Risks

In summary, the renewable fuels facility to be constructed will present negligible risk to personnel, property or the environment. The facility is a copy of tried and tested facilities elsewhere in the world, where no adverse outcomes have been experienced.

5.0 GENERAL SUMMARY AND COMMENTS

ARF Limited is constructing a renewable fuels facility in Picton, Western Australia – the first of its kind in this state. The processing facility, the ARF Plant, requires licensing as it meets the prescribed activity requirements for Category 31 under the *Environmental Protection Regulations 1987*.

All emissions from the facility have been assessed as being insignificant or are suitably managed through design and operational parameters. This premises has been classified as "low priority" in accordance with the DoE's Licensing Priority management Framework and as such, will be issued for a period of five years.

The plant's only major emission (air emissions from the boiler) has been assessed as being of low environmental risk. Nonetheless, a conservative approach, including lack of experience with this process in Australia, dictates some initial reference in the licence. This could relate to monitoring and modelling of NO_x emissions once the plant is operational.

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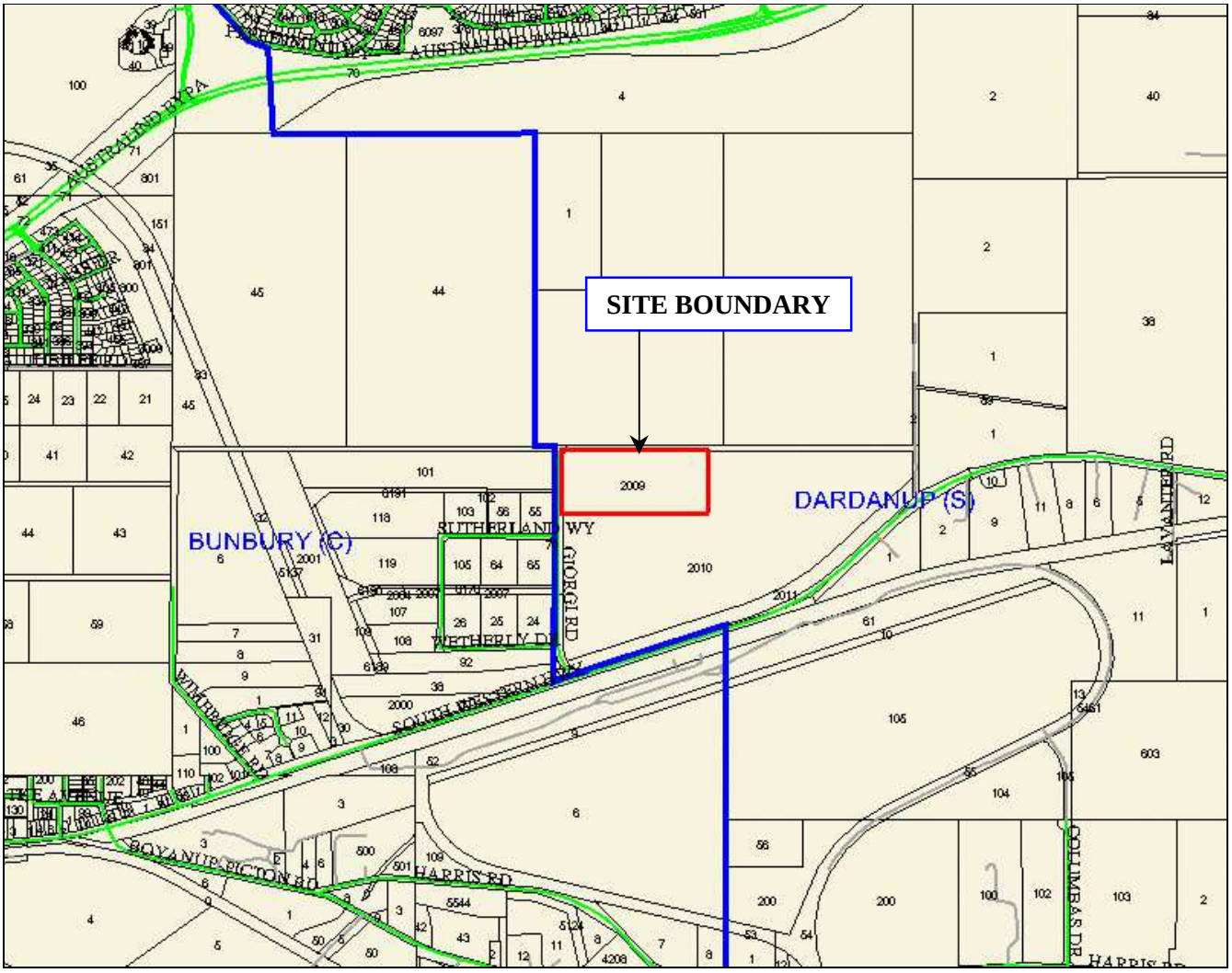
APPENDIX A – Site Location

Figure 1. Site location of ARF Limited, Giorgi Road, Picton.



APPENDIX A – Site Diagram

Figure 2. Site diagram of ARF Limited, Giorgi Road, Picton.

APPENDIX B - Environmental Risk Assessment Table

Risk Table 1: *Likelihood*

Category	Likelihood
A	Repeated (>once per year), continuous
B	intermittent (once in 1 to 10 years)
C	Rarely (once in 10 to 100 years)
D	Not likely to reoccur (once off)
E	Not previously occurred, unforeseen

Risk Table 2: *Ecological Impact Consequence*

Category	Impact	Examples / pointers
I	Major/large impact or long duration	large fish kill on Augustus River Large scale destruction of flora/fauna discovery of cluster of birth deformities
II	serious or significant impact large area	causing $10,000 damage/death of an endangered species complete obliteration of wetland/ direct spill into watercourse toxic air cloud leaves site
III	moderate or small impact or short duration or small area	> 1 Ha of vegetation suffers leaf burn small process/caustic spill into off site forest
IV	little or unknown impact	< 1 Ha of vegetation exhibits leaf burn non-toxic dust leaving Premises Process/caustic spill contained on Premises
V	no impact	Odour/ gaseous emissions on flora

Risk Table 3: *Community/Human Impact Consequence*

Category	Impact	Examples / pointers
I	Major/large	Public health symptom concern causing evacuation person suffering acute symptoms requiring hospitalisation discovery of cluster of birth deformities
II	serious or significant	Many residents report same symptoms over extended period causing $10,000 damage stay inside direction, DMAC initiation
III	moderate	More than 2 residents report same symptoms over short term unreasonable impact on amenity (cant stay outdoors) noise wakes more than 2 persons from sleep.
IV	small	Noise/odour wakes 1/2 persons from sleep.
V	very small or none	Noise/ odour event reported long afterwards member of public diagnosed with Multiple Chemical Sensitivity

Risk Table 4: *Environmental Risk Reduction Priority Matrix*

Consequence	Likelihood				
	A	B	C	D	E
I	w	w	w	x	z
II	w	x	x	y	z
III	x	x	y	z	z
IV	y	y	z	z	z
V	y	y	z	z	z

Risk Table 5: *Priority Matrix Action Descriptors*

Descriptor	Action	Examples / pointers
w	licence condition	setting limits and EMP - short timeframes
x	licence condition	setting targets and EMP - longer timeframes
y	licence condition	monitoring/reporting, EIP
z	EIP, other management mechanisms	

DMAC = District Emergency Management Committee
EMP = Environmental Management Plan
EIP = Environmental Improvement Plan