TRANSFIELD SERVICES KEMERTON PTY LTD

KEMERTON POWER STATION ENHANCEMENT PROJECT

ENVIRONMENTAL APPROVAL SUPPORTING DOCUMENTATION

VERSION 4

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REPORT NO: 2006/259

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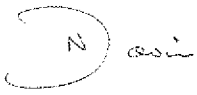
Reviewed by:	Signed:		Date:	22 May 2007
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EXECUTIVE SUMMARY

Project Outline

Transfield Kemerton Services Pty Ltd (TSK) propose to retrofit a wet compression system to the existing Kemerton Power Station (KPS). The installation of the wet compression system will allow TSK to offer Verve Energy increased power station capacity at ambient temperatures.

The proposed changes are can be summarised as follows:

- Installation of a wet compression skid and associated infrastructure at the existing power station site to optimise the performance of the power station during hot weather conditions;
- Establishment of a 4km water pipeline to allow the delivery of fresh water to the power station for use in the wet compression circuit;
- Installation of a demineralised water treatment plant;
- Installation of a 1ML demineralised water storage tank; and
- Construction of two 1.5mm High Density Polyethylene (HDPE) lined evaporation ponds within the power station site boundary. The combined capacity of the two ponds is 20.8ML.

The proposed modifications will result in a number of net environmental benefits as detailed in Section 6 of this report. Primarily, given that there will be no increase in the amount of fuel consumed on an annual basis from that already approved, the proposed modification will permit a greater amount of power to be generated, effectively reducing the greenhouse intensity of the power station by 19%. The current greenhouse intensity of the KPS is 668 tonnes of CO_2-e/MWh, which will be reduced to 539 tonnes of CO_2-e/MWh following the installation of the proposed wet compression system.

Additionally, the incorporation of wet compression will increase the overall plant generation capacity without increasing emission concentrations of key pollutants such as oxides of nitrogen (NOx).

The modification therefore allows the provision of additional energy to retailers by optimisation of an existing power generation asset that is designed to industry best practice standards with minimal emissions.

The key characteristics of the Kemerton Power Station Enhancement Project are presented in Table A1 below.

TABLE A1
KEMERTON POWER STATION KEY PROJECT CHARACTERISTICS

	2003 Original Proposal		2006 Wet Compression	
Unit	**Gas**	**Liquid Fuel**	**Gas**	**Liquid Fuel**
Project purpose	Provide peaking power to the SWIS		No change	
Project life	25 years		No change	
Power per unit [MW]	159 *131*[1]	146 *119*[1]	173 *150*[1]	165 *136*[1]
Power generating capacity [GWh/yr]	*240* GWh[1]		345 GWh *297* GWh[1]	
Plant operating modes	Mode 1 - Peaking plant for 5% of the time at 100% load Mode 2 - Spinning reserve for 10% of the time at 55% load		No change	
Operating hours	Approximately 1000 hours per year (10% liquid fuel)		Approximately 1000 hours per year (10% liquid fuel)	
Estimated capacity factor	Approximately 10%		Approximately 10%	
Facility footprint Site area including buffer Water Pipeline Corridor	2 hectares 28 hectares 0 hectares		No change No change 6 hectares	
Plant facilities				
Proposed technology Number of stacks Height of stacks Stack Diameter Number of liquid fuel storage tanks Demineralised Water Tank Water Treatment Wastewater disposal	2 x Siemens V94.2 gas turbine generators 2 35m 5.5m 1 x 2 ML tank N/A N/A N/A		No change No change No change No change No change 1 ML Water Treatment Plant 2 x lined evaporation ponds (20.8ML capacity	
Construction Period	Completed		April 2007 – October 2007	
INPUTS				
Cooling water	None		27 ML/yr sourced from Stirling Dam	
General water requirements	20kL/day - For dust suppression during construction 5kL/yr – For domestic use		5kL/day - For dust suppression during pipeline construction No change	
Natural gas	Approximately 3PJ per year taken from the Dampier to Bunbury Natural Gas Pipeline		Approximately 3PJ per year taken from the Dampier to Bunbury Natural Gas Pipeline	
Liquid fuel (Backup)	Up to 6 ML per year ultra low sulphur diesel Sulphur content of diesel – 50ppm maximum		As needed subject to gas availability.	
OUTPUTS				
Wastewater	None		RO concentrate directed to lined evaporation ponds (up to 5.4 ML).	
Predicted noise level	<28 dB(A) at closest residences		No change	
Solid waste	<10 tpa		No change	

	2003 Original Proposal		2006 Wet Compression	
Unit	**Gas**	**Liquid Fuel**	**Gas**	**Liquid Fuel**
AIR EMISSIONS				
Mass flow[1] [kg/s]	531 *455*	531 *473*	546 *472*	546 *488*
Exit volume (wet, Actual) [1] [m³/s]	1,229 *1,078*	1,181 *1,088*	1,278 *1,122*	1,228 *1,134*
Exit temperature[1] [°C]	538 *568*	517 *537*	538 *561*	517 *537*
Plume Bouyancy [m^4/s^3]	2,471 *2,320*	2,341 *2,187*	2,571 *2,402*	2,435 *2,278*
NOx exit concentration[1] [ppmv @ 15% O_2]	20.1 *20.1*	62.9 *62.9*	16.1 *16.1*	50.3 *50.3*
NOx emission rate [g/s]	15.8 *11.9*	47.3 *41.4*	14.2 *11.0*	45.3 *39.7*
CO exit concentration[1] [ppmv @ 15% O_2]	<25 *<25*	<25 *<25*	<10 *<10*	<10 *<10*
SO_2 Emission rate [g/s]	Negligible	1 *1*	Negligible	1 *1*
Particulates [ppmv @ 15% O_2]	Negligible	Negligible	Negligible	Negligible
Polycyclic aromatic hydrocarbons (PAHs) [ppmv @ 15% O_2]	Negligible	Negligible	Negligible	Negligible
Non-methane volatile organic compounds (NMVOCs) [ppmv @ 15% O_2]	Negligible	Negligible	Negligible	Negligible
H_2O mass flow in the flue gas[1] [g/s]	23,800 *30,969*	15,600 *19,600*	36,800 *42,697*	28,400 *31,200*
O_2 mass flow in the flue gas[1] [g/s]	82,500 *68,645*	85,200 *75,200*	78,600 *65,828*	79,200 *70,100*
Greenhouse gas emissions	Approximately 160,000 tpa $CO_{2\text{-}e}$ (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)		Approximately 160,000 tpa $CO_{2\text{-}e}$ (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)	
Average greenhouse intensity	667.61 kg $CO_{2\text{-}e}$/MWhr (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)		539 kg $CO_{2\text{-}e}$/MWhr (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)	

Notes:

1. Actual values measured by Siemens during acceptance tests in October 2005 at ambient temperatures and corrected to HWM and ISO conditions. Values in *italics* are related to HWM conditions (Tamb=41ºC, R.H=40%, LHV=44.7 Mj/kg, pamb=101.3 kPa), other values refer to ISO conditions (15ºC, R.H=60%) with reference gas composition.

KPS will continue to operate as a peaking plant meeting the short durations where high demands occur. This equates to operating approximately 5% of the time when periods of high demand occur. The KPS may also operate in spinning reserve. This is when the plant is operating at very low load on gas in anticipation of the times when high demand is likely to occur. High demand occurs usually in summer when high temperature conditions give rise to high air conditioning loads.

The KPS will normally operate on natural gas. Ultra low sulphur diesel is used as a back up liquid supply.

The dual fuel capability of this plant means that either fuel type can be used alternately. If natural gas supply pressure or gas availability from the pipeline is insufficient for the power station to operate at full output the station can switch to diesel without interruption to station output.

The proposed modifications to the KPS are considered to present an overall beneficial change with reduced environmental impacts resulting from the addition of wet compression.

On this basis, TSK has implemented a targeted community consultation program commensurate with the nature, scale and predicted outcome of the proposed modifications. The program has included the following components:

- Advertising of the proposal in the local newspaper commencing during the week of 11 December 2006 (Harvey Reporter, Southwest Times and Bunbury Herald);
- Advice provided to the Kemerton Industrial Park Committee (including the Community Committee);
- Briefing of relevant officers from the Shire of Harvey;
- Liaison with plantation managers (Hansol Australia);
- Ongoing liaison with occupants of the properties traversed by the pipeline (Lot 503: Con Galati; Lot 507: LandCorp, David McFerran);
- Liaison with neighbouring resident Frank Spagnoio;
- Briefing of relevant officers from the DEC (Southwest Region Office); and
- Briefing of relevant officers of the Department of Environment and Conservation (EPA Services Unit, Perth).

The original KPS proposal that was assessed by the Environmental Protection Authority (EPA) and approved by the Minister for the Environment in 2004 was based on an air cooled plant with a maximum rated capacity of 260MW at Hot Weather Maximum (HWM). The proposed modifications represent a change to the operating regime that was assessed and therefore the proposed KPS Enhancement project will need to be considered by the EPA under Part IV and Part V of the *Environmental Protection Act, 1986*.

Key Environmental Factors

The key environmental factors for this project that have been assessed in this referral document are:

Biophysical

- Flora
- Fauna

Pollution Management

- Gaseous and Particulate Emissions
- Greenhouse Gas Emissions
- Surface and Groundwater Management
- Noise
- Solid and Liquid Wastes

TSK's environmental commitments are presented in Table A2.

Based on the assessment of each environmental factor, it is concluded that the Environmental Protection Authority's objectives for each factor will be achieved given the nature of the proposal, characteristics of the existing environment, proposed environmental management measures and environmental commitments proposed by TSK.

TABLE A2
PROPONENT ENVIRONMENTAL COMMITMENTS

Topic	Objective	Action	Timing	Advice
Pipeline Route	To minimise disruption to landowners and disturbance of the existing environment	The pipeline route will be as described in this report to minimise clearing of native vegetation. The pipeline will be installed below ground outside the power station site boundaries to minimise disruption to landowners. The crossing of the Wellesley River will be constructed in accordance with the requirements of the Department of Water	Throughout	The route to be approved by the EPA through the assessment process
Evaporation Ponds	To maintain the quality of surrounding surface water bodies and groundwater	The Evaporation Ponds will be constructed in accordance with relevant engineering Standards and lined with 1.5 mm HDPE. The evaporation Pond has been designed with two separate ponds to be operated on a duty/standby basis. This provides sufficient capacity so that there will be in excess of 75% of the annual input volume available to handle storm events at any time. The standby pond will be evaporated to dryness each year and all solids will be removed for off-site disposal	Throughout Prior to Works Approval Post Commissioning	The concept design for the ponds to be approved by the EPA through the assessment process The pond Design will be approved by DEC through the Works Approval process Monitored by DEC as a requirement of the site licence

Topic	Objective	Action	Timing	Advice
Water Monitoring	To monitor surface and ground water quality and identify and mitigate sources of contamination during construction and operation	The existing bore monitoring network will be maintained and monitored as per the current licence requirements	Ongoing throughout the operating licence	Monitored by DEC as a requirement of the site licence

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11. Land Access Agreement with Mr C. Galati

12. Presentation to Kemerton Industrial Park Coordinating Committee & Kemerton Community Committee (February 2007)

13. Submission Received from the Kemerton Action Group (February 2007)

ABBREVIATIONS

AHD	Australian Height Datum (height in metres above Mean Sea Level +0.026m at Fremantle
ARI	Assessment on Referral Information
AASS	Actual Acid Sulphate Soils
ASS	Acid Sulphate Soils
ASSMP	Acid Sulphate Soil Management Plan
CALM	Department of Conservation and Land Management
CCM	Cattamarra Coal Measures
CO	Carbon monoxide
CO_{2-e}	Carbon dioxide equivalent
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage
DLN	Dry low NO_x
DoE	Department of Environment (now known as the DEC)
DoW	Department of Water
DRF	Declared Rare Flora
EPA	Environmental Protection Authority
EPBC	*Environmental Protection and Biodiversity Conservation* (Act, 1999)
FCT	Floristic Community Type
GT	Gas Turbine
H_2O	Water
HDPE	High Density Polyethylene
HSE	Health Safety and Environment
HWM	Hot Weather Maximum conditions
IMO	Independent Market Operator
ISO	International Standards Organisation
KAG	Kemerton Action Group
KPS	Kemerton Power Station
LHV	Lower Heating Value
MLV	Main Line Valve
NEPM	National Environment Protection Measure
NMVOC	Non-methane volatile organic compounds
NO_x	Oxides of nitrogen
O_2	Oxygen
PAH	Polycyclic aromatic hydrocarbons
Pamb	Ambient pressure
PASS	Potentially Acid Sulphate Soils
PCBs	Polychlorinated Biphenyls
PM	Particulate matter
PPA	Power Purchase Agreement
RH	Relative humidity
RO	Reverse Osmosis
SER	Strategic Environmental Review
SO_2	Sulfur dioxide
SWIS	South West Interconnected System
Tamb	Ambient temperature
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
TSK	Transfield Services Kemerton
WA	Western Australia
WAPC	Western Australian Planning Commission

WPC	Western Power Corporation
WSUD	Water Sensitive Urban Design

UNITS

dB(A)	decibels (A-weighted)
GWh	gigawatt hours
g/s	grams per second
ha	hectare
kg	kilogram
kg/s	kilograms per second
kL/day	kilolitres per day
kL/hr	kilolitres per hour
kL/year	kilolitres per year
km	kilometre
km/hr	kilometers per hour
L/s	litres per second
ML	megalitres
ML/yr	megalitres per year
m	metre
m^2/d	square metres per day
m^3/s	cubic metres per second (volume)
mbar	millibar (pressure)
mg/L	milligrams per litre
MJ/kg	megajoules per kilogram
ML/yr	megalitres per year
mm	millimeters
MW	megawatt
MWh	megawatt hours
PJ	petajoules
ppm	parts per million
ppmv	parts per million by volume
TJ	terajoule
tpa	tonnes per annum
%	percent
ºC	degrees Celsius

1. INTRODUCTION

As a result of Western Power Corporation's (WPC) power demand forecasts, the Minister for Energy announced an Electricity Generation Strategy in June 2002 which included the requirement for the addition from 2005 of between 220-260MW of peaking capacity at Hot Weather Maximum conditions (HWM) to meet the forecasted power generation needs.

The sources of energy available in Western Australia for power generation include natural gas, coal, petroleum oil and various renewable energy sources such as wind, solar power and fuel cells. All major sources were reviewed by WPC for possible application to meet the power generation requirements. WPC considered that while renewable energy offers many options for power generation it is unlikely that the renewable options currently available could meet the scale of immediate power generation requirements (220-260MW). Therefore, for the power competitive procurement process, WPC focussed on the conventional fuels of natural gas, coal or liquid fuel.

Transfield Services Kemerton Pty Ltd, a wholly owned subsidiary of Transfield Services Limited, was selected by WPC, as part of the competitive procurement process for peak load generation on the SWIS, to construct and operate the Kemerton Power Station to assist WPC in meeting the forecasted power generation needs. Construction of the Kemerton Power Station (KPS) commenced in February 2004 and was successfully commissioned in October 2005 before commercial operation was initiated in November 2005.

The power station consists of two Siemens V94.2 gas turbine generator sets delivering a sent out capacity of 260.9 MW at HWM conditions (Hot Weather Maximum (40^{o}C , 40% Relative Humidity (RH)). The power station turbine generators are fitted with dry, low NOx burners (DLN) capable of operating on either natural gas or ultra low sulphur diesel. The power station is designed to operate in simple cycle mode (ie open cycle mode) primarily on gas with liquid fuel as back up.

The role of KPS is to provide support to the grid during rapid changes in generation such as when other generators fails, or during unusually high loads such as air-conditioning loads that occur over intense but short periods. The lower capital cost of the simple cycle provides low cost insurance. Simple cycle generators can be rapidly started and ramped to full load in minutes, compared with combined cycle plant that can take more than an hour.

1.1 Proponent Description

The Proponent for the proposed power station is Transfield Services Kemerton Pty Ltd (TSK), (ABN 69106619112) a wholly owned subsidiary of Transfield Services Limited.

Transfield Services Limited is an Australian company and has operations throughout Australia, New Zealand, USA, Middle East and other countries. Transfield Services Limited has offices in Perth and has a significant commitment to Western Australia. Twenty two percent of Transfield Services Limited's Australian workforce is located in Western Australia and operations in Western Australia form an integral part of the company.

1.1.1 Contact Details

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1.1.2 Environmental Performance Record

Transfield Services has a proven track record in maintaining a high level of environmental performance whilst operating within environmentally sensitive areas. The Townsville Power Station (TPS) is located within 5km from the Coral Sea and hence falls under the auspices of the Great Barrier Marine Park Committee. The company's environmental management of the Townsville power station has been very favourably considered by the local office of the Townsville Environmental Protection Authority, of which a key environmental philosophy is to operate under a zero process water discharge regime.

TSK's performance for the construction and commissioning phases of the Kemerton Power Station has also been of a high standard. Transfield Services won the 2006 Process and Control Engineering (PACE) Zenith Award in the Transport, Power and Infrastructure category for the Project Management of Kemerton Power Station's construction. The award recognised Transfield Services' Environmental Health and Safety management as well as the station's innovative design and control systems. TSK's first Progress and Compliance Environmental Report (ATA Environmental, 2005b) submitted to the DEC's Audit Section was commended, and is believed to have been used on occasion as an example for other reporters. Whilst ongoing monitoring and reporting to DEC is required no non-compliances were reported since approvals were originally granted.

TSK will undertake a similar management philosophy in relation to the environment for the KPS Enhancement Project. TSK confirms that it has the capability to provide all the necessary resources (human or otherwise) to implement all environmental conditions and commitments.

1.2 Project Background

During initial power procurement run by Western Power in 2000-2003, Western Power identified a need for a 220-260 MW peaking capacity at HWM conditions (40^{o}C, 40% RH). Transfield Services offered 2 Siemens Gas Turbines with ISO rating of 155 MW each to be located at the Kemerton Power Station. Gas Turbine ISO output however reduces with higher ambient temperature so at HWM conditions, the Gas Turbine load is only 130MW.

Notwithstanding, even this reduced output sufficiently covered Wester Power needs at that time.

The plant began commercial operation on 1 November 2005 on liquid fuel only due to delays in construction of gas lateral provided by a third party. In May 2006 the power station was

commissioned on natural gas and has been operating on natural gas whenever sufficient quantities of gas were provided by Verve Energy.

The KPS is operating under a Power Purchase Agreement to Verve Energy (formerly Western Power Corporation) after Western Power Corporation was restructured into a number of separate corporations in April 2006. Verve Energy holds the 3200 MW of generation assets of the former Western Power Corporation. Verve Energy's focus is on obtaining greater value from its generating assets from within the recently established Western Australia energy market. Verve Energy must also retire ageing base-load coal fired facilities within a market that has faster peak load growth. Therefore TSK wishes to offer Verve Energy a low cost capacity upgrade at ambient conditions above ISO to replace retired plant, and reduce overall heat rate of Kemerton Power Station thereby increasing value and revenue to Verve Energy. This can be achieved by installation of wet compression.

1.3 History of Environmental Approvals

Environmental approval for the proposal is required under the *Environmental Protection Act 1986*. No Commonwealth Government environmental approval is necessary given the environmental issues associated with this project.

1.3.1 Kemerton Strategic Environmental Review (June 2002)

Power procurement requires the establishment of new power generating facilities and in order to streamline and accelerate the Western Australian approval process, avoid community confusion arising from possibly many concurrent public assessments of power generating facilities and satisfy the projected commissioning date WPC opted to follow a two-stage environmental approval process:

- Stage 1: A *Strategic Environmental Review* (SER) of select sites, which included a SER for the Kemerton Power Station (WPC, 2002). The SER documents were prepared by Western Power and assessed by the EPA under Section 16(e) of the *Environmental Protection Act 1986*; and

- Stage 2: A detailed Environmental Review of the final development proposal at the selected site will be undertaken by the successful Bidder in accordance with Section 38 of the *Environmental Protection Act 1986*.

The objective of the Section 16(e) SER was to obtain advice and "in principle" approval prior to submission of final tenders, enabling full specification of environmental performance for the proposed power station in the tender process.

The EPA issued its advice (EPA Bulletin 1067, 2002a) in response to WPC's *Strategic Environmental Review*, and provided advice to the Minister for the Environment on any environmental constraints that may apply to the installation of power generation facilities at Kemerton, and the other sites.

1.3.2 Referral of Kemerton Power Station Project (December 2003).

In November 2003, TSK referred the KPS proposal to the EPA under Section 38(1) of the *Environmental Protection Act 1986*. Given the previous *Strategic Environmental Review* for the KPS undertaken by WPC and the limited number of significant environmental factors which could be readily managed by the proponent, the EPA decided that the project could be assessed as an Assessment on Referral Information (ARI).

The EPA released it's advice as Bulletin 1121 on 8 December 2003. No appeals were received by the Office of the Appeals Convenor on the EPA's advice. Ministerial approval was granted on 9 February 2004 as Statement 645 (Appendix 1).

1.3.3 Minor Modifications

On 12 March 2004, TSK sought approval under Section 45C of the *Environmental Protection Act 1986* to undertake a number of minor modifications to the original proposal:

- Relocation of bulk fuel tank facility; and
- Increase in capacity of bulk fuel tank from 1.5ML to 2ML.

Approval for this change, which offered some environmental benefits given reduced environmental risks and increase separation from the nearest wetlands, was granted on 7 April 2004 (Appendix 2).

Subsequently, on 22 September 2005, TSK sought another change under Section 45C to permit operation of the power station for greater than 100 hours on liquid fuel totalling a maximum of 300 hours for financial year 2005/06. The request was made in response to constraints in the provision of gas supply to run the power station. Given that the predicted environmental impacts associated with this change did not alter the outcome of the acceptability of the project (particularly given that air emissions modelling conducted for the plant running continuously on liquid fuels without exceedances of adopted air quality standards) the modification was subsequently approved by the EPA on 10 October 2005 (Appendix 3).

1.3.4 Works Approval/Licensing

The KPS was constructed in accordance with Works Approval Number 3910 issued by the former Department of Environment (DoE) in response to TSK's application dated 23 January 2004. An interim (three month) licence to commence commissioning of the power station and to verify predicted air emission levels was issued by the DoE on 25 July 2005. Subsequently, following the provision of air quality emissions information required by the DoE following hot commissioning testing, a full term environmental protection licence was issued on 31 October 2005. A copy of the current Environmental Protection licence is provided as Appendix 4.

As a result of modifications now proposed at the KPS (refer Section 3), a request for an amendment to the current licence will be made via the DEC's South West Region Office in Bunbury. Relevant senior officers were briefed on the project on 30 October 2006.

1.4 Benefits of the Project

As previously discussed, the proposed changes to KPS will allow TSK to offer Verve Energy increased power station capacity at ambient temperatures above ISO conditions (15 ^{o}C, 60%RH) by removing Gas Turbine sensitivity to ambient temperature (introduction of wet compression). The modification therefore allows the provision of additional energy to retailers by optimisation of an existing power generation asset that is designed to industry best practice standards with minimal emissions.

The proposed modifications will result in a number of net environmental benefits as detailed in Section 5 of this report. Primarily, given that there will be no increase in the amount of fuel consumed on an annual basis from that already approved, the proposed modification will

permit a greater amount of power generated the greenhouse intensity of the power station will decrease by 19% i.e. reduced from 668 tonnes of CO_2-e/MWh generated to 539 tonnes of CO_2-e/MWh generated.

Additionally, the incorporation of wet compression will increase the overall plant generation capacity without increasing emission concentrations of key pollutants such as oxides of nitrogen (NOx).

The benefits of siting of the KPS have been previously addressed (ATA, 2003), and are relevant to the current proposal:

- the suitability of the Kemerton Industrial Park for major industry is well established;
- considerable community consultation has been undertaken for the Kemerton Industrial Park for over 15 years;
- detailed studies have already been conducted into air emissions, noise, water supply and waste management as part of previous planning for the Kemerton Industrial Park;
- proximity to natural gas and power transmission lines;
- noise emissions from the site will comply with the criteria at the boundary of the buffer zone;
- the site is consistent with the Final Concept Plan for Kemerton Industrial Park such that it minimises fragmentation of the larger areas of the core, leaving these areas available for future major industrial developments; and
- existing roads provide access to the site.

As part of the planning process for the expansion of the Kemerton Industrial Park, an extensive visual impact assessment was undertaken to identify concerns and limit the impact on the local community. The proposed power station site is not visible to the public from major roads such as Old Coast Road.

1.5 Sustainable Energy

According to the "Hope for the Future: The Western Australian State Sustainability Strategy" (Government of Western Australia, 2003) the long-term goal for sustainable energy use in Western Australia depends on encouraging and facilitating movement away from our reliance on combustion of fossil fuels to practices that conserve energy and encourage the use of more benign alternative forms of energy, including renewable energy.

In the short-term, one of several important initiatives within the energy portfolio that has the potential to lead to a more sustainable outcome in the development of our energy systems is the public power procurement process to facilitate the replacement of old inefficient electricity generators in regional areas of the State with new, cleaner and more efficient technologies at the most economic price (Government of Western Australia, 2003).

The EPA's *Position Statement No. 6: Towards Sustainability* (EPA, 2004) also discusses the issue of sustainability and energy. The EPA discusses sustainability and energy in the context of greenhouse gas emissions and concludes that meeting any realistic Australian emissions targets will involve a gradual move away from conventional coal-fired electricity to less

carbon intensive forms of energy, such as the direct use of natural gas. KPS is evidence of this trend towards lower carbon intensive power generation.

1.6 Purpose of this Report

The purpose of this document is to provide the EPA with relevant information to assess the proposal to implement a modification to the existing peaking plant. The proposed changes are described in detail in Section 3 but may be summarised as follows:

- Installation of a wet compression skid and associated infrastructure at the existing power station site to optimise the performance of the power station during hot weather conditions;
- Establishment of a 4km water pipeline to allow the delivery of fresh water to the power station for use in the wet compression circuit;
- Installation of a demineralised water treatment plant;
- Installation of a 1ML demineralised water storage tank; and
- Construction of two 1.5mm HDPE lined evaporation ponds within the power station site boundary. The combined capacity of the two ponds is 20.8ML.

The original KPS proposal that was assessed by the EPA and approved by the Minister for the Environment in 2004 was based on an air cooled plant with a maximum rated capacity of 260MW at HWM. The proposed modifications represent a change to the operating regime that was assessed and therefore the proposed KPS Enhancement project will need to be considered by the EPA under Part IV and Part V of the *Environmental Protection Act 1986*.

Notwithstanding the above, TSK considers that the proposed modifications will result in a net environmental benefit for the project, particularly given reductions in atmospheric emissions, and a significant reduction in greenhouse gas emissions per MWh generated.

2. SITE DESCRIPTION

2.1 Location

The proposed power station site is located in the north east of the Kemerton Industrial Park (Figure 1). The Kemerton Industrial Park is located in the South West of Western Australia, approximately 140km south of Perth, in the locality of Wellesley, within the Shire of Harvey and lies approximately 17km north east of Bunbury (Figure 2).

The total area of the power station footprint is 2ha and is surrounded by approximately 25ha of Blue Gum (*Eucalyptus globulus*) plantation with little understorey vegetation.

An illustration of site access, linear infrastructure and utilities for the power station is shown in Figure 3.

The proposed water pipeline route is shown on Figure 4 and commences at an existing offtake maintained by Harvey Water on Campbell Road. The pipeline then travels west towards the power station over Lots 503 and 507 avoiding any sensitive areas identified during a botanical and fauna habitat survey (ATA Environmental, 2006) conducted over the route. The pipeline crosses the transmission and power line corridor east of the KPS, and then crosses Treasure Road before entering the power station (Lot 505) from its northern boundary.

2.2 Land Use and Zoning

The power station site was previously owned by the Department of Conservation and Land Management (CALM) but has since been acquired by TSK under freehold title. The power station is located over land zoned as Industrial (Heavy) as gazetted on the 11 November 2003.

The proposed water pipeline will be established over Lot 503 Benger and Lot 507 Wellesley (Figure 4). Lot 503 Benger is located east of Wellesley River and is zoned rural under the Greater Bunbury Region Scheme, the land is owner by local farmer Con Galati. Lot 507 Wellesley is located west of the Wellesley River and is within the Kemerton Industrial Park boundary, the land is owned by LandCorp.

2.3 Climate

The Kemerton Industrial Park experiences a Mediterranean type climate characterised by hot dry summers with high evaporation and cool wet winters during which much of the rainfall occurs. Although temperatures are high in summer, they are lower than inland areas due to local onshore breezes. The evaporation and rainfall control seasonal fluctuations in the water table aquifer.

The average annual rainfall for the Kemerton Industrial Park is approximately 830mm, with almost 80% of the rainfall recorded between May and September (Aquaterra, 2002).

Winds in the Kemerton area are determined largely by the locations of the sub-tropical high-pressure ridge and the migratory low-pressure systems (extra-tropical cyclones) which exist on the poleward side of the ridge.

In summer, morning winds blow predominantly from the south east or east, usually at 11 – 20km/hr, and swing to the west in the afternoon, usually at 21 – 30km/hr. Winter morning winds may occur from any quarter but predominantly from the north and north east, up to

20km/hr. In the afternoon they tend to swing to the north, north west and west, usually over 10km/hr and frequently over 20km/hr (WPC, 2002).

2.4 Topography and Geological Setting

Two main topographic features dominate the landscape around the Kemerton Industrial Park. These are a north – south running dune of up to 45m above Australian Height Datum (AHD) bounding the western edge of the industrial core zone; and a gently undulating plain about 15m AHD dominating the industrial core zone and eastern buffer zone. This plain rises slightly in elevation towards the east close to the Wellesley River, up to approximately 20m AHD.

A small part of the Kemerton Industrial Park (mostly on the far eastern boundary of the Park) occurs on the Pinjarra Plain landform system. The Pinjarra Plain landform is basically an alluvial plain, consisting also of river terraces and stream deposits (at the same level as the plain), swamps and drainage areas. The soils are moderately to poorly drained sandy clays (duplex soils), mainly of alluvial origin, as well as uniform fine textured soils with a clay surface. Most areas of the plain have poor natural drainage because of the flat topography and predominantly duplex soils, which give rise to perched water tables in winter. The highly productive well-drained soils are adjacent to the major rivers, either on the higher or lower terraces.

The power station site is located within a low-lying area, less than 15m AHD. This site lies within the gently undulating plain within the north eastern area of the expanded industrial core (WPC, 2002).

The geology of the Kemerton region was mapped in 1979 at 1:50,000 scale as part of the Geological Survey of Western Australia Urban Geology series. The information presented in this section is derived from the Harvey (2031-Lake Preston) sheet.

The Bassendean Dune system which occupies the area of the Kemerton Industrial Park east of the ridgeline, forms a gently undulating to rolling landscape with broad very low rises rarely more than 20m above mean sea level and intervening low-lying poorly-drained areas. The Bassendean sands are typically fine to medium grained and have low fertility and water holding capacity. There is an extensive mosaic of seasonal wetlands within this system, in the zone immediately west of the Wellesley River.

The Bassendean sands vary in thickness from low rounded dunes (up to 15m thick) to a thin veneer (usually 2 – 5m thick). The sands are typically fine to medium grained, well drained grey to off-white in colour at the surface and pass though cream to yellow layers at depth. They are indistinguishable from the sands of the Spearwood System and mostly defined by the older age reflected in the more deflated physiography.

The Bassendean sands overlie the Guildford Formation, which is a more clay-based sediment formed of sandy and silty clays through to clayey sands with some semilithified lateritised clay. This unit is less permeable than the overlying Bassendean and a perched water table in the overlying sands may form springs at the edge of the dunes. The Guildford Formation may be waterlogged in winter. Where the Guildford formation is coarser and better drained it is used extensively for horticulture and vegetable gardens.

The Guildford Formation encroaches on the eastern boundary of the Kemerton Industrial Park. The soils are moderate to poorly drained sandy clays mainly of alluvial origin as well as uniform fine textured soils with a clay surface.

The power station site is located within the Bassendean System. The major soil types in the area are Bassendean sands overlying the clayier Guildford Formation. To the south of the site there are some swamp deposits and to the north east lies the Guildford Formation.

2.5 Hydrogeological Setting

The following description of the hydrogeology for the Kemerton Industrial Park has been extracted from the Kemerton Water Study Phase 2 (Aquaterra, 2002).

2.5.1 Groundwater

The superficial formation aquifer is an anisotropic unconfined aquifer with a saturated thickness of approximately 20m to 40m. It consists predominantly of clay and sand in the east and sand and limestone in the west. The transmissivity generally increases from east to west and ranges from 50 to 1150 m^2/d. Topography, drainage and surface geology influence the hydrogeological regime of the superficial formation, giving rise to the potential for groundwater mounding to occur in areas of high relief. The Kemerton area lies within the Myalup groundwater flow system. A low mound (Mialla Mound), centred on and to the north of the Estate has formed in the water table and locally modifies groundwater flow directions.

The aquifer is recharged by rainfall but a large proportion of the infiltration is lost due to evapotranspiration processes from the wetlands and areas where the water table is at a shallow depth. Recharge rates have been estimated to be higher in the central part of the coastal plain than in the east or west because of low clay content, shallow water table and low topographic gradient. Estimates of groundwater recharge for the area range between 25% and 60% of annual rainfall. The predominance of downward head differences in nested monitoring bores indicates that regular recharge occurs throughout the area. Pumping in areas of shallow water table has been identified as a way of increasing the renewable groundwater resource, as it would induce greater recharge and substantially reduce local discharge losses by evapotranspiration. However, there could also be environmental impacts associated with implementation of this approach.

Groundwater flow is generally westwards from the Darling Scarp, and seasonal variations in the water table are in the order of 1 to 2m. Variations in water level can usually be correlated with variations in rainfall. The presence of wetlands, drains and lakes adds to the complexity of the groundwater flow regime. The hydraulic gradient is relatively steeper to the west, towards the ocean, and is low in the central part of the coastal plain. Groundwater discharges locally to watercourses, swamps and wetlands (including Myalup Swamp), the Wellesley River, Leschenault Inlet, to the Leederville Formation and to the Indian Ocean across a saline interface. Inflow into the superficial formation also occurs from the Leederville Formation and from the Harvey River Diversion Drain. In the Kemerton area, estimated groundwater throughflow (Myalup flow system) represents 7-17% of the potential rainfall recharge to the superficial aquifer.

Groundwater to the west of the Wellesley River is generally fresh to marginal (250 to 1,500mg/L TDS) and to the east, it is generally brackish. In local discharge areas west of the Wellesley River, the salinity can be as high as 20,000mg/L TDS. Fresh groundwater (< 500mg/L TDS) is generally more extensive at the water table than at the base of the aquifer. The groundwater salinity generally increases in the direction of groundwater flow but there are significant local variations due to variations in permeability, irrigation, evapotranspiration process and leakage from the Guildford Clay. A saline interface is present along the western boundary of the aquifer at the coast.

Leederville Formation

The Leederville Formation is recharged mainly by downward leakage from the superficial formation. There is a vertical head difference of about 8m between the Superficial and Leederville Formations in the southern part of the Estate. This indicates downwards leakage from the superficial aquifer into the Leederville Formation. Upwards leakage from the Yarragadee Formation to the Leederville may also occur in some areas. The main recharge area around Kemerton for the Leederville aquifer is between the Wellesley River and Myalup Swamp, where there is a downward vertical gradient and the overlying superficial formation is predominantly sand.

Regional groundwater flow is westward, discharging offshore. Discharge is also likely to occur through upward leakage into the superficial formation between Myalup Swamp and the saline interface closer to the coast. Artesian flows may be encountered in the low-lying area west of Myalup Swamp. The hydraulic gradient is low and seasonal variation in potentiometric head is of the order of 0.5m. Exploratory drilling for industries within the Estate indicated an aquifer transmissivity of about 400m^2/d.

Water is freshest (850 to 1,500mg/L TDS) between the main recharge area and the saline interface near the coast. The remainder of the aquifer is brackish to saline (1,500 to 19,000mg/L TDS). The saline interface is estimated to occur at around 45m depth in the Leederville (below the base of superficial formation) at a distance of between 1km and 2km inland from the coast.

Cattamarra Coal Measures

The Cattamarra Coal Measures (CCM) (formerly known as Cockleshell Gully Formation) is a confined multilayered aquifer composed of siltstone and shale interbedded with sandstone. Based on groundwater salinity, the formation is divided into two parts separated by a shale layer - an upper sequence containing fresh groundwater and a lower sequence containing brackish groundwater. From monitoring bores on the Binningup Line, potentiometric heads in the CCM are higher than those in the Leederville Formation. This indicates that recharge by downward leakage probably does not occur around the Binningup Line, although it could occur further to the north. Recent test bore drilling has indicated that static water levels in the upper part of the CCM at Kemerton are about 6 to 7m higher than in the lower part of the CCM. This indicates a potential restriction of groundwater flow between the lower and upper parts of the CCM. The natural seasonal variation in potentiometric head is of the order of 0.5m, and artesian flows may be encountered in low lying areas near the coast. Exploratory drilling by Rockwater for industries within the Estate estimated an aquifer transmissivity of 400 to 1500m^2/d (BBG & Rockwater, 1999).

The groundwater salinity ranges between 2,510 and 26,100mg/L TDS. The active flow system in the west contains brackish groundwater (2,500 to 7,000mg/L TDS) and the remainder of the aquifer is saline. The salinity levels are probably a reflection of the distance from recharge and the low permeability of the sediments. In the Kemerton area, the salinity in the CCM is brackish (<3,000mg/L).

2.5.2 Surface Hydrology

The following description of the hydrology for the Kemerton Industrial Park has been extracted from the Kemerton Water Study Phase 2 (Aquaterra, 2002).

The Kemerton Industrial Park generally has low topographic relief, apart from a ridge aligned in a north-south direction on the central-west side of the Park. The major surface drainage feature around the Park is the Wellesley River, which forms the eastern and south eastern boundaries of the Kemerton Industrial Park. Although the Wellesley River does not directly

drain the Park, data collected in a 1994 study (AGC Woodward Clyde, 1994) indicate that the water course acts as a perennial drain for the local groundwater system.

Due to the low topographic relief, parts of the Kemerton Industrial Park are seasonally inundated, especially on the east. A number of artificial drains have been constructed in the area to drain (multiple use) wetlands and cleared palusplain. These drains generally flow to the east and south, discharging into the Wellesley River.

There are a number of permanent and seasonal wetlands in the eastern half of the Park. The Benger Swamp is the largest wetland in the area and lies approximately 2km east of the Wellesley River.

Water quality in the wetlands will be dependent on hydraulic connection to groundwater and the concentration of salts through evapotranspiration processes. The water table can occur close to the surface in the eastern part of the Kemerton Industrial Park particularly in winter.

Although there are no wetlands of significance within the Kemerton Power Station site there are conservation category wetlands to the north (Conservation Category) and south of the site. The management of potential impacts on this wetland, which may occur as a result of the power station, is discussed in Section 5.5.3.

The proposed water pipeline will intersect the Wellesley River as it traverses westward towards the power station. It is proposed that construction of the sub-surface pipeline will occur where river flows are reduced during May 2007.

2.6 Vegetation and Flora

A detailed description of the flora and fauna habitats within and surrounding the power station was provided in the referral supporting documentation for the Kemerton Power Station (ATA, 2003). The information was derived from a detailed spring flora and vegetation survey carried out at the power station site from the 10th to 11th of October 2002.

The entire area of the power station site is located within a blue gum (*Eucalyptus globulus*) plantation. As the vegetation did not appear to warrant more systematic survey, the blue gum plantation area was only traversed for weed and threatened flora species.

No flora species of conservation significance were recorded from the blue gum plantation. No flora and vegetation types of significance were identified during the survey within the power station site. No Declared Rare Flora or priority species were located within the area of power station site.

Several species or environmental weeds were recorded from a damp drain through the middle of the plantation, including **Acetosella vulgaris*, Couch **Cynodon dactylon* and Mallow **Malva parviflora*. Annual grass weeds Barley grass **Hordeum leporinum*, Annual veldt grass **Ehrharta longiflora* and Wild oats **Avena barbata* were common on disturbed areas and bushland margins.

One species of Declared Plant under the *Agriculture and Related Resources Protection Act 1976* the Narrow leaved cotton bush **Gomphocarpus fruticosus* was recorded in the power station site. This species was recorded at the western end of the study area near the drain that runs through the centre of the Blue Gum plantation.

Construction of the original power station in 2004/05 was completed in accordance with a *Construction Environmental Management Plan* which incorporated a Flora and Vegetation Management Plan, as well as weed management procedures (ATA, 2004a).

An additional survey was conducted to assess the impacts associated with a number of water pipeline route options on the 12th and 13th October 2005 (ATA, 2006; Appendix 5). The survey of the water pipeline route at the time was driven by TSK's response to a call by the Independent Market Operator (IMO) for Expressions of Interest to contribute to Reserve Capacity in the SWIS. TSK proposed to offer additional power through installation of wet compression, but was unsuccessful in the bid. The complete 2005 survey report is provided as Appendix 5. In accordance with recommendations in that report, a preferred pipeline route was identified and a ground truthing exercise was undertaken on 15 November 2006 to further refine the route such that there were no constraints or impacts on remnant vegetation in the area.

The results of these surveys are summarised below.

The vegetation associated with the study area is representative of the Bassendean Complex – Central and South. Bassendean Complex – Central and South is represented by 27% of its original extent on the Swan Coastal Plain and currently moderately well represented in the Greater Bunbury Region (39.1% of its original extent).

A total of 28 vegetation types were identified from the overall study area. None of these vegetation types are considered to be of conservation significance. Additionally, none of the five inferred Floristic Community Type (FCTs) identified from the study area are classified as Threatened Ecological Communities (TECs) at either the State or Commonwealth level.

The groundtruthing exercise conducted on 15 November 2006 identified the refined alignment as impacting only on Pine (*Pinus radiata*) and Blue Gum (*Eucalyptus globulus*), as well as a small area (~0.15ha) of regrowth *Astartea scoparia* Closed Heath beneath the existing transmission line.

2.7 Fauna

The KPS site is located over a Blue Gum plantation which is highly modified and generally degraded and provides little habitat for native fauna.

Based on a review of existing literature, six species of Scheduled fauna and eight species of Priority fauna could potentially occur near the plant site. No Listed or Priority fauna were identified on the KPS site during the original spring survey in 2003 (ATA, 2003). Feral cats, rabbits, and foxes were common across the site.

As part of preliminary environmental assessments of the proposed water pipeline route, an assessment to identify potential fauna habitats in the surveyed area was implemented. The assessment identified that the pipeline route traversed several potential fauna habitats. These included:

- Closed Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis;*
- Low Open Forest *Melaleuca preissiana;*
- Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia;*
- Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata;* and

- Mixed Scrub/Shrubland/Heath.

Given that these habitats were likely to support a range of native and introduced vertebrate fauna typical of the southwest region of Western Australia (Christensen *et al.*, 1985), the pipeline route was modified to avoid these potential habitats. Additionally, a targeted fauna survey of the new pipeline route was implemented (on 15 November 2006) as part of a ground-truthing exercise to assess the presence of Scheduled or Priority Fauna, in particular the Western Ringtail Possum. The pipeline traverses through mostly Blue Gum (*Eucalyptus globulus*) and Pine (*Pinus* radiata) plantations or cleared paddocks with a small section of *Corymbia calophylla* Tall Woodland with occasional *Agonis flexuosa* over introduced grass species. There is little to no understorey within these habitats, and as such they are of limited value to native fauna. The areas were searched for any signs of conservation significant fauna, including Western Ringtail Possums, Quenda and Black-Cockatoos. No scratchings or diggings of the Quenda were recorded, however, there were numerous rabbit diggings. Carnaby's Black-Cockatoo may potentially utilise the pine plantations, which are present within the vicinity of the pipeline route, as a food source. However, no areas of pine plantation will be cleared for the pipeline. The area was searched for signs of dreys (bird-like nests that Western Ringtail Possums build) and scats of the Western Ringtail Possum, however, no evidence was found. The area is considered marginal habitat for the Western Ringtail Possum as they tend to prefer dense Peppermint woodlands with close connecting canopies. The habitat within the survey area contains more open and discontinuous stands of Peppermint trees. No other surveys within the Kemerton area have recorded the presence of the Western Ringtail Possum (Biota, 2003a; b; ATA, 2003).

The habitats along the pipeline route are unlikely to support any species of conservation significance. Therefore, ATA Environmental considers that the proposed development is highly unlikely to have any significant impact upon any species listed under the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and is not required to be referred to the Department of Environment and Heritage (DEH).

2.8 Heritage Values

As identified in the Kemerton *Strategic Environmental Review* (WPC, 2002) the site at Kemerton has been subject to surface disturbance through clearing, grazing and tree planting.

The *Strategic Environmental Review* indicated that fifteen Aboriginal sites are located within a 5km radius of the power station.

As part of the overall environmental assessment of the proposed power station, a Heritage Survey of the 28ha site was undertaken in October 2003 (ATA, 2003). No sites of significance were identified within the power station boundary.

A search of the Aboriginal Affairs Department Register did not identify any aboriginal heritage issues relating to the proposed pipeline corridor.

A search of the Australian Heritage Commission, Register of the National Estate Database revealed no listed Heritage sites within the proposed pipeline corridor.

3. PROJECT DESCRIPTION

3.1 Power Station Enhancement

During initial power procurement administered by Western Power in 2000-2003, Western Power identified a need for a 220-260 MW peaking capacity at HWM conditions (40 ^{o}C, 40% RH). Transfield Services offered 2 Siemens Gas Turbines with ISO rating of 155 MW each located at the Kemerton Power Station. The power station output however reduces with higher ambient temperature so at HWM, the power station load is only 130MW per unit.

Following the restructure of Western Power Corporation into a number of separate corporations in April 2006, the Transfield Services Kemerton Power Station Power Purchase Agreement (PPA) was allocated to Verve Energy.

As a result of these changes, Verve Energy's focus is on obtaining greater value from its generating assets. On this basis TSK wishes to offer Verve Energy increased power station capacity at ambient temperatures above ISO conditions (15 ^{o}C, 60%RH) by removing sensitivity of the installed gas turbines to ambient temperature.

TSK identified that this could be achieved by installation of a wet compression system into the existing KPS.

"Wet compression is the process in which excessive amount of water in the form of fine droplets is intentionally sprayed into the compressor inlet, which evaporates within the blade path to provide thermodynamic inter-cooling affect. The resulting adiabatic process causes the air temperature to drop. Since it takes less energy to compress relatively cooler air, there is a saving in compressor work. Any reduction in compressor work translates to increase in net turbine output because one-half to two-thirds of turbine output is typically used to drive the compressor" Shepherd and Fraser (2005).

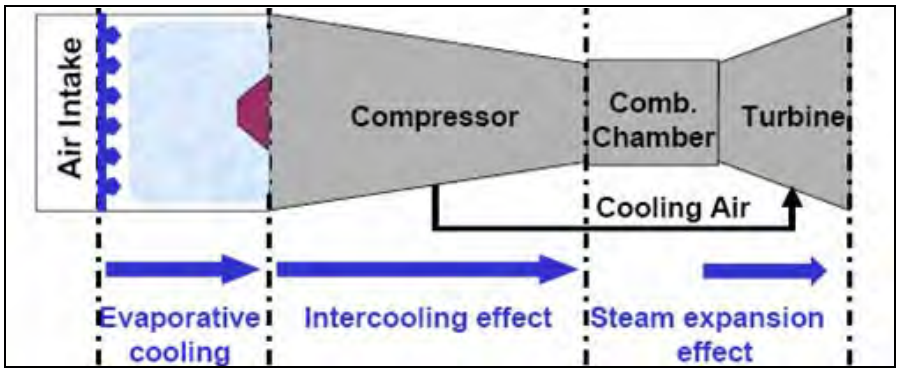
Wet compression has the advantage over other inlet cooling technologies as it is not limited by ambient conditions.

The benefits as also summarised by Siemens, (2006) are the potential:

- Power increase of up to 20% on systems without evaporative cooling and by as much as 12% to 15% with systems with evaporative cooling;
- Improved Gas Turbine Heat Rate by as much as 1.5%
- Potential NO_X Reductions between 30% and 50% (for non-dry low NO_X units).
- Exhaust flow rate is increased between 1% and 1.5% which is of benefit if the exhaust is used for combined cycle steam production.

Diagram 1 presents a schematic of the wet compression system.

DIAGRAM 1
SIEMENS WET COMPRESSION SYSTEM



Source: Transfield Services, 2006

The proposed modification would include the following components:

- 4km water pipeline (constructed and maintained by Harvey water);
- Demineralised water treatment plant;
- 1ML Demineralised water storage tank;
- Forwarding pump skid;
- Wet compression injection skid and associated spray rack installed inside GT compressor air inlet;
- Associated piping, electrical cabling and control system; and
- Two 1.5mm HDPE lined evaporation ponds with a total capacity of 20.8ML.

A site plan is provided as Figure 4.

The KPS will continue to operate as a peaking plant operating within the annual durations previously approved by the EPA.

The information provided in this report is offered to demonstrate that the proposed modifications will have a net environmental benefit, particularly in terms of atmospheric and greenhouse emissions.

3.2 Power Station Operating Characteristics

A listing of the key characteristics of the existing KPS together with proposed changes as a result of installation of wet compression is presented in Table A1.

As previously mentioned, the KPS plant will continue to operate as a peaking plant meeting the short durations where high demands occur. This equates to operating approximately 5% of the time when periods of high demand occur. The KPS may also operate in spinning reserve. This is when the plant is operating at very low load on gas in anticipation of the times when high demand is likely to occur. High demand occurs usually in summer when high temperature conditions give rise to high air conditioning loads.

The KPS will normally operate on natural gas. Ultra low sulphur diesel is used as a back up liquid supply.

The dual fuel capability of this plant means that either fuel type can be used alternately. If natural gas supply pressure or gas availability from the pipeline is insufficient for the power station to operate at full output the station can switch to diesel without interruption to station output.

3.3 Services and Utilities

3.3.1 Gas Supply

The power station will continue to be operated on natural gas supplied to the power station via Dampier to Bunbury Natural Gas Pipeline (DBNGP) which is located down the eastern boundary of the site. Due to the limited capacity of the pipeline (due to pipe diameter reduction south of junction Main Line Valve (MLV)-154) a buried 5km long gas lateral has been established which brings gas from junction MLV-154 located on the DBNGP pipeline to the gas gate station constructed on the eastern boundary of the site. The delivery point for the gas is located immediately downstream of the new gas gate station built on the power station land.

After completion of gas commissioning in June 2006, KPS was mostly operated on ultra low sulphur diesel due to undergoing expansion of DBNGP. Approximately 80% of plant operation was on liquid fuel and the remaining 20% on gas. With the completion of the Stage 4 expansion for the DBNGP in December 2006, approximately 16TJ of gas per day is available for consumption at KPS. Since the additional gas capacity has been available to KPS, the station has run primarily on natural gas as intended, significantly reducing the need for liquid fuel operation.

Upon completion of Stage 5 of DBNGP expansion it is expected that gas allocation to Kemerton will be further increased.

3.3.2 Liquid Fuel Supply

As per the original proposal, the power station will operate on liquid fuel (ultra low sulphur diesel) during periods when gas supply via the DBNGP pipeline is not available. Liquid fuel will continue to be stored in the approved 2ML bulk fuel facility onsite. The fuel supply is guaranteed through a Fuel Supply Agreement with one of the major liquid fuel distributors.

The major plant items installed as part of the Liquid Fuel Supply Agreement include:

- fuel storage tank with capacity of 2 ML;
- road tanker receiving facility;
- bunding to Australian Standard 1940 *The storage and handling of flammable and combustible liquids*;
- transfer pumps and pipework from tank to gas turbine injection pumps; and
- fire protection system.

3.3.3 Water Requirement

The proposed wet compression system will require the introduction of demineralised water into the compressor inlet in a controlled and sequenced manner. The water is injected via a spray rack in the inlet duct of the Gas Turbine. A portion of the injected water evaporates before entering the compressor thereby cooling down the air entering the compressor. The efficiency of the system is a function of the relative humidity and ambient temperature as well as the design of the spray rack and the spray nozzles.

In order to supply the required amount of water to the power station TSK have sourced high quality (~300mg/L TDS) water supplied under a Water Supply Agreement with Harvey Water (Appendix 6). The water will be sourced from Stirling Dam which supplies Harvey Weir. Harvey Water has a water distribution pipeline approximately 4km away from the power station site which is connected direct to Harvey Weir.

Other options for water sourcing that were investigated by TSK and deemed to be unfeasible as summarised in Table 1:

TABLE 1
SUMMARY OF WATER SOURCING OPTIONS FOR KPS ENHANCEMENT PROJECT

Water Source	Constraints
Future Brunswick River Dam	Limited resource influenced by drought conditions
Surplus from Harvey Dam	Limited resource influenced by drought conditions
Wellington Dam abstracted from the Collie River	Poor water quality, extensive environmental and other approvals process, costs
Wellington Dam via dedicated pipeline to KPS	Poor water quality, extensive environmental and other approvals process, costs
Groundwater	Extensive hydrogeological investigations required, will delay schedule, costs
Kemerton Wastewater Treatment Plant	Poor water quality requiring additional treatment prior to reuse, limited volumes
Stirling Dam via Marriott Road	Significant environmental constraints (protected wetlands), requires pumping station
Stirling Dam via Campbell Road offtake	Gravity fed, low environmental impact, good quality water from consistent source

The last option detailed above will be pursued as part of the KPS Enhancement Project. The proposed water pipeline route is shown on Figure 4 and commences at an existing offtake maintained by Harvey Water on Campbell Road. The pipeline then travels west towards the power station over Lots 503 and 507, avoiding any sensitive areas identified during a botanical and fauna habitat survey (ATA, 2006) conducted over the route. The pipeline enters the power station (Lot 505) from its northern boundary. The pipeline corridor will be 15m wide for the length of the pipeline between the Campbell Road offtake and the power station.

The pipeline is operated under direct head pressure generated by the elevation of the dam and is not subject to pump failures or electricity outages. The pipeline will be constructed by Harvey Water and will comprise of polyethylene material with suitable thickness and pressure rating.

The method to be used for the construction of the water pipeline across the Wellesley River will be open trench technology. A request for approval to cross the Wellesley River has been lodged with the Department of Water. The pipeline will be installed 1000mm below the invert of the river bed and encased in concrete. The invert and river banks will be reinstated as found and a riffle will be installed over the excavation area to prevent erosion. The proposed location of the river crossing is within the existing road reserve that the water pipeline will follow.

The pipeline will have the capacity to deliver up to 140L/s, which is well over the wet compression requirement of 20L/s.

The power station will consume approximately 72 kL/hr of demineralised water within the wet compression circuit. Table 2 describes the expected water inputs and outputs from the plant:

TABLE 2
WET COMPRESSION WATER REQUIREMENTS AND WASTEWATER GENERATION

Volume Imported	90 kL/hr (approx 27 ML/yr)[1]		
Volume of Demineralised Water (Permeate) Generated (directed to Wet Compression)	72 kL/hr (21.6 ML/yr)[1]		
Volume Wastewater (Concentrate) Generated (directed to lined evaporation ponds)	18 kL/hr (approx 5.4 ML/yr)[1]		
	Pass Streams		
Parameter (mg/L as Ion)	RO Feed	Concentrate	RO Permeate
TDS	144.19	786.32	1.83
pH	7.02	7.70	5.60
NH4	0.00	0.00	0.00
K	1.09	5.93	0.02
Na	41.90	228.44	0.51
Mg	4.34	23.76	0.02
Ca	2.17	11.88	0.01
Sr	0.00	0.00	0.00
Ba	0.00	0.00	0.00
CO_3	0.01	0.21	0.00
HCO_3	11.92	64.53	0.35
NO_3	0.04	0.23	0.00
Cl	69.80	380.78	0.78
F	0.00	0.00	0.00
SO_4	7.23	39.64	0.03
SiO_2	5.68	30.92	0.08
Boron	0.00	0.00	0.00
CO_2	1.76	2.04	1.82

Notes
1: Based on expected 880 hours operation per year with wet compression.

An expected volume of 18kL/hr of wastewater will be generated as reject water (concentrate) from the Reverse Osmosis (RO) plant while the power station is operational.

Several options for disposal of this reject water have been investigated including its reuse by irrigating the surrounding plantation. However, given elevated sodium and chloride concentrations, there is potential for irrigation of the water to affect tree growth. There may also be additional potential impacts from groundwater mounding and localised impacts on the nearby wetlands which would need to be monitored and managed.

Construction of the pipeline is scheduled to commence in May 2007. During dry and windy periods, water may be required for dust suppression purposes during earthworks associated with the pipeline installation. Water will be trucked to the construction site for this purpose as needed with an estimated requirement of 5kL/day is expected to be required for dust

suppression, depending upon ambient conditions during the four week pipeline construction period.

3.3.4 Evaporation Ponds

TSK proposes to direct reject water from the RO plant to two 1.5mm HDPE lined evaporation ponds to be constructed onsite. The ponds will have a combined capacity of 20.8ML, and will have sufficient freeboard to prevent overtopping in the event of extreme rainfall events (Figure 5). Pond design and capacity details were developed by TSK based on evaporation balance calculations (Appendix 7) and an annual water balance model simulation. The basin requirements were determined so that no overflow occurs during the 20 year operation period.

The ponds will be constructed using a cut to fill on existing plantation area, and will be mostly elevated above ground level to avoid impacts with potential rises of the ground water table during the winter months (Figure 5).

The use of each pond will be rotated on a yearly basis, whereby one pond will receive reject water from the RO plant, whilst the second pond is left to dry over that one year period. Appendix 7 details the annual water balance of each pond, taking into account the volume of reject water pumped into the pond, rainfall and evaporation. At the end of that year, the empty pond will be cleaned of any accumulated residues. It is expected that approximately four tonnes per year of solids will be removed and disposed of to an appropriately classed landfill. Visual inspections and assessments of the liner will be conducted biannually to test the integrity of the liner when cleaning out the ponds.

3.4 Development and Commissioning Schedule

Construction of the water pipeline and incorporation of the wet compression enhancements at the KPS is scheduled commence in the second quarter of 2007 with expected completion of commissioning by November 2007.

4. IDENTIFICATION OF KEY ENVIRONMENTAL FACTORS

Based on elements of TSK's proposal for the KPS Enhancement Project, as well as on feedback from the community consultation completed to date, the following environmental factors are considered relevant to the proposal as part of construction and/or operational phases for this project:

- Terrestrial Flora and Vegetation;
- Specially Protected (Threatened) Fauna;
- Surface and Groundwater Quality;
- Gaseous and Particulate Emissions;
- Greenhouse Gas Emissions;
- Noise and Vibration;
- Solid and Liquid Wastes.

The following sections of this document describe the potential impacts of the proposal for each environmental factor, as well as proposed management and mitigation measures to address these potential impacts. The measures draw heavily upon existing management measures, design considerations installed environmental controls that are already in place as part of the existing power station.

5. MANAGEMENT OF ENVIRONMENTAL IMPACTS

5.1 Terrestrial Flora and Vegetation

5.1.1 EPA Objective

To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.

5.1.2 Potential Environmental Impacts

The KPS footprint occupies 2ha of a dedicated 28ha site within the Kemerton Industrial Park. The power station is located within an existing *Eucalyptus globulus* cultivated plantation of which 15ha was harvested and removed during the construction of the original power station in 2004. It is considered that the plantation itself has little or no value from a flora conservation perspective.

Installation of the following infrastructure will be implemented within the existing cleared the power station footprint:

- Demineralised water treatment plant;
- 1ML Demineralised water storage tank;
- Forwarding pump skid;
- Wet compression injection skid and associated spray rack installed inside GT compressor air inlet;
- Associated piping, electrical cabling and control system; and
- Two 1.5mm HDPE lined evaporation ponds with a combined capacity of 20.8ML.

Accordingly, no additional clearing vegetation will be required within the power station site.

The proposed water pipeline to be established by Harvey Water between Campbell Road and the power station will traverse over previously cleared land on Lots 503 and 507 (Figure 4). The entire length of the 4km pipeline will be constructed within *Eucalyptus globulus* and *Pinus radiata* plantations to the east of the power station site or within cleared areas (some of which are within the power line corridor on Lot 507). As previously stated, plantations have little or no value from a flora conservation perspective, and their removal is not considered to be an environmental constraint.

Other than clearing within the plantation, there remains the potential for the introduction and spread of weed species and dieback (*Phytophthora* species) during construction of the pipeline. Dust generated during construction also has the potential to be deposited on remnant vegetation. The leakage or spillage of environmentally hazardous materials or hydrocarbons also has the potential to impact on remnant vegetation during the construction phase.

Temporary fragmentation of habitats may occur during construction of the subsurface water pipeline.

5.1.3 Environmental Management and Mitigation

As previously discussed, given the location of the power station on previously cleared land within the *E globulus* Blue Gums plantation no removal of remnant native vegetation is required to accommodate the proposed modifications at the KPS.

The proposed pipeline route has been the subject of a flora and fauna habitat survey (Appendix 5) (ATA, 2006), as well as additional groundtruthing work conducted in November 2006 to confirm that the actual pipeline alignment will not impact on any priority or significant flora or fauna habitats.

Reduced plant productivity due to construction dust will be minimised through the use of water carts and appropriate dust suppression methodologies. This issue is discussed further in Section 5.3.3.

The management and storage of hazardous materials and hydrocarbons that are potentially hazardous to vegetation will be in accordance with strategies outlined in Section 5.7.3.

At the completion of the project, the power station will be decommissioned in accordance with a Closure Plan approved by the EPA. TSK have in place an approved *Preliminary Decommissioning Plan* (ATA, 2004b) developed in accordance with Ministerial Condition 6-1 of Statement 645 for the KPS (Appendix 1). Disturbed areas within the power station footprint will be rehabilitated either to native vegetation species consistent with that of the surrounding areas or replanting to plantation Blue Gums.

The site dieback status has been determined as uninterpretable. Accordingly, dieback hygiene procedures will be adopted to minimise the spread of the disease, consistent with best practice. This will essentially involve the identification of areas likely to be affected, establishment of appropriate controls for machinery, topsoil and mulch from affected areas, and implementation of strict washdown procedures for equipment and vehicles known to access affected areas.

The earthworks associated with the project have the potential to introduce or spread weed species, particularly from areas of cleared farmland to areas of native vegetation. Weed infestation and coverage between 10 and 60% has been identified in the plantation area. A number of measures will be implemented to prevent the introduction or movement of weeds throughout the site including:

- assessments of weed potential prior to topsoil removal;
- separate storage and end use of weed infested topsoil; and
- implementation of adequate weed control by use of selective herbicides or selective application techniques consistent with Blue Gum plantation practice.

The Construction Contractors' Health Safety and Environmental Management System (HSEMS) will be implemented for all aspects of the development phase. TSK have prepared and implemented an *Operations Environmental Management Plan* (ATA, 2005a) which includes a *Flora and Vegetation Management Plan*. The *Operations Environmental Management Plan* was developed and approved by the EPA in accordance with Proponent Commitment 2 of Statement 645 and is included as Appendix 8.

5.1.4 Predicted Outcome

It is considered that the EPA's objective in relation to this factor will be met on the basis of the following:

- All modifications to the KPS through introduction of wet compression will be implemented within the existing footprint of the power station;

- Establishment of the water pipeline will be predominantly over *E globulus* Blue Gums plantation with little or no value from a flora conservation perspective, or over previously cleared farmland and *P. radiata* pine plantations;

- The removal of ~0.15ha of regrowth *Astartea scoparia* Closed Heath occurring beneath the transmission line is exempt from requiring a clearing permit.

- TSK commits to implementing site specific management measures during the construction and development phase of the project so as to minimise or prevent direct losses of remnant native vegetation, priority flora and Declared Rare Flora (DRF).

5.2 Fauna and Specially Protected (Threatened) Fauna

5.2.1 EPA Objective

Protect Specially Protected (Threatened) Fauna species and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950.*

5.2.2 Potential Environmental Impacts

The principal impacts on local fauna are likely to result from the removal of vegetation for most potentially significant fauna species. During the construction phase, potential impacts on fauna and their habitats would be through the removal of habitat that occurs within the water pipeline route (Figure 4). No clearing or remnant vegetation or plantation will be required for the modifications within the KPS footprint.

Based on a review of existing literature, and results of the spring fauna survey completed as part of the *Strategic Environmental Review* for the KPS, six species of listed fauna and eight species of Priority fauna could potentially occur near the plant site (WPC, 2002).

A spring fauna survey, involving trapping, avifauna surveys, spotlighting survey and hand searches was undertaken in October 2003 and confirmed the generally degraded and highly modified nature of the Blue Gum plantation proposed as the site. No Scheduled or Priority Fauna were observed or trapped in the area, after extensive searching and trapping effort.

In the Spring of 2005 (ATA, 2006), a fauna habitat assessment was also undertaken to assess the presence of these habitats within the proposed water pipeline route. A supplementary survey conducted in November 2006 to groundtruth the preferred pipeline route. As previously mentioned, the pipeline traverses through mostly Blue Gum (*Eucalyptus globulus*) and pine (*Pinus radiata*) plantations or cleared paddocks with a small section of *Corymbia calophylla* Tall Woodland with occasional *Agonis flexuosa* over introduced grass species. There is little to no understorey within these habitats, and as such they are of limited value to native fauna.

The areas were searched for any signs of conservation significant fauna, including Western Ringtail Possums, Quenda and Black-Cockatoos. No scratchings or diggings of the Quenda were recorded, however, there were numerous rabbit diggings. Carnaby's Black-Cockatoo may potentially utilise the pine plantations, which are present within the vicinity of the pipeline route, as a food source. However, no areas of pine plantation will be cleared for the pipeline. The area was searched for signs of dreys (bird-like nests that Western Ringtail Possums build) and scats of the Western Ringtail Possum, however, no evidence was found.

The area is considered marginal habitat for the Western Ringtail Possum as they tend to prefer dense Peppermint woodlands with close connecting canopies. The habitat within the survey area contains more open and discontinuous stands of Peppermint trees. No other surveys within the Kemerton area have recorded the presence of the Western Ringtail Possum (Biota, 2003a; b; ATA Environmental, 2003).

The pipeline route has been selected to avoid any remnant vegetation and potential fauna habitats and as such, there is unlikely to be any significant impacts to fauna resulting from the clearing of vegetation. The majority of the pipeline crosses through cleared areas or Blue Gum plantations and as such are unlikely to support many fauna species. Construction of the pipeline may potentially affect fauna through the entrapment of species in trenches that are excavated to receive the pipeline.

Removal of vegetation will affect its dependant fauna, resulting in direct loss of individuals and potential impacts on the species. Mobile species may be forced to move to less disturbed areas.

5.2.3 Environmental Management and Mitigation

Disturbance of remnant flora and accordingly their dependant fauna has been reduced as far as possible selection of the KPS site.

No direct impacts on fauna habitats will occur as a result of implementation of proposed modifications to the KPS.

The water pipeline to be established between Campbell Road and the KPS will traverse predominantly over previously cleared farmland or existing blue gum and pine plantations.

Construction of the pipeline will take several weeks to complete. The pipeline will be established sub-surface and will therefore not result in permanent fragmentation of existing fauna habitats.

During the construction phase, the Contractor's Health Safety and Environment (HSE) Management System will be implemented to ensure potential impacts on fauna and faunal habitats are minimised or prevented.

During clearing and grading, some fauna may be killed through the movement of machinery. Fauna deaths will be minimised by limiting the footprint of clearing and grading activities and to restrict vehicle speed. Clearing management strategies are detailed in the Environmental Management and Mitigation section for terrestrial flora and vegetation (Section 5.1.3).

During the construction phase, the proposed open pipeline trench will have the potential to trap terrestrial fauna. High temperatures can add to fauna deaths for entrapped fauna that inadvertently fall into the pit.

Other methods proposed to minimise fauna interaction associated with the trench clearing process are described below:

- A fauna clearing person/crew will be nominated during construction of the pipeline and should be readily available whilst the trench is to be open.

- The fauna clearing crew will check open trenches on a daily basis and remove trapped fauna. The entire length of open trench will be searched and cleared of fauna prior to 10am each day. The open trench will then be rechecked at least once each day. Continuous clearing of fauna from the trench will be necessary during warm weather.

- Detailed records of all fauna (native and introduced) encountered during fauna management operations will be made. The data recorded will include date, location, species, form of encounter, status of the animal (dead or alive) and where necessary and cause of death.

- If any injured fauna are encountered the Contractor will contact the DEC's Wild Care 24hr hotline on (08) 9474 9055.

- Any dead fauna found during operations or euthanised will be removed from the immediate vicinity of activity to prevent carrion-feeding species being attracted to areas where they may, in turn, be injured. Deceased fauna will be offered to the Western Australian Museum.

5.2.4 Predicted Outcome

It is considered the EPA's objective in relation to this factor can be met on the following basis:

- Avoidance of direct losses of terrestrial flora and accordingly their dependant fauna through location of KPS modifications entirely within the existing cleared footprint of the power station;

- Establishment of the sub-surface water pipeline along a preferred route that traverses predominantly over cleared farmland and blue gum and pine plantations; and

- Implementation of the contractors HSE management System to ensure any direct impact on fauna during the construction phase is prevented.

5.3 Gaseous and Particulate Emissions

For emissions from industrial sources, the EPA specifies in its *Guidance Statement Number 15: Emissions of Oxides of Nitrogen from Gas Turbines*, that "all reasonable and practicable means should be used to prevent and minimise the discharge of waste" (EPA, 2000). This guidance document states that for new large gas turbines burning natural gas, dry low NOx burner technology is best practice for open cycle. This technology could achieve NOx emissions at base load of 25ppmv (dry at 15% oxygen reference level).

The guidance document does not specifically mention gas turbines operating on liquid fuels. NOx emission from standard burners running on liquid fuels can be as high as 270ppm, however water injection can reduce NOx emissions to as low as 42ppm and in this case represents best practice (WPC, 2002). The EPA guidance document specifies that the AEC/NHMRC guidelines (1986) should be used as an upper limit for NOx emissions from new turbine installations. Table 3 below presents criteria specified in the AEC/NHMRC guidelines.

TABLE 3
NATIONAL GUIDELINES FOR EMISSIONS OF OXIDES OF NITROGEN FROM GAS TURBINES (AEC/NHMRC, 1986)

Fuel	Rated Electrical Output	Maximum NOx Emission Concentration	
		(g/m^3)	Equivalent (ppmv)
Gaseous Fuel	<10MW	0.09	44
	>10MW	0.07	34
Other Fuels	< 10MW	0.09	44
	> 10MW	0.15	73

Notes:
1) Gas volumes expressed dry at 0°C and at an absolute pressure equivalent to one atmosphere.
2) Oxides of nitrogen calculated as NO_2 at a 15% oxygen reference level.

5.3.1 EPA Objective

To ensure that best practicable measures are taken to minimise discharges of gaseous and particulate emissions to the atmosphere.

To protect surrounding land users such that gaseous and particulate emissions (including dust) will not adversely affect their welfare and amenity or cause health problems.

To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts.

5.3.2 Potential Environmental Impacts

In general, industrial sectors dominate sulphur dioxide emission, and significantly contribute emissions of dust and oxides of nitrogen. This contribution is caused by the combustion of heavy fuel, and diesel, although in WA natural gas is rapidly becoming the fuel of choice to minimise these impacts.

During operation, atmospheric emissions include NOx, SO_2 (when operating on liquid fuel) and to a lesser extent particulates and unburnt hydrocarbons. The original referral documentation for the KPS (ATA, 2003) identified that there are a number of industries within the Kemerton Industrial Park that are minor emitters of NOx, SO_2 and particulates. Outside the Kemerton Industrial Park, there are only small emitters in the region apart from two Alumina Refineries, which are located over 30km away.

Impacts from regional sources are relatively small. Air quality modeling for NOx, SOx and particulates arising from operation of the proposed power station was undertaken in 2003 (SKM, 2003), and the results added to emissions from existing Kemerton sources. Worst-case modeling (continuous operation on liquid fuel under local meteorological conditions) indicated that emissions will at all times comprise of a relatively low percentage of their respective guidelines and standards for all parameters modelled.

In 2003, the pollutant closest to the ambient criteria was NO_2 with predicted maximum 1-hour NO_2 concentrations at most 2.6% and 6.9% of the NEPM standard when operating on gas and distillate respectively. Other pollutants were much lower, with PM_{10} at most 0.6% of the NEPM standard, $PM_{2.5}$ at most 1.2% of the reporting standard with SO_2 at most 0.18% of the NEPM standards (SKM, 2003).

An independent review of the air quality data was undertaken using the revised operating regime created by the installation of the Wet Compression circuit (Air Assessments, 2006). A copy of the report is provided as Appendix 9. Emission characteristics with and without wet compression at ISO conditions (15 ^{o}C, relative humidity of 60% and pressure of 101.3 kPa) and at HWM (41 degrees, relative humidity of 40% and pressure of 101.3 kPa) are presented in Table 4a and 4b below.

TABLE 4a
EMISSION CHARACTERISTICS PER UNIT AT ISO CONDITIONS
(15 ^{o}C & RH OF 60%)

Parameter	Value	Gas Fired		Distillate Fired	
		Standard	Wet Compression	Standard	Wet Compression
Fuel Consumption	(kg/s)	9.5	9.5	-	-
Net Gross Power	(MW)	159[1]	173[1]	146[1] (100 – 119)[2]	165[1]
Stack Height	(m)	35	35	35	35
Stack Diameter	(m)	5.5	5.5	5.5	5.5
Mass Flow	(kg/s)	531[1]	546[1]	531[1]	546[1]
Exit Volume, wet	(m^3/s), wet, Actual	1,229[1]	1,278[1]	1,181[1]	1,228[1]
Exit Temperature	(^{o}C)	538[1]	538[1]	517[1] (492 - 508)[2]	517[1]
Plume Buoyancy	(m^4/s^3)	2,471	2,571	2,341	2,435
H_2O mass flow in the flue gas	(g/s)	23,800[1]	36,800[1]	15,600[1]	28,400[1]
O_2 mass flow in the flue gas	(g/s)	82,500[1]	78,600[1]	85,200[1]	79,200[1]
Moisture Content	(% volume)	7.16	10.65	4.75 (2.5)[2]	8.33
O_2 Content	(% volume, dry)	15.05 (14.8 – 15.4)[2]	14.32	15.35 (15.5 – 15.7)[2]	14.26
NOx Concentration	(ppmv, 15% O_2)	20.1[1] (20.1 – 23.8)[2]	16.1[1]	62.9[1] (51 - 54)[2]	50.3[1]
NOx Emission Rate	(g/s)	15.8	14.2	47.3	45.3
CO Concentrations	(ppmv, 15% O_2)	<25[1] (<1.6)[2]	<10[1]	<25[1] (<5)[2]	<10[1]
SO_2 Emission Rate	(g/s)	Negl	Negl	1	1

Notes:

1. Actual values measured by Siemens during acceptance tests in October 2005 at ambient temperatures and corrected to ISO conditions. All values have been independently verified by Air Assessments (Appendix 9).
2. Values in brackets are from stack testing. Gas fired tests on 9 May 2006 over a range of 17 to 21ºC and relative humidity from 46 to 69% and loads from 50 to 100% of base load (Siemens, 2006b). Distillate tests were at 100 MW at around 1600hrs on 31 October 2005 and 119 MW at around 1100hrs on 5 October 2006 (Stack Air, 2005 and 2006) with ambient conditions of approximately 17ºC and relative humidity of 45%; and 18ºC and a relative humidity of 55% respectively.

TABLE 4b
EMISSION CHARACTERISTICS PER UNIT AT HWM CONDITIONS
(41 ^{o}C and RH of 40%)

Parameter	Value	Gas Fired		Distillate Fired	
		Standard	Wet Compression	Standard	Wet Compression
Fuel Consumption	(kg/s)	8.4	8.4	-	-
Net Gross Power	(MW)	131[1]	150[1]	119[1]	136[1]
Stack Height	(m)	35	35	35	35
Stack Diameter	(m)	5.5	5.5	5.5	5.5
Mass Flow	(kg/s)	455[1]	472[1]	473[1]	488[1]
Exit Volume, wet	(m^3/s), wet, Actual	1,078[1]	1,122[1]	1,088[1]	1,134[1]
Exit Temperature	(^{o}C)	568[1]	561[1]	537[1]	537[1]
Plume Buoyancy	(m^4/s^3)	2,320	2,402	2,187	2,278
H_2O mass flow in the flue gas	(g/s)	30,969[1]	42,697[1]	19,600[1]	31,200[1]
O_2 mass flow in the flue gas	(g/s)	68,645[1]	65,828[1]	75,200[1]	70,100[1]
Moisture Content	(% volume)	11.02	14.48	6.66	10.17
O_2 Content	(% volume, dry)	45	68	15.39	14.30
NOx Concentrations	(ppmv, 15% O_2)	20.1[1]	16.1[1]	62.9[1]	50.3[1]
NOx Emission Rate	(g/s)	11.9	11.0	41.4	39.7
CO Concentrations	(ppmv, 15% O_2)	<25[1]	<10[1]	<25[1]	<10[1]
SO_2 Emission Rate	(g/s)	Negl	Negl	1	1

Note:
1. Actual values measured by Siemens during acceptance tests in October 2005 at ambient temperatures and corrected to HWM conditions. All values have been independently verified by Air Assessments (Appendix 9).

Based on the review of changes in emission characteristics as a result of wet compression, the following conclusions are offered where the plant was running on gas or liquid fuel:

- Wet compression offers the ability to generate additional power, however no increase to fuel consumption will occur. On this basis, there is a significant improvement in greenhouse intensity of the KPS in terms of greenhouse gas emissions emitted per MW of power generated. Greenhouse gases are discussed in more detail in Section 5.4.

- Whilst operating on gas, ground level concentrations of NO_X (the pollutant of most concern) will decrease by 7.5% - 10%, compared to that originally predicted in 2003.

- Emissions of SO_2 will be constant as this is proportional to the fuel usage of which there will be no change to that utilised in the 2003 modelling.

- When operating on distillate, a decrease in ground level NOx concentrations of between 4.1 to 4.3 is predicted.

- Although NO_X concentrations were low (max 6.9% of the standard outside the buffer), this predicted increase is environmentally beneficial as this reduces the overall mass emission of NOx to the regional airshed.

During the construction phase there may be a potential for generation of dust associated with earthworks during installation of the pipeline. There are at present no sources of dust along the pipeline route, which is predominated by farmland and a cultivated Blue Gum plantation. Up to 2ha of these areas may be disturbed during the construction period, with resulting potential for dust generation.

The nearest dust sensitive premises are located approximately 1.8km from the KPS, and at least 500m from the start of the pipeline route at Campbell Road.

The generation of dust during construction also has a nuisance value.

5.3.3 Environmental Management and Mitigation

5.3.3.1 Gaseous Emissions

A review of the effect of wet compression on stack emissions at the KPS has shown that there will not be a significant increase to previously modelled emissions. The expected change is still predicted to result in ground level concentrations of key parameters to remain well within prescribed criteria for ambient air.

Monitoring of stack emissions will be conducted in accordance with DEC prescribed requirements in the site Environmental Protection Licence (Appendix 4). Stack emissions monitoring will be conducted for each fuel type (gas and Ultra Low Sulphur Diesel) in accordance with the licence.

The following table presents the prescribed air emissions monitoring regime for the power station during operation. Stack emissions will be tested via sampling ports installed on Stacks 11 and 12 UHN for selected parameters using approved methods described in Table 5 below.

TABLE 5
STACK EMISSION MONITORING PROGRAMME

Parameter	Unit	Method	Frequency
Oxides of nitrogen	mgm^{-3}	US EPA Method 20	Annually for each fuel used
Oxides of sulphur	mgm^{-3}	Empirical methods using known fuel sulphur content.	Annually for each fuel used
Carbon monoxide	mgm^{-3}	US EPA Method 10	Annually for each fuel used

4.2.1 For each stack test conducted, the following information will be collected:

(i) Fuel consumption rate (plant production federate) relevant to the emissions at the time of the test;
(ii) in stack moisture content;
(iii) in stack volume flow rate;
(iv) in stack temperature;
(v) in stack oxygen reference level; and
(vi) a statement of compliance with the test method.

Sample collection will be conducted by a qualified air emissions testing consultant, with collected gas samples submitted to a laboratory with current NATA registration for the prescribed analytes.

The installed power station emission sampling and monitoring ports will be maintained in accordance with Australian Standard 4323.1 *Stationary source emissions – Selection of sampling positions* (Standards Australia, 1995).

Emissions of oxides of sulphur whilst burning liquid fuels will be minimised through the use of Ultra Low Sulphur Diesel.

Emissions of oxides of nitrogen will be minimised through the continued use and maintenance of Low NOx burners in the installed gas turbines.

5.3.3.2 Particulate Emissions

The power station site consists predominantly of building structures, concrete drainage facilities and hardstand areas. There is limited area exposed that will result in the generation of visible dust with potential to cross the boundary of the premises during both the construction and operations phase of the KPS Enhancement Project.

The following mitigation measures are proposed to limit dust impacts during the construction phase:

- Unsealed roads and exposed areas will be regularly watered down in the event of significant dust lift-off during dry and windy conditions;
- General housekeeping practices will be undertaken to ensure there is no accumulation of waste materials within the plant site and pipeline construction area that may generate dust;
- Areas of the pipeline route that are disturbed during the construction phase and that will no longer be accessed during operation will be rehabilitated with Blue Gums or native vegetation. Accordingly, the rehabilitated site should produce no dust sources;
- Procedures will be put in place to minimise unauthorised access to rehabilitated areas to enhance the success of regrowth;
- Dust emissions will be monitored on a regular basis through visual inspections of disturbed and open areas during the construction phase;
- During the construction phase, nearby landusers will be advised of appropriate contacts that will field and address any valid dust complaints; and
- No burning of any waste material other than fuels for power station operation will be permitted during the construction phase.

5.3.4 Predicted Outcome

Emission levels of the main atmospheric pollutants from the KPS will not increase significantly following the proposed installation of wet compression into the existing KPS. On this basis, ground level concentrations will remain within applicable ambient criteria. It is therefore considered that the NEPM criteria and the EPA's objective in relation to air emissions will be met.

Given the distance to dust sensitive premises and implementation of measures identified to reduce or control dust during pipeline construction, it is considered that construction phase dust emissions can be managed to meet the EPA's objective.

5.4 Greenhouse Gas Emissions

5.4.1 EPA Objective

To ensure that potential greenhouse gas emissions emitted from proposed projects are adequately addressed and best practicable measures and technologies are used in Western Australia to minimise Western Australia's greenhouse gas emissions.

5.4.2 Potential Environmental Impacts

The EPA's position with respect to greenhouse gas issues is detailed in the EPA's *Guidance Statement No. 12: Minimising Greenhouse Gases* (EPA, 2002b). The Guidance is mainly applied to projects of an industrial nature, and has some relevance to the proposal and it reflects the intent of sustainability principles raised in the EPA's *Position Statement No. 6: Towards Sustainability* (EPA, 2004) where initiatives should take into account the relative importance and opportunities for reduction in emissions. They should also adopt the simple principles that have guided the National Strategy, namely:

- The need to have a Greenhouse response which is tailored to Australia's national interests;
- The need to integrate Greenhouse considerations with other government commitments;
- The pursuit of Greenhouse action consistent with equity and cost effectiveness and with multiple benefits;
- Recognition of the importance of partnerships between governments, industry and the community in delivering an effective Greenhouse response; and
- The need for action to be informed by research.

TSK is aware that the use of efficient technology should be encouraged at all levels, given that more efficient technology brings economic benefits as well as reducing emissions.

A comprehensive discussion of greenhouse gas considerations was presented in the *Strategic Environmental Review* (WPC, 2002) and referral documentation (ATA, 2003) for this project. Greenhouse impacts were discussed in relation to the SWIS as a whole rather than for an isolated case such as the Kemerton Power Station, given its global implications, and is most appropriately managed as a component of a regional and industry-wide strategy.

The Greenhouse review contained in the *Strategic Environmental Review* presented the following summary of the changes in the greenhouse gas emissions specifically related to Western Power's Power Procurement Program and plant retirement/replacement (WPC, 2002).

- Greenhouse gas emissions associated with electricity produced into the SWIS (both generated by Western Power and purchased by Western Power from independent producers) were 9.079Mtpa of CO_2 equivalent (CO_2-e) in 1990.
- By 2000 this had increased by 20% to 10.935Mtpa. This increase was not proportional with electricity demand on the SWIS which increased by 33% on 1990.
- The greenhouse gas emission rate for electricity supplied into the SWIS (measured as carbon intensity over that time) has fallen from 0.98 tonnes CO_2-e/MWh in 1990 to 0.89

tonnes in 2000 (a decrease of 9%), largely due to increased sourcing of electricity from high efficiency cogeneration plant and the overall increased penetration of gas-fired generation into the supply portfolio.

- This reduced carbon intensity represents a saving of over 1Mtpa of CO2-e in 2000 compared to producing the electricity at the 1990 intensity.

Based on two scenarios for power procurement (as detailed in Section 3.5.4.2.1 of WPC, 2002), the SWIS carbon intensity was predicted to continue to decrease to either 0.70 or 0.76 tonnes CO2-e/MWh by 2010. This is a reduction of 29 or 22% respectively from the 1990 carbon intensity of 0.98 tonnes CO_2e/MWh. This is despite a predicted growth in electricity demand between 1990 and 2010 of approximately 76% (WPC, 2002).

The calculations presented in the *Strategic Environmental Review* (WPC, 2002), though only indicative, illustrate the impact that coal-fired power generation would be the least preferred from a greenhouse perspective taking into account greenhouse emissions at the generating plant site. Notwithstanding, the arguments for Western Australia to maintain coal-fired power generation in the suite of power supply options, most importantly the need to maintain some diversity of energy sources to ensure security of power supply and cost competitiveness, are not ignored.

Table 6 compares the thermal efficiency and greenhouse gas emissions intensity of a range of conventional power generation plants in WA, with the 2000 emissions intensity for the SWIS.

TABLE 6
COMPARISON OF GREENHOUSE GAS EMISSIONS FROM CONVENTIONAL POWER GENERATION PLANT
(ADAPTED FROM TABLE 16 OF ATA Environmental, 2003)

Power Station	Fuel	Typical Capacity Factor	kg CO2-e/MWhr (Sent Out)	
Peaking Plant			**Original 2003**	**Wet Compression 2006**
Kemerton Power Station	***Gas/Liquid Fuel***	***10%***	***667.6***	***539***
Pinjar	Gas	8%	700	
Typical New Gas-fired Open Cycle	Gas	10%	700	
Mid Merit				
Muja A/B	Coal	53%	1,205	
Kwinana B	Gas	21%	610	
Typical New Gas-fired Combined Cycle	Gas	50%	400	
Base Load				
Muja C/D	Coal	73%	1,030	
Collie Power Station	Coal	79%	950	
Cockburn 1	Gas	85%	405	
Western Power Regional Reciprocating Engines	Liquid Fuel	80%	Typical 750 Lowest 675	
Typical New Coal-fired Power Station	Coal	85%	900	
Typical New Gas-fired Combined Cycle	Gas	85%	400	
South West Interconnected Grid	All	43%	890	

Notes:

1. Source: Table 3-1, Kemerton Power Station *Strategic Environmental Review* (WPC, 2002)
2. A value of 0.7 tonnes CO_2-e/MWh for a new open cycle plant instead of a typical value of 0.6 tonnes CO_2-e/MWh was used to account for the lower efficiency that results when running at part load, typical of peaking plant.

Greenhouse Impact of the Kemerton Power Station

Gas will be the major fuel used. Ultra low sulphur diesel will be available as back-up fuel if gas pipeline pressures in the area are too low for the power station to use. Lower CO_2-e per unit energy is produced on gas (natural gas produces about 62% of distillate).

The principal greenhouse gas emitted by the proposed KPS will be carbon dioxide (CO_2). The quantities of nitrous oxide produced are extremely small (<2 parts per million parts of CO_2-e). Nevertheless their effect is included together with unburnt methane and therefore the greenhouse gas emissions are expressed in terms of carbon dioxide equivalent emissions.

Table 7 presents a summary of the overall greenhouse emissions impact of the project. The estimated annual averages presented assume an overall load factor for the gas turbines of approximately 10% and an average current emissions intensity of the SWIS of 890 kg $CO_{2\text{-}e}$/MWh, compared to this project's 539 kg $CO_{2\text{-}e}$/MWh whilst operating on gas. Greenhouse emission intensities were determined in accordance with the Australian Greenhouse Office's *Technical Guidelines –Generator Efficiency Standards* (AGO, 2006).

Diesel fuel is provided only as a back-up fuel to gas. If gas is unavailable at Kemerton, other plants contracted to WPC would most likely fulfill the spinning reserve requirement. Operation of KPS on diesel in spinning reserve would be an extremely unlikely event.

TABLE 7
CALCULATED GREENHOUSE EMISSION INTENSITIES
KEMERTON POWER STATION OPEN CYCLE GAS TURBINE
(Ten Percent Capacity Factor)

Original Plant 2003 kg CO_2-e/MWh	Wet Compression 2006 kg CO_2-e/MWh	SWIS average current emissions intensity of the SWIS
667	**539**	**890**

	Original Plant	Wet Compression
Energy generated by KPS GWh/yr	240 GWh	297 GWh[2]
Natural gas consumption by KPS PJ/yr	Approx 3 PJ	Approx 3 PJ
Gross carbon dioxide equivalent emissions by KPS Open Cycle GT units[2] Tonnes $CO_{2\text{-}e}$/yr	Approx 160,000 tpa $CO_{2\text{-}e}$	Approx 160,000 tpa $CO_{2\text{-}e}$
Emissions from equivalent quantity of power generated by current SWIS assets. Tonnes $CO_{2\text{-}e}$/yr	213,600	264,330
Emissions avoided from project's electricity generation compared to current SWIS. Tonnes $CO_{2\text{-}e}$/yr	53,600	**104,330**

Notes:
1. This assumes approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel.
2. This energy would be generated if wet compression was used all the time when the power station is running.

The data demonstrates that there is a 19% improvement in greenhouse intensity as a result of the installation of wet compression from 667 kg CO_2-e/MWh to 539 kg CO_2-e/MWh. This is attributable to a greater amount of electricity generated with no increase in the amount of fuel consumed, nor greenhouse emissions emitted from the facility. As a result of the improvements, the predicted greenhouse emission intensities are approximately 39.4% lower than that for the SWIS average. Over the expected annual operating regime where an estimated capacity factor of approximately 10% is expected, an equivalent $CO_{2\text{-}e}$ emission savings of approximately 104,330 tpa could be achieved, almost triple that for the original air cooled power station project. Notwithstanding, the actual reduction will depend upon the operating regime, fuel availability and total hours that the peaking plant is on duty.

5.4.3 Environmental Management and Mitigation

Consistent with commitments presented in the *Strategic Environmental Review* (WPC, 2002), the following management strategies will be implemented to manage Greenhouse emissions from the power station:

- TSK will continue its ongoing commitment to the Greenhouse Challenge. A Greenhouse Gas Management Strategy was prepared and approved under the Greenhouse Challenge Program in 2005. TSK provides reports of emissions and progress against agreed abatement actions to the Australian Greenhouse Office on an annual basis.

- Implementation of scheduled maintenance procedures to ensure optimal plant performance.

WPC initiatives that are presented in the *Strategic Environmental Review* (WPC, 2002) to pursue a range of initiatives in renewable energy, including wind farms and biomass conversion are supported. Notwithstanding, given the purpose of the proposed KPS and the quantity and reliability of the power supply requirements conventional fossil fuel power stations are the only viable options for the SWIS Power Procurement Process and established PPA.

Given that coal, gas and liquid fuels are the only viable energy options in Western Australia, the use of gas as a primary fuel for the Kemerton gas-fired Power Station will result in the least possible greenhouse emissions as gas has the lowest greenhouse intensity, followed by liquid fuels and then coal. The predominant use of gas for this project as well as the incorporation of wet compression to increase the plant power generating capacity (without a significant increase in fuel consumption) is consistent with maintaining the downward trend in carbon intensity in electricity generation.

Most importantly, the move installation of wet compression in the KPS has created an opportunity to service the needs of TSK's clients by increasing the plant output, without altering the net greenhouse emission profile for the power station. The significant improvement in the greenhouse intensity achieved at KPS is consistent with commitments made for the project in 2003.

5.4.4 Predicted Outcome

The installation of wet compression at KPS involves the adoption of best practicable measures and technologies to minimise greenhouse gas emissions from the project. On this basis, it is considered that the EPA's objectives for this factor will be met.

5.5 Surface and Groundwater Management

5.5.1 EPA Objective

To retain the integrity, functions and environmental values of protected wetlands, and to ensure that EPP lakes are protected and their key ecological functions are maintained.

To maintain the integrity, functions and environmental values of rivers and ephemeral streams, and to ensure that alterations to surface drainage do not adversely impact native vegetation.

To maintain the quality of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

5.5.2 Potential Environmental Impacts

Impacts on Surface Water

The major surface drainage feature around the Kemerton Industrial Park is the Wellesley River, which forms the eastern and south eastern boundaries of the Park. Although the Wellesley River does not directly drain the Park, data collected in a 1994 study (AGC Woodward Clyde, 1994) indicate that the water course acts as a perennial drain for the local groundwater system.

Although there are no wetlands of significance within the Kemerton Power Station site there are conservation category wetlands to the north (Conservation and Resource Enhancement Category) and south of the site (Figure 4). There are a number of permanent and seasonal wetlands in the eastern half of the Park. The Benger Swamp is the largest wetland in the area and lies approximately 2km east of the Wellesley River.

A drainage line that formerly traversed a portion of the power station site has been re-diverted around the premises. The drainage line feeds into wetlands to the east and ultimately into the Wellesley River. Although there would be no direct discharge of wastewater or contaminated stormwater into wetlands or the Wellesley River or its tributaries, there is the potential for contaminants to be exported from site. The use of lined evaporation ponds with a large excess capacity and the fact that there will be zero discharge of liquids or solids from the ponds onsite means that there is no credible threat from the evaporation ponds of discharge to this drain.

The *Strategic Environmental Review* (WPC, 2002) and original referral documentation (ATA, 2003) raised a number of relevant impacts on surface water that could potentially result from project construction:

- Increased erosion and sediment transport as a result of diversion of upstream surface runoff around the site;
- Soil deposition down gradient of project site;
- Increased surface run-off volumes due to the creation of additional hard surfaces; and
- Accidental release of hydrocarbons (fuel, lubricants and oil) required for normal earthmoving equipment during construction.

In addition, potential sources of pollutants to surface and groundwater resulting from the existing power station include:

- Potentially contaminated stormwater containing sediment or hydrocarbons from power station facilities;
- Hydrocarbons (such as backup fuel, lubricants and oils) transport, storage, handling and disposal;
- Sewerage and grey water; and
- Transport, storage, handling and disposal of chemical agents and cleaners.

The proposed KPS Enhancement Project presents a limited impact on surface water resources within or close to the project area. These impacts relate to:

- Construction activities associated with the water pipeline installation between Campbell Road and KPS;

- Establishment and ongoing discharge of RO Plant reject water into two lined evaporation ponds.

All modifications associated with installation of the wet compression circuit will be undertaken on the existing KPS footprint. Other than for the establishment of two evaporation ponds over previously cleared Bluegum plantation land (Figure 4), no major earthworks will be required onsite.

As part of the pipeline construction phase, earthworks and excavations up to 1m deep will be undertaken along the pipeline route. Following installation of the pipeline, the trench will be backfilled and recontoured to blend with surrounding topography. Accordingly, there should be no potential for permanent or long term modifications to the existing surface water sheet flows to and from existing wetland features or waterways.

The proposed pipeline will cross the Wellesley River as shown in Figure 4. Whilst the Wellesley is a perennial watercourse, flows in the river are significantly reduced during summer and early autumn which is when the pipeline river crossing construction is proposed. The pipeline will be constructed below the natural surface of the river bed so as to prevent long term impacts on the flow and hydrological regime of the river at the crossing.

Harvey Water (responsible for pipeline construction) has advised that the method to be used for the construction of the water pipeline across the Wellesley River will be open trench technology. The pipeline will be installed 1000mm below the invert of the river bed and encased in concrete. The invert and river banks will be reinstated as found and a riffle will be installed over the excavation area to prevent erosion. The proposed location of the river crossing is within the existing road reserve that the water pipeline will follow. During installation of the pipeline across the river bed, there will be some potential for sediment to be generated, as well as a localised increase in turbidity of the water in the vicinity of the construction. It is expected that pipeline installation will occur over a period of one working day in order to minimise downstream impacts on the river.

As shown in Figure 4, the selected route of the proposed water pipeline is at least 50 m away from identified wetlands in accordance with Department of Water requirements (Water and Rivers Commission, 2001).

Impacts on Groundwater

The Kemerton Industrial Park is underlain by an unconfined superficial aquifer. This aquifer is further underlain with the confined aquifers (by increasing depth) of the Leederville Formation and the Cockleshell Gully Formation. Groundwater in the superficial aquifer ranges in salinity from 100 to 8,500mg/L TDS. As shallow groundwater flow is generally towards the west, there is potential for pollutants in groundwater to migrate to wetlands and damplands, and eventually enter Leschenault Inlet.

A bunded bulk storage tank with capacity of 2ML is located on the KPS site. This serves as storage of back up liquid fuel in the event that there is insufficient gas available in the DBNGP to allow full operation of the power station. As previously detailed in the original referral documentation for the KPS (ATA, 2003), there is potential for loss of liquid hydrocarbons to the environment due to spillage during tank loading or failure of connections, valves, transfer lines or the tank itself, if containment measures are not taken.

Other than liquid fuel, operation of the power station requires the transportation, storage and handling of hydrocarbon products including lubricating oils and greases and degreasers. Small quantities of hazardous materials such as herbicides, detergents and small quantities of solvents may also be used and stored on- site. Improper handling or poor storage of these liquid chemicals could potentially result in spills that could enter the environment without safeguards being applied.

Acid Sulphate Soils Risk

Acid sulphate soils (ASS) are wetland soils and unconsolidated sediments that contain iron sulfides which, when exposed to atmospheric oxygen in the presence of water, form sulfuric acid. ASS form in protected low energy environments such as barrier estuaries and coastal lakes and commonly occur in low-lying coastal lands such as Holocene marine muds and sands. When disturbed, these soils are prone to produce sulfuric acid and mobilise iron, aluminium, manganese and other heavy metals. The release of these reaction products can be detrimental to biota, human health and built infrastructure.

The presence of ASS has been a recognised issue of concern in Western Australia since 2003. The DEC and the Western Australian Planning Commission (WAPC) have released guidance notes on ASS, covering the requirement for assessing sites and the management of sites where ASS are identified.

The Western Australian Planning Commission (WAPC) Planning Bulletin 64 (WAPC, 2003), identifies the KPS and land encompassing the pipeline route as low to moderate risk areas for acid sulphate soils. There is potential for soils along the Wellesley River to present a high risk.

5.5.3 Environmental Management and Mitigation

The management of potential sources of contamination associated with ongoing operations at KPS have previously been addressed and assessed as part of the original referral (ATA, 2003). TSK currently implements an approved *Operations Environmental Management Plan* as part of daily operations (ATA, 2005a; Appendix 8). The *Operations Environmental Management Plan* includes Surface and Ground Water Management Plans which prescribe specific design and operational requirements to be implemented in order to prevent impacts on surface and groundwater resources. The *Operations Environmental Management Plan* will continue to be implemented and will be reviewed on an ongoing basis to reflect current day operations at the site, and requirements of the site Environmental Protection licence issued annually by DEC.

5.5.3.1 Construction and Development Phase

As previously discussed, TSK proposes to install a 4km water pipeline to deliver water required for the wet compression circuit from one of Harvey Water's existing offtakes at Campbell Road (Figure 4).

Pipeline construction equipment will mainly include an excavator and mobile equipment and vehicles as needed. The pipeline corridor will be up to 15m wide, with excavations for the pipeline being up to 1m deep. The pipeline will be installed in sections over an overall construction period of up to one month. Excavation for the two proposed evaporation ponds will likewise occur to a maximum depth of 1m (Figure 5).

Construction is proposed to commence in May 2007 when the ground water table is low. Groundwater monitoring conducted as part of the construction and operations phases of the

KPS indicate that the groundwater within and in proximity to the power station site is at least 2m below ground level between the months of February and April (ATA, 2005b). This is consistent with data presented in the *Kemerton Water Study* where measurements taken in April 2001 where the groundwater levels were between 2.67m and 4.5m to the east of the KIP core (Aquaterra, 2002).

On this basis, the groundwater table will not be intersected, and hence, no dewatering will be required as part of installing the subsurface pipeline or evaporation ponds. In the event that dewatering is required, an application for a dewatering licence will be obtained from the Department of Water (DoW), and appropriate management measures will be adopted to prevent impacts associated with dewatering activities and discharges. This will be conducted to the satisfaction of the DEC and DoW as necessary.

No servicing of equipment will be undertaken on the pipeline route during the construction of the pipeline. No fuels or other liquid chemicals will be stored onsite, other than that at the KPS and construction contractor's offsite depot.

Notwithstanding, a spill response plan will be implemented such that any accidental spillage or loss of liquid chemicals will be isolated, contained and cleaned up in order to prevent impacts on the surrounding environment.

Construction contract staff will utilise temporary ablution facilities ('Portaloos') for sewerage and grey water. These facilities will be established and operated in accordance with Department of Health and Shire of Harvey requirements.

All solid and liquid wastes will be stored in impervious receptacles and removed from the construction site on at least a weekly basis.

Management of Acid Sulphate Soils

Prior to commencement of excavations associated with the water pipeline installation, a soil sampling exercise will be undertaken to determine the extent and magnitude of ASS at the site and an Acid Sulphate Soil Management Plan (ASSMP) will be prepared to the satisfaction of the Land and Water Quality Branch of the DEC.

Where excavation of Potentially Acid Sulphate Soils (PASS) or Actual Acid Sulphate Soils (AASS) is required, it will be undertaken as rapidly as possible to minimise the exposure of soils at the edge and base of excavations to the atmosphere.

Where practical, excavated acid sulphate soils will be stockpiled on a pad constructed of alkaline material such as limestone pending treatment. The pad shall be graded to ensure good drainage and all sides shall be bunded with limestone or similar alkaline material to prevent lateral migration of acidic runoff.

A neutralising agent (such as Aglime) will be mixed with the ASS material at a rate that satisfies the effective neutralising value set by the specified liming rates. If dewatering is required in areas of AASS or PASS, appropriate treatment and monitoring will be detailed in the ASSMP.

5.5.3.2 Commissioning and Operating Phase

Surface Water Management

The water quality proposed to be imported to site is shown in Table 2 in Section 3.3.3. The KPS Wet Compression system and water treatment plant relies on a consistent water quality to be imported into the plant. On this basis, and under contractual agreement with the supplier, Harvey Water, only high quality water as described in Table 2 will be brought on to site.

Pipeline water pressures and flow will be monitored throughout the year. An inspection system will be implemented to maintain the integrity of the pipeline and corridor. Given that the pipeline will be located below ground, the potential for damage in the event of fire will be avoided. Should there be any inadvertent losses from the pipeline, these will be corrected by Harvey Water immediately, however, given the high water quality (TDS <300mg/L), no significant impacts are expected to surface and groundwater resources.

Reject water from the RO plant will be generated at the rate of approximately 18kL/hr when wet compression is implemented. It is expected that reject (concentrate) water will have a TDS of approximately 700mg/L.

Several options for disposal of this effluent have been investigated including its reuse by irrigating the surrounding plantation. However, given elevated sodium and chloride concentrations, there is potential for irrigation of the water to affect tree growth. There may also be additional potential impacts from groundwater mounding and localised impacts on the nearby wetlands which would need to be monitored and managed.

Accordingly, TSK will ensure that this effluent will be directed to two 1.5mm HDPE lined evaporation ponds to be constructed onsite. The ponds will be designed and constructed to have a combined capacity of 20.8ML, and will have sufficient freeboard to prevent overtopping in the event of extreme rainfall events (Figure 5). The ponds will be constructed using a cut to fill on existing plantation area, and will be mostly elevated above ground level to avoid impacts with potential rises of the ground water table during the winter months. The ponds will be visually inspected daily by site personnel, and measures will be immediately implemented where the freeboard appears to be compromised. Visual assessments will be conducted on a biannual basis to test liner integrity when cleaning out the ponds.

TSK will continue to implement the site Surface and Stormwater Management Plan as part of the overall approved *Operations Environmental Management Plan* (ATA, 2005a; Appendix 8). The *Operations Environmental Management Plan* as well as the Environmental Protection licence (Appendix 4) for the site outlines surface water monitoring requirements which will continue to be implemented. The KPS water monitoring programme incorporates a network of surface sampling sites upstream and downstream of the power station. Based on discussions with the DEC's Southwest Region Office, it is considered that the current monitoring regime will be sufficient to assess potential impacts from the discharge of effluent to the lined evaporation ponds.

Other surface water management measures for the existing KPS will continue to be implemented:

- Clean stormwater from non-process areas, roofs, and access roads will continue to be allowed to infiltrate into the surrounding soil in accordance with Water Sensitive Urban Design (WSUD) principles. (No onsite channels, drainage basins, sediment traps or

rainwater tanks or similar will be utilised for the treatment of clean stormwater leaving the site).

- Onsite, stormwater will continue to be collected from the roofs either in galvanised mild steel gutters or directly down piped and routed through external down pipes. From the down pipes the stormwater directly discharge into soakage pits.

- Soakage pits are designed to cope with both expected and extreme (1:100) rainfall events. The pits are filled with gravel or other appropriate material to enhance infiltration to the aquifer.

- In areas where oily spills can occur catchment areas including potentially contaminated stormwater from plant process areas will be directed through an oily water separator. The discharge of this system will be connected to the existing stormwater drainage systems.

- A Spill Response Plan will be implemented to deal with spillages and leaks within the plant area. The plan includes details on methods of containment, collection and disposal and training of personnel.

Groundwater Management

The existing KPS incorporates a 2ML bulk fuel tank which has been designed to ensure zero potential for export of hydrocarbons to surface or groundwater. These measures include bunding to contain the quantity of fuel plus 10% and bund wall heights to capture jetted fuel ejected from tanks splits, plus lining with impervious concrete designed to appropriate Australian Standards of containment and fire fighting (such as Australian Standard *1940 for The Storage and Handling of Flammable and Combustible Liquids)*. Similarly all pipework and connections will be located within impervious trenches, and any spillages will be captured and contained within impervious oil separator pits.

The site is presently designed to achieve zero process water discharge under normal operation with potentially contaminated process waters from the facility being directed to a collection basin to remove suspended solids, followed by an oily water separator to remove hydrocarbons (Figure 3). The remaining effluent will continue to be removed from site by a licensed contractor.

Contaminants arising from bulk fuel tank dewatering or maintenance procedures will only be disposed of in a manner approved by the DEC on a case by case basis.

Wastewater from ablution facilities will continue to be directed to installed septic tanks and leach drains approved by the Shire of Harvey and DEC.

Solid wastes including putrescibles (kitchen scraps, biodegradable materials, etc) and hazardous wastes that have the potential to pollute groundwater will be collected regularly and disposed of to the Kemerton Regional Landfill or alternative appropriately designated landfill site. Additional management practices regarding solid and liquid wastes are detailed in Section 5.7.3 as well as within the Solid and Liquid Waste Management Plan which is a component of the overall *Operations Environmental Management Plan* (ATA, 2005a; Appendix 8).

TSK will continue to implement the site Groundwater Management Plan as part of the overall approved *Operations Environmental Management Plan* (ATA. 2005a; Appendix 8). The *Operations Environmental Management Plan* as well as the Environmental Protection licence (Appendix 4) for the site, outlines groundwater monitoring requirements which will continue

to be implemented. The KPS water monitoring programme incorporates a network of monitoring bores upgradient and down gradient of the power station. It is considered that the current monitoring regime will be sufficient to assess potential groundwater impacts from the discharge of effluent to the lined evaporation ponds.

5.5.4 Predicted Outcome

The proposed management measures as well as the existing environmental mitigation measures for the KPS will ensure that potential impacts resulting from this proposal can be managed to meet the EPA's objective in relation to this factor.

5.6 Noise

5.6.1 EPA Objective

To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997 (As Amended)*.

5.6.2 Potential Environmental Impacts

The nearest noise sensitive premises to the KPS is approximately 1.8km to the northwest of the power station. The nearest dwelling to the proposed pipeline route is at least 500m from the start of the pipeline route at Campbell Road.

Noise can be generated at the during construction of the pipeline and during operation of the power station. Generally speaking, unacceptable noise levels can that cause sleep disturbance, annoyance and also adverse health effects.

Construction activities will occur during daylight hours and principally during weekdays. Standard construction plant and earthmoving equipment will be utilised, and will be the main source of noise emissions during construction.

As for the existing power station, gas turbine and generator sets would be the main source of noise from the power station during operation. The additional components to be installed as part of the KPS Enhancement Project include:

- Demineralised water treatment plant;
- 1ML Demineralised water storage tank;
- Forwarding pump skid;
- Wet compression injection skid and associated spray rack installed inside GT compressor air inlet;
- Associated piping, electrical cabling and control system.

As shown on Figure 3, each of these components will be located within or adjacent to the existing KPS. All modifications will be within the existing KPS footprint.

There is no requirement for additional cooling fans as part of the KPS enhancement proposal.

As for the existing KPS, the wet compression technology supplier has made a commitment to attenuate the plant such that the noise at the station boundary will not exceed 60dB(A).

Noise Assessment Criteria

The *Environmental Protection (Noise) Regulations 1997 (As Amended)* stipulate the allowable noise levels that can be received at any noise sensitive premises from another premises. The allowable noise level is determined by the calculation of an influencing factor, which is added to the baseline criteria set out in Table 1 of the *Regulations*. However, under the Regulations noise emissions for the Kemerton Industrial Park have an adjustment of +5 dB(A) to the influencing factor. The Regulations under Section 5, subclause (5) of Schedule 3 state:

"Where a noise emission from any premises located within the boundaries of the area known as the Kemerton Industrial Park Policy Area, as specified in the Shire of Harvey District Planning Scheme No. 1, is assessed, an adjustment of 5 dB(A) is to be added to the influencing factor determined under subclause (1) at the point of reception of the noise emission in respect of any period between –

a) 0900 hours and 1900 hours on Sunday or public holiday;
b) 1900 hours and 2200 hours on any day;
c) 2200 hours and 0700 hours on Monday to Saturday inclusive; and
d) *2200 and 0900 hours on a Sunday or public holiday."*

Therefore, the assigned noise level at the various times of the day would be as listed in Table 8.

TABLE 8
ASSIGNED NOISE LEVELS AT RESIDENCE

Time of Day	Assigned Noise Level		
	L_{A10}	L_{A1}	L_{max}
0700 - 1900 hours - Monday to Saturday	50	60	70
0900 - 1900 hours - Sunday & Public Holidays	45	55	70
1900 - 2200 hours - All Days	45	55	60
2200 - 0700 hours - Monday to Saturday	40	50	60
2200 - 0900 hours - Sunday & Public Holidays	40	50	60

Notes:
1. The L_{A10} noise level is the noise that is exceeded for 10% of the time.
2. The L_{A1} noise level is the noise that is exceeded for 1% of the time.
3. The L_{Amax} noise level is the maximum noise level recorded.

In accordance with Regulation 7, noise emissions from the power station would be considered as not "significantly contributing" to any exceedance of the Regulatory criteria assigned level at any noise sensitive premises, if the noise received at the premises is 5 dB(A) below the assigned noise level. Therefore, to comply with Regulation 7, noise emissions due to the Power Station at the nearest noise sensitive premises would need to be 35 dB(A) or less.

With the noise control included in the design of the power station, noise emissions from the power station are not considered to be tonal and no penalties/adjustments would be applied to the calculated noise level.

As part of the original referral for the KPS, noise assessment and modelling was conducted to assess the likely noise impacts from the proposed power station (Herring Storer Acoustics, 2003). Based on the noise modelling conducted, the following conclusions were made:

- The closest noise sensitive residence is located approximately 1.8km to the northwest of the power station. Based on noise modelling conducted, the predicted overall noise at this premises is less than 32 dB(A).

- Noise emissions from the power station would comply with regulatory requirements at all residences located outside the boundary of the Kemerton Industrial Park at all times. The resultant levels within sensitive areas would be less than 35 dB(A) and therefore, noise emissions from the power station would be considered as NOT "significantly contributing" to any excess at a residence and would be deemed to comply with the *Environmental Protection (Noise) Regulations 1997(As Amended)* at all times.

- Noise received at the boundary of the site would comply with Regulatory requirements of 60 dB(A).
- Noise emissions from the proposed power station were predicted to be well below ambient noise levels at residences of concern and hence intrusive characteristics will not be an issue.

5.6.3 Environmental Management and Mitigation

5.6.3.1 Construction and Development Phase

During the construction phase of the proposed water pipeline, noise may be generated during operation of mobile equipment during excavation work. Measures to ensure noise is minimised during the construction phase includes:

Personnel shall be trained in the operation of equipment that has the potential to generate noise emissions.

- In accordance with Australian Standard 2436 *Guide to Noise Control on Construction, Maintenance and Demolition Sites* (Standards Australia, 1981), the equipment used for construction will be the quietest reasonably available.

- Personnel shall have access at all times to operational manuals for equipment being utilised and must be familiar with the procedures detailed in the operations manual.

- Equipment maintenance and inspection schedules shall be implemented to ensure that all equipment is operating as per the manufacturer's instructions and within regulatory requirements. This will include ensuring all noise control equipment is correctly fitted and operating at design performance.

- Traffic movements will be scheduled to avoid noise sensitive periods (eg night-time), and traffic routes will be restricted to major roads in and out of the Kemerton Industrial Park such as Marriot Road.

- Use silencers and noise attenuation on mobile equipment as required.

- Schedule particularly noisy activities in accordance with the *Environmental Protection (Noise) Regulations 1997* criteria.

- Implementation of a Complaints Management Protocol in accordance with the approved *Operations Environmental Management Plan* for the KPS.

5.6.3.2 Commissioning and Operations Phase

No noise complaints have ever been received as a result of operations at the existing KPS. As part of the proposed changes to the KPS, noise emissions at the nearest existing residences, will continue to be managed by engineering design methods and use of installed noise attenuation to comply with the *Environmental Protection (Noise) Regulations 1997 (as Amended)* at all times, including achieving not more than 60dB(A) at the boundary.

As previously stated, sound pressure levels have been determined for the operating plant, and the technology supplier has made a commitment to attenuate the plant such that the noise at the station boundary will not exceed 60dB(A).

The power station will not contribute significantly to noise at the nearest noise sensitive premises, and on a cumulative basis, when combined with the potential future industry mix as determined for the Kemerton Expansion Study. Noise levels are predicted to achieve the allowable noise criteria at the boundary of the power station buffer zone.

Notwithstanding, TSK will continue to implement the site Noise Management Plan which is a component of the approved *Operations Environmental Management Plan* (Appendix 8). Noise management for the project will include:

- Acceptance testing of newly installed components required for the proposed wet compression system;
- Training of personnel in the operation of equipment that has the potential to generate noise emissions;
- Implementation of plant and equipment maintenance and inspection schedules to ensure that all equipment is operating as per design specifications. This will include ensuring all noise control equipment is correctly fitted and operating at design performance;
- Retention or reestablishment of Bluegum vegetation where possible to serve as a noise buffer;
- Implementation of a complaints management protocol where received noise complaints are logged, investigated and actioned where necessary.

Given the noise mitigation initiatives adopted in the overall plant design, as well as the current track record of the premises where no noise complaints have been received since commissioning, no monitoring of plant noise levels will be undertaken on an ongoing basis unless valid complaints are lodged. In such circumstances, repeated complaints will be investigated to assess the need for completion of a detailed noise assessment that will be undertaken by a qualified sub-consultant using approved methods. A report will be prepared to address potential noise exceedances and will include practical and feasible mitigation measures that may be adopted.

5.6.4 Predicted Outcome

It is considered that acoustical treatment measures incorporated during construction and operation (if necessary) will reduce noise levels in the surrounding environment to meet the EPA's objective in relation to this factor.

5.7 Solid and Liquid Wastes

5.7.1 EPA Objective

Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal.

5.7.2 Potential Environmental Impacts

The inappropriate storage and disposal of wastes can lead to environmental problems including:

- The contamination of ground or surface waters;
- Flammable hazards;
- The creation of nuisance conditions such as offensive odours or wind-blown waste; and
- Encouragement of vermin such as feral cats and foxes.

During construction, solid waste will generally comprise domestic waste and construction waste from the plant area. Green waste will also be generated during clearing associated with removal of plantation for the water pipeline installation. Domestic and construction waste are expected to comprise of:

- Packaging materials (plastic, cardboard, paper and pallets);
- Scrap metal in various types and forms;
- PVC pipe offcuts;
- Inert wastes (wood, paper, concrete);
- Surplus fill from construction of the onsite evaporation ponds;
- Timber scraps;
- Geotextiles (such as HDPE liner for the evaporation ponds);
- Cable;
- Putrescible (kitchen) wastes;
- Oily rags; and
- Electrical off-cuts.

No hazardous solid wastes are expected to be generated during the construction activities.

During operation of the KPS, waste generation will be limited to:

- RO Plant reject water;
- Domestic and putrescible wastes;
- Inert wastes (plastic, cardboard, paper and pallets);
- Waste oils;
- Sewerage and grey wastewater from ablution facilities;
- Spent solvents;
- NiCad or FeCad batteries;
- Compressor blade washing;
- Hydrocarbons from the installed oily water separation and collection system.

5.7.3 Environmental Management and Mitigation

The management of solid and liquid wastes during the construction and operations phase of the project will be in accordance with the Solid, Liquid and Hazardous Materials Management Plan approved as part of the overall site *Operations Environmental Management Plan* (Appendix 8).

The *Operations Environmental Management Plan* includes the following management measures that will continue to be implemented:

- Reject water (concentrate) from the RO Plant will be directed via a dedicated pipeline to the proposed evaporation ponds.

- No waste will be burnt onsite.

- Solid wastes will be collected and disposed of into merrill or skip bins located on site. These bins will be emptied on a scheduled basis by a licence waste contractor. Wastes will be disposed of to the Kemerton Regional Landfill or alternative appropriately designated landfill site by a licensed contractor.

- Separate merrill or skip bins shall be provided to only accept putrescible or inert wastes such as kitchen scraps, or paper, cardboard, wood, concrete and plastics respectively. These bins shall be inspected regularly to ensure they are in good condition and only contain wastes that the bin has been designated for. These bins will have lids or cage tops to prevent vermin or feral cats entering the bins.

- Recyclable materials such as scrap metal, obsolete or expired equipment (transformers, pumps, pipes), NiCad and FeCad batteries, electrical cable shall be segregated and stockpiled separately to other wastes to allow recycling or reuse. This material will be directed to a designated area in the laydown yard and appropriately signposted.

- Designated merrill or skip bins shall be provided, signposted and monitored to ensure that only hazardous wastes are directed to these bins.

- These bins shall be inspected regularly to ensure they are in good condition and are not corroded.

- Contaminated soils, oily rags, hydrocarbons wastes and sludges shall be collected separately and disposed of by an approved, licensed contractor.

- Wastes including flammable or combustible waste, oxidising waste, corrosive waste, radioactive waste, toxic waste or Class 6.1 wastes (miscellaneous waste PCB's, environmentally hazardous) which are also a dangerous good will be stored in accordance with the *Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulation, 1992.*

- Waste oils, spent solvents, coolants and other chemical wastes shall be collected in drums or holding tanks and will be recycled wherever possible and if not, removed offsite by an approved, licensed contractor. In the event that used oils, greases and lubricants need to be stored on site, the storage would be in a designated tank in a bunded area in accordance with Australian Standard 1940 *The storage and handling of flammable and combustible liquids* (Standards Australia, 2004). Any material stored on site must be transported periodically by a contractor licensed under the *Environmental Protection (Controlled Waste) Regulations 2004.*

- Wastewater from ablution facilities will continue to be directed to installed septic tanks and leach drains approved by the Shire of Harvey and DEC.

- Septic tanks and associated above and below ground pipework must be inspected (at least annually) to determine if leaks to the pipework have occurred due to corrosion or other damage.

- Staff shall be made aware of issues affecting waste management, associated environmental impacts and be given opportunities to improve waste management procedures.

5.7.4 Predicted Outcome

It is considered that the application of accepted waste management practices during construction and operation of the proposed modifications to the KPS will meet the EPA's objective in relation to this factor.

6. COMMUNITY CONSULTATION

The proposed modifications to the Kemerton Power Station are considered to present an overall beneficial change with reduced environmental impacts resulting from the addition of wet compression.

On this basis, TSK has implemented a targeted community consultation program commensurate with the nature, scale and predicted outcome of the proposed modifications. The program has included the following components:

- Advertising of the proposal in the local newspaper commencing during the week of 11 December 2006 (Harvey Reporter, Southwest Times and Bunbury Herald) (a copy of the advertisement is provided as Appendix 10);
- Advice provided to the Kemerton Industrial Park Committee (including the Community Committee);
- Briefing of relevant officers from the Shire of Harvey;
- Liaison with plantation managers (Hansol Australia);
- Ongoing liaison with occupants of the properties traversed by the pipeline (Lot 503: Con Galati; Lot 507: LandCorp, David McFerran);
- Liaison with neighbouring resident Frank Spagnoio;
- Briefing of relevant officers of the Department of Environment and Conservation (Southwest Region Office); and
- Briefing of relevant officers of the Department of Environment and Conservation (EPA Services Unit, Perth).

Based on feedback provided to date, the key issues that were raised by consulted stakeholders relate to:

- Potential impact of site modifications on air emissions;
- Potential impact of site modifications on surface and groundwater resources; and
- Potential impact of pipeline installation on flora and vegetation.

Each of these issues are addressed in full in Section 5 of this report.

Liaison with Mr Con Galati, the owner of Lot 503 which will be traversed by the proposed pipeline, has to date raised no concerns or objections to the proposal. Mr Galati will be kept informed on the progress of work on his land. The relationship between this key stakeholder and TSK has been very positive since the inception of the KPS. A copy of the access agreement between Mr Galati and TSK is provided as Appendix 11.

A presentation to the Kemerton Industrial Park Coordinating Committee and representatives of the South West Development Commission was given on 1 February 2007 with a second presentation to the Kemerton Community Committee given on 6 February 2007. A copy of the presentation is included as Appendix 12. Feedback from both presentations was supportive, however all parties would prefer that waste water generated from the reverse

osmosis treatment plant was used for irrigation purposes rather than evaporated. This is also the preferred method of disposal for TSK, however communication with various departments to date has indicated that approval to irrigate the water may be a lengthy process. There is also some concern amongst the community in regard to the irrigation of waste water (Appendix 13). TSK would not discount using the water for irrigation purposes in the future, subject to the receipt of appropriate approvals.

Community member Mr Michael Whitehead, contacted ATA Environmental in January 2007 requesting a copy of the earlier version of this report (ATA, 2007). Mr Whitehead was mailed a copy and provided a written response on behalf of the Kemerton Action Group on the proposal. A copy of this response was forwarded to the EPA Service Unit (Filipe Dos Santos) and is provided as Appendix 13.

The submission by the Kemerton Action Group (KAG) is generally supportive of the proposal subject to the pipeline route being along the proposed northern route. There were some concerns raised in relation to the evaporation ponds and possible effects on a nearby drain.

Table 9 below provides a summary of the points raised within the submission.

TABLE 9
SUMMARY OF COMMENTS MADE BY THE KEMERTON ACTION GROUP IN RESPONSE TO THE KEMERTON POWER STATION ENHANCEMENT PROPOSAL

Raised By	Comment and/or Issue	Response by Transfield
Kemerton Action Group	***Vegetation/Habitat*** KAG recognises that the proposed modifications should have a net environmental gain and therefore support the proposal provided the water supply pipeline follows the route outlined in the proposal.	Noted. The pipeline will follow the route supported by KAG.
Kemerton Action Group	***Vegetation/Habitat*** The proposal would be opposed by the KAG if the pipeline route was to revert to earlier pipeline routes considered by TSK which could have potential significant impacts on significant wetlands and native vegetation.	Noted the Pipeline will not deviate from the route preferred by KAG. To do so would be a significant change to the proposal and would require re-assessment.
Kemerton Action Group	***Waste Water Disposal*** The proposal would be opposed by the KAG if waste water generated from the RO plant was used to irrigate surrounding blue gum plantation.	Noted. The proposal relies on evaporative disposal of waste water. Transfield did consider irrigation of the wastewater because of its inherently high quality but discarded this because the EPA advised it would complicate the assessment process. TSK proposes to install two 1.5mm HDPE lined evaporation ponds to which wastewater from the RO plant will be directed. As the proposal no longer proposes to irrigate the waste

Raised By	Comment and/or Issue	Response by Transfield
		water, this concern is not considered a matter for further assessment.
Kemerton Action Group	***Evaporation Pond*** KAG raised some concerns relating to the potential for spills from the evaporation pond and the potential for groundwater and surface water contamination	Noted. Only one evaporation pond was proposed in the original report (ATA, 2007), however this has now been revised to two ponds, to ensure that the ponds are able to dry out in order for solids to be removed. Reject water from the RO plant will have a TDS of ~700mg/L, which is consistent with water of drinking water quality. It is recognised however, that due to evaporation, the concentration of water within the evaporation ponds will increase. The proposed method of operation for these two ponds is such that only one pond is in operation (i.e. accepting RO reject water) in any one year while the second one dries out, ready for removal of accumulated residues at the end of that year. Water balance modelling was performed which took into account rainfall and evaporation data for the Harvey area. Up to 5.4ML of reject water will be directed into one of the ponds on a yearly basis, with a further 3.8ML of rainfall captured within each pond. Evaporation has been modelled at 6.51ML per year, resulting in a maximum of 2.7ML of water remaining in either pond. This represents 26% of the capacity of the smaller of the two ponds. It is considered that the spare capacity offered by the two pond design, the integrity of the 1.5mm HDPE liner and the commitment to construct the two ponds to QA standards in accordance with the relevant standards will ensure that potential surface and groundwater impacts are managed to meet the EPA's objectives in relation to surface and groundwater protection. The risk of overtopping will be addressed by management measures during the Works Approval application process.
Kemerton Action Group	***Protection of Water Quality in Drain*** A drainage feature comprising a large ditch passes through a wetland area on route to the Wellesley River and represents a possible transport route to the river should a polluting event	The only potential source of spillage into the environment is from the evaporation ponds. As these are lined with heavy duty HDPE liners designed with in excess of 100% spare capacity

Raised By	Comment and/or Issue	Response by Transfield
	occur. The KAG believes this drain should be blocked closer to the power station site to minimise the risk of pollution reaching the Wellesley River and being transported to the Leschenault Estuary.	accounting for input from the plant and rainfall, there is no credible threat of overtopping, even in extreme storm events. As a result this action is not considered necessary by Transfield. In any case the soils on the site are well drained sandy soils so that in the unlikely event that the ponds overflowed, any spillage is likely to infiltrate directly into the soil profile and would not in any case report to the drainage feature. In addition, the drain provides active drainage for the area of the power station and concerns exist that should it be blocked, the power station site may be flooded during the winter period.
Kemerton Action Group	***Impacts on Surface and Groundwater*** General concerns were raised regarding the potential risk to surface and groundwater.	The project has minimal potential for impact on surface or groundwater given that water is sourced from externally to the site and the disposal of wastewater is by evaporation in sophisticated evaporation ponds. (Also see more detailed responses above).
Kemerton Action Group	***Air Emissions*** Concerns were raised about the potential for significant changes to air emissions.	As indicated in the body of the report, air emissions will not change greatly as there is no additional fuel usage. The greenhouse intensity of the facility will decrease as CO_2 emissions will remain the same but power outputs will increase. NO_X emissions are predicted to decrease slightly and all other parameters will remain largely unchanged.
Kemerton Action Group	***Flora and Fauna*** Concerns were raised about the potential for impacts on flora and fauna.	The pipeline route has been carefully chosen to prevent impacts on flora and fauna and as a result there should be no clearing of vegetation. All other infrastructure will be constructed within the cleared building envelope of the power station. As a result there will be no significant impacts on flora and fauna.
Kemerton Action Group	***Miscellaneous*** The KAG raised some concerns in	Noted these are matters to be dealt with

Raised By	Comment and/or Issue	Response by Transfield
	relation to the ecological value placed upon wetlands and vegetation to the south of the site, which had been previously identified as a potential pipeline route. The KAG recognises that these issues do not relate to this proposal given the selected pipeline route does not transverse these areas, however their concern was that the investigations and reports conducted by ATA Environmental may be used for future developments, and they wished their concerns to be noted.	by Landcorp as owner/manager of the Kemerton Industrial Park.

Transfield is currently writing a response to the Kemerton Action Group care of Mr Whitehead which will also include updated details on the design of the evaporation ponds.

As part of TSK's Community Consultation programme (which is a component of the approved *Operations Environmental Management Plan* for the KPS (Appendix 8), liaison with key stakeholders will continue during the construction and operations phase for the project.

7. CONCLUSION

The key environmental factors that have been assessed in this referral document for the proposed bioreactor facility are:

Biophysical
- Flora
- Fauna

Pollution Management
- Gaseous and Particulate Emissions
- Greenhouse Gas Emissions
- Surface and Groundwater Management
- Noise
- Solid and Liquid Wastes

After examining these factors the following conclusions have been reached:

- The proposed changes to KPS will allow TSK to offer Verve Energy increased power station capacity at ambient temperatures above ISO conditions by removing sensitivity to ambient temperature (introduction of wet compression). The modification therefore allows the provision of additional energy to retailers by optimisation of an existing power generation asset that is designed to industry best practice standards with minimal emissions.

- The proposed modifications will result in a number of net environmental benefits as detailed in Section 5 of this report. Primarily, given that there will be no increase in the amount of fuel consumed on an annual basis from that already approved, the proposed modification will permit a greater amount of power to be generated, whilst decreasing the greenhouse intensity of the power station by 19% (i.e. reduced from 668 tonnes of CO_2-e/MWh generated to 539 tonnes of CO_2-e/MWh generated).

- The incorporation of wet compression will increase the overall plant generation capacity without increasing emission concentrations of key pollutants such as oxides of nitrogen (NOx).

- The water pipeline route has been carefully selected to avoid significant wetlands and native vegetation, traversing previously cleared farmland and bluegum and pine plantations.

The benefits of siting of the KPS have been previously addressed (ATA, 2003), and are relevant to the current proposal:

- The suitability of the Kemerton Industrial Park for major industry is well established;

- Considerable community consultation has been undertaken for the Kemerton Industrial Park for over 15 years;

- Detailed studies have already been conducted into air emissions, noise, water supply and waste management as part of previous planning for the Kemerton Industrial Park;

- Proximity to natural gas and power transmission lines;

- Noise emissions from the site will comply with the criteria at the boundary of the buffer zone;

- The site is consistent with the Final Concept Plan for Kemerton Industrial Park such that it minimises fragmentation of the larger areas of the core, leaving these areas available for future major industrial developments; and

- Existing roads provide access to the site.

This project addresses the principles of ecologically sustainable development as follows:

- ***The Precautionary Principle***: The proposal has adopted the precautionary principle by selecting a pipe route that does not pose unacceptable risks to the surrounding environment. The management of potential environmental factors is discussed in Section 5. Detailed studies have already been conducted into air emissions, noise, water supply, vegetation, fauna and waste management as part of previous planning for the Kemerton Industrial Park. This proposal presents an opportunity to further optimise electricity generation of an existing power generation asset that is designed to best practice standards with minimal emissions. The proposal avoids the need to consider the construction of a separate facility and the associated environmental costs such a facility may incur.

- ***Intergenerational Equity*****:** The design, construction and operation of the proposed enhancement will be in accordance with best practice standards, where the residual impacts to the environment are expected to be minimal. KPS already operates to industry best standards, and the proposed enhancements present an opportunity to increase electricity generation to meet forecasted power needs, without any increase in greenhouse gas emissions. The EPA's *Position Statement No. 6: Towards Sustainability* (EPA, 2004) discusses sustainability and energy in the context of greenhouse gas emissions and concludes that meeting any realistic Australian emissions targets will involve a gradual move away from conventional coal-fired electricity to less carbon intensive forms of energy, such as the direct use of natural gas. KPS is evidence of this trend towards lower carbon intensive power generation.

- ***Conservation of Biological Diversity and Ecological Integrity*****:** Conservation of biological diversity and ecological integrity is a fundamental consideration (Sections 2.6, 2.7, 5.1 and 5.2). The water pipeline route has been carefully selected to avoid significant wetlands and native vegetation within the region. The pipeline will traverse over previously cleared land which is currently used for farming purposes and bluegum and pine plantations. The evaporation ponds will be located within the existing power station footprint, and will not require the clearing of any native vegetation for their installation.

- ***Improved Valuation, Pricing and Incentive Mechanisms*****:** Environmental factors have played a significant part in the site selection process to determine the preferred location of the water pipeline route. The KPS has been designed to ensure potential pollution impacts are minimised, and the proposed enhancement will actually increase the greenhouse gas efficiency of the project.

- ***The Principle of Waste Minimisation:*** The use of wet compression increases the energy output of the gas turbines by a nominal 20% without any increase in fuel usage. This represents a significant reduction in greenhouse intensity of the facility and reduction in the amount of CO_2 (waste) produced per Kilowatt hour of energy. The by-product waste water stream is evaporated to atmosphere contributing to the natural water cycle while there are approximately 4 tonnes of solid waste in the form of salts that require off-site

disposal each year. No other solid or liquid wastes will be produced as a result of the use of wet compression.

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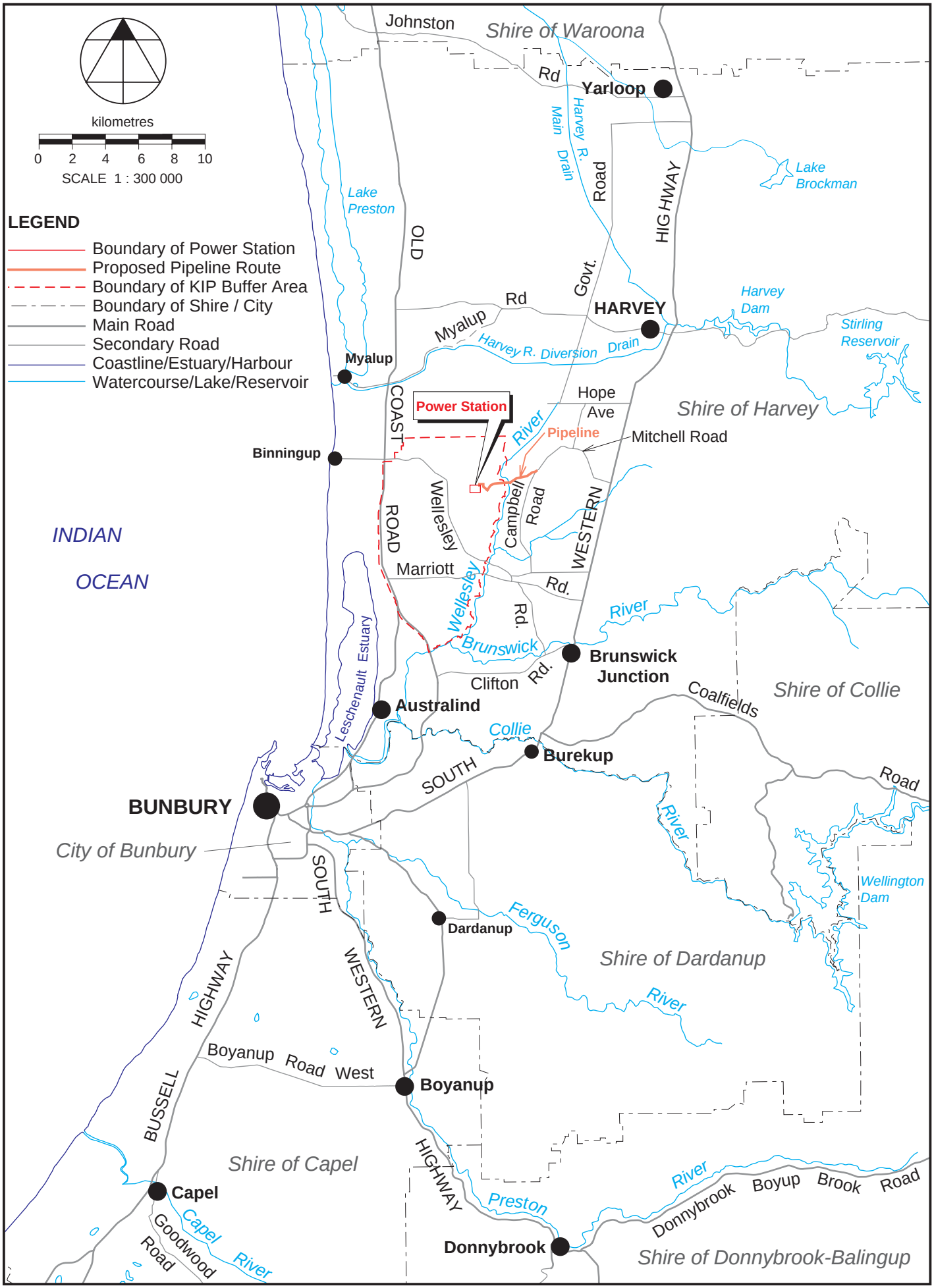
FIGURES



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KEMERTON POWER STATION ENHANCEMENT PROJECT
ENVIRONMENTAL APPROVAL SUPPORTING DOCUMENTATION

REGIONAL LOCATION

FIGURE 1

LEGEND

- Proposed Kemerton Power Station Site and Buffers
- Revised Boundary of K.I.P. Buffer Area
- Revised Boundary of Industial Core
- Dampier to Bunbury Gas Pipeline
- Proposed Gas Lateral
- Transmission Line 330kv
- Transmission Line 132kv
- Substation
- View Shed Location

SOURCE: WESTERN POWER, 14-8-01

kilometres
0 0.5 1 1.5 2 2.5
SCALE 1 : 50 000

Dampier-Bunbury Gas Pipeline
Existing Gas Lateral
Proposed Gas Lateral
Proposed KPS Site & Buffers
North View Site
South View Site
Wastewater Treatment Plant
Piggery
Abbatoir
Energy Equipment
Simcoa
MIC, Nurfarm, BOC and Cobckburn Cement
GAS GATE STATION
MYALUP SWAMP
MIALLA LAGOON
LESCHENAULT ESTUARY
INDIAN OCEAN
HARVEY RIVER DIVERSION DRAIN
WELLESLEY RIVER
BOONILUP ROAD
LEITCH ROAD
RUNNYMEDE ROAD
ARTHUR ROAD
WELLESLEY ROAD
BINNINGUP ROAD
OLD COAST ROAD
SPRINGHILL ROAD
TREASURE ROAD
BUFFALO ROAD
MARRIOTT ROAD
DEVLIN ROAD
WELLINGTON ROAD

KEMERTON POWER STATION
ENHANCEMENT PROJECT
ENVIRONMENTAL APPROVAL
SUPPORTING DOCUMENTATION

KEMERTON INDUSTRIAL PARK

FIGURE 2

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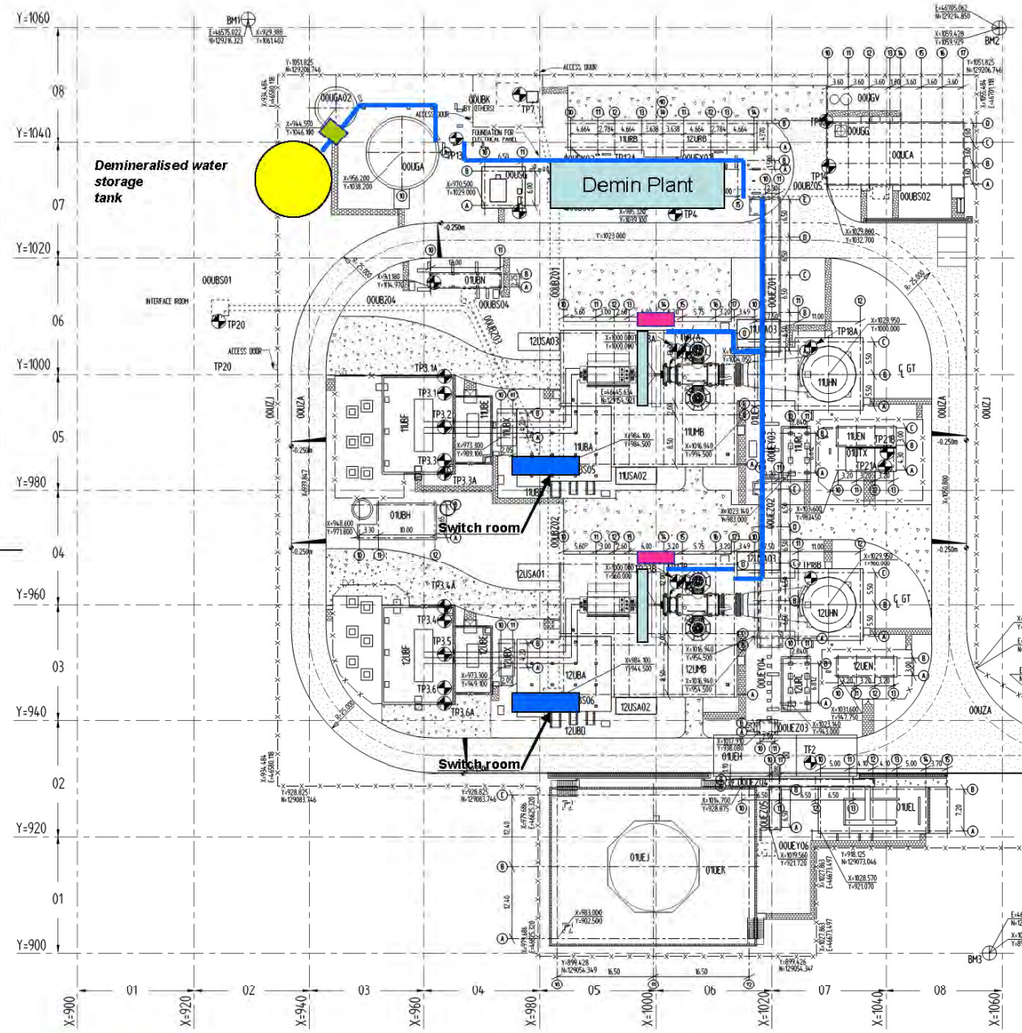
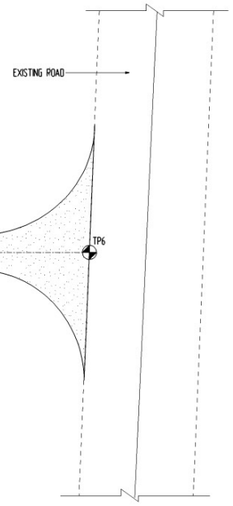
Legend

- Inlet Duct
- Pipeline from demineralised water tank to WetC skids And from WetC skid to Inlet Duct
- Demineralised water forwarding pumps
- Wet Compression Skid (Pump, motor & control system)





LIST OF TERMINAL POINTS

Terminal Point	Description	Local X	Local Y	Local Z	PCG Easting	PCG Northing	PCG Elevation	Remarks
TP1	Fuel Gas (Underground)	1071.520	928.165	- 1.605	46717.154	129083.086	13.895	Cl. Of Pipe
TP2 (A-D)	Fuel Oil	UEH	UEH	+ 0.560	UEH	UEH	16.060	
TP3.1	330kV-HV-Connection (For Unit-11)	963.575	996.740	+ 13.220	46609.209	129151.561	28.720	
TP3.1A	Earth Shield (For Unit-11)	963.575	999.690	+ 17.220	46609.209	129154.611	32.720	
TP3.2	330kV-HV-Connection (For Unit-11)	963.575	990.940	+ 13.220	46609.209	129145.861	28.720	
TP3.3	330kV-HV-Connection (For Unit-11)	963.575	985.140	+ 13.220	46609.209	129140.061	28.720	
TP3.3A	Earth Shield (For Unit-11)	963.575	982.940	+ 17.220	46609.209	129137.861	32.720	
TP3.4	330kV-HV-Connection (For Unit-12)	963.575	957.210	+ 13.220	46609.209	129112.131	28.720	
TP3.4A	Earth Shield (For Unit-12)	963.575	959.690	+ 17.220	46609.209	129114.611	32.720	
TP3.5	330kV-HV-Connection (For Unit-12)	963.575	951.410	+ 13.220	46609.209	129106.331	28.720	
TP3.6	330kV-HV-Connection (For Unit-12)	963.575	945.610	+ 13.220	46609.209	129100.531	28.720	
TP3.6A	Earth Shield (For Unit-12)	963.575	942.940	+ 17.220	46609.209	129097.861	32.720	
TP4	Demin Water	1003.300	1027.600	+ 0.500	46648.936	129182.521	16.000	Cl. Of Pipe
TP5	Raw Water	976.500	1027.945	+ 0.410	46622.134	129182.866	15.910	Cl. Of Pipe
TP6	Access Road	1236.242	933.999	-0.250	46881.876	129088.920	15.250	
TP7	Power Supply For Construction	976.550	1048.450	----	46622.184	129203.371	----	
TP10	Potable Water	1029.515	1043.830	+ 0.500	46675.149	129198.751	16.000	Cl. Of Pipe
TP13A	Raw Water at 00UGA Area	965.600	1040.700	+ 0.220	46611.234	129195.521	15.720	Cl. Of Pipe
TP14	Raw Water at 00UCA Area	1030.000	1035.790	+ 0.720	46675.634	129190.711	16.220	Cl. Of Pipe
TP17A	Drainage of Gas Turbine False Start Oil	11UMB	11UMB	----	11UMB	11UMB	----	
TP17B	Drainage of Gas Turbine False Start Oil	12UMB	12UMB	----	12UMB	12UMB	----	
TP18A	Gas Turbine Diffuser and Stack Drain	1026.780	1004.600	-0.650	46672.414	129159.321	14.850	
TP18B	Gas Turbine Diffuser and Stack Drain	1026.780	964.600	-0.650	46672.414	129119.321	14.850	
TP20	Cable Connection to Relay Room	924.230	1009.520	----	46569.864	129164.441	----	
TP21A	Ignition Gas	1040.130	984.250	+ 0.655	46685.764	129139.171	16.155	Cl. Of Pipe
TP21B	Ignition Gas	1040.130	986.550	+ 0.655	46685.764	129141.471	16.155	Cl. Of Pipe
TP22	Emergency Diesel Daily Oil Tank	UBN	UBN	----	UBN	UBN	----	
TP23A	Drainage of Gas Turbine Wash Water	11UMB	11UMB	----	11UMB	11UMB	----	
TP23B	Drainage of Gas Turbine Wash Water	12UMB	12UMB	----	12UMB	12UMB	----	

PLANT NORTH

BUILDING LEGENDS

11/12UBA01/02/03	STRUCTURE FOR POWER CONTROL CENTER (PCCs)
11/12UBD	STRUCTURE FOR LV AUXILIARY POWER TRANSFORMERS
11/12UBE	STRUCTURE FOR HV AUXILIARY POWER TRANSFORMERS
11/12UBF	STRUCTURE FOR GENERATOR TRANSFORMERS
01UBH	STRUCTURE FOR OIL-COLLECTING PIT/OIL SEPERATOR
00UBK	STRUCTURE FOR COMMON AUXILIARY TRANSFORMER FOR CONSTRUCTION AND STANDBY TRANSFORMER (SCOPE: TRANSFIELD)
01UBN	STRUCTURE FOR EMERGENCY POWER GENERATING SET
00UBS01-06	STRUCTURE FOR CABLE PULLING PITS
11/12UBX	STRUCTURE FOR GENERATOR CIRCUIT BREAKERS
00UBZ01-05	STRUCTURE FOR CABLE CONDUITS
00UCA	CONTROL ROOM, ADMINISTRATION, WORKSHOP AND STORAGE BUILDING
01UEH	STRUCTURE FOR UNLOADING OF LIQUID FUELS
01UEJ	STRUCTURE FOR STORAGE OF LIQUID FUELS
01UEK	BUND WALL FOR STORAGE OF LIQUID FUELS
01UEL	STRUCTURE FOR FORWARDING OF LIQUID FUELS
11/12UEN	STRUCTURE FOR GAS METERING AND FILTER
00UEY01-06	STRUCTURE FOR PIPE AND CABLE SLEEPER WAY
01UEX	STRUCTURE FOR PRESSURE SUSTAINING STATION
00UEZ01-03	STRUCTURE FOR PIPE AND CABLE DUCT
00UGA	STRUCTURE FOR RAW WATER TANK
00UGC	STRUCTURE FOR DEMINERALIZED WATER STORAGE
00UGG	STRUCTURE FOR POTABLE WATER STORAGE
00UGV	STRUCTURE FOR SEPTIC TANK
11/12UHN	STRUCTURE FOR STACK
11/12UMB	STRUCTURE FOR GAS TURBINE BUILDING
11/12URB	STRUCTURE FOR FIN FAN COOLERS (SERVICE WATER)
11/12URC	STRUCTURE FOR FIN FAN COOLERS (LUBE OIL)
11/12USA01-03	STRUCTURE FOR BUILDING VENTILATION
00USG	STRUCTURE FOR FIRE FIGHTING WATER PUMPS
01UTX	STRUCTURE FOR IGNITION GAS SKID
00UZA	ROADS
00UZJ	FENCING AND GATE

NOTES

1. ALL DIMENSIONS AND LEVELS ARE N METERS, UNLESS NOTED OTHERWISE
2. FINISHED FLOOR LEVEL ±0.00m = +15.50m ABOVE A.H.D
3. FINISHED GROUND LEVEL -0.30m = +15.20m ABOVE A.H.D
4. ROAD TOP LEVELS AT ROAD TERMINAL POINTS TO BE MATCHED PROVIDING GENTLE SLOPE
5. MAIN ROAD IS 6 M WIDE

OUTDOOR ROOM NUMBERING SYSTEM

00 UZT 0101
- UNIT
- KKS
- SITE FIELD NO.

NOTIONAL LOCATION OF EVAPORATION PONDS

SOURCE: Siemens AG, 30-5-2005

LEGEND

- ROADS IN SIEMENS SCOPE
- HARDSTANDING AREA
- WALKWAY
- FENCE
- 300mm. WIDE PREFABRICATED CHANNEL
- BM1/2/3 BENCH MARKS

Export classification AL: N ECCN: N
Goods labeled with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN not equal to N" are subject to US reexport authorization. Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

Index Rev.	Datum Date	bearb. Coord.	gepruft Checked	Änderungshinweis/Details
e	2005-05-30	BC sgd	SV sgd	AXIS FOR 00UGA02 ADDED
d	2005-01-05	BC sgd	SV sgd	GENERALLY REVISED
c	2004-11-09	BC sgd	SV sgd	REVISED AS MARKED 1
b	2004-07-23	BC sgd	SV sgd	REVISED AS MARKED 0
a	2004-07-12	BC sgd	SV sgd	REVISED AS MARKED 0

TRANSFIELD SERVICES

Ursprung/Original	Ursprung-Nr./Original-No.	Urspr.-PKZ-Nr. Orig.-PC
Projekt/Project: KEMERTON POWER STATION SCPP		PKZ/PC: AUS379
Datum Date / Name / Maßstab Scale: 1:500 / A1		UA/DCC Type: UC07
gezeich. Drawn: 2004-07-07 P.MANNA sgd		Inhaltskennzeichen Contents Code: U
bearb. Coord.: 2004-07-07 BHASKAR sgd		
geprüft Checked: 2004-07-07 S.VERMA sgd		

Wet Compression System
Prcposed layout

ATA Environmental
environmental scientists

KEMERTON POWER STATION ENHANCEMENT PROJECT
ENVIRONMENTAL APPROVAL
SUPPORTING DOCUMENTATION
SITE PLAN
FIGURE 3

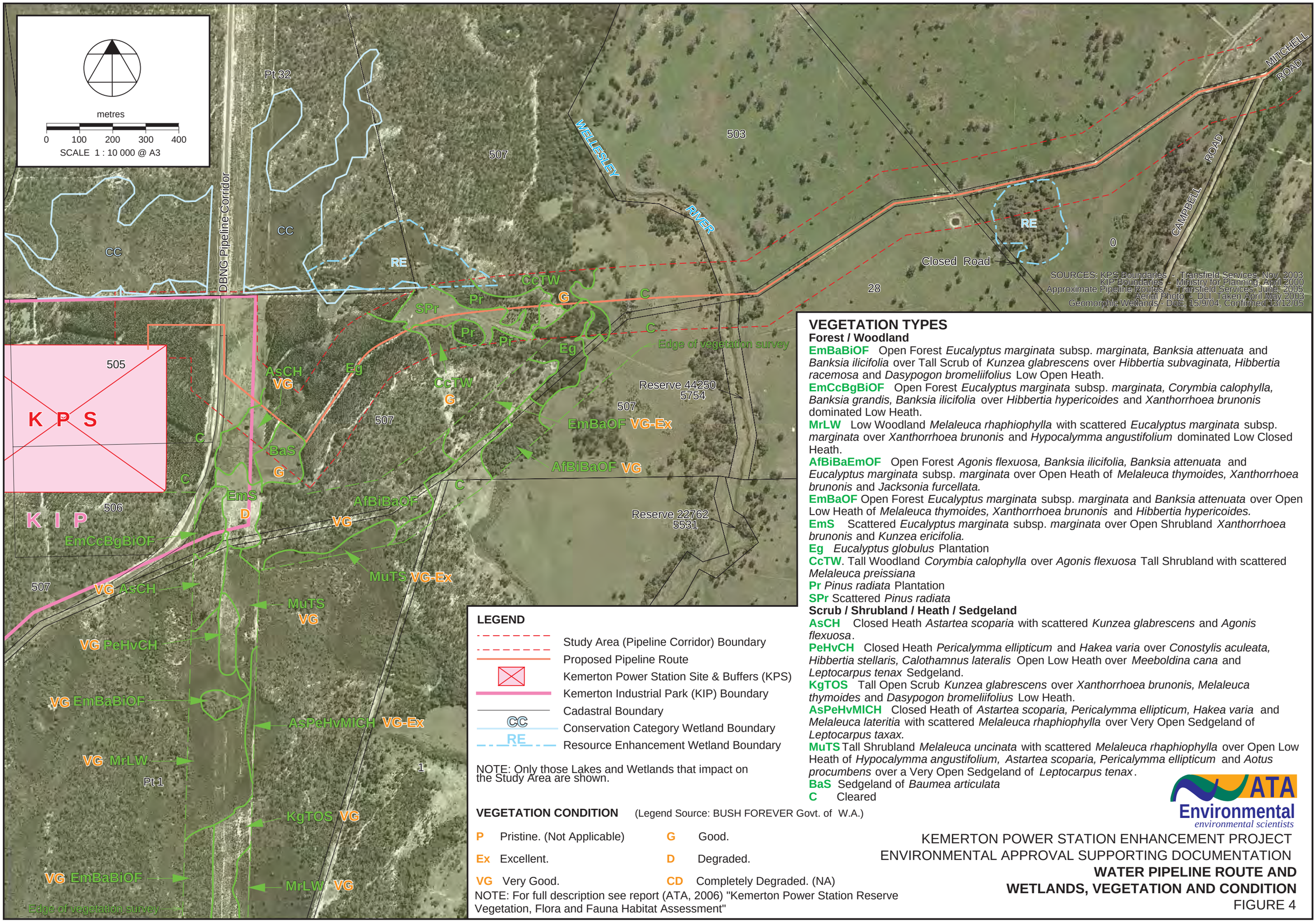
PRINTED: Tue 10 Apr 07

CHECKED: RK

DRAWN: MR 10-04-07

DATUM: MGA

TRA-2006-006/REPT/26_259f4.dgn



LEGEND

- Study Area (Pipeline Corridor) Boundary
- Proposed Pipeline Route
- Kemerton Power Station Site & Buffers (KPS)
- Kemerton Industrial Park (KIP) Boundary
- Cadastral Boundary
- CC — Conservation Category Wetland Boundary
- RE — Resource Enhancement Wetland Boundary

NOTE: Only those Lakes and Wetlands that impact on the Study Area are shown.

VEGETATION TYPES

Forest / Woodland

EmBaBiOF Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* over Tall Scrub of *Kunzea glabrescens* over *Hibbertia subvaginata, Hibbertia racemosa* and *Dasypogon bromeliifolius* Low Open Heath.

EmCcBgBiOF Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath.

MrLW Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea brunonis* and *Hypocalymma angustifolium* dominated Low Closed Heath.

AfBiBaEmOF Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata* over Open Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Jacksonia furcellata.*

EmBaOF Open Forest *Eucalyptus marginata* subsp. *marginata* and *Banksia attenuata* over Open Low Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Hibbertia hypericoides.*

EmS Scattered *Eucalyptus marginata* subsp. *marginata* over Open Shrubland *Xanthorrhoea brunonis* and *Kunzea ericifolia.*

Eg *Eucalyptus globulus* Plantation

CcTW. Tall Woodland *Corymbia calophylla* over *Agonis flexuosa* Tall Shrubland with scattered *Melaleuca preissiana*

Pr *Pinus radiata* Plantation

SPr Scattered *Pinus radiata*

Scrub / Shrubland / Heath / Sedgeland

AsCH Closed Heath *Astartea scoparia* with scattered *Kunzea glabrescens* and *Agonis flexuosa*.

PeHvCH Closed Heath *Pericalymma ellipticum* and *Hakea varia* over *Conostylis aculeata, Hibbertia stellaris, Calothamnus lateralis* Open Low Heath over *Meeboldina cana* and *Leptocarpus tenax* Sedgeland.

KgTOS Tall Open Scrub *Kunzea glabrescens* over *Xanthorrhoea brunonis, Melaleuca thymoides* and *Dasypogon bromeliifolius* Low Heath.

AsPeHvMlCH Closed Heath of *Astartea scoparia, Pericalymma ellipticum, Hakea varia* and *Melaleuca lateritia* with scattered *Melaleuca rhaphiophylla* over Very Open Sedgeland of *Leptocarpus taxax.*

MuTS Tall Shrubland *Melaleuca uncinata* with scattered *Melaleuca rhaphiophylla* over Open Low Heath of *Hypocalymma angustifolium, Astartea scoparia, Pericalymma ellipticum* and *Aotus procumbens* over a Very Open Sedgeland of *Leptocarpus tenax*.

BaS Sedgeland of *Baumea articulata*

C Cleared

VEGETATION CONDITION (Legend Source: BUSH FOREVER Govt. of W.A.)

P	Pristine. (Not Applicable)	**G**	Good.
Ex	Excellent.	**D**	Degraded.
VG	Very Good.	**CD**	Completely Degraded. (NA)

NOTE: For full description see report (ATA, 2006) "Kemerton Power Station Reserve Vegetation, Flora and Fauna Habitat Assessment"

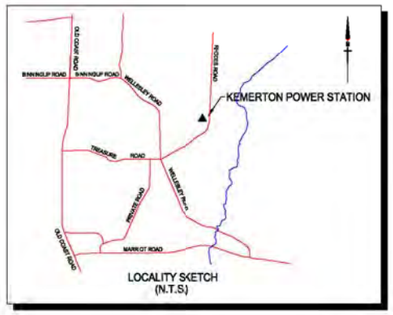
ATA Environmental
environmental scientists

KEMERTON POWER STATION ENHANCEMENT PROJECT
ENVIRONMENTAL APPROVAL SUPPORTING DOCUMENTATION

WATER PIPELINE ROUTE AND WETLANDS, VEGETATION AND CONDITION

FIGURE 4

625.0



LOCALITY SKETCH
(N.T.S)

NOTES

CLEAR SMALL TREES AND STOCKPILE FOR REMOVAL BY OTHERS - GRUB OUT ROOTS AND ROOTLETS AND DISPOSE OF.

REMOVE TOPSOIL (150mm) AND STOCKPILE FOR LATER RE-USE.

CUT TO FILL AND COMPACT FILL TO 95%MDD. COMPACT CUT BASE TO 95%MDD.

PROOF ROLL BASE OF DAM IN PRESENCE OF ENGINEER AND REMOVE ANY SOFT AREAS.

REPLACE DELETERIOUS MATERIALS WITH ACCEPTABLE FILL AND COMPACT.

INSTALL 1.5mm THICK HDPE WELDED LINER TO INTERIOR SURFACES, ANCHOR IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS.

CONSTRUCTION AND EQUIPMENT IS NOT TO ENCROACH INTO THE LARGE TREED BLOCKS.

N

ROAD

LINE BETWEEN WEST... POWER TOWER CENTRES

CENTRE OF POWER TRANSMISSION TOWER

NOM. 89.6m

NOM. 41.2m

LOT 505

EXISTING POWER STATION

PROJECT BOUNDARY

NOMINAL POSITION OF INLET PIPE (BY OTHERS)

CENTRE OF POWER TRANSMISSION TOWER (CONFIRMED POSITION)

446.0

128.1m

5.00

SURVEY STAKE FOUND (TYP)

26.6m

NOMINAL ALTERNATIVE INLET

OPEN DRAIN

EDGE LARGE TREE BLOCK

10.00

b=2227
t=4712
v=10408

DIVERTER VALVE

118.8m

BASE AREA 6709.5m²

CREST 50mm LOWER THAN SIDE EMBANKMENTS

b=2111
t=4817
v=10392

83.8m

OPEN DRAIN

50.7m

5.00

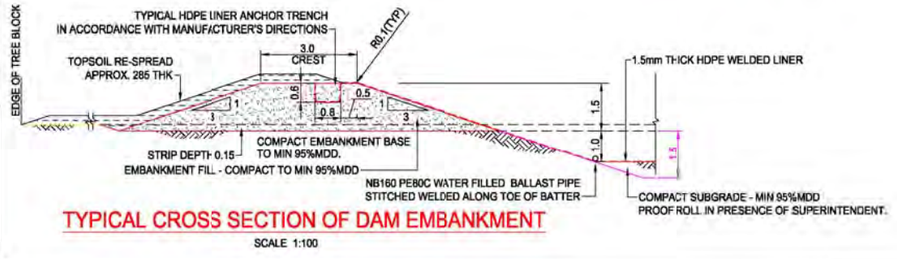
LOW GROUND, SCRUBBY

EDGE LARGE TREE BLOCK

168.5m

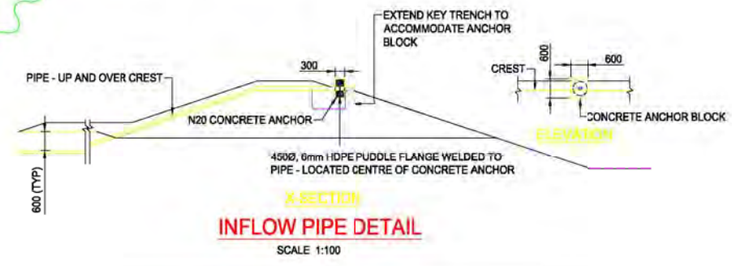
10.00

CREST 50mm LOWER ALONG THIS EMBANKMENT. HDPE LINER TO CONTINUE ACROSS CREST AND DOWN OUTSIDE BATTER TO FORM PROTECTED EMERGENCY SPILLWAY. LINER TO BE ANCHORED AT BASE OF OUTSIDE BATTER USING DETAIL SHOWN.



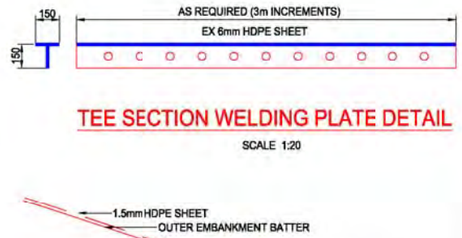
TYPICAL CROSS SECTION OF DAM EMBANKMENT

SCALE 1:100



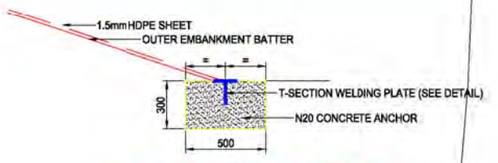
INFLOW PIPE DETAIL

SCALE 1:100



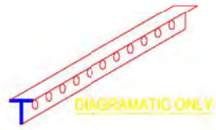
TEE SECTION WELDING PLATE DETAIL

SCALE 1:20



SPILLWAY LINER ANCHOR

SCALE 1:20



TREASURE

SURVEY

EXISTING STRUCTURES AND SURVEY STAKES HAVE BEEN DETERMINED ONSITE USING HAND HELD GPS, THEN CORRECTED TO THE ACTUAL COORDINATE POSITION OF THE FIRST WESTERN POWER TOWER WEST OF THE POWER STATION SITE. POSITIONS AND DISTANCES ARE NOT FINITE BUT ARE APPROXIMATE ONLY.

595.8

LOT 506

ATA Environmental
environmental scientists

KEMERTON POWER STATION ENHANCEMENT PROJECT
ENVIRONMENTAL APPROVAL SUPPORTING DOCUMENTATION

EVAPORATION POND DESIGN DETAILS

FIGURE 5

SOURCE: GOMME CIVIL & STRUCTURAL ENGINEERS, JAN 2007

APPENDICES

APPENDIX 1

MINISTERIAL STATEMENT 645
KEMERTON POWER STATION

MINISTER FOR THE ENVIRONMENT

Statement No.

000645

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

KEMERTON POWER STATION, KEMERTON

Proposal: The construction, operation and maintenance of a nominal 260 megawatt open cycle peaking power plant at Kemerton, as documented in schedule 1 of this statement.

Proponent: Transfield Services Kemerton Pty Limited (as trustee for Transfield Services Kemerton Trust)

Proponent Address: Level 12, Maritime Towers
201 Kent Street
Sydney NSW 2000

Assessment Number: 1499

Report of the Environmental Protection Authority: Bulletin 1121

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

Published on

- 9 FEB 2004

29th FLOOR, ALLENDALE SQUARE, 77 ST. GEORGE'S TERRACE, PERTH 6000 TELEPHONE: (08) 9220 5050 FACSIMILE: (08) 9221 4665/8
E-MAIL: judy-edwards@dpc.wa.gov.au

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of the approval of the Minister for the Environment.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;

2. new, significant, environmental issues have not arisen; and

3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environmental Protection which address:

1. the status of implementation of the proposal as defined in schedule 1 of this statement;

2. evidence of compliance with the conditions and commitments; and

3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every five years after the start of the operations phase, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;

2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;

3. significant improvements gained in environmental management, including the use of external peer reviews;

4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and

5. the proposed environmental targets over the next five years, including improvements in technology and management processes.

5-3 The proponent may submit a report prepared by an auditor approved by the Department of Environmental Protection under the "Compliance Auditor Accreditation Scheme" to the Chief Executive Office of the Department of Environmental Protection on each condition/commitment of this statement which requires the preparation of a management plan, programme, strategy or system, stating that the requirements of each condition/commitment have been fulfilled within the timeframe stated within each condition/commitment.

6 Decommissioning Plans

6-1 Prior to construction, the proponent shall prepare a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Preliminary Decommissioning Plan shall address:

1 rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;

2 a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;

3 a conceptual plan for a care and maintenance phase; and

4 management of noxious materials to avoid the creation of contaminated areas.

6-2 At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;

2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and

3 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

6-3 The proponent shall implement the Final Decommissioning Plan required by condition 6-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

6-4 The proponent shall make the Final Decommissioning Plan required by condition 6-2 publicly available, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environmental Protection for the preparation of written notice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environmental Protection.

3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environmental Protection.

Notes

1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

3 Within this statement, to "have in place" means to "prepare, implement and maintain for the duration of the proposal".

Judy Edwards

Dr Judy Edwards MLA
MINISTER FOR THE ENVIRONMENT

- 9 FEB 2004

Schedule 1

The Proposal (Assessment No. 1499)

The proposal is to construct, operate and maintain a nominal 260 megawatt open cycle peaking power plant at Kemerton (location shown in Figures 1 and 2).

Table 1 – Key Proposal Characteristics

Element	Description	
Project purpose	Provide peaking power to the South West Interconnected System	
Project life	25 years	
Power generating capacity	Nominal 260MW	
Energy generated per year	Approximately 240GWh	
Thermal efficiency At 40°C, 40% relative humidity, and 101.3kPa ISO conditions 15°C, 60% relative humidity	Natural gas 28.6% HHV 31.8% LHV[3] 30.2% HHV 33.5% LHV[3]	Liquid fuel 29.3% HHV 31.4% LHV[3] 30.9 % HHV 33.0% LHV[3]
Plant operating modes	Mode 1 - Peaking plant for 5% of the time at 100% load Mode 2 - Spinning reserve for 10% of the time at 55% load	
Operating hours	Approximately 1000 hours per year	
Estimated capacity factor	Approximately 10%	
Facility footprint Site area including buffer	2 hectares 28 hectares	
Plant facilities		
Proposed technology Number and size of gas turbines Number of stacks Height of stacks Number of liquid fuel storage tanks	2 x Siemens V94.2 gas turbine generators 2 x 130.5MW 2 35m 1 x 1.5ML tank	
Construction period	Approximately 16 months	
Inputs		
Cooling water	None	
General water requirements	20kL/day - For dust suppression during construction 30kL/yr - For domestic use	
Natural gas	Approximately 3PJ per year (approximately 900 hours per year) taken from the Dampier to Bunbury Natural Gas Pipeline	

Liquid fuel (Backup)	Up to 6 ML per year ultra low sulphur diesel (less than 100 hours per year) Sulphur content of diesel – 50ppm maximum	
Outputs		
Wastewater	None	
Solid waste	Less than 10 tpa	
Air emissions: Oxides of nitrogen (NO_X) Oxides of sulphur (SO_X)[1] Oxides of sulphur (SO_X)[2] Particulate matter Carbon monoxide (CO) Polycyclic aromatic hydrocarbons (PAHs) Non-methane volatile organic compounds (NMVOCs)	Natural gas (based on 900h per year at full load) <39.1 g/s (127 tpa) 0.0 g/s (negligible tpa) 0.0 g/s (negligible tpa) 2.0 g/s (6.48 tpa) 21.7 g/s (70.3 tpa) 0.00087 g/s (0.0028 tpa) 0.83 g/s (2.69 tpa)	Liquid fuel (based on 100h per year at full load) <114.2 g/s (41.1 tpa) 4.06 g/s (1.146 tpa) 0.406 g/s (0.146 tpa 7.62 g/s (2.74 tpa) 20.9 g/s (7.54tpa) 0.016 g/s (0.0057 tpa) 0.16 g/s (0.058 tpa)
Greenhouse gas emissions Average greenhouse intensity	Approximately 160,000 tpa CO_{2-e} (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel) 667.6.1 kg CO_{2-e}/MWh (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)	
Predicted noise level	<28 dB(A) at closest residences	

[1] Emissions modelling based on use of normal distillate (500 ppm sulphur content)
[2] Emissions modelling based on use of ultra low sulphur diesel (50 ppm sulphur content)
[3] Lower Heating Values (LHV) are manufacture guarantee values.

Abbreviations for Table 1

°C	degrees Celsius
CO_{2-e}	carbon dioxide equivalent
dB(A)	decibels (A weighted)
GWh	gigawatt hours
g/s	grams per second
HHV	higher heating value
ISO	International Standards Organisation
kg	kilograms
kL/day	kilolitres per day
kL/yr	kilolitres per year
kPa	kilopascals
LHV	lower heating value
m	metres
ML	megalitres
MW	megawatts
MWh	megawatt hours
ppm	parts per million
tpa	tonnes per annum
PJ	petajoules
<	less than

Figures (attached)

Figure 1 – Regional location
Figure 2 – Location in Kemerton Industrial Park
Figure 3 – Proposed Kemerton Power Station site map

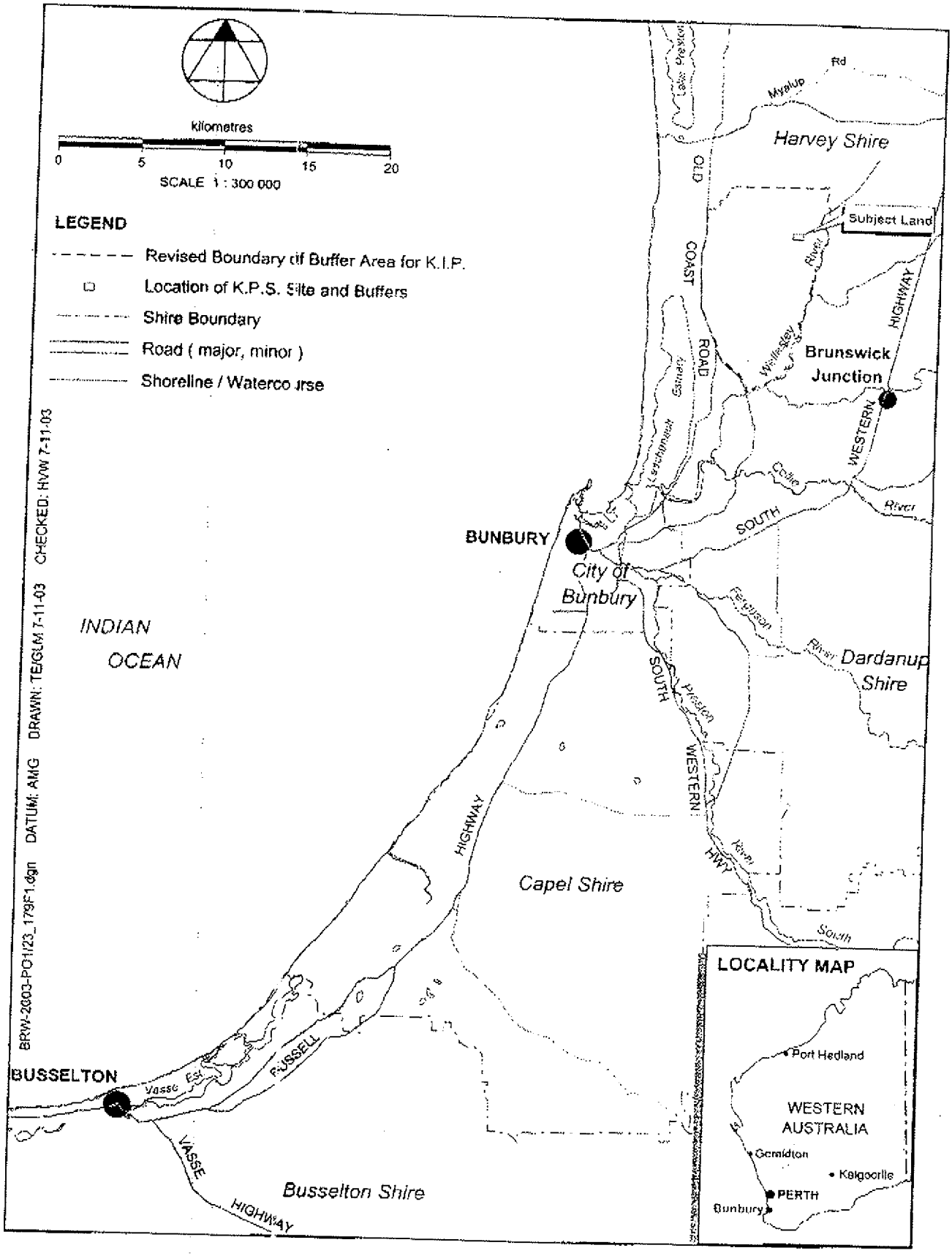


Figure 1: Regional location

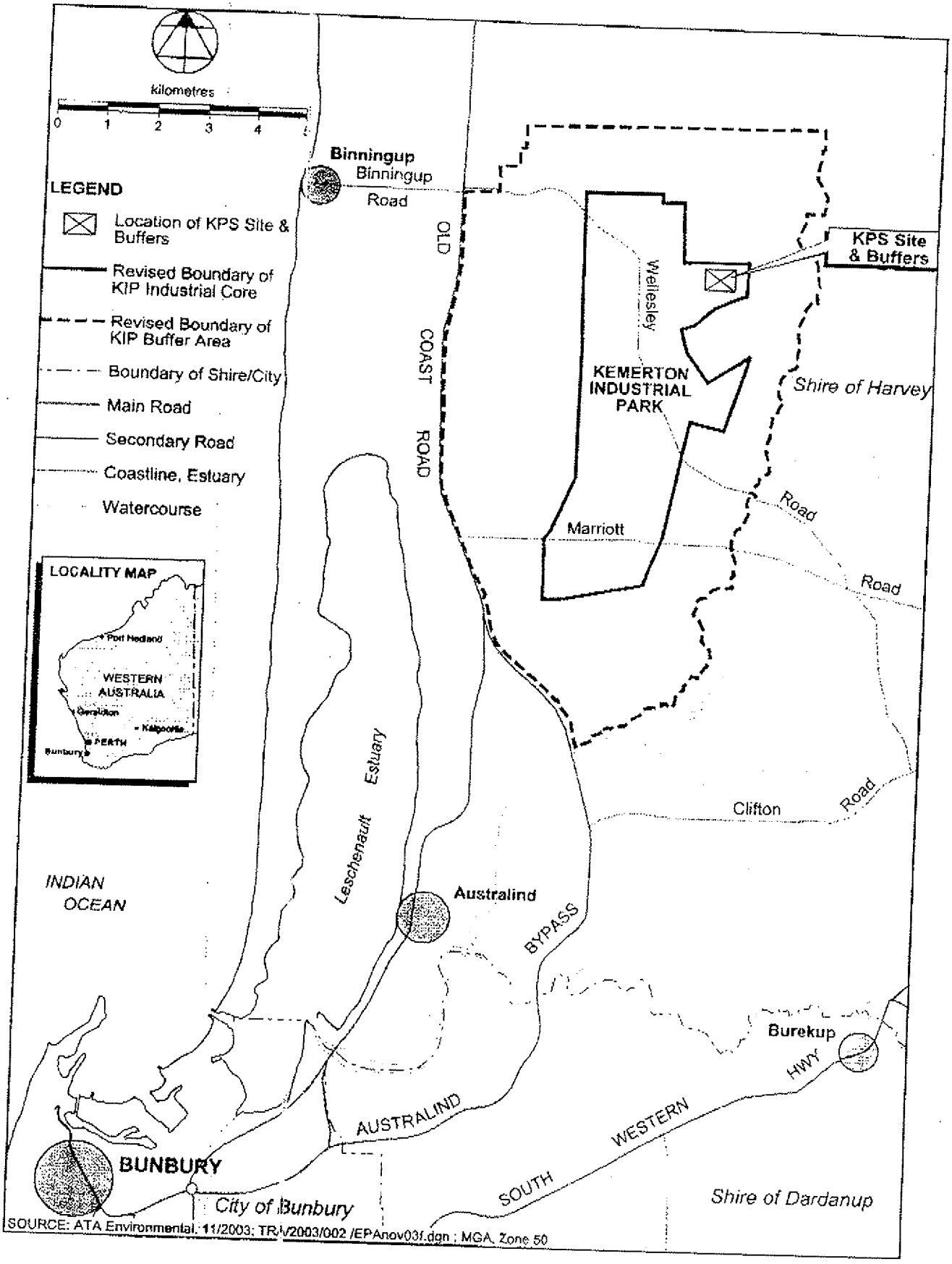


Figure 2: Location in Kemerton Industrial Park

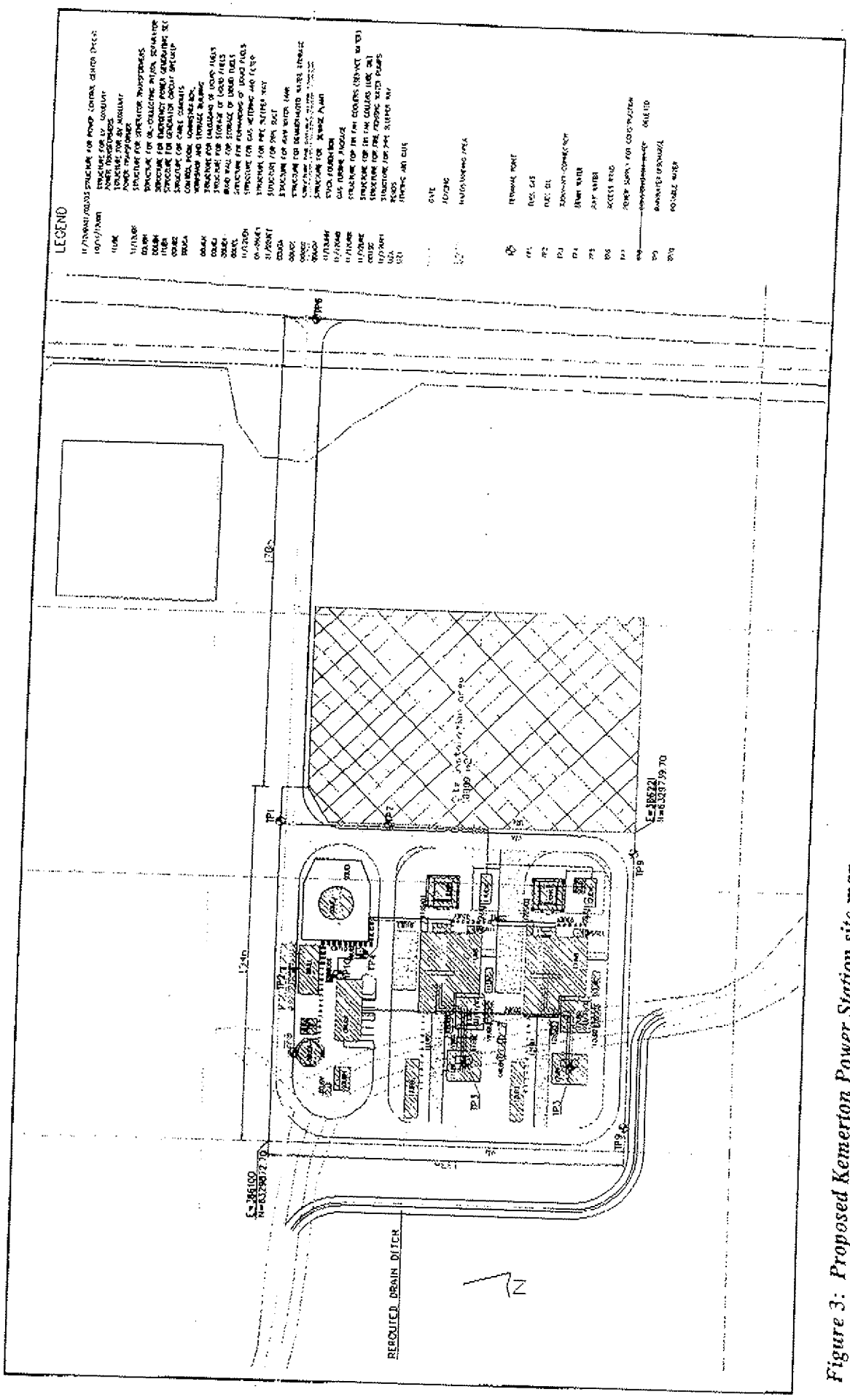


Figure 3: Proposed Kemerton Power Station site map

Schedule 2

Proponent's Environmental Management Commitments

December 2003

KEMERTON POWER STATION, KEMERTON

(Assessment No. 1499)

TRANSFIELD SERVICES KEMERTON PTY LIMITED
(AS TRUSTEE FOR TRANSFIELD SERVICES KEMERTON TRUST)

Proponent's Environmental Management Commitments – December 2003

KEMERTON POWER STATION (Assessment No. 1499)

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environmental Protection.

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
1	Construction Environmental Management	To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	1. Prepare a Construction Environmental Management Program (CEMP) which will include the following plans: • Flora and Vegetation Management Plan (see commitment 3); • Fauna Management Plan (see commitment 5); • Groundwater Management Plan (see commitment 6); • Surface and Stormwater Water Management Plan (see commitment 8); • Air Emissions and Dust Management Plan (see commitment 10); • Noise Management Plan (see commitment 13); • Solid and Liquid Waste Management Plan (see commitment 15); • Hydrocarbon and Hazardous Material Handling Plan (see commitment 17); • Aboriginal Heritage Management Plan (see commitment 19); • Community Consultation Plan (see commitment 20); and • Dewatering Management Plan (see commitment 22); 2. Implement the approved Construction Environmental Management Program (CEMP) described in 1.1 above.	Prior to Construction	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
2	Operational Environmental Management	To ensure all aspects of project operation are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	1. Prepare an Operational Environmental Management Program (OEMP) which will include the following plans: • Flora and Vegetation Management Plan (see commitment 4); • Groundwater Management Plan (see commitment 7); • Surface and Stormwater Water Management Plan (see commitment 9); • Air Emissions Management Plan (see commitment 11); • Noise Management Plan (see commitment 14); • Solid and Liquid Waste Management Plan (see commitment 16); • Hydrocarbon and Hazardous Material Handling Plan (see commitment 18); • Community Consultation Management Plan (see commitment 21). 2. Implement the approved Operational Environmental Management Program (OEMP) described in 2.1 above.	Prior to Commission-ing	
3	Terrestrial Flora and Vegetation	To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during construction.	1. Prepare a Construction Flora and Vegetation Management Plan which will address: • Construction Lay-down Site Rehabilitation; • Dieback Hygiene; • Weed management and control; • Clearing of blue gums; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Flora and Vegetation Management Plan described in 3.1 above.	Prior to Construction	CALM FPC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
4	Terrestrial Flora and Vegetation	To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during operation	1. Prepare an Operational Flora and Vegetation Management Plan which will address: • Dieback Hygiene; • Weed management and control; • Clearing of blue gums in buffer; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Operational Flora and Vegetation Management Plan described in 4.1 above.	Prior to Commissioning	CALM FPC
5	Terrestrial Fauna Specially protected (Threatened) fauna.	To protect Specially Protected (Threatened) Fauna species and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950* during construction	1. Prepare a Construction Fauna Management Plan which will address: • Feral and introduced animal management; • Management of species location if required; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Fauna Management Plan described in 5.1 above.	Prior to Construction	CALM
6	Groundwater Quality	To monitor groundwater quality and identify and mitigate sources of contamination during construction	1. Prepare a Construction Groundwater Management Plan which will address: • Sample bore locations; • Parameters and sample frequency for monitoring; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Construction Groundwater Management Plan described in 6.1 above.	Prior to Construction	WRC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
7	Groundwater Quality	To monitor groundwater quality and identify and mitigate sources of contamination during operation	1. Prepare an Operational Groundwater Management Plan which will address: • Zero process water discharge; • Design and bore construction; • Sample bore locations; • Parameters and sample frequency for monitoring; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Operational Groundwater Management Plan described in 7.1 above.	Prior to Commissioning	WRC
8	Surface Water Quality	To manage the potential effects of the construction of the project on surface water quality and to maintain existing flow paths where possible	1. Prepare a Construction Surface and Storm Water Management Plan which will address: • Management of contaminated surface water runoff; • Monitoring requirements; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Construction Surface and Storm Water Management Plan described in 8.1 above.	Prior to Construction	WRC
9	Surface Water Quality	To manage the potential effects of the operation of the project on surface water quality and to maintain existing flow paths where possible	1. Prepare an Operational Surface and Storm Water Management Plan which will address: • Management of contaminated storm waters such that none leaves the site; • Recovery mechanisms and structures for chemical and hydrocarbon spillages, • Monitoring requirements; • Response and contingency measures; and • Reporting requirements. 2. Implement the approved Operational Surface and Storm Water Management Plan described in 9.1 above.	Prior to Commissioning	WRC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
10	Air Quality - Gaseous Emissions	To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts.	1. Prepare a Construction Air Emissions/Dust Management Plan which will address: • the use of water sprays to wet the site during windy conditions; • the use of speed limits to minimise dust generated by vehicle movements; • the use of minimum drop heights when loading and unloading soils and other excavated materials; minimisation of areas of disturbed and/or exposed soils; • Incident management; • Responsibilities; • Reporting requirements; and • Employee training and awareness. 2. Implement the approved Construction Air Emissions / Dust Management Plan described in 10.1 above.	Prior to Construction	
11	Air Quality - Gaseous Emissions	To ensure that best practicable measures are taken to minimise discharge of gaseous and particulate emissions to the atmosphere. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical	1. Prepare an Operational Air Emissions Management Plan which will address: • Stack emission monitoring program (sampling location, frequency, parameters, standards and limits); • Reporting schedules; • Incident management; • Responsibilities; and • Employee training and awareness. 2. Implement the approved Operational Air Emissions Management Plan described in 11.1 above.	Prior to Commissioning	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
		smog are managed to minimise the generation of smog and any subsequent impacts.			
12	Greenhouse Gas Emissions	To ensure that potential greenhouse gas emissions emitted from proposed projects are adequately addressed and best practicable measures and technologies are used in Western Australia to minimise Western Australia's greenhouse gas emissions.	Pursue greenhouse gas reduction through: • Commitment to participate in the Greenhouse Challenge program. • Prepare a Greenhouse Gas Management Strategy under the Greenhouse Challenge program. • Implement a Greenhouse Gas Management Strategy under the Greenhouse Challenge program • Operate and maintain the plant to "Good Electricity Practice" as defined in the National Electricity Code.	Prior to Construction and throughout Operation	Australian Greenhouse Office
13	Noise	To protect the amenity of nearby residents from noise impacts resulting from construction activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997.*	1. Prepare a Construction Noise Management Plan which will address: • Noise management procedures for construction; • Retention of vegetation (plantation blue gums) where practicable to assist in noise mitigation; • Implementation of alternative noise attenuation packages to provide enhanced levels of noise control to meet boundary level noise limits if necessary; and • Implementation of a complaint management procedure to receive, investigate and action noise complaints. 2. Implement the approved Construction Noise Management Plan described in 13.1 above.	Prior to Construction	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
14	Noise	To protect the amenity of nearby residents from noise impacts resulting from operational activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997.*	1. Prepare an Operational Noise Management Plan which will address: • Maintenance of equipment that contributes to overall plant noise; • the use of silencers where necessary; • noise monitoring and reporting as necessary. • Implementation of a complaint management procedure to receive, investigate and action noise complaints. 2. Implement the approved Operational Noise Management Plan described in 14.1 above.	Prior to Commissioning	
15	Waste Management	Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during construction.	1. Prepare a Construction Solid and Liquid Waste Management Plan to address the following: • Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal; • Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; • General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements • Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area. • Prohibition of burning of waste onsite at all times. • Education of employees in non-hazardous solid waste management.	Prior to Construction	Shire of Harvey

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
			• Preparation of annual waste reports 2. Implement the approved Construction Solid and Liquid Waste Management Plan described in 15.1 above.		
16	Waste Management	Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during operation.	1. Prepare an Operational Solid and Liquid Waste Management Plan to address the following: • Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal ; • Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; • General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements; • Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area; • Prohibition of burning of waste onsite at all times. • Education of employees in non-hazardous solid waste management; and • Preparation of annual waste reports. 2. Implement the approved Operational Solid and Liquid Waste Management Plan described in 16.1 above.	Prior to Commissioning	Shire of Harvey

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
17	Hydrocarbon and Hazardous Materials	Design and construct (including bunding) in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the *Explosives and Dangerous Goods Act 1961*.	1. Prepare a Construction Hydrocarbon and Hazardous Materials Handling Plan to address: • Tracking of the volume of hydrocarbon and hazardous waste materials produced; • Identification of disposal options. • Appropriate transport, storage and handling procedures; • Appropriate clean-up and emergency procedures for spillages; • Monitoring requirements; • Contingency and Response Measures; • Reporting requirements. 2. Implement the approved Construction Hydrocarbon and Hazardous Materials Handling Plan described above in 17.1.	Prior to Construction	DoIR
18	Hydrocarbon and Hazardous Materials	Operate in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the *Explosives and Dangerous Goods Act 1961*.	1. Prepare an Operational Hydrocarbon and Hazardous Materials Handling Plan to address: • Tracking of the volume of hydrocarbon and hazardous waste materials produced; • Identification of disposal options. • Appropriate transport, storage and handling procedures; • Appropriate clean-up and emergency procedures for spillages; • Monitoring requirements; • Contingency and Response Measures; • Reporting requirements. 2. Implement the approved Operational Hydrocarbon and Hazardous Materials Handling Plan described above in 18.1.	Prior to Commissioning	DoIR

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
19	Heritage	To protect any sites of significance uncovered during the construction phase of the project.	1. Prepare a Construction Aboriginal Heritage Management Plan to address: • Procedures to ensure compliance with the *Aboriginal Heritage Act 1972*; • Consideration of recommendations of the Archaeological and Ethnographic Site Identification Survey Report (AIC, 2003) and adopt appropriate measures to address these recommendations where practicable. • Procedures for protection of a site of significance uncovered during construction; and • Procedure for continued liaison with relevant parties during construction. 2. Implement the approved Construction Aboriginal Heritage Management Plan described above in 19.1.	Prior to Construction	DIA
20	Social and Economic Issues	Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised.	1. Prepare a Construction Community Consultation Plan to address: • General community consultation associated with the environmental approval process; • Targeted consultation with nearby landowners and communities. • Consultation with the Shires of Harvey, (and/or Dardanup and City of Bunbury) and Kemerton Community Committee; • Local waterbody users' representative groups; • Opportunities to engage local workforces. 2. Implement the approved Construction Community Consultation Plan described above in 20.1.	Prior to Commissioning	Kemerton Community Committee

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
21	Social and Economic Issues	Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised.	1. Prepare an Operational Community Consultation Plan to address: • General community consultation associated with the environmental approval process; • Targeted consultation with nearby landowners and communities; • Consultation with the Shires of Harvey,(and/or Dardanup and City of Bunbury) and Kemerton Community Committee; • Local waterbody users' representative groups; • Opportunities to engage local workforces. 2. Implement the approved Operational Community Consultation Plan described above in 21.1.	Prior to Commissioning	Kemerton Community Committee
22	Groundwater	To ensure the discharge water from de-watering activities during the construction phase will have no adverse impacts on the groundwater table, and /or the water quality or flow regime of surface water bodies (including wetlands).	1. Prepare a Construction Dewatering Management Plan to address: • Definition of the commencement date, duration, anticipated quantity and frequency of discharge; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Dewatering Management Plan described above in 22.1.	Prior to Construction	WRC

Abbreviations

CALM Department of Conservation & Land Management
DEP Department of Environmental Protection
DIA Department of Indigenous Affairs
DoIR Department of Industry and Resources
EPA Environmental Protection Authority
FPC Forest Products Commission
WRC Water and Rivers Commission

APPENDIX 2

EPA APPROVAL UNDER SECTION 45C FOR MINOR MODIFICATIONS – CHANGE IN LOCATION OF AND INCREASE IN CAPACITY OF BULK FUEL TANK (APRIL 2004)

MINISTER FOR THE ENVIRONMENT

Our Reference: 26399

Mr David Jones
General Manager
Transfield Services
Level 13, 80 Albert Street
BRISBANE QLD 4000

Dear Mr Jones

PROPOSED MODIFICATION TO PROPOSAL – KEMERTON POWER STATION (ASSESSMENT 1499)

On 12 March 2004 you wrote to the Chairman of the Environmental Protection Authority regarding proposed changes to the Kemerton Power Station Proposal. These changes are an increase in the capacity of the fuel storage tank from 1.5ML to 2ML, and relocation of the fuel storage facilities from the north of the site to the south of the site. Under Section 45C of the *Environmental Protection Act 1986* I am able to approve changes to a proposal, without a revised proposal being submitted to the EPA, when it is considered that the changes will not have a significant environmental impact.

On the advice of the EPA I understand that the increase in fuel storage tank size is for logistical reasons, and will not result in an increase in emissions from the plant. Relocation of the tank provides a greater buffer to the Conservation Category wetland to the north of the site. For these reasons I consider that the increase in size is unlikely to result in a significant environmental impact. Approval is therefore granted under Section 45C of the *Environmental Protection Act 1986* for the requested changes.

Yours sincerely

Judy Edwards

Dr Judy Edwards MLA
MINISTER FOR THE ENVIRONMENT

7 APR 2004

29th FLOOR, ALLENDALE SQUARE, 77 ST. GEORGE'S TERRACE, PERTH 6000 TELEPHONE: (08) 9220 5050 FACSIMILE: (08) 9221 4665/8
E-MAIL: judy-edwards@dpc.wa.gov.au

APPENDIX 3

EPA APPROVAL UNDER SECTION 45C FOR MINOR MODIFICATION – INCREASE IN LIQUID FUEL OPERATING HOURS (OCTOBER 2005)

Environmental Protection Authority

Westralia Square,
141 St Georges Terrace, Perth, Western Australia 6000.
Telephone: (08) 9222 7000. Facsimile: (08) 9222 7155.

Postal Address: PO Box K822,
Perth, Western Australia 6842.
Website: www.epa.wa.gov.au

General Manager Power
Transfield Services Limited
80 Albert Street
Brisbane Qld 4000

Attention: Mr Miro Tischljar

Dear Mr Tischljar

PROPOSED CHANGE TO PROPOSAL – KEMERTON POWER STATION (STATEMENT 645): – MODIFICATION TO LIQUID FUEL USE

Thank you for your letter of 22 September 2005 and accompanying documents (Your Ref: SKM, 2003). As you may be aware, under section 45C of *the Environmental Protection Act 1986*, I, under delegation from the Minister for the Environment, am able to approve changes to a proposal, without a revised proposal being submitted to the EPA, when it is considered that the changes will not have a significant detrimental environmental effect in addition to, or different from, the effect of the original proposal.

I have now considered your application request for the increase in liquid fuel use from 100 hours to 300 hours of operation of the Transfield Kemerton Power Station during 1 July 2005 to 30 June 2006 for the assessed proposal (Assessment Number 1499) approved under statement 645. It is acknowledged that the proposed change does not alter/increase the assessed air emission rates for the project that was presented in the key proposal characteristics table (refer Attachment 1). Furthermore, the assessed greenhouse emissions would be reduced for the first 12-month period of operation (ie 2005/2006 financial year). Consequently, the proposed modification could be implemented in accordance with the existing environmental management controls that are drawn from the current conditions and commitments of statement 645. Therefore I consider that the proposed change to the proposal will not result in significant detrimental environmental effect in addition to, or different from, the effect of the original proposal.

Approval is therefore granted under section 45C of the *Environmental Protection Act 1986* for the requested change detailed in your letter (DoE Ref: CRN215795) as specified in Attachment 1 (enclosed). You are reminded that this approval relates to environmental requirements in statement 645 and does not replace any responsibilities you may have for seeking approvals from other government agencies to implement the proposed change to the approved proposal.

Yours sincerely

Walter Cox
CHAIRMAN

10 OCT 2005

[Ref: Filipe Dos Santos; CRN215795; SKM, 2003]

Attachment 1– Change to Proposal (Statement 645).

PROPOSAL: KEMERTON POWER STATION.

PROPONENT: ROC OIL (WA) PTY. LTD.

CHANGE: IN SCHEDULE 1, TABLE 1: KEY PROPOSAL CHARACTERISTICS (ASSESSMENT NO. 1499).

FROM:

ELEMENT	QUANTITIES/DESCRIPTION
LIQUID FUEL (BACKUP)	Up to 6 ML per year ultra low sulphur diesel (less than 100 hours per year). Sulphur content of diesel – 50ppm maximum

TO:

ELEMENT	QUANTITIES/DESCRIPTION
LIQUID FUEL (BACKUP)	• Up to 300 hours ultra low sulphur diesel for the 2005/2006 financial year period (1 July 2005 – 30 June 2006). • Up to 6 ML per year ultra low sulphur diesel (less than 100 hours per year) from 1 July 2006. Sulphur content of diesel – 50ppm maximum

DATE OF APPROVAL: 10/10/05

APPENDIX 4

ENVIRONMENTAL PROTECTION LICENCE NO. 8026/3

Department of
Environment and Conservation

Your ref:
Our ref: L5/04
Enquiries: Neville Welsh
Phone: 9726 4127
Fax:
Email:

RECEIVED
0 8 NOV 2006
BY:

The Manager
Transfield Services Kemerton Pty Limited
80 Albert Street
Brisbane City QLD 4000

Dear Sir/Madam

ENVIRONMENTAL PROTECTION ACT 1986 - LICENCE
Kemerton Power Station, Lot 505 on Deposited Plan 39528, Rhodes Rd
Kemerton WA 6230

You are advised that your application for a licence to operate the works prescribed under the *Environmental Protection Act 1986* at the above-mentioned location has been approved subject to the attached conditions. Enclosed is your licence together with receipt number, 05100 for the prescribed fee.

If any aspect of the conditions of licence aggrieves you, you may lodge an appeal, accompanied by the $50.00 fee, with the Minister for the Environment within 21 days from the date on which this licence is received. Members of the public may also appeal conditions. Please contact the Appeals Registrar at the Office of the Appeals Convenor on 9221 8711 after the closing date of appeals to check whether any appeals were received.

Under Section 58 of the *Environmental Protection Act 1986*, it is an offence to contravene a licence condition. This offence carries a penalty of up to $125,000, with a daily penalty of up to $25,000. The Department considers that a breach of this section, or any other section, of the *Environmental Protection Act 1986* to be extremely serious.

If you have any questions relating to the licence or licence conditions, please do not hesitate to contact Neville Welsh of the South West Region on 97264127.

Yours faithfully

Decl E.J. Morg

Declan Morgan
ACTING ASSISTANT DIRECTOR REGIONAL SERVICES, ENVIRONMENT

Tuesday, 31 October 2006

Encls

copy to: Local Government Authority: Shire of Harvey

WESTERN AUSTRALIA

DEPARTMENT OF ENVIRONMENT & CONSERVATION

Environmental Protection Act 1986

LICENCE

LICENCE NUMBER: 8026/3 **FILE NUMBER:** L5/04

NAME OF OCCUPIER:

Transfield Services Kemerton Pty Limited

ADDRESS OF OCCUPIER:

80 Albert Street
Brisbane City QLD 4000

NAME AND LOCATION OF PREMISES:

Kemerton Power Station
Lot 505 on Deposited Plan 39528
Kemerton WA 6230

Environmental Protection Regulations 1987
CLASSIFICATION(S) OF PREMISES:

Category 52 - Electric power generation

COMMENCEMENT DATE OF LICENCE: Wednesday, 1 November 2006

EXPIRY DATE OF LICENCE: Wednesday, 31 October 2007

CONDITIONS OF LICENCE:
As described and attached:

DEFINITIONS
GENERAL CONDITION(S) (2)
AIR POLLUTION CONTROL CONDITION(S) (5)
WATER POLLUTION CONTROL CONDITION(S) (3)
ATTACHMENTS (4)

Dec E.J. Mory

.....

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Tuesday, 31 October 2006

Department of Environment and Conservation

Environmental Protection Act 1986

LICENCE NUMBER: 8026/3 **FILE NUMBER: L5/04**

PREAMBLE

Applicability

This licence is issued to Transfield Services Kemerton Pty Ltd for the operation of dual fuel open cycle power station located on Lot 505 on Plan 39528, Wellesley. The site is located in the north eastern section of the Kemerton Industrial Park, approximately 17 kilometres north east of Bunbury, and is the prescribed premises within Schedule 1 of the *Environmental Protection Regulations 1997.*

Table 1:Categories under which the premises are prescribed.

Category number	Category name	Description
84	Electric power generation	Premises (other than premises within category 53 or an emergency or stand-by power generating plant) on which electrical power is commercially generated using natural gas as a fuel.

These licence conditions relate to, but are not necessarily limited to, the following:

- Two Siemens V94.2 gas turbine generators (260.9 MW capacity), fitted with low NO_x burners operating in simple cycle mode, that can operate on either natural gas or ultra low sulphur diesel;
- Two 35 metre high stacks from the gas turbine generators;
- A 2 megalitre Ultra Low Sulphur Diesel (ULSD) storage tank and associated unloading and transfer infrastructure;
- Other infrastructure such as hardstand, office, workshop, stormwater runoff collection and treatment and fencing.

The power station will be a peaking plant expected to operate for approximately 1000 hours per year. There is an expectation that the plant will be run using both fuels in each year.

The power plant and associated infrastructure will have a footprint of two hectares.

The site's environmental values were assessed as part of the Kemerton Power Station Section 38 Referral Documentation, refer to Environmental Protection Authority, Bulletin 1121, issued 8 December 2003. The Shire of Harvey has been advised of the project.

Under the operation phase, the site will be managed under the Operation Environmental Management Plan required by the Ministerial conditions.

MINISTERIAL CONDITIONS

This premises is also subject to conditions set by the Minister for the Environment under Part IV of the *Environmental Protection Act 1986.* The licensee is required to comply with the requirements of the Minister's Statements (Statement 654) as well as those in this licence.

CONDITIONS OF LICENCE

DEFINITIONS

In these conditions of licence, unless inconsistent with the text or subject matter:

"APHA-AWWA-WEF" means American Public Health Association - American Water Works Association - Water Environment Federation;

"AS1940-1993" means Australian Standard 1940-1993: The storage and handling of flammable and combustible liquids;

"AS4323.1-1995" means Australian Standard 4323.1-1995: Stationary source emissions - Selection of Sample Positions;

"BTEX" means Benzene, Toluene, Ethylbezene, and Xylene;

"Director" means Director, Environmental Management Division of the Department of Environment and Conservation for and on behalf of the Chief Executive Officer as delegated under Section 20 of the *Environmental Protection Act 1986*;

"Director" and "Department of Environment and Conservation" for the purpose of correspondence means:

South West Regional Office
Department of Environment and Conservation
PO Box 1693 *Telephone:* 9726 4111
BUNBURY WA 6231 *Facsimile:* 9726 4100

"inspector" means a person appointed as an Inspector under Section 88 of the *Environmental Protection Act 1986*;

"NATA" means National Association of Testing Authorities, Australia; and

"premises" means Lot 505 on Plan 39528, Treasure Road, Wellesley, Shire of Harvey approximately 17 kilometres north east of Bunbury, as outlined in **Attachment 1**;

"Reporting year" means 1 November to 31 October

"US EPA" means the United States Environmental Protection Agency;

"US EPA Method 10" means the promulgated Test Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources;

"US EPA Method 20" means the promulgated Test Method 20 - Determination of Nitrogen Oxides, Sulfur Dioxide, and Oxygen Emissions from Stationary Gas Turbines;

GENERAL CONDITIONS

REPORTING OF INCIDENTS

G1(a) The licensee shall maintain a permanent record of any incident or activity on the premises which has, or may have caused pollution or environmental harm.

G1(b) The information required by condition G1(a) shall include:

(i) the date, time and probable reason for the incident;
(ii) an estimate of the period over which the incident was or is likely to be in effect;
(iii) the potential or known environmental consequences of the incident and the extent of these;
(iv) corrective action taken or planned to mitigate any adverse environmental consequences, and;
(v) corrective action taken or planned to prevent reoccurrence of the incident.

G1(c) The record required by condition G1(a) shall be retained on site and made available to an Inspector upon request.

ANNUAL REPORT

G2 The licensee shall provide to the Director a copy of the annual monitoring report. This report shall contain data collected from the reporting year and shall be provided prior to **1 February the following year**. Two copies of the report (one electronic) shall be forwarded to the Department of Environment and Conservationand shall contain:

(i) a brief background on the approval of the project and an overview of the project and its processes, a current plan of the premises and a table showing quantities of raw materials used and the quality and quantity of wastes produced;
(ii) the monitoring data and other collected data required by any condition of this licence for the described period;
(iii) a discussion of the results of any monitoring programs against background data, guidelines and/or limits set in the licence (data should be provided in tables and significant results should be presented in a graphical format);
(iv) a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of reoccurrence;
(v) a discussion of the operation of the project, compliance with conditions and its environmental performance to date;

AIR POLLUTION CONTROL CONDITIONS

DUST - GENERAL REQUIREMENT

A1 The licensee shall prevent visible dust from crossing the boundary of the premises.

STACK MONITORING PORTS

A2 The licensee shall maintain emission sampling and monitoring ports in accordance with AS4323.1-1995.

STACK MONITORING

A3 The licensee shall, take and have analysed, for the following analytes outlined in column 1 of Table 2, using methods outlined in column 3 of Table 2, air emissions from Stack 11 and 12 UHN (See **Attachment 2**) annually when using natural gas:

Table 2: Stack air emission monitoring programme

Parameter (mass emission and concentration	**Unit**	**Method**
Oxides of nitrogen	mgm^{-3}	US EPA Method 20
Oxides of sulphur	mgm^{-3}	Calculated
Carbon monoxide	mgm^{-3}	US EPA Method 10

A4 The licensee shall, take and have analysed, for the following analytes outlined in column 1 of Table 3, using methods outlined in column 3 of Table 3, air emissions from Stack 11 and 12 UHN (See **Attachment 2**) annually when ultra low sulphur diesel was used as a fuel source in the reporting year:

Table 3: Stack air emission monitoring programme

Parameter (mass emission and concentration	**Unit**	**Method**
Oxides of nitrogen	mgm^{-3}	US EPA Method 20
Oxides of sulphur	mgm^{-3}	Calculated
Carbon monoxide	mgm^{-3}	US EPA Method 10

A5 The licensee shall provide the following information together with the results of each set of source tests required by condition A3 and A4:

(i) plant production feed-rate relevant to the emissions at the time of the test;
(ii) in stack moisture content;
(iii) in stack volume flow rate;
(iv) in stack temperature;
(v) a statement of compliance with the test method; and
(vi) any other information relevant to the test results.

WATER POLLUTION CONTROL CONDITIONS

MANAGEMENT OF WATER

W1 The licensee shall manage process water and potentially contaminated stormwater on the premises by:

(i) directing potentially contaminated water from plant washdown to a collection basin that includes an oily water separator;
(ii) allowing the removal of the remaining effluent in part (i) above by an approved controlled waste contractor;

GROUNDWATER AND SURFACE WATER MONITORING SITES

W2 The licensee shall maintain groundwater and surface water monitoring sites, at the locations depicted in **Attachments 3 and 4** to allow representative water samples to be collected.

GROUNDWATER AND SURFACE WATER MONITORING

W3 (a) The licensee shall, at the frequencies stated in column 2 of Table 3, take and have analysed, for the parameters outlined in column 3 of Table 3, representative water samples from the monitoring sites outlined in column 1 of Table 3 in accordance with conditions W3 (b) and W3 (c):

Table 3: Water Monitoring Sites for the Kemerton Power Station

Monitoring site	Frequency	Parameters to be measured
Monitoring bores GW1S and GW2S (see **Attachment 3**)	**6 monthly** (nominally March and September)	pH, total dissolved solids or electrical conductivity, BTEX and total petroleum hydrocarbons.
Surface Water Sites SW1, SW2, (see **Attachment 3 and 4**)	**Twice per year** when flowing (nominally separated by 4 weeks)	pH, total dissolved solids, total suspended solids, electrical conductivity, BTEX and total petroleum hydrocarbons.

With the exception of pH and conductivity, all measurements are to be reported in milligrams or micrograms per litre.

W3(b) The licensee shall collect all water samples in accordance with Australian Standard 5667.1,1998.

W3(c) The licensee shall submit all water samples to a laboratory with current NATA accreditation for the analyses specified, and analysed in accordance with the current "Standard Methods for Examination of Water and Wastewater-APHA-AWWA-WEF".

W3(d) The licensee shall measure and record the results of the Standing Water Level (in metres Australian Height Datum), prior to sampling each groundwater monitoring bore outlined in column 1 of Table 3.

SEVERANCE
It is the intent of these works approval conditions that they shall operate so that, if a condition or a part of a condition is beyond my power to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within my power to impose and are not otherwise *ultra vires* or invalid.

Dec E.J. Mag
.....

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Tuesday, 31 October 2006

L5/04-Licence 8026/3 Attachment 1

LEGEND

Cadastre - DLI

Bunbury 1m Orthomosaic - DLI 03

N

0 125 m

Scale 1:5,729
(Approximate when reproduced at A4)

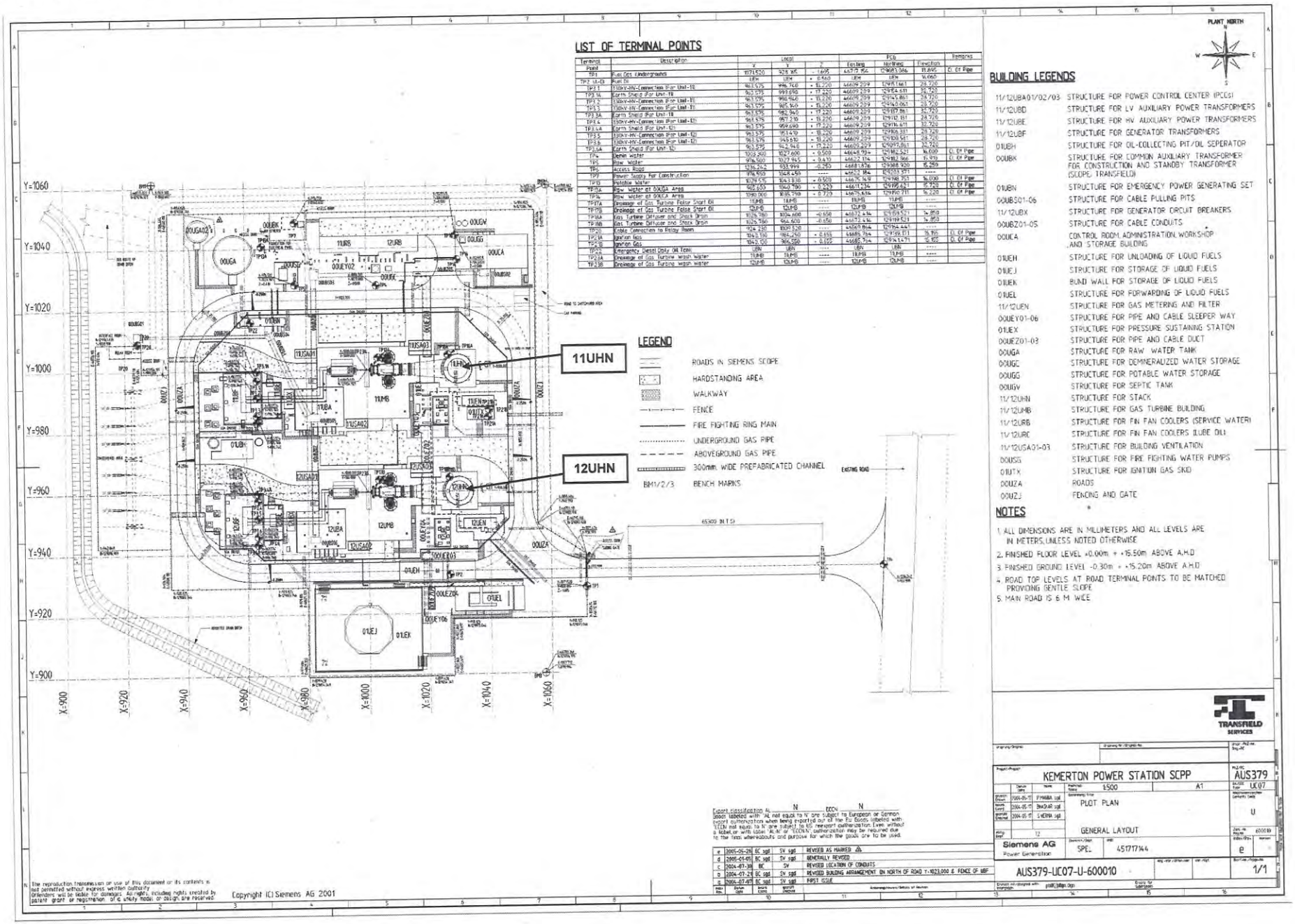
Geocentric Datum of Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

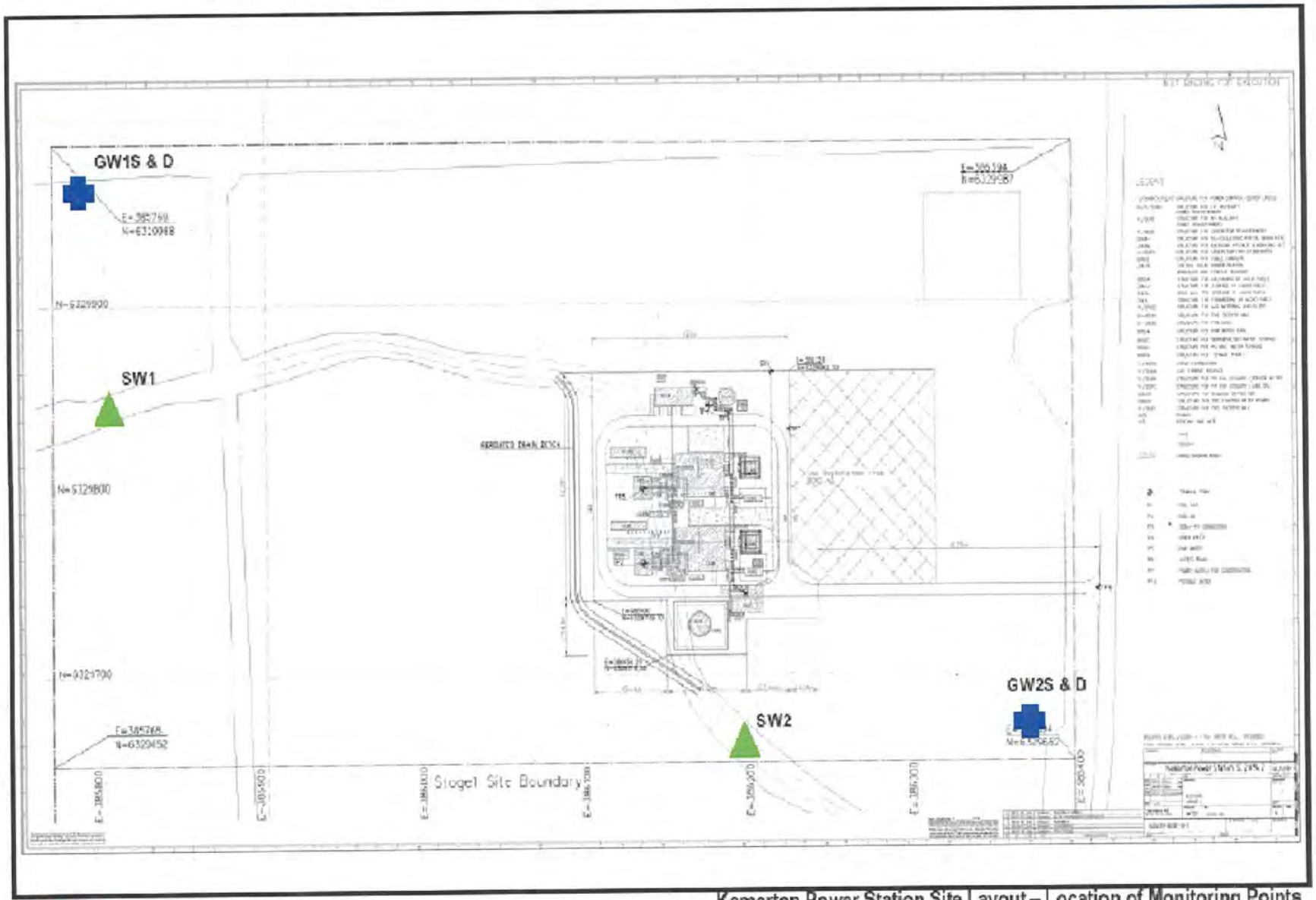
Prepared by: McseviS
Prepared for:
Date: Friday, 27 October 2006 16:13

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment


LIST OF TERMINAL POINTS
BUILDING LEGENDS
LEGEND
NOTES
11UHN
12UHN
KEMERTON POWER STATION SCPP
PLOT PLAN
GENERAL LAYOUT
AUS379-UC07-U-600010
Siemens AG
Power Generation
TRANSFIELD SERVICES
Copyright (C) Siemens AG 2001

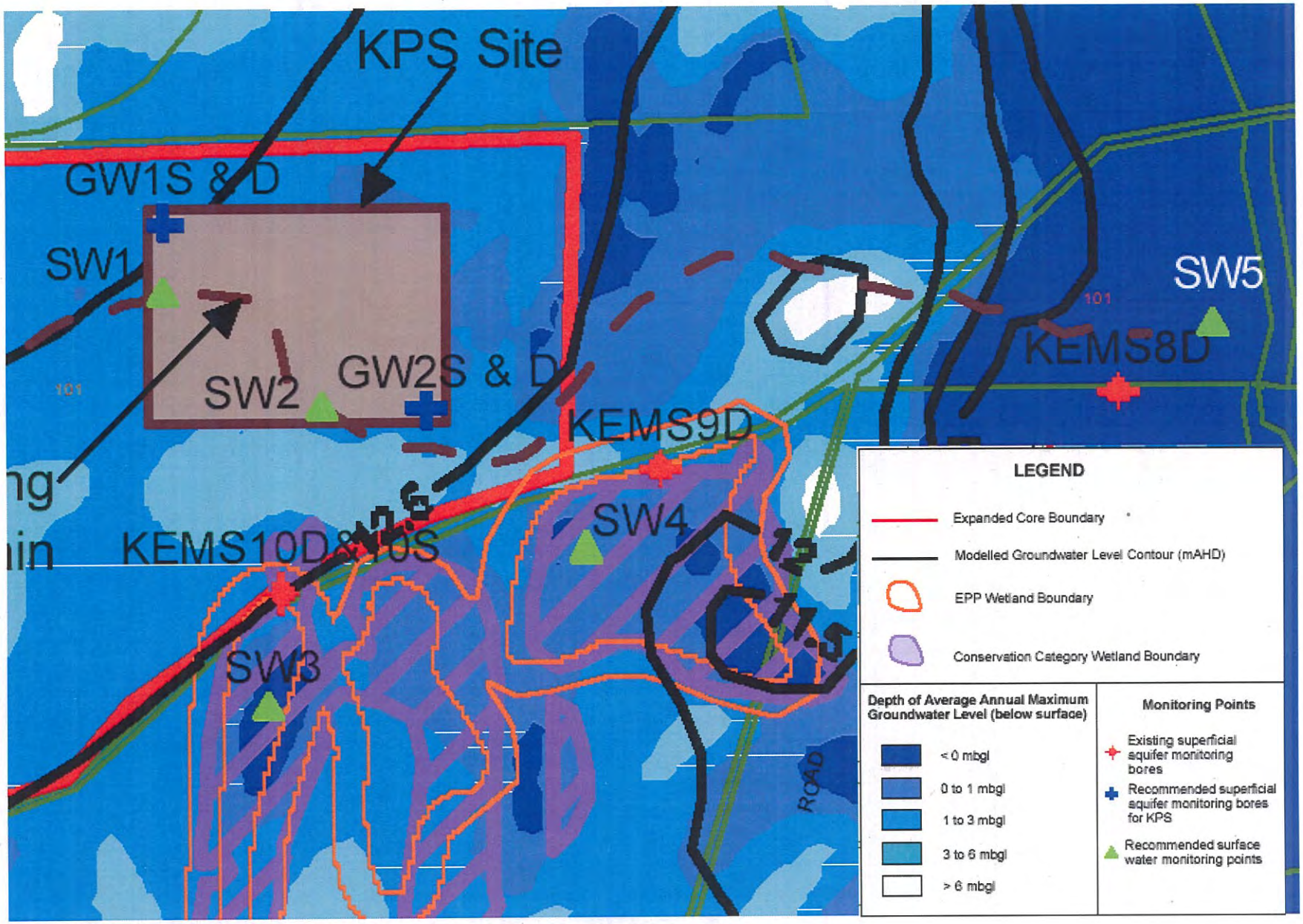
L5/04 Licence number 8026/3 – Attachment 3 – Onsite Water Monitoring Sites



aquaterra

Kemerton Power Station Site Layout – Location of Monitoring Points

L5/04 Licence number 8026/3 – Attachment 4 – Water Monitoring Sites



Department of Environment

Receipt

No. : DOE-05100
Date : 28-Jul-2006

ABN : 12 740 143 260

Received From : Transfield Services Kemerton
Payment Type : Cheque

Payment Type	Amount
DOE Licence Fees / Licence No. : L 5/04	$8,944.28
Total	$8,944.28

Original

APPENDIX 5

KEMERTON POWER STATION RESERVE VEGETATION, FLORA AND FAUNA HABITAT ASSESSMENT (ATA, 2006)

TRANSFIELD SERVICES KEMERTON PTY LTD

KEMERTON POWER STATION RESERVE VEGETATION, FLORA AND FAUNA HABITAT ASSESSMENT

VERSION 4

MAY 2006

REPORT NO: 2006/070

ATA Environmental
environmental scientists

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Document No: TRA-2005-004-VEAS_001_sg_V4

Report No: 2006/070

Checked by: Signed:

Name: Shaun Grein Date: 19 May 2006
Manager – Ecological Management

Review by: Signed:

Name: Shaun Grein Date: 19 May 2006
Manager – Ecological Management

Approved by: Signed:

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Partner

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1. INTRODUCTION

1.1 Background

The Government of Western Australia released the Wholesale Electricity Market arrangements in October 2004. A key feature of the arrangement was the establishment of an entity called the Independent Market Operator in December 2004 who will forecast longer-term demand, supply, and generating plant requirements and who will conduct an auction to satisfy any shortfall in reserve capacity. Transfield Services responded to a call for Expressions of Interest by proposing a relatively small modification to the existing Kemerton Power Station (KPS) to produce a modest but important and cost effective increase in generating capacity.

The upgrade of KPS will be achieved by adding either evaporative cooling or wet compression to the inlet to the gas turbines. The changes necessary to perform the upgrade involve the installation of a raw water pipeline from a suitable source to KPS and construction of raw water storage tanks on the KPS site. If wet compression is used in the upgrade then a 0.5 ML/d water demineralising plant and a demineralised water storage tank will also be necessary. On-site activities and wastewater management strategies will be subjects of separate reports.

The Western Power Strategic Environmental Review of June 2002 discussed several options for water supply to KPS. The preferred option was for Harvey Water to construct a water pipeline to service the KPS.

The project will be conducted in phases, with the initial phase to assess the flora and fauna values of the pipeline alignments. Two potential alignments have been investigated; one that runs from South-West Highway with Marriot Road into Wellesley Rd and connecting through an existing (predominantly cleared) easement to the power station site (Option A). The second alignment option is from Harvey Water's northeastern offtake, along Mitchell Rd, across the Wellesley River and then to the power station (Option B). The surveyed area along the proposed alignments was approximately 200m in width.

This report constitutes the vegetation, flora and fauna habitat assessment phase of the project. A review of the implications of significant wetlands within the area was also assessed.

2 EXISTING ENVIRONMENT

2.1 Location

The Kemerton Reserve Capacity Project (KRCP) study area lies within the Kemerton Industrial Estate, which is located approximately 17km northeast of Bunbury and 170km south of Perth, and is bounded by Wellesley Road North to the south and west, Campbell Road to the east and the Dampier Bunbury Natural Gas Pipeline to the north (Figures 1 and 2).

2.2 Existing Land Use

A considerable portion of the KRCP study area coincides with the Western Power 330Kv transmission line alignment while the minor potential pipeline spur alignments have predominantly been cleared for grazing activities and other rural pursuits.

2.3 Wetlands

The originally preferred KRCP water pipeline corridor options (Options A and B) are associated with a number of wetlands mapped on the Department of Environments *Geomorphic Wetlands Swan Coastal Plain* dataset. These wetlands are part of the Kemerton suite of wetland and are considered by the DoE (Aquaterra, 2002) to be one of the largest remaining aggregations of relatively undisturbed wetlands within an uncleared block of vegetation on the Swan Coastal Plain.

The DoE's Geomorphic *Wetlands Swan Coastal Plain* dataset mapping indicates that the following wetlands are bisected by the two pipeline corridor options (Figure 2):

Conservation Category Wetlands:

Five CCWs, (4 sumplands and 1 dampland) identified in the DoE's *Geomorphic Wetlands Swan Coastal Plain* dataset are bisected by the southern pipeline alignment option (Pipeline Option A) while one CCW is bisected by the Option B Pipeline corridor (Figure 2). These are:

- Sumpland (UFI 1854);
- Dampland (UFI 2048):
- Sumpland (UFI 1828);
- Sumpland (UFI 2041); and
- Sumpland (UFI 2036)

Conservation Category Wetlands (CCWs) are regarded as the highest priority wetlands and support a high level of ecological attributes and functions (Water and Rivers Commission, 2001). The management objective for CCWs is to preserve these attributes and functions through various mechanisms including reservation in national parks, Crown reserves or State owned land, protection under Environmental Protection Policies or through covenanting by landowners. In addition to being classified by the DoE as Conservation Category wetlands, these five wetlands have also been recommended for inclusion in the EPA's *Revised Draft Environmental Protection (Swan Coastal Plain Wetlands) Policy 2004* (EPA, 2004a) which will supersede the Lakes EPP when gazetted.

Resource Enhancement Wetlands:

Three Resource Enhancement (REW) management category wetlands (all sumplands) have been identified in the DoE *Geomorphic Wetlands Swan Coastal Plain* dataset bisected by the southern pipeline alignment option corridor (Pipeline Option A), while one REW is bisected by the Option B pipeline corridor (Figure 2). These are:

- Sumpland (UFI 1844);
- Sumpland (UFI 1853):
- Sumpland (UFI 2052); and
- Sumpland (UFI 1854).

Resource Enhancement Wetlands (REWs) are wetlands that have been modified but still support some wetland ecological attributes and functions (Water and Rivers Commission, 2001). Although REWs are considered less important than CCWs in terms of significance and protection, the EPA still regards REWs as priority wetlands that support substantial ecological attributes and functions.

EPP Wetlands

Some wetlands on the Swan Coastal Plain have been afforded statutory protection under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*. This policy prohibits the filling, mining, pollution or changing of drainage into or out of wetlands without assessment and approval by the Environmental Protection Authority and approved by the Minister for the Environment. As a general guide, the EPA recommends that the environmental values of an EPP wetland be protected by the provision and maintenance of a dryland buffer around the periphery of the wetland. The EPA usually requires a buffer of at least 50m or 1m AHD higher than the furthest extent of the wetland dependant vegetation.

There are five wetlands that are bisected by the southern KRCP pipeline alignment corridor (Pipeline Option A) and one by the Option B pipeline corridor (Figure 2) that are currently protected under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP) (Figure 2). These wetlands are also recommended for inclusion in the *Revised Draft Environmental Protection (Swan Coastal Plain Wetlands) Policy 2004* which will supersede the Lakes EPP when it is finally gazetted.

2.4 Biological Context of the Study Area

2.4.1 Bioregions

Western Australia supports 53 biogeographical subregions. The KRCP pipeline alignment option is located in the Perth subregion of the Swan Coastal Plain bioregion. The Swan Coastal Plain Bioregion is a low lying coastal plain, mainly covered with woodlands. The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats and coastal limestone (McKenzie *et al.*, 2002).

2.4.2 Vegetation Complexes

According to broad scale mapping of the vegetation of the area (Heddle *et al*. 1980), vegetation within the KRCP pipeline alignment option is considered to be representative of the Bassendean Vegetation Complex – Central and South. This transitional vegetation complex is

associated with woodlands of Jarrah-Marri with *Melaleuca preissiana/Melaleuca rhaphiophylla/Eucalyptus rudis* fringing sumplands, damplands and moister area. Substantial area of species rich damplands including *Pericalymma ellipticum/Kunzea ericifolia/Hypocalymma angustifolium/Astartea scoparia* is associated with this vegetation complex within the KRCP study area.

Remnant vegetation associated with the Bassendean Complex – Central and South is represented by 27% of its original extent on the Swan Coastal Plain and is currently well represented in the Greater Bunbury Region (39.1% of its original extent remaining)(EPA, 2003).

3 FLORA, VEGETATION AND FAUNA HABITAT ASSESSMENT

3.1 Methodology

3.1.1 Flora and Vegetation

In an effort to identify the flora and vegetation values of the KRCP water pipeline option alignment study area (i.e. 200m wide corridor between Wellesley Rd North and the Kemerton Power Station and Kemerton Power Station and the Wellesley River), a flora and vegetation survey was conducted by Mr Shaun Grein, an experience ecologist from ATA Environmental with more than 14 years experience in undertaking botanical surveys throughout Western Australia including in the Kemerton Industrial Precinct, on the 12 and 13 October 2005. The survey was conducted in accordance with Environmental Protection Authority's (EPA's) Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004b) and Position Statement No. 3 *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA, 2002).

The survey relied on available aerial photography (at scale of 1:13,000) to delineate vegetation types prior to conducting the survey with ground-truthing to verify vegetation types wherever possible. The survey resulted in the following:

- Mapping of vegetation types (and condition) using a combination of recent aerial photography supplemented with field surveys to ground-truth;
- Providing a list of all native and non-native plant species recorded from non-permanent 10m x 10m quadrats located within representative vegetation types identified from the water pipeline option alignment;
- A list of significant species recorded on CALM's database as having been previously recorded from the vicinity of the study area. The location of any significant species (DRF and Priority) identified during the survey were recorded using a Global Positioning System. Desktop searches for the presence of rare flora will review the following databases:

    1. Department of Conservation and Land Management's (CALM) *'Threatened (Declared Rare) Flora'* database;
    2. *'Western Australian Herbarium Specimen'* database for priority species opportunistically collected in the area of interest.
    3. CALM's *'Declared Rare and Priority Flora List'* which contain species that area declared rare (Conservation code R or X for those presumed to be extinct) poorly known (Conservation codes 1, 2 or 3) or require monitoring (Conservation Code 4).

The CALM database search of potential threatened flora species previously recorded from the vicinity of the study area is provided in Table 1 below. Prior to undertaking the field survey, specimens of these threatened species where examined at the Western Australian Herbarium to familiarise morphology and assist with identification in the field.

TABLE 1
DRF AND PRIORITY FLORA PREVIOUSLY RECORDED FROM THE VICINITY OF STUDY AREA

Species	Conservation Status	No. of Populations in Vicinity
Diuris micrantha	DFR	4
Drakea elastica	DRF	2
Drakea micrantha	DRF	2
Lasiopetalum membranaceum	P3	1
Stylidium longitubum	P3	Unspecified
Verticordia attenuata	P3	1
Acacia flagelliformis	P4	Unspecified
Aponogeton hexatepalus	P4	Unspecified
Caladenia speciosa	P4	1
Drosera marchantii	P4	2
Jacksonia sparsa	P4	Unspecified
Pultenaea skinneri	P4	1

Specimens of plant species not identified in the field were collected and identified at the Western Australian Herbarium. Voucher specimens of species collected during the survey were retained for lodgement with the Western Australian Herbarium.

The condition of the vegetation was assessed according to the condition rating scale described in Bush Forever (Government of Western Australia, 2000). This condition rating scale ranges from Pristine (where the vegetation exhibits no visible signs of disturbance) to Completely Degraded (where the vegetation structure is no longer intact and without native plant species).

3.1.1.1 Survey Limitations

No fungi and non-vascular flora were surveyed as part of this assessment. Additionally, no analysis of floristic data collected was undertaken.

3.1.2 Fauna Assessment

Based on the anticipated level of impact resulting from the proposed construction of each pipeline alignment option, only a Level 1 fauna survey was conducted. This generally accords with EPA Guidance Statement No. 56 *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004c). The field component of the fauna survey was undertaken by Mr Shaun Grein in conjunction with the October 12 and 13 2005 flora and vegetation survey.

The approach for the Level 1 fauna assessment involved:

- a review of the Western Australian Museum (*FaunaBase*) on-line database to identify potential vertebrate fauna within the project area;
- a search of the Department of Conservation and Land Management's Threatened and Priority Species database to identify potential scheduled and threatened species within the project area;
- a search of the Commonwealth's on-line database to identify fauna species of national environmental significance that are protected under the *Environment Protection and Biodiversity Conservation Act 1999* potentially occurring within the project area; and

- a review of the published and any of the 'grey' literature that we can access to provide a list of mammals, reptiles, amphibians, and birds that have potential to occur in the region, and where possible their preferred habitats.

- an on-site assessment describing the available habitats and 'ground-truthing' the results of the desktop survey;

A description of the potential impacts of construction of the pipeline along the preferred alignment on the fauna is provided and includes

- recommendations on:

    a) any species-specific searches that may be required within the project area;

    b) any follow-up fauna surveys required to identify species of conservation significance or faunal assemblages that are important and likely to be impacted upon within the study area; and

    c) strategies to minimise potential impact on the fauna.

3.1.1.2 Survey Limitations

No fauna trapping was undertaken, with the potential occurrence of significant fauna species based on habitat types identified during the flora and vegetation assessment and existing database records.

This assessment is primarily based on Western Australian Museum records made available through '*FaunaBase*', a search of CALM Threatened Fauna list and the known habitat preferences for each species. These databases do not provide a comprehensive coverage of the state and are not adequate to provide species lists for small scale sites. Large search areas are generally used in order to generate species lists for small sites, but these searches invariably include numerous species not likely to be found at any specific location within the search area. These are significant limitations to the assessment.

3.2 Results

3.2.1 Vegetation Types

Vegetation can be described and mapped at a finer level than the vegetation complexes (i.e. vegetation types). The following vegetation types were identified and mapped (Figures 3a and 3b) for the KRCP pipeline alignment options during the 2005 field survey:

Forest/Woodland

MrErCF — Closed Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis* to 15m in height over Tall Shrubland of *Kunzea ericifolia* and *Agonis flexuosa* to 5m in height. This vegetation type was recorded from the southern portion of the preferred pipeline alignment, to the immediate north of Wellesley Rd North. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

MpNfOW — Open Woodland of *Melaleuca preissiana* and *Nuytsia floribunda* to 12m in height over Closed Thicket of *Kunzea ericifolia* to 3m in height over

Astartea scoparia, Adenanthos meisneri and *Hypocalymma angustifolium* Low Open Heath to 1.2m in height. This vegetation type was recorded from an area to the immediate west of the preferred pipeline corridor option. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

MpErLOF — Low Open Forest *Melaleuca preissiana* and *Eucalyptus rudis* with scattered *Banksia ilicifolia* to 10m in height over *Kunzea glabrescens* Tall Scrub to 5m in height over *Adenanthos meisneri, Hypocalymma angustifolium and Calothamnus lateralis* Open Heath to 1.2m in height. This vegetation type was recorded from the western portion of the proposed alignment corridor, approximately 150 m north of Wellesley Rd North. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

EmLOW — Open Low Woodland *Eucalyptus marginata* subsp. *marginata* to 10m in height over Tall Shrubland of *Agonis flexuosa* and *Kunzea glabrescens* to 6m in height over *Dasypogon bromeliifolius* dominated Sedgeland to 0.3m in height. This vegetation type was recorded from the western portion of the proposed alignment corridor, approximately 200m north of Wellesley Rd North. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

EmBaBiOF — Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* to 15m in height over Tall Scrub of *Kunzea glabrescens* to 3m in height over *Hibbertia subvaginata, Hibbertia racemosa* and *Dasypogon bromeliifolius* Low Open Heath to 0.3m in height. This vegetation was recorded from several locations along the pipeline corridor alignment, predominately within the northern portion and central portion. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

MpLOW — Low Woodland to Low Open Woodland of *Melaleuca preissiana* to 10m in height over Low Closed Heath *Astartea scoparia* to 1.6m in height over Open Sedgeland *Lepidosperma longitudinale* to 1m in height. This vegetation type was recorded from the western side of the proposed alignment within the southern and central portions of the study area. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type ranged in condition from Very Good to Excellent condition.

EmBmBaOF — Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia menziesii* and *Banksia attenuata* to 15m in height over a Tall Open Shrubland of *Kunzea ericifolia* to 3m in height. This vegetation type was recorded from a small area within the preferred pipeline corridor alignment to the immediate east of the unmade section of Wellington Rd. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type ranged in condition from Degraded to Good condition

EmCcBgBiOF — Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* to 20m in height over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath to 0.6m in height. This vegetation type was recorded from the western side of the proposed corridor alignment, to the immediate southeast of the Kemerton Power Station. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type ranged in condition from Degraded to Good condition.

MrLW — Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* to 5m *over Xanthorrhoea brunonis a*nd *Hypocalymma angustifolium* dominated Low Closed Heath to 1m in height. This vegetation type was identified for the northern portion of the preferred pipeline alignment and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type ranged in condition from Degraded to Good condition.

EmCcBgBiOF — Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* to 20m in height over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath to 0.6m in height. This vegetation type was identified from the northern portion of the study area, to the immediate southeast of the Kemerton Power Station. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type ranged from Degraded to Good condition.

MrLW — Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* to 3m in height over *Xanthorrhoea brunonis a*nd *Hypocalymma angustifolium* dominated Low Closed Heath to 1m in height. This vegetation type was identified from the central and northern portions of the study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

AfBiBaEmOF — Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata* to 15m in height over Open Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Jacksonia furcellata* to 1.2m in height. This vegetation type was recorded from the eastern "spur" of the preferred corridor alignment and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

EmBaOF — Open Forest *Eucalyptus marginata* subsp. *marginata* and *Banksia attenuata* to 15m in height over Open Low Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Hibbertia hypericoides* to 1m in height. This vegetation type was recorded from the eastern "spur" of the preferred corridor alignment and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to range from Very Good to Excellent condition.

EmS — Scattered *Eucalyptus marginata* subsp. *marginata* to 20m in height over Open Shrubland *Xanthorrhoea brunonis* and *Kunzea ericifolia* to 0.8m in height. This vegetation type was recorded from the northern end of the

study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in a Degraded condition.

Eg — *Eucalyptus globulus* Plantation. This plantation was recorded from the eastern end of the eastern "spur"

Scrub/Shrubland/Heath

KgTS — Tall Shrubland of *Kunzea glabrescens* to 3m in height over Open Heath dominated by *Hypocalymma angustifolium* to 1m in height. This vegetation type was recorded from the southern end of the preferred corridor alignment option, approximately 500m north of Wellesley Rd North and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Degraded to Good condition.

KeCTS — Closed Tall Scrub of *Kunzea ericifolia* to 4m in height with scattered *Melaleuca preissiana* and *Nuytsia floribunda* over a Low Open Shrubland of *Melaleuca scabra* to 1.5m in height. This vegetation type was recorded from the central portion of the study area, approximately 200m east of the unmade Wellington Road reserve. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

AsCH — Closed Heath *Astartea scoparia* to 1.5m in height with scattered *Kunzea glabrescens and Agonis flexuosa*. This vegetation type was recorded from the northern portion of the preferred alignment and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

mrS — Scattered Mixed regrowth to 0.5m in height. This vegetation type was recorded from several locations within the preferred corridor alignment, but predominantly within the central portion of the Western Power easement. The condition of this vegetation type was co0nsidered to be degraded.

KeTOS — Tall Open Scrub of *Kunzea ericifolia* to 2.5m in height over *Jacksonia furcellata, Lysinema ciliatum, Leucopogon polymorphous* and *Hibbertia hypericoides* Open Shrubland to 1.8m in height. This vegetation type was identified from the central portion of the study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Degraded to Good condition.

PeAsCH — Closed Heath of *Pteridium esculentum* and *Astartea scoparia* to 1.2 m in height with Open Sedgeland of **Typha orientalis* and *Baumea articulata* to 1.2m in height. This vegetation type is associated with the Resource Enhancement wetland located in the southern portion of the study area. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in a Degraded to Good condition.

PeLCH — Low Closed Heath of *Pteridium esculentum* to 0.8m in height. This vegetation type is associated with an EPP wetland to the immediate north of

Wellesley Rd North in the southern portion of the study area and *was* considered to be in a Degraded condition.

PeHvCH — Closed Heath *Pericalymma ellipticum* and *Hakea varia* to 1.8m in height over *Conostylis aculeata, Hibbertia stellaris, Calothamnus lateralis* Open Low Heath to 0.6m over *Meeboldina cana* and *Leptocarpus tenax* Sedgeland to 0.4m in height. This vegetation type was identified from a small area in the northern portion of the study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

KgTOS — Tall Open Scrub *Kunzea glabrescens* to 3m in height over *Xanthorrhoea brunonis, Melaleuca thymoides* and *Dasypogon bromeliifolius* Low Heath to 1.2m in height. This vegetation type was identified from the central portion of the Western Power easement (Option A), approximately 200m east of the Wellington Rd road reserve and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Degraded to Good condition.

HaAsPeCH — Closed Heath *Hypocalymma angustifolium, Astartea scoparia* and *Pericalymma ellipticum* to 1.5m in height with scattered *Kunzea ericifolia*. This vegetation types was recorded from a small area in the central portion of the study area an according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good condition.

AsPeHvMlCH — Closed Heath of *Astartea scoparia, Pericalymma ellipticum, Hakea varia* and *Melaleuca lateritia* to 2m in height with scattered *Melaleuca rhaphiophylla* over Very Open Sedgeland of *Leptocarpus tenax* to 0.5m in height. This vegetation type was recorded from the north-eastern portion of the study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good to Excellent condition.

MuTS — Tall Shrubland *Melaleuca uncinata* with scattered *Melaleuca rhaphiophylla* to 3m in height over Open Low Heath of *Hypocalymma angustifolium, Astartea scoparia, Pericalymma ellipticum* and *Aotus procumbens* to 1.5m in height over Very Open Sedgeland of *Leptocarpus tenax* to 0.5m in height. This vegetation type was recorded from the north-eastern portion of the study area and according to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Very Good to Excellent condition.

Sedgeland

JpBaCS — Closed Sedgeland of *Juncus pallidus* and *Baumea articulata* to 1.2m in height with scattered *Kunzea glabrescens* and *Astartea scoparia* to 2m in height. This vegetation type was identified in association with the Resource Enhancement category wetland in the southern portion of the study area. According to the vegetation condition rating scale outlined in Bush Forever (Government of Western Australia, 2000) this vegetation type was considered to be in Degraded to Good condition.

* Indicates non-endemic species

3.2.2 Vegetation Condition

The condition of the vegetation was assessed according to the condition rating scale in Bush Forever (Government of Western Australia, 2000). The condition rating scale ranges from Pristine (which the vegetation exhibits no visible signs of disturbance) to Completely Degraded (where the vegetation structure in no longer intact and without native plant species). Vegetation condition associated with the KRCP pipeline alignment option is mapped on Figure 3a and range from Degraded to Excellent

A description of the vegetation condition ratings identified during the site investigation is outlined below.

Excellent (4)

Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive. This condition rating corresponds with the Very Good rating that was used to rate condition prior to the Bush Forever Strategy

Very Good (3)

Vegetation structure altered, obvious signs of disturbance. For example disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. This condition rating corresponds with the Good rating that was used to rate condition prior to the Bush Forever Strategy

Good (4)

Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing. This condition rating corresponds with the Poor rating that was used to rate condition prior to the Bush Forever Strategy.

Degraded (5)

Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. This condition rating corresponds with the Very Poor rating that was used to rate condition prior to the Bush Forever Strategy.

3.2.3 Floristic Community Types and Threatened Ecological Communities

Classification of Threatened Ecological Communities (TECs) on the Swan Coastal Plain is achieved by assigning a Floristic Community Type (FCT), as classified by Gibson *et al.*, (1994). Dominant flora species are identified in the Floristic Survey of the Swan Coastal Plain (Gibson *et al.*, 1994) as characteristics of a suite of FCTs. Hence, data collected in the field can be compared to the dataset used to categorise the FCTs for the Gibson *et al.*, 1994 publication. Assignment of FCTs is achieved by determining common species and confirming suitable distributions.

Based on the flora and vegetation surveys undertaken and floristic data collected from each of the forty three 10m x 10m quadrats sampled a total of six Floristic Community Types were inferred as occurring within the KRCP pipeline alignment option study area. These are:

FCT 4 – *Melaleuca preissiana* damplands. FCT 4 is distributed over the length of the Swan Coastal Plain and is generally associated with the Bassendean and Southern River units. FTC 4 is a shrub rich community with *Melaleuca preissiana* generally scattered as an overstorey. FCT 4 is well reserved and its conservation status is considered to be at low risk.

FCT 5 – Mixed Shrub damplands. FCT 5, which is associated with the Bassendean, Vasse, Herdsman and Beermullah units, has no consistent dominant understorey, but dominant may include *Banksia ilicifolia, Melaleuca preissiana* and *Kunzea ericifolia*. FCT 5 is generally more open and has less of a shrub layer than FCT 4. FCT 5 is well reserved and its conservation status is considered to be at low risk.

FCT 11 – Wet Forest and Woodland. FCT 11 occurs on the Bassendean and heavier soil units. This community is generally dominated by *Eucalyptus rudis* and/or *Melaleuca rhaphiophylla*. This community is found from Bullsbrook south to Pinjarra. Common species associated with this vegetation type include *Astartea scoparia, Lepidosperma longitudinale* and *Pericalymma ellipticum.* FCT 11 is well reserved and its conservation status is considered to be at low risk.

FCT 21a – Central *Banksia attenuata – Eucalyptus marginata* Woodlands. FCT 21a is primarily associated with *Eucalyptus marginata-Banksia attenuata* woodlands, *Eucalyptus marginata-Corymbia calophylla-Banksia attenuata* woodlands or *Banksia attenuata* woodlands. This community type occurs in the central portion of the Swan Coastal Plain from Perth to Capel. FCT 21a is well reserved and its conservation status is considered to be at low risk.

FCT 21c – Low lying *Banksia attenuata* woodlands or shrublands. FCT 21c occurs sporadically between Gingin and Bunbury. This community type is largely restricted to the Bassendean unit and tends to occupy low lying wetter sites and is variously dominated by *Melaleuca preissiana, Banksia attenuata, B. menziesii, Eucalyptus marginata* and/or *Corymbia calophylla.* FCT 21c is well reserved and its conservation status is considered to be susceptible.

None of these FCTs are categorised as TECs at either the State or the Commonwealth (*EPBC Act 1999*) level.

3.2.4 Flora

A total of 131 species of flora were recorded from the 43 quadrats sampled and opportunistically identified from traversing the study area during the October 2005 field survey of the KRCP pipeline alignment option study area (Appendix 1). Of these, 112 were native and 19 were introduced species. The list consists of 1 Fern, 1 Gymnosperm, 40 Monocotyledons and 89 Dicotyledons. The families with the greatest representation of species were the Myrtaceae (*Eucalyptus* family - 20 species, including 1 non-native species), the Papilionaceae (Pea Family – 17 species, including 2 non-native species) and the Poaceae (Grass Family – 9 species, including 7 non-natives).

The total number of species is considered average considering the size of the area surveyed. However there was a relatively high representation of ephemeral species, including orchids, which indicate that the timing of the survey was optimal. The total number of taxa recorded is considered to represent at least 90% of the total complement of species likely to occur in the study area.

3.2.5 Significant Flora

No Declared Rare Flora (DRF) was recorded from the study area during the October 2005 survey. However, three specimens of the Priority 4 taxa *Jacksonia sericea* were recorded from scattered mixed regrowth (WGS 84 50386636E; 6327226N) within the Western Power

easement (i.e Option A corridor) in the central portion of the study area (Figure 3a). *Jacksonia sericea* is a low, spreading shrub, to 0.6 m high and is found on calcareous & sandy soils.

Acacia semitrullata (Priority 3) and the Priority 4 taxa *Jacksonia sparsa* has previously been recorded from the Kemerton Industrial Estate during previous spring flora survey in 2003 and 1999 (Biota, 2003; Armstrong, 1999). These taxa were found to be widespread throughout the core area of the Estate.

3.2.6 Fauna

Several fauna habitats are traversed by the KRCP pipeline alignment options study area. These included:

- Closed Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis;*
- Low Open Forest *Melaleuca preissiana;*
- Open Forest *Eucalyptus marginata* subsp. *marginata*, *Banksia attenuata* and *Banksia ilicifolia;*
- Open Forest *Agonis flexuosa*, *Banksia ilicifolia*, *Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata;* and
- Mixed Scrub/Shrubland/Heath.

These habitats are likely to support a range of native and introduced vertebrate fauna typical of the southwest region of Western Australia (Christensen *et al.*, 1985). Without having conducted a detailed fauna survey of the study area, there is little value in attempting to compile a list of vertebrate fauna species that may be present in the area.

Given the strategic level of this assessment, a habitat and distribution-based for the potential occurrence of threatened fauna only was undertaken.

3.2.6.1 Potential Threatened Fauna Species

Under the *Wildlife Protection Act* 1950-1979, all native fauna species in Western Australia are protected. Species threatened with extinction, rare fauna and fauna considered to be of high conservation value are afforded special protection under the Act. Many of these species are also protected under the Commonwealth *Environmental Protection Biodiversity Conservation Act* 1999. Additionally, some species of fauna are protected under the 1991 ANZECC convention, while several bird species area listed under the Japanese and Australia Migratory Bird Agreement (JAMBA). Classification of rare and endangered fauna under the *Wildlife Conservation (Specially Protected Fauna) Notice 2003* recognises four distinct schedules of taxa (see Table 2).

TABLE 2
SCHEDULES OF CONSERVATION SIGNIFICANCE CATEGORIES FOR FAUNA SPECIES

1. Schedule 1 taxa are fauna which are rare or likely to become extinct and are declared to be fauna in need of special protection
2. Schedule 2 taxa are fauna which are presumed to be extinct and are declared to be fauna in need of special protection
3. Schedule 3 taxa are birds which are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction which are declared to be fauna in need of special protection; and
4. Schedule 4 taxa are fauna that are in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 and 3.

In addition to the classifications described above, CALM also classifies fauna according to four Priority codes:

- Priority One – Taxa with few, poorly known populations or threatened lands.

Taxa which are known from few specimens or sight records from one or few localities on lands not managed for conservation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

- Priority Two – Taxa with few, poorly known populations on conservation lands, or taxa with several, poorly known populations not on conservation lands.

Taxa which are known from few specimens or sight records from one or few localities on lands not under legitimate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

- Priority Three – Taxa with several, poorly known populations, some on conservation lands.

Taxa which are known from few specimens or sight records from several localities, some of which are not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration of as threatened fauna.

- Priority Four – Taxa in need of monitoring.

Taxa which have been considered to have been adequately surveyed or for which sufficient knowledge is available and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. Taxa which are declining significantly but are not yet threatened.

- Priority 5 - Taxa in Need of Monitoring

Taxa which have been considered to have been adequately surveyed or for which sufficient knowledge is available and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. Taxa which are declining significantly but are not yet threatened.

A search was CALM Threatened Fauna database identified seven species of Schedule listed and four Priority listed fauna as potentially occurring in the study area.

- **Schedule 1 - Fauna**

***Dasyurus geoffroii* – Chuditch**

Formally known from over 70% of Australia, the Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of south-west WA. They den in hollow logs and burrows and have also been recorded in tree hollows and cavities. Habitat alteration and removal of suitable den logs and den sites following land clearing, grazing and

frequent wildfire have contributed to a decline in Chuditch numbers. The Chuditch ***potentially*** occurs in woodland habitats associated with the study area.

***Pseudocheirus occidentalis* - Western Ringtail Possum**

Populations of this possum species are now restricted to coastal areas of Peppermint (*Agonis flexuosa*) and Peppermint-Tuart woodlands from Australind to the Waychinicup National Park. Highest densities seem to be in the Swan Coastal Plain near Busselton. Nests are on or near the ground in the absence of predators, but in tree hollows and dreys in the tree canopies when predators are present. Loss of habitat and predation by foxes are the two significant factors leading to their decline. Suitable habitat exist, however, no Western Ringtail Possums, dreys or scats were recorded during the fauna habitat assessment. The denser woodlands bisected by the proposed pipeline alignment (Option B corridor and preferred pipeline route (Figure 3A)) where *Agonis flexuosa* formed a dominant component ***may*** provide suitable habitat for the species.

***Calyptorhynchus baudinii* - Baudin's Cockatoo**

This species is most common in the far south-west of WA where it breeds. Breeding records come from the southern forests north to Collie and east to near Kojonup. Baudin's Cockatoo is typically found in vagrant flocks and utilises the taller, more open Jarrah and Marri woodlands, where it feeds mainly on Marri seeds. Baudin's Black Cockatoos were ***may*** be an occasional visitor to the study area.

***Calyptorhynchus latirostris* - Carnaby's Black-Cockatoo**

This species inhabits the south-west of WA. Its preferred habitat is the woodland where it preferentially feeds on plants of the Proteaceae family. In winter, flocks can be found in heaths. Due to the availability of suitable habitat it is ***likely*** to be a seasonal visitor to the study area.

***Calptorhynchus banksii naso* - Forest Red-tailed Black Cockatoo**

This species is most commonly seen in Eucalypts where it is attracted to seeding Marri, Jarrah, Blackbutt, Karri and Snottygobble. Forest Red-tailed Black Cockatoo's were formally common but now rare to uncommon and patchily distributed. They are usually seen in pairs or small flocks and seldom in large flocks (up to 200). The main cause of population decline has been habitat destruction and alteration. Forest Red-tailed Black Cockatoos ***may*** be found in the study area.

- **Schedule 4 - Fauna that are in Need of Special Protection**

***Falco peregrinus* - Peregrine Falcon**

This species is found across most of Australia, but only occurs in low densities and has a wide and patchy distribution. It favours hilly or mountainous country and open woodlands and ***may*** be an occasional visitor to the study area.

***Morelia spilota imbricata* - Carpet Python**

A large python found across the southwest of Western Australia, north to Geraldton and Yalgoo, and east to Kalgoorlie, Fraser Range and Eyre. They inhabit forest, heath, or wetland areas and shelter in hollow logs or in branches of large trees. This species has a number of disjunct populations that are widespread within the southwest of Western Australia, however, its density is generally low across its distribution except on a couple of off-shore islands.

Carpet Pythons have previously been found in the vicinity of Kemerton and therefore ***may*** occur in habitats associated with the pipeline alignment.

- **Priority Fauna**

***Charadrius rubricollis* - Hooded Plover (Priority 3)**

This species frequents the margins and shallows of salt lakes, also along coastal beaches, where it forages for invertebrates along the water's edge. It is an uncommon to common resident on the southern sea beaches from Cape Naturalist east to Eyre. It is scarce to common throughout the rest of its distribution. The Hooded Plover is ***unlikely*** to be found within the study area due to unsuitable habitat.

***Phascogale tapoatafa tapoatafa* - Southern Brush-tailed Phascogale (Priority 3)**

Formerly widespread in eastern and southwestern Australia, it is now found from Perth to Albany, west of Albany highway. It occurs at low densities in the northern Jarrah forest, and higher densities in the Perup/Kingston area, Collie River valley, and near Margaret River and Busselton. Habitat clearing and fragmentation, and habitat alteration by logging and mining are the main causes threatening populations. The greatest threat appears to be the reduced availability of trees with hollows, and predation by cats and foxes. The Southern Brush-tailed Phascogale ***may*** be found in the study area, as there was one previous record from the Bunbury area.

***Macropus irma* – Western Brush Wallaby (Priority 4)**

This species is commonly associated with open northern *Eucalyptus marginata* (Jarrah) forest associations. It is generally regarded as typically absent high rainfall areas with dense closed understoreys. It is ***unlikely*** to be associated with the study area.

***Isoodon obesulus fasciventer* - Quenda or Southern Brown Bandicoot (Priority 5)**

Quenda prefer dense scrub (up to one metre high), with swampy vegetation. They will often feed in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and crop land lying close to dense cover. Major threats to Quenda include habitat fragmentation and loss of habitat on the coastal plain and wheat belt, fire in fragmented habitat, predation by foxes, predation of young by cats and predation around residential areas by dogs. Quenda ***may*** occur in habitats associated with the pipeline alignment.

4. DISCUSSION OF RESULTS

4.1 Wetlands

4.1.1 Southern Pipeline Corridor Option (Option A)

The assessment of the study area determined that the proposed southern alignment option either directly impacts upon or is in close proximity to five Conservation Category Wetlands (CCWs) and three Resource Enhancement Wetlands (REWs) identified from the Department of Environment's *Geomorphic Wetlands of the Swan Coastal Plains Wetlands* dataset (Figure 2). The Department of Environment considers CCWs to be the most valuable wetlands and will oppose any activity that will result in their degradation, while the protection of REWs is recommended wherever possible. In addition, five wetlands protected under the *Environmental Protection (Swan Coastal Plain Lakes) (EPP) Policy 1992* are also either intersected or in close proximity to the proposed pipeline alignment (Figure 2). The 1992 EPP prohibits any alteration to the drainage regime in or out of EPP wetlands without the assessment and approval of the Environmental Protection Authority and the Minister for the Environment. The construction of the southern pipeline option is likely to result in an altered drainage regime of the EPP wetlands.

4.1.2 Northeastern Pipeline Corridor Option (Option B)

One Resource Enhancement Wetland (REW), two Conservation Category wetlands (CCWs) and one EPP wetland occur in proximity to the north-eastern alignment, however none of these wetlands will be intersected by the proposed modified pipeline alignment.

This preferred pipeline alignment Option B shown in Figure 2, will be at least 50 metres from any significant wetland in proximity to the north-eastern survey corridor, and is therefore unlikely to impede drainage regimes within significant (EPP) wetlands.

4.1.3 Northeastern Pipeline Option (Option C – Alternative Pipeline Route)

This alternative pipeline route Option C indicated in Figure 2, will be more than 50 metres from any significant wetland in proximity to the north-eastern survey corridor, and is therefore unlikely to impede drainage regimes within significant (EPP) wetlands.

4.2 Flora and Vegetation

The vegetation associated with the study area is representative of the Bassendean Complex – Central and South. Bassendean Complex – Central and South is represented by 27% of its original extent on the Swan Coastal Plain and currently moderately well represented in the Greater Bunbury Region (39.1% of its original extent).

A total of 28 vegetation types were identified from the preferred KRCP water pipeline option alignment study area. None of these vegetation types are considered to be of conservation significance. Additionally, none of the five inferred Floristic Community Type (FCTs) identified from the study area are classified as Threatened Ecological Communities (TECs) at either the State or Commonwealth level.

A small population (3 plants) of the Priority Four listed flora species *Jacksonia sericea* was identified from the study area (i.e. central portion of Option A pipeline corridor study area). Wherever possible, disturbance to this population should be avoided.

4.3 Fauna

Some of the relatively intact habitats identified from the study area have the greatest potential to support fauna species of conservation significance, particularly the Western Ringtail Possum and the Southern Brown Bandicoot. These include:

- Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata.* This habitat was identified from the Option B pipeline corridor and the preferred pipeline route area; and

- Mixed Scrub/Shrubland/Heath. This habitat was identified from the Option A pipeline corridor study area

The removal of intact habitat associated with these areas has the potential to impact on local populations of the Western Ringtail Possum and the Southern Brown Bandicoot, should these species be present. These species are reliant on intact shrub strata and dense *Agonis flexuosa* (Peppermint) woodlands. Fragmentation of these areas through the construction of the pipeline could also potentially increase feral predator access to the more intact habitat areas. Spotlighting to confirm the presence or absence of this species should be conducted prior to any proposed removal of habitat within the Option B pipeline corridor area should this route option be chosen.

5 RECOMMENDATIONS

Based on the completed assessment of the southern pipeline route option (Option A), the north-eastern pipeline route option (Option B) and the alternative pipeline route option (Option C), the following recommendations are offered:

- Whilst there are no significant flora and vegetation constraints to the construction of either water pipeline along the surveyed alignment, the southern pipeline option (Option A) presents a significant risk given the likelihood of impacts on CCWs and EPP wetlands. This option will require referral to the Environmental Protection Authority, and is likely to require formal assessment under Section 38 of the *Environmental Protection Act 198*6.

- The preferred north-eastern pipeline route option, represents a lesser impact than Option A given that there are no significant flora and vegetation constraints, nor will the route alignment intersect any significant wetlands. However, the preferred pipeline route through this area will impact on potential habitat of the Schedule 1 and *EPBC Act* listed Western Ringtail Possum impact. To ensure the least impact:

  - A minimum buffer of 50 metres should be maintained between the pipeline corridor and the nearest wetland, as shown on Figure 2.

  - Procedures to ensure that impacts during the construction phase are appropriately managed should be developed and implemented by the successful EPC contractor prior to implementation of the proposal.

- The alternative pipeline route (Option C) represents the least impact of the three options in terms on potential adverse effects on significant flora, vegetation, fauna and wetlands. The construction of the alternative route would also largely avoid the requirement to clear native vegetation through utilising existing access tracks and alignment of the pipeline route through either likely Pine or Blue Gum plantations. However, it should noted that unlike the Option A and B corridor routes, which are aligned within a gazetted power line easement and a road reserves, no easement has been gazetted for the Option C alternative pipeline route. Gazettal of an easement would be required for this pipeline alignment prior to any approval to construct would be approved. Additionally, this alternative pipeline route will require a brief site visit to groundtruth vegetation type as it was outside of the original study area.

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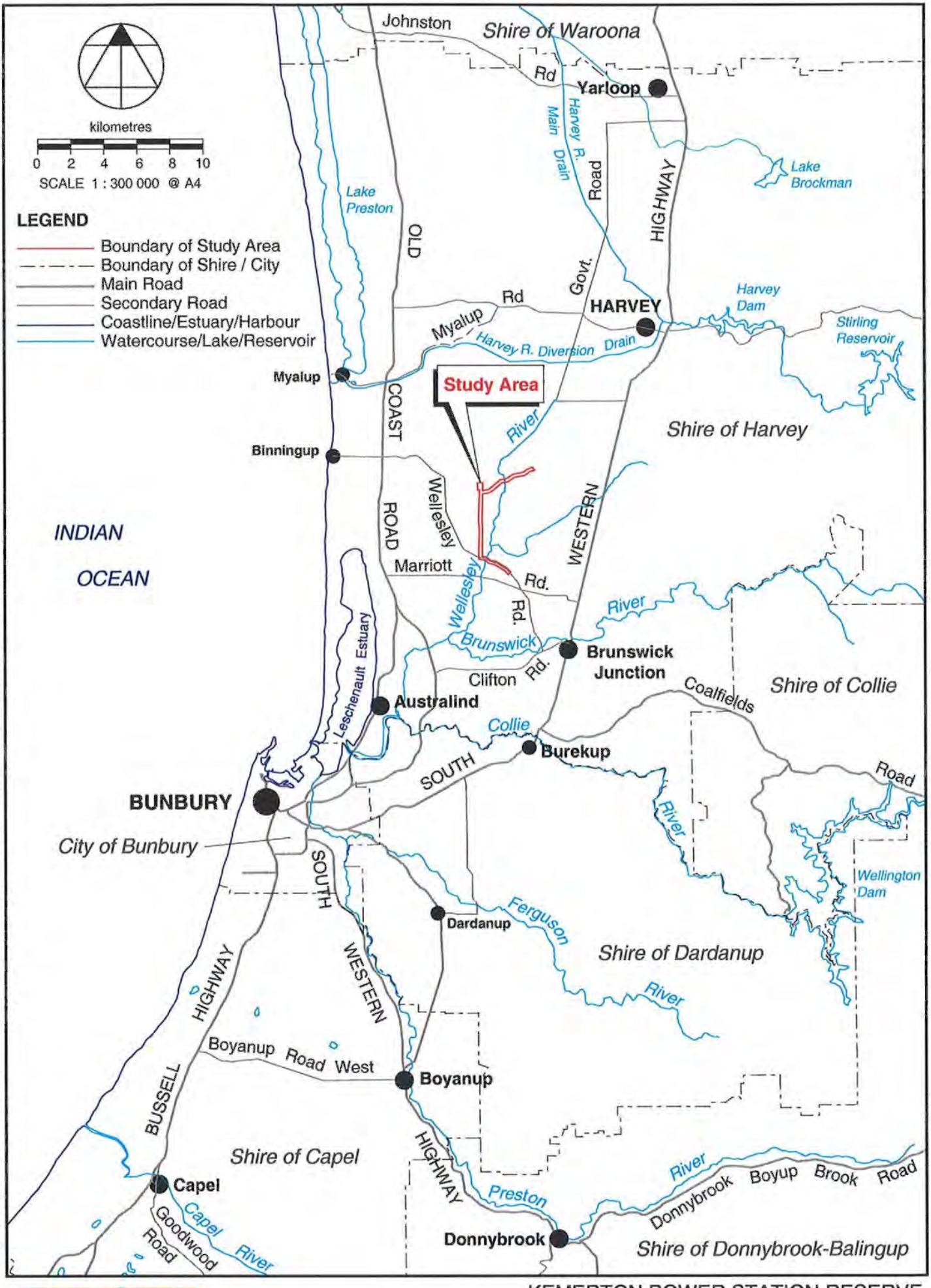
FIGURES



PRINTED: Wed 17 May 06 DRAWN BY: GLM 15-3-06 CHECKED BY: SG 15-3-06 DATUM: MGA TRA-2005-004/VEAS/26_70F1.dgn

ATA Environmental
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KEMERTON POWER STATION RESERVE
VEGETATION, FLORA & FAUNA HABITAT ASSESSMENT

REGIONAL LOCATION

FIGURE 1

TRA-2005-004/VEAS/26_70F2.dgn DATUM: MGA Zone 50 DRAWN BY: GLM/TE 10-05-06 CHECKED BY: SG/PJ 10-05-06 PRINTED: Wed 17 May 06

OPTION C

OPTION B

OPTION A

KPS

KIP

DBNGP Pipeline Corridor

RIVER

WELLESLEY

MITCHELL ROAD

CAMPBELL ROAD

NORTH ROAD

PARTRIDGE ROAD

MARRIOTT ROAD

Wellington Road

Closed Road

Water Feature

Drain Reserve

Reserve 44250 5764

Reserve 22762 5531

Reserve 38137 5409

Reserve 38137 5884

CC

RE

metres

0 200 400 600 800 1000

SCALE 1 : 20 000 @ A3

LEGEND

- Study Area (Pipeline Corridor) Boundary
- Preferred Pipeline Route
- Option c - Alternative Pipeline Route
- Kemerton Power Station Site & Buffers (KPS)
- Kemerton Industrial Park (KIP) Boundary
- Cadastral Boundary
- EPP Lake Boundary (EPP Boundary)
- CC Conservation Category Wetland Boundary
- RE Resource Enhancement Wetland Boundary

NOTE: Only those Lakes and Wetlands that impact on the Study Area are shown.

SOURCES: KPS Boundaries - Transfield Services, Nov. 2003
KIP Boundaries - Ministry for Planning, April 2000
Approximate Pipeline Routes - Transfield Services, June. 2005
Aerial Photo - DLI, Taken April May 2003, Received 30/9/2005
Geomorphic Wetlands - DoE, 15/9/04, Confirmed 13/12/05
EPP Lakes - EPA, 1992

ATA Environmental *environmental scientists*

KEMERTON POWER STATION RESERVE
VEGETATION, FLORA AND
FAUNA HABITAT ASSESSMENT
WETLANDS
FIGURE 2

TRA-2005-004/VEAS/26_70F3A.dgn DATUM: MGA Zone 50 DRAWN BY: GLM/TE 10-05-06 CHECKED BY: SG/PJ 10-05-06 PRINTED: Wed 17 May 06

OPTION C

OPTION B

OPTION A

K P S

K I P

DBNG Pipeline Corridor

Reserve 44250 5754

Reserve 22762 5531

Reserve 38137 5409

Reserve 38137 5884

Closed Road

CAMPBELL ROAD

RIVER

WELLESLEY

Wellington Road

WELLESLEY ROAD

NORTH

Priority Taxa *Jacksonia sericea*

Water Feature

metres

0 100 200 300 400 500

SCALE 1 : 13 000 @ A3

KERTON POWER STATION RESERVE
VEGETATION, FLORA AND
FAUNA HABITAT ASSESSMENT

VEGETATION TYPES AND CONDITION

FIGURE 3A

Environmental ATA environmental scientists

LEGEND

- Study Area (Pipeline Corridor) Boundary
- Preferred Pipeline Route
- Option C - Alternative Pipeline Route
- Kemerton Power Station Site & Buffers (KPS)
- Kemerton Industrial Park (KIP) Boundary
- 94 Cadastral Boundary, Lot Number
- Vegetation Type Boundary
- 43 Flora Quadrat Location (10 x 10m)
- Location of Priority Taxa *Jacksonia sericea*

NOTE: See Figure 3B for Vegetation Types description

VEGETATION CONDITION

(Legend Source: BUSH FOREVER Govt. of W.A.)

P	Pristine. (Not Applicable)
Ex	Excellent.
VG	Very Good
G	Good.
D	Degraded.
CD	Completely Degraded. (NA)

NOTE: See Figure 3B for Vegetation Condition description

SOURCES: KPS Boundaries - Transfield Services, Nov. 2003
KIP Boundaries - Ministry for Planning, April 2000
Approximate Pipeline Routes - Transfield Services, June. 2005
Aerial Photo - DLI, Taken April May 2003, Received 30/9/2005

VEGETATION CONDITION (Legend Source: BUSH FOREVER Govt. of W.A.)

P Pristine or nearly so, no obvious signs of disturbance. (Not Applicable)

Ex Excellent. Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

VG Very Good. Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G Good. Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D Degraded. Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD Completely Degraded. The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs. (NA)

VEGETATION TYPES

Forest / Woodland

MrErCF Closed Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis* over Tall Shrubland of *Kunzea ericifolia* and *Agonis flexuosa*.

MpNfOW Open Woodland of *Melaleuca preissiana* and *Nuytsia floribunda* over Closed Thicket of *Kunzea ericifolia* over A*startea scoparia, Adenanthos meisneri* and *Hypocalymma angustifolium* Low Open Heath.

MpErLOF Low Open Forest *Melaleuca preissiana* and *Eucalyptus rudis* with scattered *Banksia ilicifolia* over *Kunzea glabrescens* Tall Scrub over *Adenanthos meisneri, Hypocalymma angustifolium* and *Calothamnus lateralis* Open Heath.

EmLOW Open Low Woodland *Eucalyptus marginata* subsp. *marginata* over Tall Shrubland of *Agonis flexuosa* and *Kunzea glabrescens* over *Dasypogon bromeliifolius* dominated Sedgeland.

EmBaBiOF Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* over Tall Scrub of *Kunzea glabrescens* over *Hibbertia subvaginata, Hibbertia racemosa* and *Dasypogon bromeliifolius* Low Open Heath.

MpLOW Low Woodland to Low Open Woodland of *Melaleuca preissiana* over Low Closed Heath *Astartea scoparia* over Open Sedgeland *Lepidosperma longitudinale.*

EmBmBaOF Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia menziesii* and *Banksia attenuata* over a Tall Open Shrubland of *Kunzea ericifolia.*

EmCcBgBiOF Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath.

MrLW Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea brunonis* and *Hypocalymma angustifolium* dominated Low Closed Heath.

EmCcBgBiOF Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath.

MrLW Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea brunonis* and *Hypocalymma angustifolium* dominated Low Closed Heath.

AfBiBaEmOF Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata* over Open Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Jacksonia furcellata.*

EmBaOF Open Forest *Eucalyptus marginata* subsp. *marginata* and *Banksia attenuata* over Open Low Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Hibbertia hypericoides.*

EmS Scattered *Eucalyptus marginata* subsp. *marginata* over Open Shrubland *Xanthorrhoea brunonis* and *Kunzea ericifolia.*

Eg *Eucalyptus globulus* Plantation.

Scrub / Shrubland / Heath

KgTS Tall Shrubland of *Kunzea glabrescens* over Open Heath dominated by *Hypocalymma angustifolium.*

KeCTS Closed Tall Scrub of *Kunzea ericifolia* with scattered *Melaleuca preissiana* and *Nuytsia floribunda* over a Low Open Shrubland of *Melaleuca scabra*.

AsCH Closed Heath *Astartea scoparia* with scattered *Kunzea glabrescens* and *Agonis flexuosa*.

mrS Scattered mixed regrowth.

KeTOS Tall Open Scrub of *Kunzea ericifolia* over *Jacksonia furcellata, Lysinema ciliatum, Leucopogon polymorphous* and *Hibbertia hypericoides* Open Shrubland.

PeAsCH Closed Heath of *Pteridium esculentum* and *Astartea scoparia* with Open Sedgeland of **Typhae orientalis* and *Baumea articulata*.

PeLCH Low Closed Heath of *Pteridium esculentum*.

PeHvCH Closed Heath *Pericalymma ellipticum* and *Hakea varia* over *Conostylis aculeata, Hibbertia stellaris, Calothamnus lateralis* Open Low Heath over *Meeboldina cana* and *Leptocarpus tenax* Sedgeland.

KgTOS Tall Open Scrub *Kunzea glabrescens* over *Xanthorrhoea brunonis, Melaleuca thymoides* and *Dasypogon bromeliifolius* Low Heath.

HaAsPeCH Closed Heath *Hypocalymma angustifolium, Astartea scoparia* and *Pericalymma ellipticum* with scattered *Kunzea ericifolia*.

AsPeHvMICH Closed Heath of *Astartea scoparia, Pericalymma ellipticum, Hakea varia* and *Melaleuca lateritia* with scattered *Melaleuca rhaphiophylla* over Very Open Sedgeland of *Leptocarpus taxax.*

MuTS Tall Shrubland *Melaleuca uncinata* with scattered *Melaleuca rhaphiophylla* over Open Low Heath of *Hypocalymma angustifolium, Astartea scoparia, Pericalymma ellipticum* and *Aotus procumbens* over a Very Open Sedgeland of *Leptocarpus tenax*.

Sedgeland

JpBaCS Closed Sedgeland of *Juncus pallidus* and *Baumea articulata* with scattered *Kunzea glabrescens* and *Astartea scoparia*

C Cleared

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KEMERTON POWER STATION RESERVE
VEGETATION, FLORA AND FAUNA HABITAT ASSESSMENT

VEGETATION TYPES & CONDITION LEGEND

FIGURE 3B

APPENDICES

APPENDIX 1

FLORA SPECIES LIST
KEMERTON POWER STATION RESERVE
STUDY AREA

APPENDIX 1

FERNS

PTERIDIACEAE
Pteridium esculentum

GYMNOSPERMAE

ZAMIACEAE
Macrozamia riedlei

MONOCOTYLEDONS

AGAVACEAE
* *Agave americana*

ANTHERICACEAE
Thysanotus multiflorous
Tricoryne elatior

ARACEAE
* *Zantedeschia aethiopica*

COLCHICACEAE
Burchardia umbellata

CYPERACEAE
Baumea articulata
Lepidosperma angustatum
Lepidosperma longitudinale
Schoenus curvifolius
Tetraria octandra

DASYPOGONACEAE
Dasypogon bromeliifolius

HAEMODORACEAE
Conostylis aculeata
Conostylis setigera

IRIDACEAE
**Watsonia meriana* var. *bulbillifera*
Patersonia occidentalis

JUNCACEAE
Juncus pallidus

Hibbertia racemosa
Hibbertia stellaris
Hibbertia subvaginata

ORCHIDACEAE
Caladenia flava
Caladenia latifolia
Caladenia paludosa
Elythranthera brunonis
Pterostylis vittata
Thelymitra macrophylla

POACEAE
**Avena barbata*
**Avena fatua*
**Briza maxima*
**Cynodon dactylon*
**Eragrostis curvula*
**Ehrharta calycina*
* *Poa annua*
Neurachne alopecuroidea
Stipa sp.

RESTIONACEAE
Anarthria gracilis
Anarthria laevis
Desmocladus flexuosus
Leptocarpus tenax
Lyginia barbata
Meeboldina cana

TYPHACEAE
**Typha orientalis*

XANTHORRHOEACEAE
Xanthorrhoea brunonis
Xanthorrhoea preissii

DICOTYLEDONS

ASCLEPIADACEAE
* *Gomphocarpus fruticosus*

ASTERACEAE
**Arctotheca calendula*
**Hypochaeris glabra*
**Ursinia anthemoides*

DILLENIACEAE
Hibbertia huegelii
Hibbertia hypericoides

DROSERACEAE
Drosera erythrorhiza
Drosera glanduligera
Drosera menziesii
Drosera pallida
Drosera stolonifera

EPACRIDACEAE
Conostephium pendulum
Leucopogon conostephioides
Leucopogon polymorphous
Leucopogon propinquus
Leucopogon racemulosus
Lysinema ciliatum

EUPHORBIACEAE
Phyllanthus calycinus

GOODENIACEAE
Dampiera linearis

LAURACEAE
Cassytha racemosa

LORANTHACEAE
Nuytsia floribunda

MIMOSACEAE
Acacia pulchella

MYRTACEAE
Agonis flexuosa
Astartea scoparia
Calothamnus lateralis
Calytrix flavescens
Calytrix fraseri
Corymbia calophylla
Eucalyptus marginata subsp. *marginata*
Eucalyptus rudis
Hypocalymma angustifolium
Kunzea ericifolia
Kunzea glabrescens
**Leptospermum laevigatum*
Melaleuca lateritia
Melaleuca preissiana
Melaleuca rhaphiophylla
Melaleuca teretifolia
Melaleuca thymoides
Melaleuca uncinata
Pericalymma ellipticum,
Taxandria linearifolia

OROBANCHACEAE
* *Orobanche minor*

PAPILIONACEAE
Aotus procumbens
Bossiaea eriocarpa
Bossiaea linophylla
Daviesia divaricata
Daviesia incrassata
Daviesia nudiflora
Daviesia physodes
Gompholobium confertum
Gompholobium knightiatum
Gompholobium tomentosum
Jacksonia furcellata
***Jacksonia sericea*
Jacksonia sternbergiana
**Lotus suavolescens*
Kennedia prostrata
**Trifolium angustifolium*
Viminaria juncea

PROTEACEAE
Adenanthos meisneri
Banksia attenuata
Banksia grandis
Banksia ilicifolia
Banksia littoralis
Banksia menziesii
Hakea varia
Petrophile linearis
Stirlingia latifolia

RUTACEAE
Crowea angustifolia
Philotheca spicata

STYLIDIACEAE
Stylidium brunonianum
Stylidium junceum
Stylidium piliferum
Stylidium repens
TREMANDRACEAE
Tetratheca hirsutus

*Introduced species
** Priority Flora

APPENDIX 2

QUADRAT FLORA DATA

Quadrat 1
50386456E; 6325493N

Closed Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis* over Tall Shrubland of Kunzea *ericifolia* and *Agonis flexuosa*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca rhaphiophylla	20	10
Eucalyptus rudis	30	15
Kunzea ericifolia	20	5
Agonis flexuosa	2	2
Taxandria linearifolia	2	1.5
Astartea scoparia	2	1.5
**Hypochaeris glabra*	1	0.5
Lotus suavolescens	1	1.5

SPECIES	% COVER	HEIGHT (M)
Caladenia flava	1	0.3
**Arctotheca calendula*	1	0.2
Corymbia calophylla	<1	8
**Ehrharta calycina*	<1	0.8
**Ursinia anthemoides*	<1	0.6
Conostylis aculeata	<1	0.3
Caladenia latifolia	<1	0.3
**Avena barbata*	<1	0.3

Quadrat 2
50386401E; 6325573N

Low Forest of *Melaleuca rhaphiophylla/Eucalyptus rudis* over Open Shrubland of *Astartea scoparia* and *Kunzea ericifolia* over *Lepidosperma longitudinale* Sedgeland

Condition: Very Good

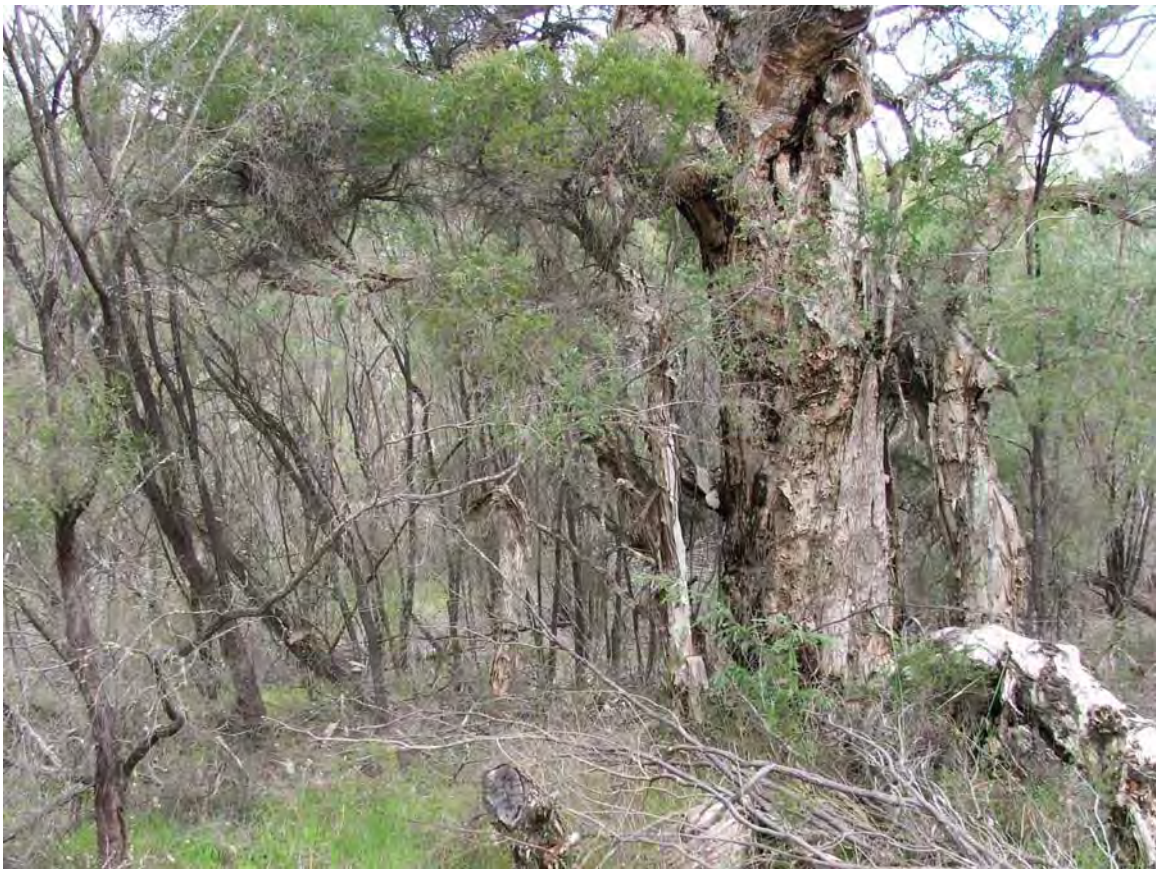
(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca rhaphiophylla	20	8
Eucalyptus rudis	30	4
Lepidosperma longitudinale	20	1.1
Kunzea ericifolia	20	5
Astartea scoparia	10	1.5
Agonis flexuosa	<1	0.5
**Hypochaeris glabra*	1	0.5
**Arctotheca calendula*	1	0.2
Caladenia flava	<1	0.2
**Gomphrocarpus fruitiosus*	<1	1.4
**Agave americanus*	<1	0.4
* *Zantedeschia aethiopica*	<1	0.6
**Trifolium angustifolium*	<1	0.1
**Orobanche minor*	<1	0.3

Quadrat 3
50386355E; 6325674N

Open Woodland of *Melaleuca preissiana* and *Nuytsia floribunda* over Closed Thicket of *Kunzea ericifolia* d over *Astartea scoparia, Adenanthos meisneri* and *Hypocalymma angustifolium* Low Open Heath

Condition: Very Good



(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	5	12
Nuytsia floribunda	2	10
Kunzea ericifolia	70	3
Astartea scoparia	2	1.2
Adenanthos meisneri	2	0.2
Hypocalymma angustifolium	2	0.5
Dasypogon bromeliifolius	<1	0.4
**Ursinia anthemoides*	<1	0.5
**Hypochaeris glabra*	<1	0.3
**Arctotheca calendula*	1	0.2
Caladenia flava	<1	0.3
**Poa annua*	1	0.3
Meeboldini cana	<1	0.2
Drosera stolonifera	<1	Creeper
Hibbertia racemosa	<1	0.2
Leucopogon polymorphous	<1	0.2
**Ehrharta calycina*	<1	0.6
Caladenia paludosa.	<1	0.3

SPECIES	% COVER	HEIGHT (M)
Stylidium piliferum	<1	0.5
Lotus sp	<1	1.2
**Anagallis arvensis*	<1	0.2
Elythranthera brunosis	<1	0.4
Lepidosperma longitudinale	<1	0.4
Calothamnus lateralis	<1	0.5

Quadrat 4
50386451E; 6325719N

Low Open Forest *Melaleuca preissiana* and *Eucalyptus rudis* with scattered *Banksia ilicifolia* over *Kunzea glabrescens* Tall Scrub over *Adenanthos meisneri, Hypocalymma angustifolium and Calothamnus lateralis* Open Heath

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	25	10
Kunzea glabrescens	30	5
Eucalyptus rudis	10	10
Adenanthos meisneri	5	0.2
Hypocalymma angustifolium	2	1.2
Banksia ilicifolia	1	4
Aotus procumbens	2	1.5
Astartea scoparia	1	1.5
Elythranthera brunosis	<1	0.4
Caladenia flava	<1	0.3
Hibbertia racemosa	<1	0.3
**Ursinia anthemoides*	<1	0.3
Anarthria grackles	<1	0.3
Meeboldini cana	<1	0.2
Daucus glochidiatus	<1	0.1
Thysanotus multiflorus	<1	Creeper
Drosera pallida	<1	Climber

Quadrat 5
50386486E; 6325767N

Low Open Woodland *Eucalyptus marginata* subsp. *marginata* over Tall Shrubland of *Agonis flexuosa* and *Kunzea glabrescens* over *Dasypogon bromeliifolius* Sedgeland

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	10	10
Agonis flexuosa	20	6
Kunzea glabrescens	30	5
Banksia ilicifolia	2	3
Dasypogon bromeliifolius	20	0.3
Xanthorrhoea brunosis	2	0.8
Ehrharta calycina	1	0.6
Hibbertia hypericoides	1	0.5
Philotheca spicata	1	0.5
Dampiera linearis	1	0.4
Bossiaea eriocarpa	1	0.3
Conostylis setigera	1	0.2
Lepidosperma angustatum	1	0.3
Astartea scoparia	1	1.5
Jacksonia sternbergiana	<1	1.2
**Burchardia umbellata*	<1	0.6
Gompholobium tomentosum	<1	0.5
Conostephium pendulum	<1	0.4

SPECIES	% COVER	HEIGHT (M)
Elythranthera brunosis	<1	0.4
Stylidium brunonianum	<1	0.3
Anarthria gracilis	<1	0.3
Caladenia flava	<1	0.2
**Briza maxima*	<1	0.2
Daucus glochidiatus	<1	0.1
Thysanotus multiflorus	<1	Creeper
Drosera pallida	<1	Climber

Quadrat 6
50386461E; 6325896N

Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* over Tall Scrub of *Kunzea glabrescens* over *Hibbertia subvaginata, Hibbertia racemosa* and *Dasypogon bromeliifolius* Low Open Heath

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Banksia attenuata	20	6
Banksia ilicifolia	10	8
Eucalyptus marginata subsp. *marginata*	5	15
Kunzea glabrescens	30	4
Nuytsia floribunda	1	4
Dasypogon bromeliifolius	5	0.4
Hibbertia subvaginata	2	0.2
Hibbertia racemosa	2	0.2
Anarthria gracilis	2	0.2
Tetraria octandra	1	0.3
Bossiaea eriocarpa	1	0.3
Philotheca spicata	<1	0.6
Gompholobium knightiatum	<1	0.6
Elythranthera brunosis	<1	0.5
Melaleuca scabra	<1	0.4
Leucopogon polymorphous	<1	0.3
Caladenia flava	<1	0.2

SPECIES	% COVER	HEIGHT (M)
Conostylis setigera	<1	0.1
Drosera pallida	<1	creeper

Quadrat 7
50386525E; 6325997N

Tall Shrubland of *Kunzea glabrescens* over Open Heath dominated by *Hypocalymma angustifolium*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Kunzea glabrescens	15	3
Hypocalymma angustifolium	20	1
**Ehrharta calycina*	1	0.6
Xanthorrhoea brunosis	1	0.6
Adenanthos meisneri	1	0.3
Daviesia nudiflora	<1	0.5
Dasypogon bromeliifolius	<1	0.4
**Arctotheca calendula*	<1	0.2
Kennedia prostrata	<1	Groundcover

Quadrat 8
50386506E; 6326145N

Low Open Woodland of *Melaleuca preissiana* over Low Closed Heath *Astartea scoparia* over Open Sedgeland *Lepidosperma longitudinale*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	10	6
Astartea scoparia	60	1.5
Lepidosperma longitudinale	20	1
**Leptospermum laevigatum*	<1	2.5
Kunzea glabrescens	<1	1.8
**Ursinia anthemoides*	<1	0.5
**Hypochaeris glabra*	<1	0.2
Dampiera linearis	<1	0.2
Caladenia flava	<1	0.2
**Arctotheca calendula*	<1	0.2
**Briza maxima*	<1	0.2
Cassytha racemosa	<1	Creeper

Quadrat 9
50386508E; 6326351N

Low Woodland of *Melaleuca preissiana* over Tall Shrubland *Kunzea ericifolia* and *Astartea scoparia* over Open Sedgeland *Lepidosperma longitudinale*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	30	8
Kunzea ericifolia	50	6
Astartea scoparia	10	1.6
Lepidosperma longitudinale	10	0.5
Calothamnus lateralis	1	2
Pericalymma ellipticum	<1	1.5
Adenanthos meisneri	<1	0.3
Caladenia flava	<1	0.2

Quadrat 10
50386513E; 6326494N

Closed Tall Scrub of *Kunzea ericifolia* with scattered *Melaleuca preissiana* and *Nuytsia floribunda* a over Low Open Shrubland of *Melaleuca scabra*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Kunzea ericifolia	70	4
Melaleuca scabra	5	1.5
Nuytsia floribunda	2	10
Melaleuca preissiana	2	4
Acacia pulchella	1	1.2
Dasypogon bromeliifolius	<1	0.3
**Ursinia anthemoides*	<1	0.3
Caladenia flava	<1	0.1
Daucus glochidiatus	<1	0.1

Quadrat 11
50386516E; 6326702N

Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia menziesii* and *Banksia attenuata* over a Tall Open Shrubland of *Kunzea ericifolia*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	20	15
Banksia menziesii	20	10
Banksia attenuata	10	10
Kunzea ericifolia	10	3
**Ehrharta calycina*	5	0.6
Drosera erythrorhiza	2	Climber
Conostylis aculeata	1	0.3
Conostephium pendulum	<1	0.5
**Ursinia anthemoides*	<1	0.4
Caladenia flava	<1	0.2
Dampiera linearis	<1	0.2
Daucus glochidiatus	<1	0.1
Thysanotus multiflorus	<1	Climber
Kennedia prostrata	<1	Creeper

Quadrat 12
50386578E; 6326834N

Closed Sedgeland of *Juncus pallidus* and *Baumea articulata* with scattered *Kunzea glabrescens and Astartea scoparia*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Juncus pallidus	80	1.2
Baumea articulata	10	1.3
Astartea scoparia	5	2
Kunzea glabrescens	5	2
**Arctotheca calendula*	<1	0.2

Quadrat 13
50386578E; 6326834N

Closed Heath *Astartea scoparia* with scattered *Kunzea glabrescens and Agonis flexuosa*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Astartea scoparia	90	1.8
Kunzea glabrescens	5	2
Agonis flexuosa	2	1.8
Aotus procumbens	1	1.6
Viminaria juncea	1	1.5
Xanthorrhoea brunosis	<1	0.5

Quadrat 14
50386636E; 6327226N

Scattered mixed regrowth

Condition: Degraded

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Daviesia divaricata	5	0.5
Kunzea glabrescens	5	0.5
Petrophile linearis	2	0.3
Jacksonia sericea	1	0.2
Melaleuca thymoides	1	0.5
Xanthorrhoea brunosis	1	0.5
Eucalyptus marginata	<1	0.7
Banksia ilicifolia	<1	0.5
Stylidium repens	<1	0.1
Dasypogon bromeliifolius	<1	0.2
**Ursinia anthemoides*	<1	0.2
Acacia pulchella	<1	0.3
Elythranthera brunonis	<1	0.3
Stylidium piliferum	<1	0.2
Drosera glanduligera	<1	Climber

Quadrat 15
50386621E; 6326763N

Tall Open Scrub of *Kunzea ericifolia* over *Jacksonia furcellata, Lysinema ciliatum, Leucopogon polymorphous* and *Hibbertia hypericoides* Open Shrubland

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Kunzea ericifolia	60	2.5
Leucopogon polymorphous	5	0.2
Jacksonia furcellata	2	1.8
Lysinema ciliatum	1	0.8
Hibbertia hypericoides	1	0.3
**Ursinia anthemoides*	<1	0.4
Conostylis aculeata	<1	0.3
Conostylis setigera	<1	0.2

Quadrat 16
50386623E; 6326616N

Scattered mixed regrowth

Condition: Degraded

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Kunzea glabrescens	10	02
**Ursinia anthemoides*	1	0.2
Astartea scoparia	1	0.2
**Arctotheca calendula*	<1	0.2
**Avena barbata*	<1	0.2
Hypocalymma angustifolium	<1	0.2
Eucalyptus marginata subsp. *marginata*	<1	0.4
Xanthorrhoea brunonis	<1	0.3
Jacksonia sternbergiana	<1	0.5
Daviesia divaricata	<1	0.2
Drosera pallida	<1	Climber
Petrophile linearis	1	0.2

Quadrat 17
50386602E; 6326388N

Scattered mixed regrowth

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Macrozamia riedlei	1	.9
Jacksonia sternbergiana	1	1.1
Kunzea ericifolia	1	0.5
**Ursinia anthemoides*	1	0.5
Aotus procumbens	1	0.5
Hibbertia subvaginata	1	0.4
Leucopogon propinquus	<1	0.3
Petrophile linearis	<1	0.2
Daviesia physodes	<1	0.3
Eucalyptus marginata	<1	1
Leucopogon racemulosus	<1	0.2
Adenanthos meisneri	<1	0.2
**Briza maxima*	<1	0.2
Bossiaea eriocarpa	<1	0.2
Hypocalymma angustifolium	<1	0.3
Dasypogon bromeliifolius	<1	0.2
**Avena fatua*	<1	0.3
**Arctotheca calendula*	<1	0.2

Quadrat 18
50386592E; 6326122N

Closed Sedgeland *Baumea articulata/Juncus pallidus*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Juncus pallidus	60	1.6
Baumea articulata	20	1.6
**Hypochaeris glabra*	<1	0.2
**Avena fatua*	<1	0.6
**Briza maxima*	<1	0.3
**Arctotheca calendula*	<1	0.2

Quadrat 19
50386600E; 6325981N

Closed Sedgeland *Baumea articulata/Juncus pallidus*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Juncus pallidus	60	1.6
Baumea articulata	20	1.6
Kunzea ericifolia	5	0.8
**Hypochaeris glabra*	<1	0.2
**Avena fatua*	<1	0.6
**Briza maxima*	<1	0.3
**Arctotheca calendula*	<1	0.2
Dampiera linearis	<1	0.3

Quadrat 20
50386596E; 6325711N

Closed Heath of *Pteridium esculentum* and *Astartea scoparia* with Open Sedgeland of **Typhae orientalis* and *Baumea articulata*

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Pteridium esculentum	60	0.8
Astartea scoparia	20	1.2
**Typhae orientalis*	20	1.2
Baumea articulata	5	1.2
Hypocalymma angustifolium	2	0.2
Agonis flexuosa	<1	1
**Ursinia anthemoides*	<1	0.6
**Briza maxima*	<1	0.2
**Arctotheca calendula*	<1	0.3
Poa annua	<1	0.2

Quadrat 21
50386588E; 6325519N

Low Closed Heath of *Pteridium esculentum*
Condition: Degraded

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Pteridium esculentum	60	0.8

Quadrat 22
50386541E; 6329646N

Closed Heath of *Astartea scoparia* with Closed Sedgeland of *Juncus pallidus*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Astartea scoparia	80	1.2
Juncus pallidus	15	1.2

Quadrat 23
50386540E; 6329447N

Open Forest *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla, Banksia grandis, Banksia ilicifolia* over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* dominated Low Heath

Condition: Degraded to Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	20	20
Corymbia calophylla	10	15
Banksia ilicifolia	5	15
Banksia grandis	5	15
Hibbertia hypericoides	10	0.5
Xanthorrhoea brunonis	10	0.6
Melaleuca thymoides	5	1
**Briza maxima*	5	0.2
Kunzea glabrescens	1	1.2
Viminaria juncea	1	1
Daviesia physodes	1	0.5
Bossiaea eriocarpa	1	0.2
Jacksonia furcellata	<1	1.2
Stirlingia latifolia	<1	0.6
**Hypochaeris glabra*	<1	0.5
Patersonia occidentalis	<1	0.3
Caladenia latifolia	<1	0.3

SPECIES	% COVER	HEIGHT (M)
Tetraria octandra	<1	0.3
Macrozamia riedlei	<1	0.3
Petrophile linearis	<1	0.3
Stylidium junceum	<1	0.3
**Ursinia anthemoides*	<1	0.2
Dampiera linearis	<1	0.2
Dasypogon bromeliifolius	<1	0.2
Tetratheca hirsutus	<1	Groundcover
Drosera menziesii	<1	Climber

Quadrat 24
50366570E; 6329350N

Closed Heath *Astartea scoparia* with scattered *Eucalyptus marginata* subsp. *marginata over* Low Open Heath *Hypocalymma angustifolium* and *Xanthorrhoea brunonis*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Astartea scoparia	60	1.2
Eucalyptus marginata subsp. *marginata*	5	10
Hypocalymma angustifolium	5	1.2
Xanthorrhoea brunonis	5	0.8

Quadrat 25
50386528E; 6329170N

Low Woodland *Melaleuca rhaphiophylla* with scattered *Eucalyptus marginata* subsp. *marginata* over *Xanthorrhoea brunonis a*nd *Hypocalymma angustifolium* dominated Low Closed Heath

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca rhaphiophylla	20	3
Hypocalymma angustatum	10	1
Pericalymma ellipticum	10	1
Eucalyptus marginata subsp. *marginata*	2	5
Xanthorrhoea brunonis	5	1
Melaleuca thymoides	2	1.5
Adenanthos meisneri	<1	0.5
Patersonia occidentalis	<1	0.5
Hibbertia stellaris	<1	0.4
Leucopogon propinquus	<1	0.3
**Briza maxima*	<1	0.2
Bossiaea linophylla	<1	0.2
Tricoryne elatior	<1	0.2
**Ursinia anthemoides*	<1	0.2
Stylidium repens	<1	0.2

Quadrat 26
50386519E; 6328483N

Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia over Kunzea ericifolia, Melaleuca thymoides, Hibbertia hypericoides* and *Stirlingia latifolia* dominated Shrubland

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Banksia attenuata	15	12
Banksia ilicifolia	10	15
Eucalyptus marginata subsp. *marginata*	5	15
Kunzea ericifolia	10	3
Melaleuca thymoides	5	1
Stirlingia latifolia	3	0.4
Hibbertia hypericoides	2	0.5
Acacia pulchella	1	1.2
Lysinema ciliatum	<1	1
Anarthria laevis	1	0.3
Macrozamia riedlei	<1	0.3
Caladenia latifolia	<1	0.3
Petrophile linearis	<1	0.3
**Briza maxima*	<1	0.3
Stylidium repens	<1	0.3
Dampiera linearis	<1	0.2

Quadrat 27
50386587E; 6329010N

Closed Heath *Pericalymma ellipticum* and *Hakea varia* over *Conostylis aculeata, Hibbertia stellaris, Calothamnus lateralis* Open Low Heath over *Meeboldina cana* and *Leptocarpus tenax* Sedgeland

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Pericalymma ellipticum	80	1.2
Hakea varia	10	1.8
Conostylis aculeata	2	1
Calothamnus lateralis	2	0.6
Hypocalymma angustifolium	2	0.5
Leptocarpus tenax	1	0.5
Meeboldina cana	1	0.4
Hibbertia stellaris	1	0.3
Acacia pulchella	<1	0.6

Quadrat 28
50386596E; 6328546N

Tall Open Scrub *Kunzea glabrescens* over *Xanthorrhoea brunonis, Melaleuca thymoides, Dasypogon bromeliifolius* Low Heath

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Kunzea ericifolia	60	3
Melaleuca thymoides	5	2.5
Xanthorrhoea brunonis	5	0.5
Dasypogon bromeliifolius	5	0.3
Eucalyptus marginata subsp. *marginata*	1	5
Nuytsia floribunda	1	3
Acacia pulchella	1	1
Anarthria laevis	1	0.3
Adenanthos meisneri	<1	0.6

Quadrat 29
50386524E; 6328151N

Low Open Woodland of *Melaleuca preissiana* with scattered *Melaleuca rhaphiophylla* over Closed Heath of *Astartea scoparia* and *Pericalymma ellipticum*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	10	8
Pericalymma ellipticum	40	1.5
Astartea scoparia	30	1.5
Melaleuca rhaphiophylla	10	3
Hypocalymma angustifolium	5	0.5
**Hypochaeris glabra*	1	0.2

Quadrat 30
50386541E; 6328139N

Closed Heath *Hypocalymma angustifolium, Astartea scoparia and Pericalymma ellipticum* with scattered *Kunzea ericifolia*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Pericalymma ellipticum	40	1.5
Astartea scoparia	20	1.5
Hypocalymma angustifolium	20	0.5
Kunzea ericifolia	5	3
Melaleuca thymoides	2	1.8
Adenanthos obovatus	1	0.5
***Ursinia anthemoides*	<1	0.3
**Briza maxima*	<1	0.3
Xanthorrhoea brunonis	<1	0.3
Crowea angustifolia	<1	0.3
Hibbertia stellaris	<1	0.3
**Orobanche minor*	<1	0.2
Dampiera linearis	<1	0.2
Dasypogon bromeliifolius	<1	0.2

Quadrat 31
50386524E; 6328069N

Open Forest *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia over Kunzea ericifolia, Melaleuca thymoides, Hibbertia hypericoides* and *Stirlingia latifolia* dominated Shrubland

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Banksia attenuata	15	12
Banksia ilicifolia	10	15
Eucalyptus marginata subsp. *marginata*	5	15
Kunzea ericifolia	10	3
Melaleuca thymoides	5	1
Stirlingia latifolia	3	0.4
Hibbertia hypericoides	2	0.5
Acacia pulchella	1	1.2
Lysinema ciliatum	<1	1
Anarthria laevis	1	0.3
Macrozamia riedlei	<1	0.3
Caladenia latifolia	<1	0.3
Petrophile linearis	<1	0.3

Quadrat 32
50386501E; 6327923N

Low Woodland of *Melaleuca preissiana* with scattered *Melaleuca rhaphiophylla* over Closed Heath of *Astartea scoparia* and *Pericalymma ellipticum*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca preissiana	10	10
Pericalymma ellipticum	40	1.5
Astartea scoparia	30	1.5
Melaleuca rhaphiophylla	10	3
Hypocalymma angustifolium	5	0.5
**Hypochaeris glabra*	1	0.2

Quadrat 33
50386532E; 6327888N

Closed Heath *Astartea scoparia* and *Baumea articulata* with scattered *Kunzea ericifolia*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Astartea scoparia	80	1.5
Baumea articulata	10	0.5
Kunzea ericifolia	5	1.5
Melaleuca rhaphiophylla	2	2

Quadrat 35
50386632E; 6327678N

Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* over Low Shrubland of *Hibbertia hypericoides, Melaleuca thymoides* and *Xanthorrhoea brunonis*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	40	15
Banksia ilicifolia	20	10
Banksia attenuata	10	10
Hibbertia hypericoides	15	0.3
Xanthorrhoea brunonis	10	0.5
Melaleuca thymoides	2	0.5
Kunzea ericifolia	<1	2
Dasypogon bromeliifolius	<1	0.5
Macrozamia riedlei	<1	0.5
Lepidosperma angustatum	<1	0.3
Hibbertia subvaginata	<1	0.3
Acacia pulchella	<1	0.3
Caladenia latifolia	<1	0.3
Stylidium repens	<1	0.3
Drosera pallida	<1	Climber

Quadrat 36
50386630E; 6327841N

Low Woodland of *Melaleuca rhaphiophylla* over Closed Low Heath of *Hypocalymma angustifolium, Pericalymma ellipticum* and *Xanthorrhoea brunonis* over Open Sedgeland of *Lepidosperma longitudinale*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca rhaphiophylla	10	3
Hypocalymma angustifolium	40	1.2
Pericalymma ellipticum	20	1.5
Xanthorrhoea brunonis	10	0.5
Lepidosperma longitudinale	2	0.5

Quadrat 37
50386631E; 6328097N

Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* over Low Shrubland of *Hibbertia hypericoides, Melaleuca thymoides* and *Xanthorrhoea brunonis*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	40	15
Banksia ilicifolia	20	10
Banksia attenuata	10	10
Hibbertia hypericoides	15	0.3
Xanthorrhoea brunonis	10	0.5
Melaleuca thymoides	2	0.5
Kunzea ericifolia	<1	2
Dasypogon bromeliifolius	<1	0.5
Macrozamia riedlei	<1	0.5
Lepidosperma angustatum	<1	0.3
Hibbertia subvaginata	<1	0.3
Acacia pulchella	<1	0.3
Caladenia latifolia	<1	0.3
Stylidium repens	<1	0.3
Drosera pallida	<1	Climber

Quadrat 38
50386653E; 6328237N

Low Woodland of *Melaleuca rhaphiophylla* over Closed Low Heath of *Hypocalymma angustifolium, Pericalymma ellipticum* and *Xanthorrhoea brunonis* over Open Sedgeland of *Lepidosperma longitudinale*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca rhaphiophylla	10	3
Hypocalymma angustifolium	40	1.2
Pericalymma ellipticum	20	1.5
Xanthorrhoea brunonis	10	0.5
Lepidosperma longitudinale	2	0.5

Quadrat 39
50386650E; 6328680N

Closed Heath of *Astartea scoparia*, *Pericalymma ellipticum*, *Hakea varia* and *Melaleuca lateritia* with scattered *Melaleuca rhaphiophylla* over Very Open Sedgeland of *Leptocarpus tenax*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Astartea scoparia	50	1.5
Pericalymma ellipticum	30	1.5
Melaleuca lateritia	5	2
Hakea varia	2	1.6
Leptocarpus tenax	10	0.5
Xanthorrhoea brunonis	<1	0.5
Meeboldina cana	<1	0.4
Stylidium junceum	<1	0.3

Quadrat 40
50386644E; 6328997N

Tall Shrubland *Melaleuca uncinata* with scattered *Melaleuca rhaphiophylla* over Open Low heath of *Hypocalymma angustifolium, Astartea scoparia , Pericalymma ellipticum* and *Aotus procumbens* over Very Open Sedgeland of *Leptocarpus tenax*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Melaleuca uncinata	20	3
Pericalymma ellipticum	30	1
Astartea scoparia	30	0.8
Melaleuca rhaphiophylla	5	3
Aotus procumbens	5	1.2
Melaleuca teretifolia	5	1.5
Melaleuca scabra	5	1.2
Leptocarpus tenax	5	0.5
Calothamnus lateralis	2	1
Meeboldina cana	2	1
Acacia pulchella	<1	1.4
Dampiera linearis	<1	0.3

Quadrat 41
50386648E; 6329384N

Scattered *Eucalyptus marginata* subsp. *marginata* over Open Shrubland
Xanthorrhoea brunonis and *Kunzea ericifolia*

Condition: Degraded

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	2	20
Xanthorrhoea brunonis	5	0.8
Kunzea ericifolia	2	0.8
Dasypogon bromeliifolius	1	0.2
**Orobanche minor*	<1	0.2

Quadrat 42
50386795E; 6323938N

Open Forest *Agonis flexuosa, Banksia ilicifolia, Banksia attenuata* and *Eucalyptus marginata* subsp. *marginata* over Open Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Jacksonia furcellata*

Condition: Very Good

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Agonis flexuosa	30	10
Banksia attenuata	10	15
Banksia ilicifolia	10	10
Eucalyptus marginata subsp. *marginata*	2	15
Melaleuca thymoides	20	1.5
Xanthorrhoea brunonis	5	0.5
Jacksonia furcellata	2	1.2
Macrozamia riedlei	<1	0.4

SPECIES	% COVER	HEIGHT (M)
Hibbertia hypericoides	<1	0.3
Stylidium piliferum	<1	0.3
**Briza maxima*	<1	0.2
**Ursinia anthemoides*	<1	0.2
Dasypogon bromeliifolius	<1	0.2

Quadrat 43
50387188E; 6329796N

Open Forest *Eucalyptus marginata* subsp. *marginata* and *Banksia attenuata* over Open Low Heath of *Melaleuca thymoides, Xanthorrhoea brunonis* and *Hibbertia hypericoides*

Condition: Very Good to Excellent

(10m x 10m)

SPECIES	% COVER	HEIGHT (M)
Eucalyptus marginata subsp. *marginata*	30	15
Banksia attenuata	10	10
Hibbertia hypericoides	20	0.5
Melaleuca thymoides	10	1
Xanthorrhoea brunonis	10	0.5
Banksia ilicifolia	10	10
Calytrix fraseri	1	1.2
Petrophile linearis	1	0.3
Agonis flexuosa	<1	1.5
Viminaria juncea	<1	1.5
Stirlingia latifolia	<1	0.4
Caladenia latifolia	<1	0.4
Dasypogon bromeliifolius	<1	0.3
**Briza maxima*	<1	0.2
**Ursinia anthemoides*	<1	0.2
Anarthria laevis	<1	0.2
Drosera pallida	<1	Creeper

APPENDIX 6

HARVEY WATER SUPPLY AGREEMENT

"Helping our irrigation industries to grow from Waroona to Dardanup."

HARVEY WATER

ABN: 54 498 176 490
Irrigation Centre, James Stirling Place, Harvey W.A. 6220
P.O. Box 456 Harvey W.A. 6220
Telephone: (08) 9729 0100; Fax: (08) 9729 0111
Email: admin@harveywater.com.au
Website: www.harveywater.com.au

Steve Iceton
97290100

RECEIVED
12 AUG 2005
BY:

Transfield Services
Peter Winch
Project Developer
Level 13
80 Albert Street
Brisbane Qld 4000
Australia

Dear Mr Winch

RE:- PROVISION OF A WATER SUPPLY TO THE KEMERTON POWER STATION

Further to our discussions and our meeting in Brisbane last week I now have a clearer understanding of your requirements and have an appreciation of the process that you are going through.

To meet the water requirements of the power station currently under construction you have suggested that the maximum flow rate required is less than 1ML per day. Harvey Water can supply that amount from our current industrial allocation as and when required.
The supply would require the installation of 4.2km of 150mm pipeline and the associated infrastructure.
The cost of providing this supply would be $

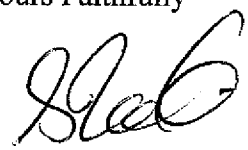
As I understand it you may in the future require a supply of 14ML per day and you wish to determine the difference in cost between a 1ML pipeline and a 14ML pipeline at today's rates.
As previously stated the 14ML supply requires full board approval however we are confidant that we can supply the required amount should it be required. Should the approval be given then Harvey Water would need at least two years notice to facilitate the supply.
The supply would require the installation of 4.2km of 355mm pipeline and the associated infrastructure.
The cost of providing this supply would be $

With regard to providing a quotation to supply and install both pipelines in the future you would appreciate that given the movement in oil prices and labour rates it would

be impossible to give an accurate costing. Consequently I can only estimate that the price may go up by around 15% in two years which is the movement we have seen over the last two years. However given the volatility of the markets Harvey Water would need to issue a quotation when and if the works are required.

Should you wish to discuss this matter or need any further information please do hesitate to contact me or HW's General Manager Geoff Calder on the above number.

Yours Faithfully



Steve Iceton
Operations Manager
8 August 2005

APPENDIX 7

EVAPORATION POND WATER BALANCE CALCULATIONS

EVAPORATION POND WATER BALANCE CALCULATIONS

SUMMARY OF DESIGN AND OPERATION

Evaporation Pond Water Balance

Evaporation data and pan factors from Harvey Station (Station 9812) have been adopted for this report.

1. Evaporation Data

	Units	Jan	Feb	March	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Mean
Pan Evaporation	mm/d	8.2	7.9	6.6	3.9	2.9	2.1	2.1	2.3	3.2	4.1	5.7	7.3	4.69
Pan Factor	-	0.9	0.9	0.85	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.85	0.85	0.8
Lake Evaporation	mm/d	8.19	7.89	6.59	3.90	2.90	2.10	2.10	2.30	3.20	4.10	5.70	7.29	**4.69**

Adjustment of the evaporation rate was made on a daily basis within the simulation depending on the simulated salt concentration within the basin. The Morton equation was used for the adjustment.

It was assumed that all of the available salt in the basing would be dissolved into whatever water was stored in the basin on any given day. This is a conservative assumption in that it increases the basin are /volume requirements by around 3.5-6%, however it provides a reasonable "worst case" scenario for this assessment.

The relationship used to determine the daily evaporation was therefore as follows:

$$Es = \frac{FmEp}{1+\left(\frac{S}{10^6}\right)}$$

Where:
Es – Salinity adjusted lake evaporation (mm/day)
Fm - Pan Factor (monthly) for lake evaporation
Ep – Pan Evaporation (mm/day)
S – Salinity of water in basin (mg/L TDS)

2. Rainfall

Monthly rainfall data for Harvey (Station 9812) was obtained from the Australian Bureau of Meteorology for the period 2000 – 2007. The average monthly and annual rainfall for this station presented in table below.

Rainfall data		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total
Average rainfall dept	mm/ month	11	11.3	13.2	37.4	118.6	137.2	141.4	153.8	107.4	58.7	34.8	10.8	**835.6**

3. Inflows

Inflow to the evaporation basin was assumed to be from Reverse Osmosis (RO) waste water.

It is assumed that wet compression will be used during summer months mid December – mid March. 10 days per month, with average run of 10 hours per day. Based on this assumption, approximately 5.4 ML of waste water will be generated. Waste water salinity will be in order of 700 mg/l TDS.

The above operating assumption is supported by historical operation data recorded from the beginning of commercial operation since November 2005.

Wet compression utilisation		**Calculation based on historical capacity factor assuming wet compression will be ON 90% of the time**	
wet compression operation [months]	3	Historical capacity factor	5.0%
days per month [days]	10	Wet compression utilisation factor	70%
hours per day [hrs]	10		
demin water flow per GT [kg/s]	10	demin water flow per GT [kg/s]	10
number of GT's	2	number of GT's	2
RO conversion factor	0.8	RO conversion factor	0.8
total demin water demand for 2 GT's [m3/hr]	72	total demin water demand for 2 GT's [m3/hr]	72
demin demand [ML/day]	0.72		
demin demand [ML/month]	7.2		
demin demand [ML/year]	21.6	demin demand [ML/year]	**22.08**
raw water demand [m3/hr]	90	raw water demand [m3/hr]	90
raw water demand [ML/day]	0.9		
raw water deman [ML/month]	9		
raw water demand [ML/year]	**27**	**raw water demand [ML/year]**	**27.594**
reject [m3/hr]	18	reject [m3/hr]	18
reject [ML/day]	0.18		
reject [ML/month]	2		
reject [ML/year]	**5.4**	**reject [ML/year]**	**5.5**

4. Water Balance

An annual water balance model was prepared to simulate the evaporation basing. The basin requirements were determined so that no overflows occurred during the 20 year operation period.

POND 1

Water balance		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
reject water per annum	ML	5.4	0	5.4	0	5.4	0	5.4	0	5.4	0
rainfall per annum in to evaporation pond	ML	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81
evaporation from the pond	ML	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51
remaining water in the pond	**ML**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**

POND 2

Water balance		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
reject water per annum	ML	0	5.4	0	5.4	0	5.4	0	5.4	0	5.4
rainfall per annum in to evaporation pond	ML	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81
evaporation from the pond	ML	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51
remaining water in the pond	**ML**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**

5. Evaporation pond management

The ponds will be used on annual basis.

Example:

Year 1

- Pond 1 receives the waste water
- Pond 2 will stay empty
-

Year 2

- Pond 2 receives the waste water
- Pond 1 is left to dry. At the end of the year 2, the pond will get cleaned. Approximately 4 tonnes of solids will be will be removed from the pond and disposed of to an appropriately classed landfill.

Year 3

- Pond 1 receives the waste water
- Pond 2 is left to dry. At the end of the year 3, the pond will get cleaned. Approximately 4 tonnes of solids will be will be removed from the pond and disposed of to an appropriately classed landfill.

EVAPORATION POND WATER BALANCE CALCULATIONS

WATER REQUIREMENT DATA, CLIMATIC DATA & EVAPORATION POND DATA

Water requirements

Wet compression	
estimated wet compresssion operation [months]	3
days per month [days]	10
hours per day [hrs]	10
demin water flow per GT [kg/s]	10
number of GT's	2
RO conversion factor	0.8
total demin water demand for 2 GT's [m3/hr]	72
demin demand [ML/day]	0.72
demin demand [ML/month]	7.2
demin demand [ML/year]	21.6
raw water demand [m3/hr]	90
raw water demand [ML/day]	0.9
raw water deman [ML/month]	9
raw water demand [ML/year]	**27**
reject [m3/hr]	18
reject [ML/day]	0.18
reject [ML/month]	2
reject [ML/year]	**5.4**

Amount of solids after one year	
reject water concentration [mg/l]	786
amount of reject water per annum [ML]	5.4
Amount of solids in pond after 1 year of operation [kg]	**4,244**
Amount of solids in pond after 5 years [kg]	**21,220**
Area of evaporation pond [m2]	6709
average density [kg/m3]	1700
Depth of solids after 1 year of operation [mm]	0.3721

Climatic Data - Harvey Weather Station (Station 9812)

Stn_Num	Year	NameAndUnit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
9812	2000	Mean Daily Evaporation {from Class A Pan} (mm/day)											19.6	2.4	
9812	2000	Total Monthly Evaporation (mm)													
9812	2000	Total Monthly Precipitation (mm)													
9812	2001	Mean Daily Evaporation {from Class A Pan} (mm/day)		7.8	6.8	4.4	3.2	1.6	1.8	2.1	2.8	3.9	6.1	6.7	
9812	2001	Total Monthly Evaporation (mm)		218.4	210.8	132	99.2	48	55.8	65.1	84	120.9	183	207.7	1424.9
9812	2001	Total Monthly Precipitation (mm)	0	0.6	2.7	6.3	133.1	31	105	158	128.5	29.6	41.8	36.2	672.8
9812	2002	Mean Daily Evaporation {from Class A Pan} (mm/day)	8	8.3	6.4	4	2.5	2.2	2.7	2.3	3.2	4	5.7	8	4.8
9812	2002	Total Monthly Evaporation (mm)	248	232.4	198.4	120	77.5	66	83.7	71.3	96	124	171	248	1736.3
9812	2002	Total Monthly Precipitation (mm)	4.8	1.8	6.4	69.2	80.4	189.5	216.6	146	105.7	81.2	25.4	2.4	929.4
9812	2003	Mean Daily Evaporation {from Class A Pan} (mm/day)	9	8.1	7.1	3.8	3.2	2	1.9	2.5	3.4	4	5.7	7.3	4.8
9812	2003	Total Monthly Evaporation (mm)	279	226.8	220.1	114	99.2	60	58.9	77.5	102	124	171	226.3	1758.8
9812	2003	Total Monthly Precipitation (mm)	4.2	38.8	30.6	57.3	103.7	154.4	165.4	127.6	139.2	31.7	51.4	1.4	905.7
9812	2004	Mean Daily Evaporation {from Class A Pan} (mm/day)	8.5	7.8	6.3	4	3	2.4	2.1	2.5	3.8	4.3	5.7	8	4.9
9812	2004	Total Monthly Evaporation (mm)	263.5	226.2	195.3	120	93	72	65.1	77.5	114	133.3	171	248	1778.9
9812	2004	Total Monthly Precipitation (mm)	22.2	21.6	1.2	20.8	118.6	202.3	141.5	169	46	57.6	45.6	5	851.4
9812	2005	Mean Daily Evaporation {from Class A Pan} (mm/day)	8.8	7.7	6.4	3.4	3.1	2.1	2	2.2	2.8	3.6	5.5	5.3	4.4
9812	2005	Total Monthly Evaporation (mm)	272.8	215.6	198.4	102	96.1	63	62	68.2	84	111.6	165	164.3	1603
9812	2005	Total Monthly Precipitation (mm)	0.2	7.2	29.4	35.9	243.6	211	77.2	148.6	156.8	106.2	32.4	23.8	1072.3
9812	2006	Mean Daily Evaporation {from Class A Pan} (mm/day)	6.9	7.9	6.6	3.5	2.6	2.1	2.1	2.4	3.1	4.7	5.7	8.2	4.7
9812	2006	Total Monthly Evaporation (mm)	213.9	221.2	204.6	105	80.6	63	65.1	74.4	93	145.7	171	254.2	1691.7
9812	2006	Total Monthly Precipitation (mm)	28.6	3	8.8	34.6	31.9	34.9	142.9	173.6	68.3	45.6	27.6	4.4	604.2
9812	2007	Mean Daily Evaporation {from Class A Pan} (mm/day)													
9812	2007	Total Monthly Evaporation (mm)													
9812	2007	Total Monthly Precipitation (mm)	17	5.8											
9812	Number of Obs	Total Monthly Precipitation (mm)	7	7	6	6	6	6	6	6	6	6	7	7	6
9812	Mean	Total Monthly Precipitation (mm)	11	11.3	13.2	37.4	118.6	137.2	141.4	153.8	107.4	58.7	34.8	10.8	839.3
9812	Median	Total Monthly Precipitation (mm)	4.8	5.8	7.6	35.3	111.2	172	142.2	153.3	117.1	51.6	32.4	4.4	878.6
9812	Lowest	Total Monthly Precipitation (mm)	0	0.6	1.2	6.3	31.9	31	77.2	127.6	46	29.6	19.6	1.4	604.2
9812	Highest	Total Monthly Precipitation (mm)	28.6	38.8	30.6	69.2	243.6	211	216.6	173.6	156.8	106.2	51.4	36.2	1072.3
9812	Number of Obs	Mean Daily Evaporation {from Class A Pan} (mm/day)	5	6	6	6	6	6	6	6	6	6	6	6	5
9812	Mean	Mean Daily Evaporation {from Class A Pan} (mm/day)	8.2	7.9	6.6	3.9	2.9	2.1	2.1	2.3	3.2	4.1	5.7	7.3	4.7
9812	Median	Mean Daily Evaporation {from Class A Pan} (mm/day)	8.5	7.9	6.5	3.9	3.1	2.1	2.1	2.4	3.2	4	5.7	7.7	4.8
9812	Lowest	Mean Daily Evaporation {from Class A Pan} (mm/day)	6.9	7.7	6.3	3.4	2.5	1.6	1.8	2.1	2.8	3.6	5.5	5.3	4.4
9812	Highest	Mean Daily Evaporation {from Class A Pan} (mm/day)	9	8.3	7.1	4.4	3.2	2.4	2.7	2.5	3.8	4.7	6.1	8.2	4.9
9812	Number of Obs	Total Monthly Evaporation (mm)	5	6	6	6	6	6	6	6	6	6	6	6	5
9812	Mean	Total Monthly Evaporation (mm)	255.4	223.4	204.6	115.5	90.9	62	65.1	72.3	95.5	126.6	172	224.8	1713.7
9812	Median	Total Monthly Evaporation (mm)	263.5	223.7	201.5	117	94.6	63	63.6	72.9	94.5	124	171	237.2	1736.3
9812	Lowest	Total Monthly Evaporation (mm)	213.9	215.6	195.3	102	77.5	48	55.8	65.1	84	111.6	165	164.3	1603
9812	Highest	Total Monthly Evaporation (mm)	279	232.4	220.1	132	99.2	72	83.7	77.5	114	145.7	183	254.2	1778.9

	Units		
Evaporation basin area	m2	**4560**	Please note that this is the area of the pond filled at 50%
Salinity of water in basin	mg/l TD	786	

Evaporation Data		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Pan Evaporation	mm/d	8.2	7.9	6.6	3.9	2.9	2.1	2.1	2.3	3.2	4.1	5.7	7.3	4.69
Pan Factor	-	0.9	0.9	0.85	0.8	0.8	0.7	0.7	0.7	0.8	0.8	0.85	0.85	0.804167
Basin Evaporation	mm/d	7.37	7.10	5.61	3.12	2.32	1.47	1.47	1.61	2.56	3.28	4.84	6.20	**3.91**

Rainfall data		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	total
Average rainfall dept	mm/mo	11	11.3	13.2	37.4	118.6	137.2	141.4	153.8	107.4	58.7	34.8	10.8	**835.6**

Inflows ML/yea **5.4**

POND 1

Water balance		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
reject water per annum	ML	5.4	0	5.4	0	5.4	0	5.4	0	5.4	0
rainfall per annum in to evaporation pond	ML	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81
evaporation from the pond	ML	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51
remaining water in the pond	**ML**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**	**2.70**	**0.00**

POND 2

Water balance		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
reject water per annum	ML	0	5.4	0	5.4	0	5.4	0	5.4	0	5.4
rainfall per annum in to evaporation pond	ML	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3.81
evaporation from the pond	ML	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51	6.51
remaining water in the pond	**ML**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**	**0**	**2.70**

Solids [kg] **4,244**

APPENDIX 8

KEMERTON POWER STATION OPERATIONS ENVIRONMENTAL MANAGEMENT PLAN (ATA, 2005a)

THIS DOCUMENT IS UPDATED PERIODICALLY.

TRANSFIELD SERVICES
Kemerton Power Station

OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

DOCUMENT No. TMP-6023_EV_0001

Revision 1

November 2005

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OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

PART A

1. INTRODUCTION

1.1 Background

Transfield Services Kemerton Pty Ltd (Transfield Services) was selected through a competitive tendering process to construct and operate a peaking power station to assist Western Power Corporation in meeting forecasted power generation needs for the South West Interconnected System.

The peaking station is located within the Kemerton Industrial Park and consists of two Siemens V94.2 gas turbine generator sets delivering a sent out capacity of a nominal 260.9 MW (at 40°C and 40% relative humidity). The turbine generators will operate primarily on natural gas with distillate (ultra low sulphur fuel) as a backup.

Hot commissioning and initial operations in 2006 will utilise liquid fuels, due to unforeseen delays in construction of the natural gas lateral from the Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the power station gas delivery point and likely limitations on gas transport capacity to the power station until the new owner of the DBNGP has installed increased pipeline capacity. The gas fuel supply pipeline is the subject of a separate referral by the Western Power Corporation.

The facilities at the Kemerton Power Station comprise:

- two open cycle air cooled gas turbine generator sets;
- standby liquid fuel storage (2ML ultra low sulphur diesel); and
- ancillary buildings and plant.

The gas conditioning plant and grid connection are located on the same site.

The environmental impacts of the KPS were formally assessed by the Environmental Protection Authority (Bulletin 1121) and received conditional approval from the Western Australian Minister for the Environment in February 2004 (Statement No 645) (Appendix 1). An increase in the capacity of the fuel storage tank (from 1.5ML to 2ML) and its location was approved by the Minister for the Environment in April 2004 (Appendix 2).

1.2 The Proponent

The owner and operator of the power station is Transfield Services Kemerton Pty Limited (TSKPL) a wholly owned subsidiary of Transfield Services Limited.

The key contacts for the KPS are:

Corporate
Mr Miro Tischljar
Senior Engineer Infrastructure Assets

Level 13, 80 Albert Street
BRISBANE QLD 4000
Telephone: 07-3248 8786
Facsimile: 07-324808790
Email: tischljarm@transfieldservices.com

Site
Mr Wayne Roberts
KPS Operations Superintendent

Lot 505 (Extension to Treasure Road)
Kemerton Industrial Estate
HARVEY WA 6220
Telephone: 08 9729 0821
Facsimile: 08 9729 0844
Email: robertsw@transfieldservices.com

1.3 Purpose

This Operational Environmental Management Plan (OEMP) has been prepared to satisfy the Ministerial conditions and the commitments given in the referral documentation for the Kemerton Power Station. The relevant Ministerial Conditions/Proponent commitments relating to operation of the project are listed in Table 1.

TABLE 1
SUMMARY OF RELEVANT MINISTERIAL CONDITIONS AND PROPONENT COMMITMENTS APPLYING TO THE OPERATION OF THE KPS

Environmental Factor	Ministerial Statement	Auditable Element
Flora and Vegetation	645	P2.1, P2.2, P4.1, P4.2
Groundwater	645	P2.1, P2.2, P7.1, P7.2
Surface and Stormwater	645	P2.1, P2.2, P9.1, P9.2
Air Emissions	645	P2.1, P2.2, P11.1, P11.2
Noise	645	P2.1, P2.2, P14.1, P14.2
Soil and Liquid Waste	645	P2.1, P2.2, P16.1, P16.2
Hydrocarbon and Hazardous Materials	645	P2.1, P2.2, P18.1, p18.2
Social and Economic issues (Community Consultation)	645	P1.1, P1.2, P21.1, P21.2

The Ministerial Conditions/ Proponent Commitments are detailed in full in the relevant Management Plan in Part B of this OEMP.

The Department of Environment's Audit Table for the KPS Project is provided as Appendix 3.

The KPS will be required to operate under an Environmental Protection Licence issued by the Department of Environment (DoE) for the prescribed premises, issued under Part V of the *Environmental Protection Act 1986*. A copy of the licence is provided as Appendix 4.

1.4 Structure

This OEMP has been divided into 2 parts, which are as follows:

Part A - General:

- **Introduction** - outlines the background to the project, the proponent, and purpose of the OEMP.
- **Site Description** - provides an overview of the location, climate and physical features of the site.
- **Project Description** - provides a summary of the project, particularly relating to the impacts of construction;

Part B - Environmental Management Plans

Part B contains specific Environmental Management Plans (EMP) for relevant environmental issues relating to the operation of the Kemerton Power Station. Relevant environmental issues for the operation of the power station are:

1) protection of flora and vegetation;
2) groundwater management;
3) surface and stormwater management;
4) management of air emissions;
5) management of noise;
6) management of solid and liquid wastes;
7) hydrocarbon and hazardous materials; and
8) community consultation.

Each EMP provides the following information:

- Purpose;
- Scope;
- Definitions;
- Performance criteria;
- Management procedures (including monitoring and reporting requirements); and
- Reference Documentation.

1.4.1 Transfield Services Operational Systems

All Transfield Services facilities are governed by an Operational Systems which is an electronic based Management System that is developed in accordance with:

- AS/NZS ISO 9001:2000 Quality Management Systems
- AS/NZS ISO14001:2004 Environmental Management Systems
- AS 4801:2000 Occupational Health and Safety Management Systems
- AS/NZS 4360:1999 Risk Management
- Workcover Self Insurers Model (NSW)

The structure and functionality of the Management System is shown in the following illustration. An integral component of the systems is the site specific Operational Systems Plan (OSP) which is intended to be used as a map to guide the user through the relevant site specific, National and Industry Systems (Procedures, Instructions, Forms, Schedules, etc.) applicable to Transfield Services employees and sub-contractors working for Transfield Services.

The Operational Systems Plan acts as a quick reference to the systems applicable for the site, and subsequently hyperlinks the user to the Systems that will explain the how to.

The Operational Systems Plan contains referenced/hyperlinked documents (Procedures, Instructions and Forms) which are tools and aids to complete the daily tasks undertaken by Transfield Services.

The Operational Environmental Management Plans developed for the Kemerton Power Station will be fully integrated into the site Operational Systems Plan once formal approvals for the OEMP has been granted by the Department of Environment.

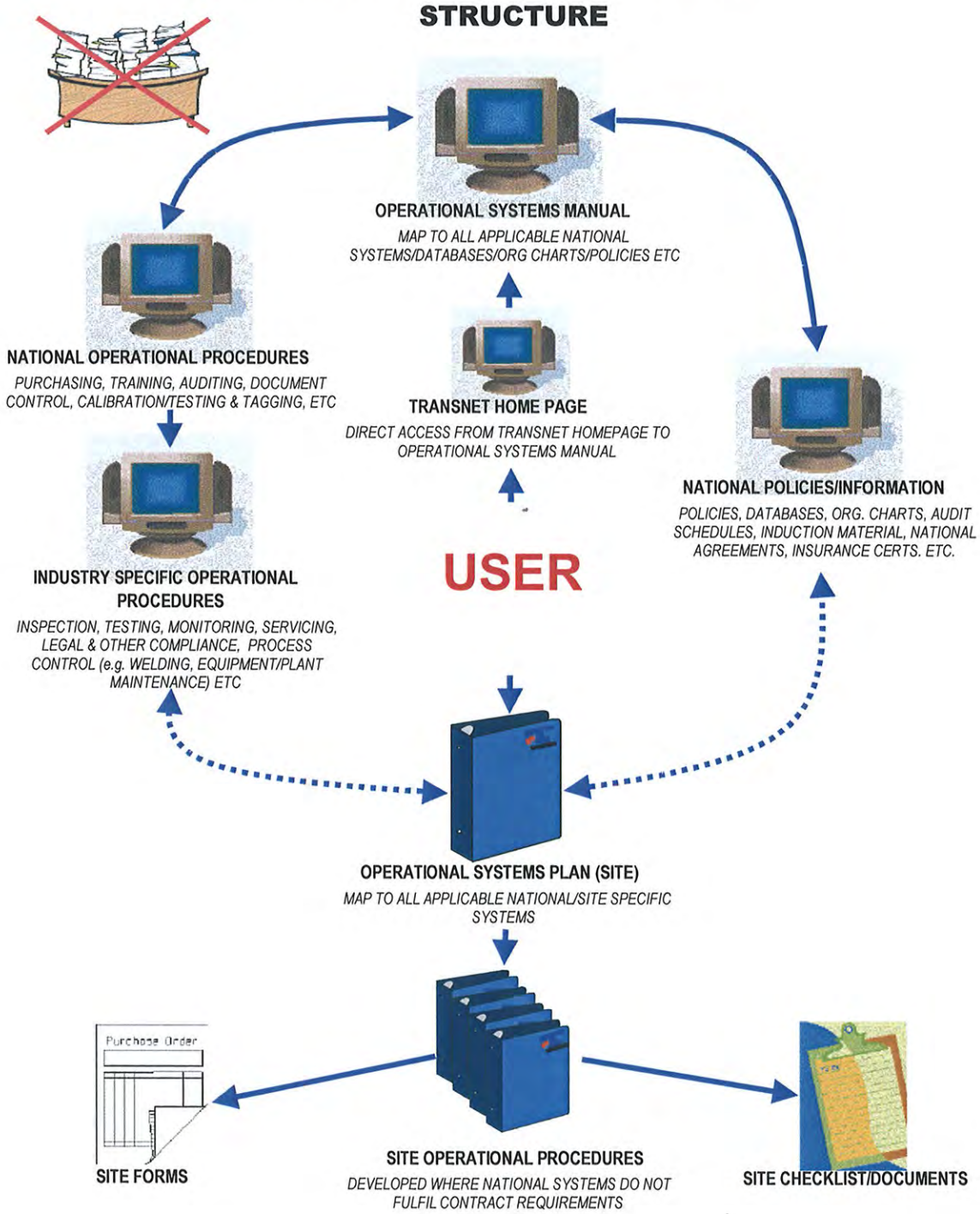
The Operational Systems Plan and hence, the OEMP will be adopted and fully implemented by all Transfield Services employees.

Implementation of the Operational Systems Plan and associated documentation shall be verified by periodic audits performed by regional and site based auditors.

The effective implementation of this Operational Systems Plan shall ensure that Transfield Services complies with relevant legislation, standards and codes of practice.

OPERATIONAL SYSTEMS

STRUCTURE



1.5 Site Description

1.5.1 Location

The KPS generation facilities are located in the Kemerton Industrial Park approximately 20km north of Bunbury, Western Australia (Figure 1).

The power station is located on an approximately 2ha footprint area located within a 27.3a dedicated site comprising a portion of the Industrial Park (totalling about 7543ha). The nearest sensitive premises is located approximately 2km west of the plant site (Figure 2).

1.5.2 Climate

The site experiences a Mediterranean type climate characterised by hot dry summers with high evaporation, and cool wet winters during which much of the rainfall occurs. Although temperatures are high in summer, they are lower than adjacent inland areas due to local onshore breezes. The evaporation and rainfall control seasonal fluctuations in the water table aquifer.

The average annual rainfall for the site is approximately 830mm, with almost 80% of the rainfall recorded between May and September. Summer winds are predominantly from the SE or E at 11-20km/hr and in the afternoons from the W at 21-30km/hr. Winter winds in the morning are predominantly from the N and NE up to 20km/hr. Afternoon winds are predominantly from the N, NW and W at over 10km/hr and frequently above 20km/hr.

1.5.3 Geology

The underlying geology at Kemerton consists of superficial sands, resting on the Leederville Formation, overlying the Yarragadee Formation or the Cattamarra Coal Measures.

The superficial formation (Quaternary) consists of sand, limestone, silt and clay units of the Guildford Formation, Bassendean Sand, Tamala Limestone and Safety Bay Sand. Peaty sand deposits can also occur associated with swamps and wetlands.

The Leederville Formation (Early Cretaceous) consists of quartz sandstone, siltstone and shale. The Leederville extends across most of the Coastal Plain, and is overlain by the superficial formations.

1.5.4 Surface Water and Hydrogeology

The Kemerton Industrial Park is underlain by an unconfined superficial aquifer. This aquifer is further underlain with the confined aquifers (by increasing depth) of the Leederville Formation and the Cockleshell Gully Formation. The depth to the water table over much of the area is 1-3m and seasonal fluctuations in groundwater elevations in the order of 1 – 3m. Groundwater in the superficial aquifer ranges in salinity from 100 to 8,500mg/L TDS.

The Kemerton Industrial Park falls within the boundaries of the Leschenault Inlet Management Area which aims to protect the Leschenault Estuary, an environmentally significant water resource.

Shallow groundwater flow is generally to the east and south east towards a series of Environmental Protection Policy (EPP) wetlands and the Wellesley River. A surface drainage line traverses a portion of the proposed site, and an existing man-made drain line passes through the site. This drain has been realigned as part of the KPS project.

There are no Environmental Protection Policy (EPP) wetlands within the KPS, however there are a number of EPP and Conservation Category wetlands located 200m to the north and 750m to the south of the KPS site. Conservation Category and Resource Enhancement wetlands are located on the eastern and western boundaries of the Industrial Park and many Multiple Use category wetlands are located on the eastern side of Kemerton Industrial Estate. EPP and Conservation category wetlands have stringent management requirements, which are summarised in Table 2.

TABLE 2
CATEGORIES OF WETLANDS AND THEIR MANAGEMENT OBJECTIVES

Category	Primary Management Objectives
EPP	These wetlands are protected from activities included draining, filling, mining, polluting, or other alteration to the hydrological function of the wetland.
Conservation	Management to maintain, and wherever possible, enhance the natural attributes and functions of the wetland.
Multiple Use	There are generally no constraints associated with the development of MU wetlands, provided the remaining hydrological functions of the catchment are maintained.

1.5.5 Vegetation and Flora

The power station footprint will occupy 2ha of a dedicated 27.3ha site within the Kemerton Industrial Park. The entire area of the KPS is located over what was originally a blue gum (*Eucalyptus globulus*) plantation (Figure 3). Up to 15 ha of *E. globulus* cultivated plantation was removed during the construction of the KPS for laydown and operational requirements.

No flora species of conservation significance were recorded from the KPS site during a spring survey for DRF and Priority Flora. Two priority flora *Acacia semitrullata* (Priority 3 Flora) and

Jacksonia sparsa ms (Priority 4 Flora) are located in the remnant vegetation to the south of the KPS site.

Several species of environmental weeds were recorded from the KPS site including Acetosella vulgaris, Couch (*Cynodon dactylon*), Mallow (*Malva parviflora*), Barley Grass (*Hordeum leporium*), Annual veldt grass (*Ehrarta longiflora*) and Wild oats (*Avena barbata*). The Narrow leaved Cotton Bush (*Gomphocarpus fruticosus*), a Declared Plant classified as P4 by the Shire of Harvey, was recorded at the KPS site during a survey by ATA Environmental in 2003.

1.5.6 Fauna

The KPS site is a Bluegum plantation which is highly modified and generally degraded and provides little habitat for native fauna.

Based on a review of existing literature, six species of Listed fauna and eight species of Priority fauna could potentially occur near the plant site. No Listed or Priority fauna were identified on the KPS site during a spring survey by ATA Environmental in 2003.

Feral cats, rabbits, and foxes were common.

1.5.7 Aboriginal Heritage

A heritage survey has been conducted within the area encompassing the power station and buffer zone. No sites of significance have been identified within the KPS, although a number of sites are known to exist within the Kemerton Industrial Estate. There are no identified sites within 4km of the KPS.

Notwithstanding this, where clearing of land is required for new infrastructure or extensions to existing infrastructure, the potential for disturbing latent Aboriginal Heritage sites must be addressed. Protection of these sites is managed under the *Aboriginal Heritage Act 1972*.

1.6 Project Description

1.6.1 Description of the Project

A full description of the KPS project is provided in the *Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179* prepared by ATA Environmental in December 2003. Layout of the KPS Project is provided in Figures 4A, 4B and 4C. Pre-construction topographic contours for the KIP and the site are presented as Figures 5 and 6 respectively.

1.6.2 Environmental Impacts

Key environmental impacts resulting from the operation of the KPS Project were identified in the Kemerton Power Station referral documentation and include:

1) protection of flora and vegetation;

2) groundwater management;

3) surface and stormwater management;

4) management of air emissions;

5) management of noise;

6) management of solid and liquid wastes;

7) hydrocarbon and hazardous materials; and

8) community consultation.

The management of potential environmental impacts from the operation of the KPS on each of these issues is summarised in the respective management plan provided in Part B of this OEMP.

OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

PART B

FLORA AND VEGETATION MANAGEMENT

1.0 PURPOSE

This Flora and Vegetation Management Plan has been prepared to ensure that Power Station operational activities do not impact on vegetation communities. The management plan has been developed to maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.

The following commitments relating to the management of flora and vegetation were made in the referral documentation:

Prepare and implement an Operational Flora and Vegetation Management Plan which will address but not be limited to:

- Dieback Hygiene;
- Weed management and control;
- Clearing of blue gums in buffer;
- Monitoring requirements; and
- Reporting requirements.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to impact upon local flora and vegetation within and surrounding the premises.

3.0 DEFINITIONS

CALM – Western Australian Department of Conservation and Land Management

CEMP – Construction Environmental Management Plan, Version 6, July 2004

DoE - Western Australian Department of Environment

EPA – Western Australian Environmental protection Authority

4.0 PERFORMANCE CRITERIA

Land clearing activities will comply with clearing permit provisions prescribed in the WA *Environmental Protection Act, 1986 (As amended).*

5.0 PROCEDURE

5.1 General Management

The following management practices will be adopted for protection of flora adjoining the premises during operation of the project:

5.1.1 Dust minimisation measures will be implemented (Air Emissions Management Plan).

5.1.2 Materials that are potentially hazardous to vegetation will be contained and managed in accordance with strategies outlined in Groundwater, Surface Water, Liquid and Solid Waste and Hydrocarbon and Hazardous Materials Management Plans respectively.

5.1.3 Vehicles are not to leave established access tracks to prevent vegetation damage and erosion, and possible spread of dieback.

5.2 Clearing of Bluegums

The Bluegums located on the Power Station site and its buffer area are owned by tree grooving companies (Hansol Pty Ltd and Bunbury Tree Farms), not the proponent. The Bluegums in the area of the footprint of the KPS were harvested by tree grooving companies in March-April of 2004 using standard plantation harvesting practices.

The following measures will be implemented during the operation of the project:

5.2.1 Rehabilitation of previously cleared areas to enhance noise and visual buffers will continue to be undertaken in accordance with Section B1.5.6 of the CEMP.

5.2.2 No further clearing of existing Bluegums will be undertaken without prior approval from the tree owners, CALM and the EPA as required.

5.3 Dieback Hygiene

Phytophthora cinnamomi is the most widely recognised plant pathogen responsible for Jarrah Dieback, which infects a range of plant species. Movement of soil during site earthworks, increased traffic through the area and uncontrolled drainage may introduce or spread the disease within the project area. The dieback status of the KPS site is **'uninterpretable'**.

The constructed premises is designed to be completely sealed thereby avoiding any potential for contact with dieback infected soils.

The following Dieback hygiene procedures shall be adopted to minimise the spread of the disease:

5.3.1 All Transfield or sub-contractor vehicles/equipment entering the premises will be restricted to sealed hardstand areas or access roads onsite and will not be allowed to enter areas of native vegetation.

5.3.2 No fill will be brought onto the site.

5.3.3 No soils will be removed from site.

5.4 Weed Control

The constructed premises has been designed to be completely sealed thereby avoiding the potential for soil movement and spread of weeds. Notwithstanding, the following practices shall be implemented to prevent the introduction or movement of weeds throughout the site:

5.4.1 Assessment of weed potential prior to movement of soil on the premises. If applicable, separate storage and end use of significantly weedy and non-weedy topsoil.

5.4.2 Topsoils will be stockpiled in the vicinity of its origin.

5.4.3 Where there is evidence of weed proliferation on the premises, adequate control of weeds will be undertaken using chemical herbicides. (Care will be taken to ensure that the chemical is suitable for the vegetation type being targeted, and that the chemical is applied according to the manufacturer's instructions to prevent excessive use of the chemical. Use of herbicides with a protracted half-life (greater that 1 year) shall be avoided. Herbicides shall not be used close to waterways, watercourses or drains).

5.5 Monitoring

No monitoring of vegetation is required.

5.6 Reporting

No reporting on flora and vegetation aspects at the power station premises are foreseen.

Adherence to this Flora and Vegetation Management Plan will be detailed in ongoing Compliance Reports provided to the DoE.

In the event of any unforeseen vegetation clearing required as a result of modifications to the project, the necessary approvals will be sought from DoE beforehand.

5.7 Responsibility

All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Flora and Vegetation Management Plan. The Operations Superintendent shall carry overall responsibility for the Plan and will ensure appropriate approvals are in place prior to any vegetation removal.

6.0 REFERENCE DOCUMENTATION

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

Biota Environmental Services (2002) *Kemerton Power Station and Wastewater Pipeline Flora, Vegetation and Fauna Survey*. Report prepared for Sinclair Knight Merz and Western Power, April 2003.

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

GROUNDWATER MANAGEMENT

1.0 PURPOSE

This Groundwater Management Plan has been prepared to monitor groundwater quality and to identify and mitigate sources of contamination during operation of the Power Station so that existing and potential uses, including ecosystem maintenance, are protected. Implementation of this management plan will ensure that the integrity, functions and environmental values of protected wetlands is retained, as their key ecological functions are maintained.

The following commitments relating to groundwater quality were made in the referral documentation:

Prepare and implement an Operational Groundwater Management Plan which will address but not be limited to:

- Zero process water discharge;
- Design and bore construction;
- Sample bore locations;
- Parameters and sample frequency for monitoring;
- Mitigation and contingency measures;
- Reporting requirements.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to impact upon the quality of groundwater resources beneath and in proximity of the premises.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

DoIR - Department of Industry and Resources

EPA – Western Australian Environmental protection Authority

GW1S – Upstream shallow aquifer groundwater monitoring bore

GW2S – Downstream shallow aquifer groundwater monitoring bore

4.0 PROCEDURE

4.1 Groundwater Protection

4.1.1 The on-site storage of hazardous materials will comply with the relevant requirements and guidelines for storage and handling (see Hydrocarbon and Hazardous Materials Management Plan) (Document Number TMP-6023_EV_0008).

4.1.2 Bunding of liquid chemicals stored onsite will be maintained in accordance with Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*, the requirements of the DoIR and Environmental Protection Licence requirements specified by the DoE.

4.1.3 The site is presently designed to achieve zero process water discharge under normal operation with potentially contaminated process waters from the facility being directed to a collection basin to remove suspended solids, followed by an oily water separator to remove hydrocarbons (Figures 4A and 4B). The remaining effluent will be removed from site by a licensed contractor.

4.1.4 In areas where the oily spills can occur, the water from the catchment areas including potentially contaminated stormwater from plant process areas will be directed through an oily water separator. The discharge of this system will be connected to the existing stormwater drainage systems.

4.1.5 A Spill Response Plan will be implemented to deal with spillages and leaks within the plant area. The plan includes details on methods of containment, collection and disposal and training of personnel (refer Document No TMP-6023-EV-0010 - Spill Cleanup Procedure provided as Appendix 5). Management of spills are described in the Hydrocarbon and Hazardous Materials Handling Management Plan (Document Number TMP-6023_EV_0008).

4.1.6 Wastewater from ablution facilities will continue to be directed to installed septic tanks and leach drains approved by the Shire of Harvey and DoE.

4.1.7 Solid wastes including putrescibles (kitchen scraps, biodegradable materials, etc) and hazardous wastes that have the potential to pollute groundwater will be collected regularly and disposed of to the Kemerton Regional Landfill or alternative appropriately designated landfill site. Additional management practices regarding solid and liquid wastes are

detailed in the Solid and Liquid Waste Management Plan (Document TMP-6023_EV_0007).

4.2 Storage of Bulk Fuels and Chemicals

4.2.1 Bunding of the bulk liquid fuel tank is designed to contain the quantity of hydrocarbons plus 10% with a sufficient bund wall height to capture jetted fuel ejected from a split tank. The bund constructed from impervious concrete designed to appropriate Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*, as required by the DoIR. More detail is provided in the Hydrocarbon Management and Hazardous Materials Management Plan (Document TMP-6023_EV_0008).

4.3 Monitoring of Groundwater

4.3.1 Monitoring Bore Construction

A groundwater monitoring bore network has been established around the power station as part of project pre-feasibility assessments and monitoring of groundwater impacts during construction (Figure 7). Deep bores are drilled to a depth of 20m, with a 3m slotted section at the base. Shallow bores were drilled to a depth of 5m, with a 2m slotted section at the base. All installed bores used in groundwater monitoring were constructed in accordance with guidelines prescribed by the DoE.

Monitoring of groundwater will be conducted in accordance with DoE prescribed requirements in the site Environmental Protection Licence. The following table presents the required monitoring regime for the power station during operation.

4.3.2 Proposed groundwater Monitoring Regime

Location ID*	Sampling Frequency	Parameters
GW1S, GW2S	6 monthly (nominally March and September)	pH, Total Dissolved Solids (TDS) or Electrical Conductivity (EC), Total Petroleum Hydrocarbons (TPH), and Benzene, Toluene, Ethyl benzene, Xylene, (BTEX)

* refer to Figure 7

4.4 Performance Criteria

Groundwater monitoring results will be assessed against:

4.4.1 Prescribed Environmental Protection licence limits;

4.4.2 Baseline monitoring data collated prior to and during the construction phase; and

4.4.3 Table 3.3.6 and 3.4.1 of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. National Water Quality Management Strategy 2000, Australian & New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).

4.5 Incident and Exceedance Management

4.5.1 The results of all monitored data will be evaluated against prescribed Environmental Protection licence limits. Where the water quality limits are exceeded, the Operations Superintendent will be notified and the activity causing the problem will cease immediately.

4.5.2 The following corrective action should be taken prior to recommencing work:

- Recording of the date, time and likely reason for the incident or exceedance;
- Estimation of the period over which the exceedance occurred;
- Determination of the extent of the discharge over that period and potential or known environmental consequences;
- Establishment and implementation of corrective action taken or planned to mitigate adverse environmental consequences; and
- Establishment of corrective action taken or planned to prevent a recurrence of the exceedance.

4.5.3 The Operations Superintendent must advise the DoE within 24 hours of becoming aware of an exceedance of any measurement which indicates that any prescribed discharge limit has been exceeded.

4.5.4 The Operations Superintendent must advise the DoE in writing within 14 days of becoming aware of an exceedance of the status, of corrective actions implemented to address the problem.

4.6 Reporting

4.6.1 Groundwater monitoring results will be reported to the DoE in accordance with Annual Monitoring Report requirements prescribed by the DoE in the Environmental Protection Licence.

4.6.2 The Annual Report will also include:

- a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of recurrence;

- a description of the characteristics, volume and effects of discharges to the environment and on groundwater characteristics of the receiving environment within the vicinity of the premises;
- an assessment of the information against previous monitoring results, licence limits or other appropriate measures (eg. standards or guidelines).

4.7 Responsibility

4.7.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Groundwater Management Plan as relevant to their roles.

4.7.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that monitoring is scheduled and conducted in accordance with prescribed requirements.

4.7.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

Aquaterra (2002) *Kemerton Water Study Phase 2*. Report prepared for Landcorp April 2002. Unpublished

Aquaterra (June 2004) Modelling of Groundwater Impacts Due to Construction Dewatering. Letter Report to Transfield Services. Letter Dated 3 June 2004.

Aquaterra (May 2004) Kemerton Power Station Baseline Assessment. Letter Report to Transfield Services. Letter Dated 14 May 2004.

Aquaterra (Nov 2003) Kemerton Power Station –Hydrogeological and Groundwater Protection Advice. Letter Report to Transfield Services. Letter Dated 4 November 2003.

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy 2000, Australian & New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).

DoE Environmental Protection Licence (8026/2)

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

SURFACE AND STORMWATER MANAGEMENT

1.0 PURPOSE

This Surface and Storm Water Management Plan has been prepared to manage the potential impacts on surface water quality as a result of Surfacewater and stormwater runoff generated during operation of the Power Station.

The following commitments relating to surface water quality were made in the referral documentation:

Prepare and implement an Operational Surface and Storm Water Management Plan which will address but not be limited to:

- Management of contaminated storm waters such that none leaves the site;
- Recovery mechanisms and structures for chemical and hydrocarbon spillages,
- Monitoring requirements;
- Response and contingency measures; and
- Reporting requirements.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to impact upon the quality of surface water resources including surrounding wetlands in proximity of the premises.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

DoIR - Department of Industry and Resources

EPA – Western Australian Environmental Protection Authority

Process waters – Wastewater generated as a direct result of plant operations (eg washdown) or from contamination of stormwater entering plant or process areas (eg fuel unloading pad or bunded areas).

4.0 PROCEDURE

4.1 Stormwater Drainage

4.1.1 No discharge of process waters shall occur into the diverted agricultural drain (Figures 3 and 4A) located around the outside perimeter of the power station site.

4.1.2 Clean stormwater from non-process areas, roofs, and access roads will be allowed to infiltrate into the surrounding soil in accordance with Water Sensitive Urban Design principles. (No onsite channels, drainage basins, sediment traps or rainwater tanks or similar will be utilised for the treatment of clean stormwater leaving the site).

4.1.3 Onsite, stormwater will be collected from the roofs either in galvanised mild steel gutters or directly down piped and routed through external down pipes. From the down pipes the stormwater will directly discharge into soakage pits.

4.1.4 Soakage pits will be designed to cope with both expected and extreme (1:100) rainfall events. The pits will be filled with gravel or other appropriate material to enhance infiltration to the aquifer.

4.1.5 Stormwater drainage from the roads will be dispersed onto the surrounding soil for evaporation or directed for soakage into a french drain installed along the road. (The French drain has only been installed in areas where there is insufficient free space between roads and buildings or other paved areas to allow sufficient soakage).

4.1.6 Drainage and water collection structures will be inspected on a regular basis and properly maintained.

4.2 Management of Contaminated Process Water and Stormwater

4.2.1 The site is presently designed to achieve zero process water discharge under normal operation with potentially contaminated process waters from the facility being directed to a collection basin to remove suspended solids, followed by an oily water separator to remove hydrocarbons (Figures 4A and 4B). The remaining effluent will be removed from site by a licenced and approved contractor (under the *Environmental Protection (Controlled Waste) Regulations, 2004*)).

4.2.2 The use of detergents or degreasers onsite will be restricted to prevent these substances entering and compromising the effectiveness of oily water separation systems.

4.2.3 Contaminants arising from bulk fuel tank dewatering or maintenance procedures will only be disposed of in a manner approved by the DoE on a case by case basis.

4.2.4 In areas where the oily spills can occur, water from the catchment areas including potentially contaminated stormwater from plant process areas will be directed through an

oily water separator. The discharge of this system will be connected to the existing stormwater drainage systems.

4.2.5 A Spill Response Plan will be implemented to deal with spillages and leaks within the plant area. The plan includes details on methods of containment, collection and disposal and training of personnel (Document TMP-6023-EV-0010 - Spill Cleanup Procedure provided in Appendix 5). Management of spills are described in the Hydrocarbon and Hazardous Materials Handling Management Plan (Document TMP-6023_EV_0008).

4.3 Storage of Bulk Fuels and Hazardous materials

4.3.1 Bunding of the bulk liquid fuel tank is designed to contain the quantity of hydrocarbons plus 10% with a sufficient bund wall height to capture jetted fuel ejected from a split tank. The bund constructed from impervious concrete designed to appropriate Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*, as required by the DoIR. More detail is provided in the Hydrocarbon Management and Hazardous Materials Management Plan (Document TMP-6023_EV_0008).

4.4 Contaminated Run Off from Vehicle/Equipment Washdown

4.4.1 No servicing of mobile equipment or vehicles will be permitted onsite.

4.4.2 No washdown of mobile equipment or vehicles will be conducted onsite, thereby avoiding the generation of contaminated washdown water.

4.5 Sewerage and Grey Wastewater from Ablution Facilities

4.5.1 Wastewater from ablution facilities will continue to be directed to installed septic tanks and leach drains approved by the Shire of Harvey and DoE.

4.6 Solid Wastes

4.6.1 Management practices to prevent solid wastes contaminating the surface waters are detailed in the Solid and Liquid Waste Management Plan (Document TMP-6023_EV_0007).

4.7 Monitoring

Monitoring of surface water leaving the site will be conducted in accordance with DoE prescribed requirements in the site Environmental Protection Licence.

The following table presents the prescribed surface water monitoring regime for the power station during operation via the established network of surface water quality monitoring points (Figure 7). The monitoring regime focuses on water quality within the re-diverted artificial drain both upstream (SW1) and downstream (SW2) of the site.

4.7.1 Proposed Surface Water Monitoring Regime

Location ID*	Sampling Frequency	Parameters
SW1, SW2	Twice per year when flowing (nominally separated by 4 weeks)	pH, Total Dissolved Solids (TDS), Electrical Conductivity (EC), Total Suspended Solids (TSS), Total Petroleum Hydrocarbons (TPH), (Benzene, Toluene, Ethyl benzene, Xylene) BTEX,

* refer to Figure 7

4.7.2 Drainage, oil collection pits and water collection structures will be visually inspected at least biannually in April and October each year.

4.8 Performance Criteria

Surface water monitoring results will be assessed against:

4.8.1 Prescribed Environmental Protection licence limits;

4.8.2 Baseline monitoring data collated prior to and during the construction phase; and

4.8.3 Table 3.3.6 and 3.4.1 of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. National Water Quality Management Strategy 2000, Australian & New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).

4.9 Incident and Exceedance Management

4.9.1 The results of all monitored data will be evaluated against prescribed Environmental Protection licence limits. Where the water quality limits are exceeded, the Operations Superintendent will be notified and the activity causing the problem will cease immediately.

4.9.2 The following corrective action should be taken prior to recommencing work:

- Recording of the date, time and reason for the incident or exceedance;
- Estimation of the period over which the exceedance occurred;
- Determination of the extent of the discharge over that period and potential or known environmental consequences;

- Establishment and implementation of corrective action taken or planned to mitigate adverse environmental consequences; and
- Establishment of corrective action taken or planned to prevent a recurrence of the exceedance.

4.9.3 The Operations Superintendent must advise the DoE within 24 hours of becoming aware of an exceedance of any measurement which indicates that any prescribed discharge limit has been exceeded.

4.9.4 The Operations Superintendent must advise the DoE in writing within 14 days of becoming aware of an exceedance of the status, of corrective actions implemented to address the problem.

4.10 Reporting

4.10.1 Surface water monitoring results will be reported to the DoE in accordance with Annual Monitoring Report requirements prescribed by the DoE in the Environmental Protection Licence.

4.10.2 The Annual Report will also include:

- a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of recurrence;
- a description of the characteristics, volume and effects of discharges to the environment and on surface water characteristics of the receiving environment within the vicinity of the premises;
- an assessment of the information against previous monitoring results, licence limits or other appropriate measures (eg. standards or guidelines).

4.11 Responsibility

4.11.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Surface Water Management Plan as relevant to their roles.

4.11.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that monitoring is scheduled and conducted in accordance with prescribed requirements.

4.11.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

Aquaterra (2002) *Kemerton Water Study Phase 2*. Report prepared for Landcorp April 2002. Unpublished

Aquaterra (June 2004) Modelling of Groundwater Impacts Due to Construction Dewatering. Letter Report to Transfield Services. Letter Dated 3 June 2004.

Aquaterra (May 2004) Kemerton Power Station Baseline Assessment. Letter Report to Transfield Services. Letter Dated 14 May 2004.

Aquaterra (Nov 2003) Kemerton Power Station –Hydrogeological and Groundwater Protection Advice. Letter Report to Transfield Services. Letter Dated 4 November 2003.

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy 2000, Australian & New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ).

DoE Environmental Protection Licence (8026/2)

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

AIR EMISSIONS MANAGEMENT

1.0 PURPOSE

This Air Emissions Management Plan has been prepared to ensure that air emissions during operation of the Power Station do not adversely impact on the health, welfare and amenity of employees and local residents.

This management plan has also been designed to achieve the following key objectives:

- Provide a framework to assess compliance with Environmental Protection licence limits, through measurement of emissions; and
- To address potential exceedances with a view to minimise as far as practicable, the effects of air emissions.

The following commitments relating to the management of air emissions were made in the referral documentation:

Prepare and implement an Operational Air Emissions Management Plan which will address but not be limited to:

- Stack emission monitoring program (sampling location, frequency, parameters, standards and limits);
- Reporting schedules;
- Incident management;
- Responsibilities; and
- Employee training and awareness.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to impact upon the quality of atmospheric emissions during operation of the plant.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

EPA – Western Australian Environmental Protection Authority

Stacks 11 UHN and 12 UHN – Gas Turbine Units Stack Structure

AS4323.1-1995 - Stationary Source Emissions Method 1, Selection of Sampling Positions

USEPA Method 20 – USEPA Stack Testing Procedure for Nitrogen Oxides, Sulfur Dioxides and Oxygen Emissions

US EPA Method 10 – USEPA Stack Testing Procedure for Carbon Monoxide

4.0 PROCEDURE

4.1 General Dust and Particulate Control

4.1.1 The power station site consists predominantly of building structures, concrete drainage facilities and hardstand areas. There is limited area exposed that will result in the generation of visible dust with potential to cross the boundary of the premises.

4.1.2 No burning of any waste material other than fuels for power station operation will be permitted onsite.

4.2 Stack Emissions Monitoring

Monitoring of stack emissions will be conducted in accordance with DoE prescribed requirements in the site Environmental Protection Licence (Appendix 4). Stack emissions monitoring will be conducted for each fuel type (gas and Ultra Low Sulphur Diesel) in accordance with the licence.

The following table presents the prescribed air emissions monitoring regime for the power station during operation. Stack emissions will be tested via sampling ports installed on Stacks 11 and 12 UHN (Figure 4B and 4C) for selected parameters using approved methods described below.

4.2.1 Stack emission monitoring programme.

Parameter	Unit	Method	Frequency
Oxides of nitrogen	mgm^{-3}	US EPA Method 20	Annually for each fuel used

Parameter	Unit	Method	Frequency
Oxides of sulphur	mgm^{-3}	Empirical methods using known fuel sulphur content.	Annually for each fuel used
Carbon monoxide	mgm^{-3}	US EPA Method 10	Annually for each fuel used

4.2.2 For each stack test conducted, the following information will be collected:

(i) Fuel consumption rate (plant production federate) relevant to the emissions at the time of the test;

(ii) in stack moisture content;

(iii) in stack volume flow rate;

(iv) in stack temperature;

(v) in stack oxygen reference level; and

(vi) a statement of compliance with the test method.

4.2.3 Sample collection will be conducted by a qualified air emissions testing consultant, with collected gas samples submitted to a laboratory with current NATA registration for the prescribed analytes.

4.2.4 Established power station emission sampling and monitoring ports will be maintained in accordance with AS4323.1-1995.

4.2.5 Emissions of oxides of sulphur whilst burning liquid fuels will be minimised through the use of Ultra Low Sulphur Diesel.

4.2.6 Emissions of oxides of nitrogen will be minimised through the use and maintenance of Low NOx burners in all gas turbines.

4.3 Performance Criteria

The gas turbines will be operated to meet emission criteria prescribed in the Environmental Protection licence. The current licence 8026/2 does not prescribe emission criteria.

4.3.1 The following table presents air emissions targets for oxides of nitrogen against which annual stack testing results will be compared against during operation:

Fuel	Rated Electrical Output	Maximum NOx Emission Concentration	
		g/m^3	(ppmv)
Gaseous Fuel	>10MW	0.07	34
Other Fuels	> 10MW	0.15	73

Notes:

1. Source - WA EPA Guidance Statement Number 15 "*Emissions of Oxides of Nitrogen from Gas Turbines*
2. Gas volumes expressed dry at 0°C and at an absolute pressure equivalent to one atmosphere.
3. Oxides of nitrogen calculated as NO_2 at a 15% oxygen reference level.

4.3.2 In addition to the above established EPA standards, the following table presents plant design specifications for emission rates. Annual stack testing and empirical emission calculation results will also be assessed against these specifications during operation.

Air emissions	Natural gas	Liquid fuel
Oxides of nitrogen (NO_X)	<39.1 g/s	<115 g/s
Oxides of sulphur (SO_X)	Negligible	<0.5 g/s
Carbon monoxide (CO)	<21.7 g/s	<21 g/s

4.4 Incident and Exceedance Management

4.4.1 The results of all measurements will be evaluated against the prescribed standards. Where the emission levels are exceeded, the Operations Superintendent will be notified and the activity causing the problem will cease immediately.

4.4.2 The following corrective action should be taken prior to recommencing work:

- Recording of the date, time and reason for the incident or exceedance;
- Estimation of the period over which the exceedance occurred;
- Determination of the extent of the discharge over that period and potential or known environmental consequences;
- Establishment and implementation of corrective action taken or planned to mitigate adverse environmental consequences; and
- Establishment of corrective action taken or planned to prevent a recurrence of the exceedance.

4.4.3 The Operations Superintendent must advise the DoE within 24 hours of becoming aware of an exceedance of any measurement which indicates that any prescribed discharge limit has been exceeded.

4.4.4 The Operations Superintendent must advise the DoE in writing within 14 days of becoming aware of an exceedance of the status of corrective actions implemented to address the problem.

4.5 Reporting

4.5.1 Air emissions monitoring results will be reported to the DoE in accordance with Annual Monitoring Report requirements prescribed by the DoE in the Environmental Protection Licence.

4.5.2 The Annual Report will also include:

- a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of recurrence;
- an assessment of the information against previous monitoring results, licence limits or other appropriate measures (eg. standards or guidelines).

4.6 Responsibility

4.6.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Air Emissions Management Plan as relevant to their roles.

4.6.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that stack testing is scheduled and conducted in accordance with prescribed requirements.

4.6.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

AEC/NHMRC (1986) *National Guidelines for Control of Emissions of Pollutants from New Stationary Sources*. Australian Government Publishing Service, Canberra, 1986.

AS4323.1-1995 – "Stationary Source Emissions Method 1, Selection of Sampling Positions", Standards Australia, 1995

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

DoE Environmental Protection Licence (8026/2)

Environmental Protection Authority (2000a) *Guidance for the Assessment of Environmental Factors No. 15 – Guidance Statement for Emissions of Oxides of Nitrogen from Gas Turbines*, May 2000.

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

US EPA Method 10 – USEPA Stack Testing Procedure for Carbon Monoxide

USEPA Method 20 – USEPA Stack Testing Procedure for Nitrogen Oxides, Sulfur Dioxides and Oxygen Emissions

NOISE MANAGEMENT

1.0 PURPOSE

The purpose of this Noise Management Plan is to protect the amenity of nearby residents resulting from operational activities associated with the KPS project by ensuring that the noise levels meet the requirements of the *Environmental Protection (Noise) Regulations* 1997.

The following commitments relating to the management of noise were made in the referral documentation:

Prepare and implement an Operational Noise Management Plan which will address but not be limited to:

- Maintenance of equipment that contribute to overall plant noise;
- the use of silencers where necessary;
- noise monitoring and reporting as necessary; and
- Implementation of a complaint management procedure to receive, investigate and action noise complaints.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to impact upon noise levels during operation of the plant.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

EPA – Western Australian Environmental Protection Authority

PPE - Personnel Protective Equipment

4.0 PROCEDURE

4.1 General Noise Management

4.1.1 Personnel shall be trained in the operation of equipment that has the potential to generate noise emissions.

4.1.2 Personnel shall have access at all times to operational manuals for equipment being utilised and must be familiar with the procedures detailed in the operations manual.

4.1.3 Plant and equipment maintenance and inspection schedules shall be implemented to ensure that all equipment is operating as per design specifications. This will include ensuring all noise control equipment is correctly fitted and operating at design performance.

4.1.4 On parts of the plant where high levels of noise are unavoidable and are likely to be a hazard to persons working on-site, prominent warning notices will be displayed and, where necessary, appropriate hearing protection will be provided.

4.1.5 As outlined in the Vegetation and Flora Management Plan, the Bluegum vegetation will be retained where possible on the KPS site (Figure 3) to serve as a noise buffer.

4.2 Noise Complaints

4.2.1 A Complaints Register will be established to record any complaints received, date, nature, and resolution action undertaken.

4.2.2 The Operations Superintendent will contact any complainants that have concerns related to noise levels and determine the nature of the noise nuisance.

4.2.3 If the nuisance is of an ongoing nature as deemed from the receipt of repeated valid complaints, the Operations Superintendent will take steps to ensure that any identified noise source is addressed in accordance with Incident and Exceedance Management Procedures (refer Section 4.4).

4.3 Monitoring

Given the noise mitigation initiatives adopted in the overall plant design, outcomes of predictive noise modelling results and the maintenance of a designated noise buffer around the premises, no monitoring of plant noise levels will undertaken on an ongoing basis unless valid complaints are lodged.

In such circumstances, repeated complaints will be investigated to assess the need for completion of a detailed noise assessment that will be undertaken by a qualified sub-consultant using

approved methods. A report will be prepared to address potential noise exceedances and will include practical and feasible mitigation measures that may be adopted.

4.4 Performance Criteria

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels that can be received at any noise sensitive premises from another premises.

Under the Regulations noise emissions for the Kemerton Industrial Park have an adjustment of +5 dB(A) to the influencing factor. The Regulations under Section 5, subclause (5) of Schedule 3 state:

> *"Where a noise emission from any premises located within the boundaries of the area known as the Kemerton Industrial Park Policy Area, as specified in the Shire of Harvey District Planning Scheme No. 1, is assessed, an adjustment of 5 dB(A) is to be added to the influencing factor determined under subclause (1) at the point of reception of the noise emission in respect of any period between –*
>
> *a) 0900 hours and 1900 hours on Sunday or public holiday;*
>
> *b) 1900 hours and 2200 hours on any day;*
>
> *c) 2200 hours and 0700 hours on Monday to Saturday inclusive; and*
>
> *d) 2200 and 0900 hours on a Sunday or public holiday."*

Accordingly the allowable noise level determined by the calculation of an influencing factor, which is added to the baseline criteria is set out in the table below.

ASSIGNED NOISE LEVELS AT NOISE SENSITIVE PREMISES

Time of Day	Assigned Noise Level		
	L_{A10}	L_{A1}	L_{max}
0700 - 1900 hours - Monday to Saturday	50	60	70
0900 - 1900 hours - Sunday & Public Holidays	45	55	70
1900 - 2200 hours - All Days	45	55	60
2200 - 0700 hours - Monday to Saturday	40	50	60

Time of Day	Assigned Noise Level		
	L_{A10}	L_{A1}	L_{max}
2200 - 0900 hours - Sunday & Public Holidays	40	50	60

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.

Other influencing factors that would apply include:

- For residences located within the industrial core area, where the land is zoned industrial, the influencing factor to be added to the base level is 20dB(A) (the residences within the core are tenants of LandCorp on a short-term lease agreement); and
- For residences located to the west of the Park and within 100m of the Old Coast Road, a "transport influencing factor" of 2dB(A) would be added.

Therefore, noise emissions from the Kemerton Power Station site would be limited by the criteria outlined in the table overleaf, applicable under the *Environmental Protection (Noise) Regulations 1997*.

LIMITING NOISE CRITERIA

Type of premises receiving noise	Time of Day	Assigned Noise Level		
		L_{A10}	L_{A1}	L_{max}
Residential dwelling(s) outside the Industrial Park	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	40	50	60
Residential dwelling(s) outside the Industrial Core zone and within 100m of Old Coast Road	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	42	52	62
Residential dwelling(s) within the industrial core	0700-1900 Monday to Saturday	65	75	85
	0900-1900 Sunday and Public Holidays	65	75	90
	1900-2200 Monday to Sunday and Public Holidays	65	75	80
	2200-0700 Monday to Sunday	60	70	80
	2200-0900 Sunday and Public Holidays	60	70	80
Industrial and utility premises	All hours	65	80	90

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.

The assigned noise levels are also conditional on no annoying characteristics existing, such as tonal components etc. If such characteristics exist, then any measured level is adjusted upwards accordingly. The adjustments that apply are shown below:

ADJUSTMENTS FOR ANNOYING CHARACTERISTICS

Tonality	Modulation	Impulsiveness
+5dB	+5dB	+10dB

4.5 Incident and Exceedance Management

4.5.1 Where noise surveys are conducted following repeated noise complaints, the results of all measurements will be evaluated against the prescribed standards. Where the emission

levels are exceeded, the Operations Superintendent will be notified and the activity causing the problem will cease immediately.

4.5.2 The following corrective action should be taken prior to recommencing work:

- Recording of the date, time and reason for the incident or exceedance;
- Estimation of the period over which the exceedance occurred;
- Establishment and implementation of corrective action taken or planned to mitigate the noise exceedance; and
- Establishment of corrective action taken or planned to prevent a recurrence of the exceedance.

4.5.3 The Operations Superintendent must advise the DoE within 24 hours of becoming aware of an exceedance of any measurement which indicates that any prescribed limit has been exceeded.

4.5.4 The Operations Superintendent must advise the DoE in writing within 14 days of becoming aware of an exceedance of the status of corrective actions implemented to address the problem.

4.6 Reporting

4.6.1 The number of noise complaints received each year and action taken will be reported to the DoE in accordance with Annual Monitoring Report requirements prescribed by the DoE in the Environmental Protection Licence.

4.6.2 Where noise surveys are conducted in response to repeated noise complaints, the Annual Report will also include:

- a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of recurrence;
- an assessment of the information against previous monitoring results, licence limits or other appropriate measures (eg. standards or guidelines).

4.7 Responsibility

4.7.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Noise Management Plan as relevant to their roles.

4.7.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that complaints are managed in accordance with Section 4.2, and if necessary, that noise surveys are scheduled and conducted in accordance with prescribed requirements.

4.7.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

DoE Environmental Protection Licence (8026/2)

Environmental Protection (Noise) Regulations 1997

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

SOLID AND LIQUID WASTE MANAGEMENT

1.0 PURPOSE

The purpose of this Management Plan is to ensure that the generation of all wastes during operation follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment and disposal.

The following commitments relating to the management of solid and liquid wastes were made in the referral documentation:

Prepare and implement an Operational Solid and Liquid Waste Management Plan which will address but not be limited to:

- Compliance with the requirements of the DoE and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal ;
- Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor;
- General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Health Dept of WA and Landfill Board requirements;
- Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area;
- Prohibit burning of waste onsite at all times;
- Educate employees in non-hazardous solid waste management; and
- Preparation of annual waste reports.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that have the potential to generate solid and liquid wastes at the premises.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

EPA – Western Australian Environmental Protection Authority

Waste Hierarchy – Promotes the methods of dealing with wastes generated onsite according to the following, from most preferable to least preferable: reduction, reuse, recycling, treatment, and disposal

4.0 PROCEDURE

4.1 Solid Wastes - General

4.1.1 Solid wastes will be collected and disposed of into merrill or skip bins located on site. These bins will be emptied on a scheduled basis by a licenced waste contractor. Wastes will be disposed of to the Kemerton Regional Landfill or alternative appropriately designated landfill site by a licensed contractor.

4.1.2 Separate merrill or skip bins shall be provided to only accept putrescible or inert wastes such as kitchen scraps, or paper, cardboard, wood, bricks, concrete and plastics respectively. These bins shall be inspected regularly to ensure they are in good condition and only contain wastes that the bin has been designated for. Where possible, these bins shall have lids or cage tops to prevent vermin or feral cats entering the bins.

4.1.3 No waste will be burnt onsite.

4.1.4 Where practical, all staff shall minimise the amount of wastes generated from their daily activities. Opportunities for recycling or reuse shall be investigated and implemented where practical and cost effective.

4.1.5 Only contractors that are registered or licensed with the DoE and/or the local government authority shall be employed to manage and dispose of these wastes. Waste contractor authorisation will be formalised prior to construction and will consider issues such as licensing, dumping receipts, inclusion in site inductions, emergency response plans, equipment maintenance requirements etc.

4.1.6 Staff shall be made aware of issues affecting waste management, associated environmental impacts and be given opportunities to improve waste management procedures.

4.2 Recyclable Wastes

4.2.1 Recyclable materials such as scrap metal, obsolete or expired equipment (transformers, pumps, pipes), NiCad and FeCad batteries, electrical cable shall be segregated and

stockpiled separately to other wastes to allow recycling or reuse. This material will be directed to a designated area in the laydown yard and appropriately signposted.

4.3 Toxic and Hazardous Wastes

4.3.1 Toxic and hazardous wastes shall be exported to an approved disposal site (in accordance with the *Environmental Protection (controlled Waste) regulations,* 2004 or as otherwise approved by the DoE.

4.3.2 Hazardous wastes which contain flammable, ignitable, combustible, toxic, acidic or alkaline materials will be stored separately from other materials prior to removal from site.

4.3.3 Designated merrill or skip bins shall be provided, signposted and monitored to ensure that only hazardous wastes are directed to these bins.

4.3.4 These bins shall be inspected regularly to ensure they are in good condition and are not corroded.

4.3.5 Contaminated soils, oily rags, hydrocarbons wastes and sludges shall be collected separately and disposed of by an approved, licensed contractor.

4.3.6 Wastes including flammable or combustible waste, oxidising waste, corrosive waste, radioactive waste, toxic waste or Class 6.1 wastes (miscellaneous waste PCB's, environmentally hazardous) which are also a dangerous good will be stored in accordance with the *Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations, 1992.*

4.3.7 Waste oils, spent solvents, coolants and other chemical wastes shall be collected in drums or holding tanks and will be recycled wherever possible and if not, removed offsite by an approved, licensed contractor.

4.3.8 In the event that used oils, greases and lubricants need to be stored on site, the storage would be in a designated tank in a bunded area in accordance with Australian Standard 1940. Any material stored on site must be transported periodically by a licenced contractor to an oil recycling facility.

4.3.9 Records will be kept of the disposal of any hazardous materials (including fuel and /or oil spills) including the volume and the method of disposal.

4.4 Liquid Wastes – Sewage and Grey Water

4.4.1 Wastewater from ablution facilities will continue to be directed to installed septic tanks and leach drains as approved by the Shire of Harvey.

4.4.2 Septic tanks and associated above and below ground pipework must be inspected (at least annually) to determine if leaks to the pipework have occurred due to corrosion or other damage.

4.5 Incident and Exceedance Management

4.5.1 In the event of an environmental incident involving the inappropriate handling or disposal of solid or liquid wastes, the Operations Superintendent will be notified and the activity causing the problem will cease immediately.

4.5.2 The following corrective action should be taken prior to recommencing work:

- Recording of the date, time and reason for the incident or exceedance;
- Estimation of the period over which the exceedance occurred;
- Determination of the extent of the environmental impact over that period and potential or known environmental consequences;
- Establishment and implementation of corrective action taken or planned to mitigate adverse environmental consequences; and
- Establishment of corrective action taken or planned to prevent a recurrence of the incident.

4.5.3 The Operations Superintendent must advise the DoE within 24 hours of becoming aware of an environmental incident which has the potential to cause pollution.

4.5.4 The Operations Superintendent must advise the DoE in writing within 14 days of becoming aware of the incident of the status of corrective actions implemented to address the problem.

4.6 Reporting

4.6.1 The Annual Monitoring Report submitted to the DoE as prescribed in the Environmental Protection Licence will include:

- a summary of incident reports and discussion of any significant responses taken to minimise the likelihood of recurrence;
- an assessment of the information against licence limits conditions or other relevant standards or guidelines.

4.7 Responsibility

4.7.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Waste Management Plan as relevant to their roles.

4.7.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that bin inspections are scheduled and conducted in accordance with this plan.

HYDROCARBON AND HAZARDOUS MATERIALS MANAGEMENT

1.0 PURPOSE

The purpose of this Management Plan is to ensure that the management of hydrocarbon and other hazardous materials at KPS is conducted in accordance with Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*, the requirements of the Department of Industry and Resources (DoIR) and Environmental Protection Licence requirements specified by the Department of Environment (DoE).

The following commitments relating to the management of Hydrocarbons and Hazardous Materials were made in the referral documentation:

Prepare and implement an Operational Hydrocarbon and Hazardous Materials Management Plan to address but not be limited to:

- Tracking of the volume of hydrocarbon and hazardous waste materials produced;
- Identification of disposal options.
- Appropriate transport, storage and handling procedures;
- Appropriate clean-up and emergency procedures for spillages;
- Monitoring requirements;
- Contingency and Response Measures;
- Reporting requirements.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and all activities undertaken by all personnel, including subcontractors, engaged or visiting Transfield workplaces, that involve the transport, handling, and storage of hydrocarbons and hazardous materials during operation of the plant.

3.0 DEFINITIONS

DoE - Western Australian Department of Environment

EPA – Western Australian Environmental Protection Authority

DoIR – Department of Industry and Resources

MSDS - Material Safety Data Sheet

4.0 PROCEDURE

4.1 Bulk Fuel Storage and Handling

4.1.1 All constructed bulk fuel storage tanks will be managed to maintain at least 110% of the capacity of the largest container in accordance with Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*. (Standards Australia, 1993) and requirements of the DoIR.

AS 1940-1993 requires all environmentally hazardous chemicals including fuel or other hydrocarbons (where the total volume of each substance stored on the premises exceeds 250 litres) to be stored within low permeability (10^{-9} metres per second or less) compound(s) designed to contain not less than 110% of the of the volume of the largest storage vessel or inter-connected system, and at least 25% of the total volume of substances stored in the compound.

4.1.2 Bunded storage areas will be maintained such that:

a) valves, pumps and meters associated with transfer operations are included within bunded areas wherever practical. Otherwise the equipment will be adequately protected (eg. Bollards) and contained in an area designed to permit recovery of chemicals released following accidents or vandalism;

b) jetting from any storage vessel or fitting will be captured within the bunded area (see for example Australian Standard 3780 – 1994 Section 5.7);

c) chemicals which may react dangerously if they come into contact, are in separate bunds in the same compound or in different compounds; and

d) the capacity of the bund is maintained at all times by. regular inspection and pumping of trapped uncontaminated rain water.

4.1.3 All fuel tanks and bunded areas will be inspected regularly (weekly) for evidence of spills or leakage.

4.1.4 Drums containing oils shall be maintained in a sealed condition and stored on an impervious base such as sealed concrete.

4.1.5 No vehicle and mobile equipment maintenance or servicing will be conducted onsite.

4.2 Refuelling

4.2.1 Refuelling of the bulk fuel tank will be conducted within the designated unloading station (refer Figure 4C).

4.2.2 The fuel unloading pump area will be roofed to minimise stormwater infiltration onto the refuelling pad. (tanker bay is not roofed)

4.2.3 The refuelling area is located over a sealed hardstand area and graded such that any spillage is contained and directed to an oily water separator and then to an impermeable oil collection pit, and pumped out by a licenced contractor as needed.

4.2.4 Refuelling tanks, lines, hoses, pumps, couplings, valves and associated equipment shall to be maintained in good working order, without leaks and with appropriate level alarms, shutdown and dry break systems to minimise the risk of spillage.

4.3 Fixed Equipment Maintenance

4.3.1 All fixed equipment that utilises, contains or transfers fuels, oils or other liquid chemicals will be maintained in good working order, without leaks.

4.4 Hazardous Substances

4.4.1 Hazardous substances that are liquid shall be stored in a weatherproof and fire resistant building such as a sea container on an impervious base and bunded. Substances that if mixed, will cause undesirable reactions to occur such as fires and explosions, will be segregated.

4.4.2 Hazardous material stores will be located well away from sensitive areas such as wetlands and other surface water bodies.

4.4.3 All staff on site shall be trained in the hazards associated with the stored hazardous substances and procedures to follow in the event of an emergency (refer Document No. TMP-6023-SA-0001 - Emergency Response Plan provided as Appendix 6).

4.4.4 MSDS sheets will be kept on site together with a register of volumes and locations of all hazardous substances stored on the premises.

4.4.5 Trucks used to transport hazardous substances to or from site will be appropriately signed, identifying the substance in accordance with DoIR requirements and DoE *Environmental Protection (Controlled Waste) Regulations, 2004*.

4.5 Spill Management

4.5.1 Spills shall be prevented by storing liquid fuels, oils, and other liquid chemicals within bunded areas that meet DoE licence and DoIR requirements.

4.5.2 Bunded areas shall be maintained such that spills may be contained, recovered and directed into holding receptacles prior to offsite disposal in accordance with the *Environmental Protection (Controlled Waste) Regulations, 2004.*

4.5.3 Drainage from the bulk fuel tank facility will be controlled manually so that spills and any contaminated stormwater are directed to the oil water separator for treatment. Drainage valves will be kept closed at all times except when authorised for opening by the Operations Superintendent.

4.5.4 A high level alarm will be maintained on the oily water treatment system (oily water separator and collection pit) to alert operators of pump failures or excessive water levels in the system before it overtops.

4.5.5 Employees and sub-contractors engaged in the delivery and unloading of liquid fuels and other petroleum products will be trained on spill and overfill prevention and response.

4.5.6 Further details on spill response are contained in Sections 4.8 below and in Document No. TMP-6023-EV-0010 - Spill Cleanup Procedure provided as Appendix 5.

4.6 Monitoring

4.6.1 All fuel tanks and bunded areas will be inspected at least weekly for evidence of spills or leakage in accordance with the *Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations, 1992.*

4.6.2 All oil collection pits, drainage systems and bunded areas will be inspected least weekly to ensure these are maintained and operated appropriately, and that excess stormwater that is contaminated is pumped out and removed from site by a licenced contractor upon request.

4.6.3 An environmental audit of hydrocarbon storage and stormwater management will be undertaken annually.

4.6.4 A Hazardous Substances Register will be kept on site to record details of the quantity, type, storage location and special handling requirements for all hazardous substances stored onsite.

4.6.5 Records will be kept of the disposal of any hazardous materials (including fuel and /or oil spills) including the volume and the method of disposal.

4.7 Incident and Exceedance Management

4.7.1 In the event of a fuel or oil spillage, the spill will be contained, the source isolated and recovered immediately using absorbent materials, which shall then be placed in disposable drums or containers for later removal to an approved waste disposal facility.

4.7.2 Any contaminated soil or absorbent material resulting from a fuel or oil spillage will be removed to an authorised waste disposal site. Where necessary, validation sampling will be undertaken verify that all contaminated soil has been removed.

4.7.3 All significant spills (greater than 200L) will be reported to the DoE, DoIR, DoCEP and any other relevant government authority as soon as practicable.

4.7.4 All staff on site shall be trained in the procedures to follow in the event of an emergency, as well as precautionary measures to prevent spills. The Spill Response Plan (Document No. TMP-6023-EV-0010) and Emergency Response Plans (Document No. TMP-6023-SA-000)1 provided as Appendix 5 and 6 respectively.

4.8 Reporting

4.8.1 Any fuel/oil spillage outside bunded areas will be reported as shown in the following table.

REPORTING REQUIREMENTS FOR SPILLS OF LIQUID CHEMICALS

LOCATION	VOLUME				
	0-19L	20-49L	50-99L	100-199L	>200 L
Unsealed Areas	R_i	R_i	R_i	R_i	R_e
Contained Spill on Concrete	R_i	R_i	NR	R_i	R_e
Uncontained Spill on Concrete	R_i	R_i	R_i	R_i	R_e
Within bunded areas	NR	NR	NR	R_i	R_e
Into or Near a Watercourse	R_e	R_e	R_e	R_e	R_e

LOCATION	VOLUME				
	0-19L	20-49L	50-99L	100-199L	>200 L
NR = Reporting Not Required					
R_I = Report internally as Environmental Incident					
R_e = Report externally to Department of Environmental Protection as Environmental Incident					

Notes:

- This is a *guideline only* based on risk to the environment and company reputation – it does not replace judgement
- R_I are the incidents that must be reported internally
- R_e are the incidents that must be reported externally to relevant regulatory agencies including the Department of Environment.
- NR incidents do not have to be reported. However, if they are a near miss (ie were lucky to only spill 10 L - and it could have been 1000 L) they shall also be reported.

4.8.2 The Annual Monitoring Report submitted to the DoE as prescribed in the Environmental Protection Licence will include:

- a description of the characteristics, volume and environmental impacts of environmental incidents associated with chemical spillages or hazardous materials and management measures undertaken to address the incident;
- a discussion of any significant responses taken to minimise the likelihood of recurrence of such incidents;
- an assessment of the information against licence conditions.

4.9 Responsibility

4.9.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Management Plan as relevant to their roles.

4.9.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that inspections are scheduled and conducted in accordance with prescribed requirements.

4.9.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

Australian Standard AS 1940-1993 *The Storage and Handling of Flammable and Combustible Liquids*. (Standards Australia, 1993)

DoE Environmental Protection Licence (8026/2)

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

COMMUNITY CONSULTATION

1.0 PURPOSE

The purpose of this Management Plan is to ensure that stakeholders are appropriately informed of the potential environmental implications related to the operational phase of the Kemerton Power Station.

The following commitments relating to Community Consultation were made in the referral documentation:

Prepare and implement an Operational Community Consultation Plan to address but not be limited to:

- General community consultation associated with the environmental approval process;
- Targeted consultation with nearby landowners and communities;
- Consultation with the Shires of Harvey, (and/or Dardanup and City of Bunbury) and Kemerton Industrial Park Coordinating Committee;
- Local waterbody users representative groups; -
- Opportunities to engage local workforces.

2.0 SCOPE

This procedure applies to the Kemerton Power Station, and is relevant to designated personnel, including subcontractors involved in liaising with stakeholders including regulatory authorities, the public and interested parties such as the Kemerton Industrial Park Coordinating Committee.

3.0 DEFINITIONS

The following key stakeholders have been identified as potentially having an interest in the project are summarised in the following table:

KEY STAKEHOLDERS

Stakeholder Category	Group Name	Contact
Local Government	Shire of Harvey	Michael Parker (CEO) 9729 0300
State Government	Department of Environment (Bunbury)	Fionnulla Hanan– 9726 4111
	Department of Industry and Resources	Ross Guyton – 9327 5442
Local Businesses	British Oxygen Corporation (BOC Gases)	9721 1217
	Kemerton Silica Sands	9720 0000
	Simcoa Operations	9780 6666
	Goodschilds Abbattoir	9797 1122
	Cockburn Cement	9797 0122
	Nufarm- Coogee	9797 4343
	Millenium Inorganic Chemicals	9780 8666
Community groups/Not For Profit Organisations	Conservation Council of WA	9420 7266
	South West Environment Centre	John Sherwood – sherwood@dodo.com.au
	Conservation Volunteers Australia (Bunbury Office)	9791 6699
Community Members	Private Landowner	Mr Peter Wine
	Private Landowner	Mr Lyndon Edwards
	Kemerton Industrial Park Community Committee	Carol Smith – 9222 5897
Industry Associations	Kemerton Industrial Park Coordinating Committee	Carol Smith – 9222 5897
	Chamber of Commerce and Industry	Mr Harrison (Director) – 9791 2666

4.0 PROCEDURE

4.1 Information Dissemination

4.1.1 Key stakeholders will be kept informed of new or proposed initiatives at the premises, modifications to the plant or operating regimes.

4.1.2 Key stakeholders will also be advised of, contact details within Transfield Services for seeking additional information or lodging environmental complaints. These measures will be implemented via the following initiatives:

4.1.2.1 Annual letter drops to all residents and businesses located in proximity to the power station, including those located:

- along the Old coast Road (between Treasure Road and Marriot Road),
- along Marriott Road, Wellesley Road, Treasure Road and the smaller off-roads adjoining these major roads where residences exist.

4.1.2.2 Updates via annual status reports in writing or via annual presentations to the Kemerton Industrial Park Coordinating and Community Committees, DoE, DoIR, Shire of Harvey and community groups.

4.1.2.3 Major plant modifications with potential to affect the plant environmental performance will be advertised in the local newspapers as well as in the Australind Shopping Centre and Council libraries.

4.1.3 Signs will be maintained at the entrance to the Power Station informing interested parties of the Transfield Services Operations Superintendent contact name, address and daytime and after hours telephone numbers for lodging complaints or concerns.

4.1.4 Community complaints received in relation to environmental impacts from the power station will be recorded on a complaints register held onsite, investigated and actioned as appropriate (depending on the nature of the complaints eg noise, air emissions, etc).

4.2 Reporting

4.2.1 The number of complaints received each year will be reported to the DoE in accordance with Annual Monitoring Report requirements prescribed by the DoE in the Environmental Protection Licence.

4.2.2 Where noise surveys are conducted in response to repeated noise complaints, the Annual Report will also include:

- a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of recurrence;
- an assessment of the information against previous monitoring results, licence limits or other appropriate measures (eg. standards or guidelines).

4.3 Responsibility

4.3.1 All staff and contractors of Transfield Services at Kemerton Power Station are responsible for fulfilling the requirements of this Community Consultation Management Plan as relevant to their roles.

4.3.2 The Operations Superintendent shall carry overall responsibility for the Plan and will ensure that complaints are managed in accordance with Section 4.2.

4.3.3 The Operations Superintendent is responsible for the preparation of the Annual Monitoring Report and submission to the DoE as prescribed in the Environmental Protection Licence.

5.0 REFERENCE DOCUMENTATION

ATA Environmental (2003) Kemerton Power Station Referral Supporting Documentation Volume I and II. Report No 2003/179. December 2003.

ATA Environmental (2004) Kemerton Power Station Construction Community Consultation Plan. Version 3, Report No 2004/73. July 2004.

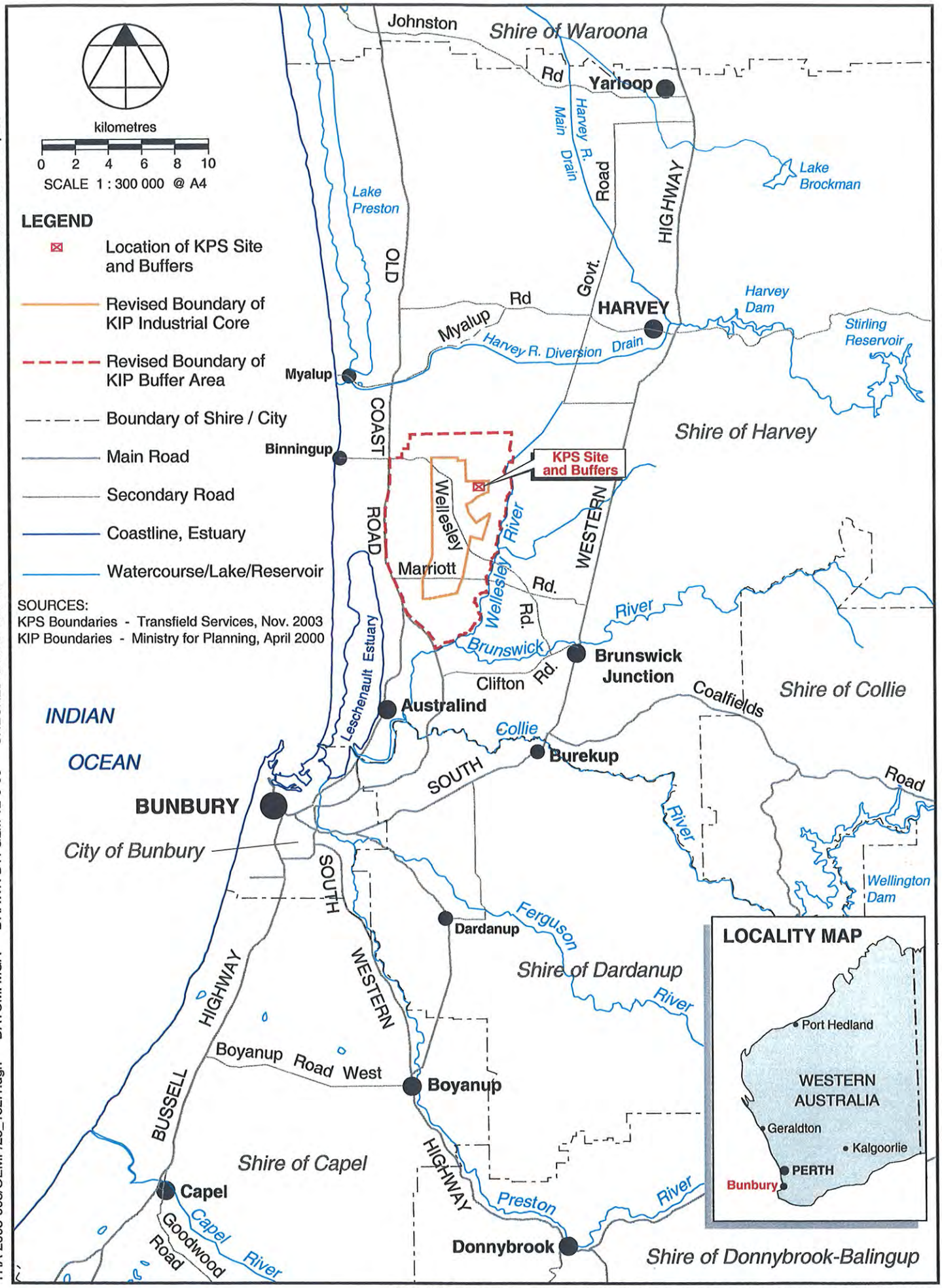
DoE (2003) Community Involvement Framework

DoE Environmental Protection Licence (8026/2)

Environmental Protection Authority (2003) Kemerton Power Station. Report and Recommendations of the Environmental Protection Authority. Bulletin 1121. December 2003.

Transfield Service Kemerton Pty Limited, (2004) *Kemerton Power Station: Supporting Documentation to Works Approval Application*, letter Report submitted to DoE dated 23 January 2004. Prepared by ATA Environmental for Transfield Service Kemerton Pty Limited.

FIGURES



PRINTED: Mon 19 Sep 05 CHECKED BY: PJ 12-9-05 DRAWN BY: GLM 12-9-05 DATUM: MGA TRA-2005-003/OEMP/25_152f1.dgn

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TRANSFIELD SERVICES KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

REGIONAL LOCATION

FIGURE 1

TRA-2005-003/OEMP/25_152f2.dgn DATUM: MGA DRAWN BY: GLM 12-9-05 CHECKED BY: PJ 12-9-05 PRINTED: Mon 19 Sep 05

LEGEND

- Kemerton Power Station Site and Buffers
- Revised Boundary of K.I.P. Buffer Area
- Revised Boundary of Industrial Core
- Dampier to Bunbury Gas Pipeline
- Proposed Gas Lateral
- Transmission Line 330kv
- Transmission Line 132kv
- Substation

kilometres
0 0.5 1 1.5 2 2.5
SCALE 1 : 50 000 @ A3

Dampier-Bunbury Gas Pipeline
Existing Gas Lateral
Proposed Gas Lateral
KPS Site & Buffers
Dampier-Bunbury Gas Pipeline

HARVEY RIVER DIVERSION DRAIN
BOONILUP ROAD
LEITCH ROAD
RUNNYMEDE ROAD
ARTHUR ROAD
WELLESLEY RIVER
BINNINGUP ROAD
WELLESLEY ROAD
COAST ROAD
OLD SPRINGHILL ROAD
TREASURE ROAD
BUFFALO ROAD
WELLINGTON ROAD
WELLESLEY RD
MARRIOTT ROAD
DEVLIN ROAD
GAS GATE STATION
INDIAN OCEAN
MYALUP SWAMP
MIALLA LAGOON
LESCHENAULT ESTUARY
Wastewater Treatment Plant
Piggery
Abbatoir
Energy Equipment
Simcoa
MIC, Nurfarm, BOC and Cobckburn Cement

SOURCE: WESTERN POWER, 14-8-01

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TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

KEMERTON INDUSTRIAL PARK

FIGURE 2

metres

0 100 200 300 400

SCALE 1 : 6 000 @ A3

LEGEND

- Power Station Boundary
- Laydown Area Boundary
- Buffer Area Boundary
- Noise Area Boundary
- Boundary of Core Expansion for K.I.P.
- Cadastral Boundary
- Boundary of Vegetation Communities

VEGETATION COMMUNITIES / WETLANDS

DaH	Species rich Dampland Heath / Wetland
EgP	*Eucalyptus globulus* Plantation
Em/B	*Eucalyptus marginata/Banksia attenuata/Banksia grandis* Woodland
Em/Cc	*Eucalyptus marginata/Corymbia calophylla* Woodland
Mp	Scattered or Parkland Cleared *Melaleuca preissiana* trees
Cl	Cleared

SOURCES: KPS and Buffers - Tranfield Services, Nov. 2003
Aerial Photograph - DLI, Nov 2003, Taken Jan 2003
Cadastra - DLI, Nov. 2003

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TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

AERIAL PHOTOGRAPH OF KPS SITE

FIGURE 3

LIST OF TERMINAL POINTS

Terminal Point	Description	Local X	Local Y	Local Z	PCG Easting	PCG Northing	PCG Elevation	Remarks
TP1	Fuel Gas (Underground)	1071.520	928.165	- 1.605	46717.154	129083.086	13.895	Cl. Of Pipe
TP2 (A-D)	Fuel Oil	UEH	UEH	+ 0.560	UEH	UEH	16.060	
TP3.1	330kV-HV-Connection (For Unit-11)	963.575	996.740	+ 13.220	46609.209	129151.661	28.720	
TP3.1A	Earth Shield (For Unit-11)	963.575	999.690	+ 17.220	46609.209	129154.611	32.720	
TP3.2	330kV-HV-Connection (For Unit-11)	963.575	990.940	+ 13.220	46609.209	129145.861	28.720	
TP3.3	330kV-HV-Connection (For Unit-11)	963.575	985.140	+ 13.220	46609.209	129140.061	28.720	
TP3.3A	Earth Shield (For Unit-11)	963.575	982.940	+ 17.220	46609.209	129137.861	32.720	
TP3.4	330kV-HV-Connection (For Unit-12)	963.575	957.210	+ 13.220	46609.209	129112.131	28.720	
TP3.4A	Earth Shield (For Unit-12)	963.575	959.690	+ 17.220	46609.209	129114.611	32.720	
TP3.5	330kV-HV-Connection (For Unit-12)	963.575	951.410	+ 13.220	46609.209	129106.331	28.720	
TP3.6	330kV-HV-Connection (For Unit-12)	963.575	945.610	+ 13.220	46609.209	129100.531	28.720	
TP3.6A	Earth Shield (For Unit-12)	963.575	942.940	+ 17.220	46609.209	129097.861	32.720	
TP4	Demin Water	1003.300	1027.600	+ 0.500	46648.934	129182.521	16.000	Cl. Of Pipe
TP5	Raw Water	976.500	1027.945	+ 0.410	46622.134	129182.866	15.910	Cl. Of Pipe
TP6	Access Road	1236.242	933.999	-0.250	46881.876	129088.920	15.250	
TP7	Power Supply For Construction	976.550	1048.450	----	46622.184	129203.371	----	
TP10	Potable Water	1029.515	1043.830	+ 0.500	46675.149	129198.751	16.000	Cl. Of Pipe
TP13A	Raw Water at 00UGA Area	965.600	1040.700	+ 0.220	46611.234	129195.621	15.720	Cl. Of Pipe
TP14	Raw Water at 00UCA Area	1030.000	1035.790	+ 0.720	46675.634	129190.711	16.220	Cl. Of Pipe
TP17A	Drainage of Gas Turbine False Start Oil	11UMB	11UMB	----	11UMB	11UMB	----	
TP17B	Drainage of Gas Turbine False Start Oil	12UMB	12UMB	----	12UMB	12UMB	----	
TP18A	Gas Turbine Diffuser and Stack Drain	1026.780	1004.600	-0.650	46672.414	129159.521	14.850	
TP18B	Gas Turbine Diffuser and Stack Drain	1026.780	964.600	-0.650	46672.414	129119.521	14.850	
TP20	Cable Connection to Relay Room	924.230	1009.520	----	46569.864	129164.441	----	
TP21A	Ignition Gas	1040.130	984.250	+ 0.655	46685.764	129139.171	16.155	Cl. Of Pipe
TP21B	Ignition Gas	1040.130	986.550	+ 0.655	46685.764	129141.471	16.155	Cl. Of Pipe
TP22	Emergency Diesel Daily Oil Tank	UBN	UBN	----	UBN	UBN	----	
TP23A	Drainage of Gas Turbine Wash Water	11UMB	11UMB	----	11UMB	11UMB	----	
TP23B	Drainage of Gas Turbine Wash Water	12UMB	12UMB	----	12UMB	12UMB	----	

LEGEND

- ROADS IN SIEMENS SCOPE
- HARDSTANDING AREA
- WALKWAY
- FENCE
- FIRE FIGHTING RING MAIN
- UNDERGROUND GAS PIPE
- ABOVEGROUND GAS PIPE
- 300mm. WIDE PREFABRICATED CHANNEL
- BM1/2/3 BENCH MARKS

BUILDING LEGENDS

11/12UBA01/02/03	STRUCTURE FOR POWER CONTROL CENTER (PCCs)
11/12UBD	STRUCTURE FOR LV AUXILIARY POWER TRANSFORMERS
11/12UBE	STRUCTURE FOR HV AUXILIARY POWER TRANSFORMERS
11/12UBF	STRUCTURE FOR GENERATOR TRANSFORMERS
01UBH	STRUCTURE FOR OIL-COLLECTING PIT/OIL SEPERATOR
00UBK	STRUCTURE FOR COMMON AUXILIARY TRANSFORMER FOR CONSTRUCTION AND STANDBY TRANSFORMER (SCOPE: TRANSFIELD)
01UBN	STRUCTURE FOR EMERGENCY POWER GENERATING SET
00UBS01-06	STRUCTURE FOR CABLE PULLING PITS
11/12UBX	STRUCTURE FOR GENERATOR CIRCUIT BREAKERS
00UBZ01-05	STRUCTURE FOR CABLE CONDUITS
00UCA	CONTROL ROOM, ADMINISTRATION, WORKSHOP AND STORAGE BUILDING
01UEH	STRUCTURE FOR UNLOADING OF LIQUID FUELS
01UEJ	STRUCTURE FOR STORAGE OF LIQUID FUELS
01UEK	BUND WALL FOR STORAGE OF LIQUID FUELS
01UEL	STRUCTURE FOR FORWARDING OF LIQUID FUELS
11/12UEN	STRUCTURE FOR GAS METERING AND FILTER
00UEY01-06	STRUCTURE FOR PIPE AND CABLE SLEEPER WAY
01UEX	STRUCTURE FOR PRESSURE SUSTAINING STATION
00UEZ01-03	STRUCTURE FOR PIPE AND CABLE DUCT
00UGA	STRUCTURE FOR RAW WATER TANK
00UGC	STRUCTURE FOR DEMINERALIZED WATER STORAGE
00UGG	STRUCTURE FOR POTABLE WATER STORAGE
00UGV	STRUCTURE FOR SEPTIC TANK
11/12UHN	STRUCTURE FOR STACK
11/12UMB	STRUCTURE FOR GAS TURBINE BUILDING
11/12URB	STRUCTURE FOR FIN FAN COOLERS (SERVICE WATER)
11/12URC	STRUCTURE FOR FIN FAN COOLERS (LUBE OIL)
11/12USA01-03	STRUCTURE FOR BUILDING VENTILATION
00USG	STRUCTURE FOR FIRE FIGHTING WATER PUMPS
01UTX	STRUCTURE FOR IGNITION GAS SKID
00UZA	ROADS
00UZJ	FENCING AND GATE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL LEVELS ARE IN METERS, UNLESS NOTED OTHERWISE
2. FINISHED FLOOR LEVEL ±0.00m = +15.50m ABOVE A.H.D
3. FINISHED GROUND LEVEL -0.30m = +15.20m ABOVE A.H.D
4. ROAD TOP LEVELS AT ROAD TERMINAL POINTS TO BE MATCHED PROVIDING GENTLE SLOPE
5. MAIN ROAD IS 6 M WIDE

Export classification AL: N ECCN: N
Goods labeled with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN not equal to N" are subject to US reexport authorization. Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

Index Rev.	Datum Date	Bearb. Coord.	gepruft Checked	Änderungshinweis/Details of Revision
e	2005-05-28	BC sgd	SV sgd	REVISED AS MARKED ⚠
d	2005-01-05	BC sgd	SV sgd	GENERALLY REVISED
c	2004-07-30	BC	SV	REVISED LOCATION OF CONDUITS
b	2004-07-21	BC sgd	SV sgd	REVISED BUILDING ARRANGEMENT ON NORTH OF ROAD Y=1023.000 & FENCE OF UBF
a	2004-07-07	BC sgd	SV sgd	FIRST ISSUE

SOURCE: TRANSFIELD SERVICES, 2005 (Siemans AG Drawing AUS379-UC07-U-600010, Rev e, 28-5-2005)

TRANSFIELD SERVICES

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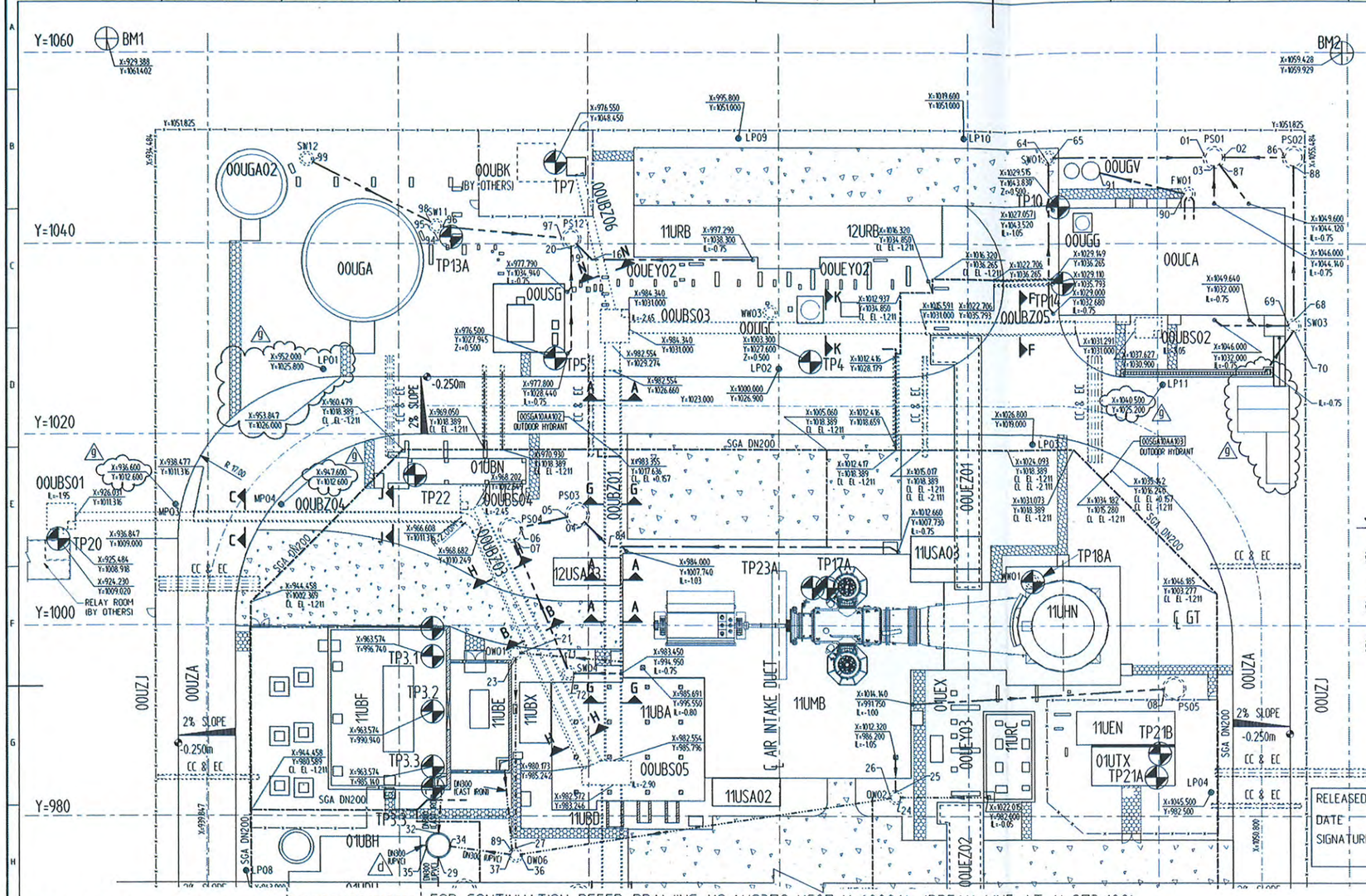
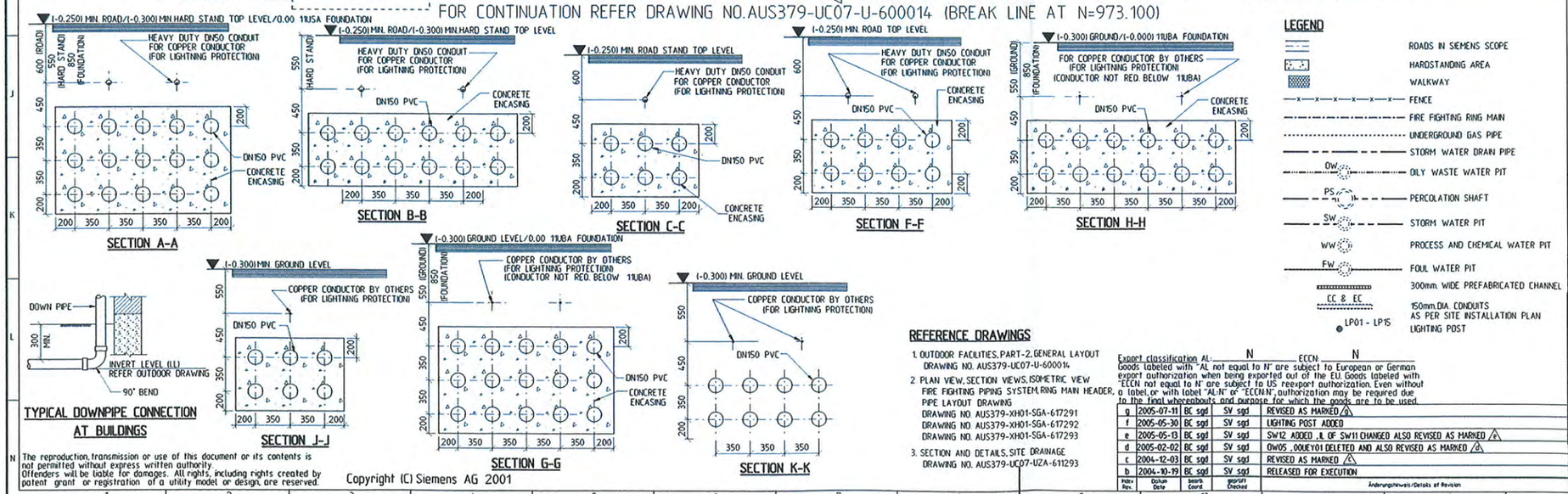
TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN
GENERAL SITE LAYOUT
FIGURE 4A





TYPICAL DOWNPIPE CONNECTION AT BUILDINGS

REFERENCE DRAWINGS

1. OUTDOOR FACILITIES, PART-2, GENERAL LAYOUT DRAWING NO. AUS379-UC07-U-600014
2. PLAN VIEW, SECTION VIEWS, ISOMETRIC VIEW FIRE FIGHTING PIPING SYSTEM, RING MAIN HEADER, PIPE LAYOUT DRAWING
   DRAWING NO. AUS379-XH01-SGA-617291
   DRAWING NO. AUS379-XH01-SGA-617292
   DRAWING NO. AUS379-XH01-SGA-617293
3. SECTION AND DETAILS, SITE DRAINAGE DRAWING NO. AUS379-UC07-UZA-611293

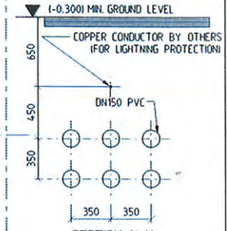
Export classification AL: N ECCN: N
Goods labeled with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN not equal to N" are subject to US reexport authorization. Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

Index Rev.	Datum Date	bearb. Coord.	gepr./fr. Checked	Änderungshinweis/Details of Revision
g	2005-07-11	BC sgd	SV sgd	REVISED AS MARKED
f	2005-05-30	BC sgd	SV sgd	LIGHTING POST ADDED
e	2005-05-13	BC sgd	SV sgd	SW12 ADDED ,IL OF SW11 CHANGED ALSO REVISED AS MARKED
d	2005-02-02	BC sgd	SV sgd	OW05 ,00UEY01 DELETED AND ALSO REVISED AS MARKED
c	2004-12-03	BC sgd	SV sgd	REVISED AS MARKED
b	2004-10-19	BC sgd	SV sgd	RELEASED FOR EXECUTION

PLANT NORTH

BUILDING LEGENDS

11/12UBA01/02/03	STRUCTURE FOR POWER CONTROL CENTER (PCCs)
11/12UBD	STRUCTURE FOR LV AUXILIARY POWER TRANSFORMERS
11/12UBE	STRUCTURE FOR HV AUXILIARY POWER TRANSFORMERS
11/12UBF	STRUCTURE FOR GENERATOR TRANSFORMERS
01UBH	STRUCTURE FOR OIL-COLLECTING PIT/OIL SEPERATOR
00UBK	STRUCTURE FOR COMMON AUXILIARY TRANSFORMER FOR CONSTRUCTION AND STANDBY TRANSFORMER (SCOPE TRANSFIELD)
01UBN	STRUCTURE FOR EMERGENCY POWER GENERATING SET
00UBS01-07	STRUCTURE FOR CABLE PULLING PITS
11/12UBX	STRUCTURE FOR GENERATOR CIRCUIT BREAKERS
00UBZ	STRUCTURE FOR CABLE CONDUITS
00UCA	CONTROL ROOM, ADMINISTRATION, WORKSHOP AND STORAGE BUILDING
01UEH	STRUCTURE FOR UNLOADING OF LIQUID FUELS
01UEJ	STRUCTURE FOR STORAGE OF LIQUID FUELS
01UEK	BUND WALL FOR STORAGE OF LIQUID FUELS
01UEL	STRUCTURE FOR FORWARDING OF LIQUID FUELS
11/12UEN	STRUCTURE FOR GAS METERING AND FILTER
01-07UEY	STRUCTURE FOR PIPE AND CABLE SLEEPER WAY
01-05UEZ	STRUCTURE FOR PIPE AND CABLE DUCT
00UGA	STRUCTURE FOR RAW WATER TANK
00UGC	STRUCTURE FOR DEMINERALIZED WATER STORAGE
00UGG	STRUCTURE FOR POTABLE WATER STORAGE
00UGV	STRUCTURE FOR SEPTIC TANK
11/12UHN	STRUCTURE FOR STACK
11/12UMB	STRUCTURE FOR GAS TURBINE BUILDING
11/12URB	STRUCTURE FOR FIN FAN COOLERS (SERVICE WATER)
11/12URC	STRUCTURE FOR FIN FAN COOLERS (LUBE OIL)
11/12URY	STRUCTURE FOR PIPE SLEEPER WAY
11/12USA01-03	STRUCTURE FOR BUILDING VENTILATION
00USG	STRUCTURE FOR FIRE FIGHTING WATER PUMPS
01UTX	STRUCTURE FOR IGNITION GAS SKID
UZA	ROADS
UZJ	FENCING AND GATE



SECTION N-N

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, ALL LEVELS AND COORDINATES ARE IN METERS, UNLESS NOTED OTHERWISE
2. FINISHED FLOOR LEVEL +0.00m = +15.50m ABOVE A.H.D
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6. ALL UNDERGROUND PIPES FOR STORM WATER AND OILY WATER WILL BE 150 DIA. UPVC UNLESS NOTED OTHERWISE
7. SLOPE 1:100 FOR 150 DIA. PVC PIPES
   SLOPE 1:250 FOR 300 DIA. PVC PIPES
8. IL OF OUTFLOW PIPE SAME AS IL OF PIT UNLESS NOTED OTHERWISE

NOTES FOR CABLE CONDUITS

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3. WHERE CONDUITS ARE NOT EMBEDDED IN RCC. FOR LAYING OF EACH LAYER OF CONDUITS, DISTANCE-PIECE/SEPERATORS SHALL BE PLACED AT A DISTANCE OF AROUND 1.5M TO MAINTAIN THE HORIZONTAL AND VERTICAL DISTANCE BETWEEN CONDUITS AS GIVEN IN THE DRAWING
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10. FOR TP CO-ORDINATES REF. DRAWING NOAUS379-UC07-U-600010

RELEASED FOR EXECUTION
DATE 2004-10-19
SIGNATURE SIGNED SANJAY VERMA SIEMENS

LEGEND

- ROADS IN SIEMENS SCOPE
- HARDSTANDING AREA
- WALKWAY
- FENCE
- FIRE FIGHTING RING MAIN
- UNDERGROUND GAS PIPE
- STORM WATER DRAIN PIPE
- OW — OILY WASTE WATER PIT
- PS — PERCOLATION SHAFT
- SW — STORM WATER PIT
- WW — PROCESS AND CHEMICAL WATER PIT
- FW — FOUL WATER PIT
- 300mm. WIDE PREFABRICATED CHANNEL
- CC & EC — 150mm.DIA. CONDUITS AS PER SITE INSTALLATION PLAN
- LP01 - LP15 — LIGHTING POST

SOURCE: TRANSFIELD SERVICES, 2005
(Siemans AG Drawing AUS379-UC07-U-600013, Rev g, 11-7-2005)

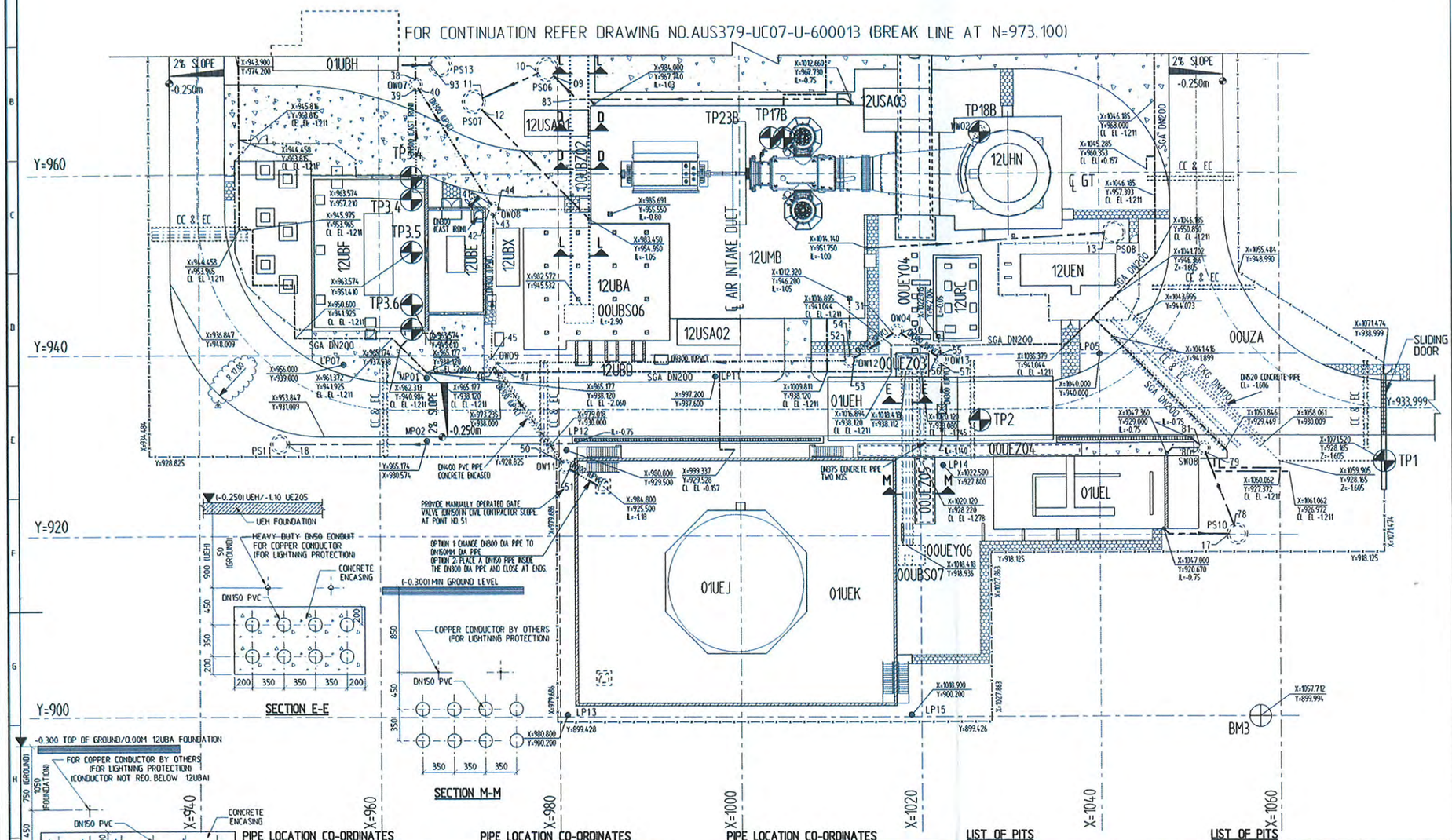
TRANSFIELD SERVICES

ATA Environmental
environmental scientists

TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

DETAILED SITE LAYOUT (PART A)

FIGURE 4B



BUILDING LEGENDS

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10. FOR TP CO-ORDINATES REF. DRAWING NO AUS379-UC07-U-600010.

REFERENCE DRAWING

1. OUTDOOR FACILITIES, PART-1, GENERAL LAYOUT DRAWING NO. AUS379-UC07-U-600013
2. SECTION AND DETAILS, SITE DRAINAGE DRAWING NO. AUS379-UC07-UZA-611293

RELEASED FOR EXECUTION
DATE 2004-10-19
SIGNATURE SIGNED SANJAY VERMA SIEMENS

SOURCE: TRANSFIELD SERVICES, 2005
(Siemans AG Drawing
AUS379-UC07-U-600014, Rev h, 11-7-2005)

TRANSFIELD SERVICES

PIPE LOCATION CO-ORDINATES

PIPE LOCATE NO.	X	Y	PIT NO.	LL
01	1045.100	1048.970	PS01	-1.086
02	1046.900	1048.970	PS01	-1.092
03	1046.000	1048.070	PS01	-0.790
04	979.567	1010.808	PS03	-1.079
05	977.800	1011.320	PS03	-1.099
06	972.804	1010.208	PS04	-1.151
07	972.087	1008.960	PS04	-1.196
08	1040.590	993.323	PS05	-1.265
09	979.567	970.808	PS06	-1.079
10	977.860	971.135	PS06	-1.122
11	971.553	968.418	PS07	-1.191
12	971.493	967.094	PS07	-1.221
13	1040.590	953.323	PS08	-1.265
14	VOID			
15	VOID			
16	980.390	1038.300	PS10	-0.920
17	1054.300	920.100	PS10	-0.818
⚠18	949.700	930.210	PS11	-1.035
19	978.766	1039.925	PS12	-0.943
20	978.200	1039.690	PS12	-0.859
21	972.743	997.077	OW01	-0.860
22	VOID			
23	972.280	996.598	OW01	-0.880
24	1012.845	982.000	OW02	-0.842
25	1012.320	982.525	OW02	-0.787
26	1011.803	981.906	OW02	-0.990
27	972.222	976.634	OW03	-1.080
28	VOID			
29	964.120	975.700	UBH	-1.760
30	1017.917	942.325	OW04	-1.249
31	1017.035	942.306	OW04	-1.270
32	964.168	978.107	UBH	-1.079

PIPE LOCATION CO-ORDINATES

PIPE LOCATE NO.	X	Y	PIT NO.	LL
33	VOID			
34	965.308	976.812	UBH	-1.547
35	962.924	976.900	UBH	-1.780
36	972.739	975.969	OW06	-1.386
37	971.695	975.896	OW06	-1.410
38	964.120	970.495	OW07	-1.760
39	964.120	969.445	OW07	-1.105
40	964.398	969.525	OW07	-1.706
41	972.453	956.629	OW08	-1.630
42	972.238	955.983	OW08	-1.080
43	972.716	955.655	OW08	-1.611
44	973.235	956.054	OW08	-0.854
45	972.434	939.645	OW09	-1.530
46	972.733	938.695	OW09	-1.485
47	972.950	939.120	OW09	-1.511
48	VOID			
49	VOID			
50	980.402	928.085	OW11	-1.220
51	981.152	927.378	OW11	-1.200
52	1011.795	939.317	OW12	-1.316
53	1012.763	939.600	OW12	-1.296
54	1012.320	939.845	OW12	-0.793
55	1022.300	940.040	OW13	-0.770
56	1021.931	939.800	OW13	-1.225
57	1022.375	938.995	OW13	-1.205
58	VOID			
59	VOID			
60	VOID			
61	VOID			
62	VOID			
63	VOID			
64	1028.540	1048.445	SW01	-0.902
65	1029.065	1048.970	SW01	-0.925
66	VOID			

PIPE LOCATION CO-ORDINATES

PIPE LOCATE NO.	X	Y	PIT NO.	LL
67	VOID			
68	1054.300	1031.925	SW03	-0.845
69	1053.776	1031.428	SW03	-0.821
70	1054.300	1030.875	SW03	-0.793
71	977.698	995.485	SW04	-1.050
72	978.423	994.960	SW04	-0.801
73	VOID			
74	VOID			
75	VOID			
76	VOID			
77	VOID			
78	1054.870	920.935	PS10	-0.888
79	1051.653	929.080	SW08	-0.800
80	1050.935	929.570	SW08	-0.780
81	1051.040	929.888	SW08	-0.761
82	VOID			
83	982.148	968.226	-	-1.047
84	982.148	1008.226	-	-1.047
85	VOID			
86	1053.400	1048.970	PS02	-1.027
87	1046.536	1048.247	PS02	-0.802
88	1054.300	1048.070	PS02	-1.007
89	971.840	976.253	OW03	-1.079
90	1042.850	1045.160	FW01	-1.100
91	1033.934	1047.369	00UGV	-1.200
92	VOID			
93	965.810	972.100	PS13	-0.220
94	963.340	1041.520	SW11	-0.142
95	963.790	1041.110	SW11	-0.142
96	964.760	1041.760	SW11	-0.910
97	977.155	1040.590	PS12	-1.035
98	963.425	1042.276	SW11	-0.89
99	950.936	1048.498	SW12	-0.75

LIST OF PITS

PIT NO.	INNER DIAMETER (M)	X (M)	Y (M)	IL (M)
0W01	1.05	972.220	997.120	-0.880
0W02	1.05	1012.320	982.000	-0.990
0W03	VOID			
0W04	1.05	1017.470	942.600	-1.270
0W05	VOID			
0W06	1.05	972.220	975.890	-1.410
0W07	1.05	964.120	969.970	-1.730
0W08	1.05	972.725	956.180	-1.630
0W09	1.05	972.425	939.120	-1.530
0W10	VOID			
0W11	1.05	980.710	927.660	-1.220
0W12	1.05	1012.320	939.320	-1.316
0W13	1.05	1022.375	939.520	-1.225
0W14	VOID			
0W15	VOID			
0W16	VOID			
WW01	1.05	1026.780	1005.220	-1.300
WW02	1.05	1026.780	965.220	-1.300
WW03	1.05	999.100	1032.800	-1.300
FW01	0.90	1043.300	1045.160	-1.100
FW02	VOID			
SW01	1.05	1028.540	1048.970	-0.925
SW02	VOID			

LIST OF PITS

PIT NO.	INNER DIAMETER (M)	X (M)	Y (M)	IL (M)
SW03	1.05	1054.300	1031.400	-0.84
SW04	1.05	977.900	995.000	-1.05
SW05	VOID			
SW06	VOID			
SW07	VOID			
SW08	1.05	1051.460	929.570	-0.80
SW09	VOID			
SW10	VOID			
SW11	1.05	964.020	1041.830	-0.91
SW12	1.05	950.270	1048.830	-0.75
PS01	1.60	1046.000	1048.970	-1.30
PS02	1.60	1054.300	1048.970	-1.30
PS03	2.10	978.820	1011.550	-1.30
PS04	2.10	971.780	1009.960	-1.30
PS05	2.10	1041.640	993.390	-1.30
PS06	2.10	978.820	971.550	-1.30
PS07	2.10	970.580	968.020	-1.30
PS08	2.10	1041.640	953.390	-1.30
PS09	VOID			
PS10	1.60	1055.200	920.100	-1.30
⚠PS11	1.60	948.900	930.210	-1.30
PS12	1.60	978.200	1040.490	-1.30
PS13	2.10	966.860	972.100	-1.30

Export classification AL: N ECCN: N
Goods labeled with "AL not equal to N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN not equal to N" are subject to US reexport authorization. Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required due to the final whereabouts and purpose for which the goods are to be used.

Index Rev.	Datum Date	Bearb. Coord.	Gepruft Checked	Änderungshinweis/Details of Revision
h	2005-07-11	B.C. sgd	S.V. sgd	REVISED AS MARKED/⚠
g	2005-05-30	B.C. sgd	S.V. sgd	LIGHTING POLE ADDED AND ACCESS DOOR NEAR SLIDING GATE ADDED
f	2005-05-13	B.C. sgd	S.V. sgd	REVISED AS MARKED/⚠
e	2005-04-08	B.C. sgd	S.V. sgd	REVISED AS MARKED/⚠
d	2005-02-02	B.C. sgd	S.V. sgd	REVISED AS MARKED/⚠
c	2004-12-03	B.C. sgd	S.V. sgd	REVISED AS MARKED/⚠

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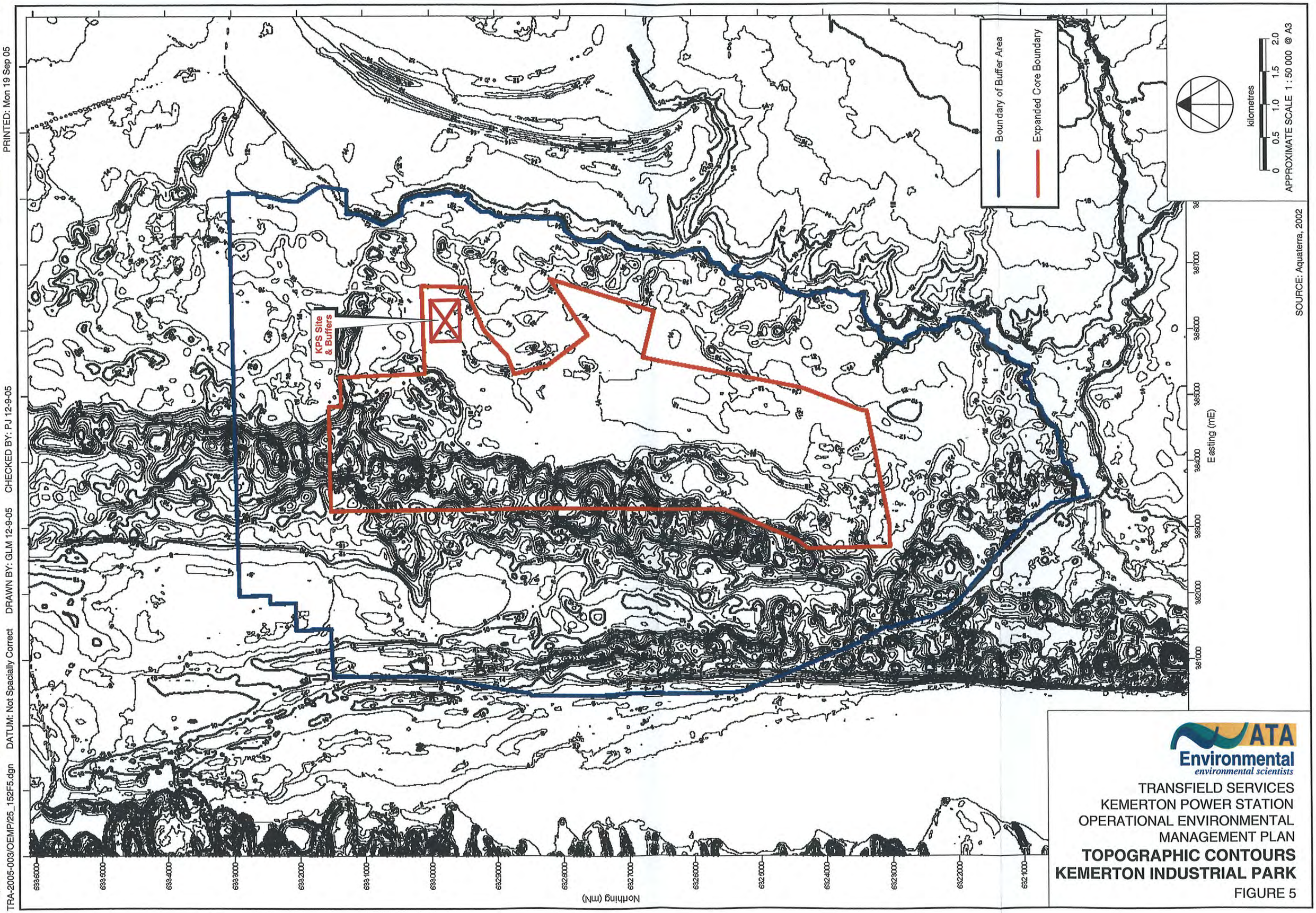
TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN
DETAILED SITE LAYOUT (PART B)
FIGURE 4C



PRINTED: Mon 19 Sep 05

CHECKED BY: PJ 12-9-05

DRAWN BY: GLM 12-9-05

DATUM: Not Spacially Correct

TRA-2005-003/OEMP/25_152F5.dgn

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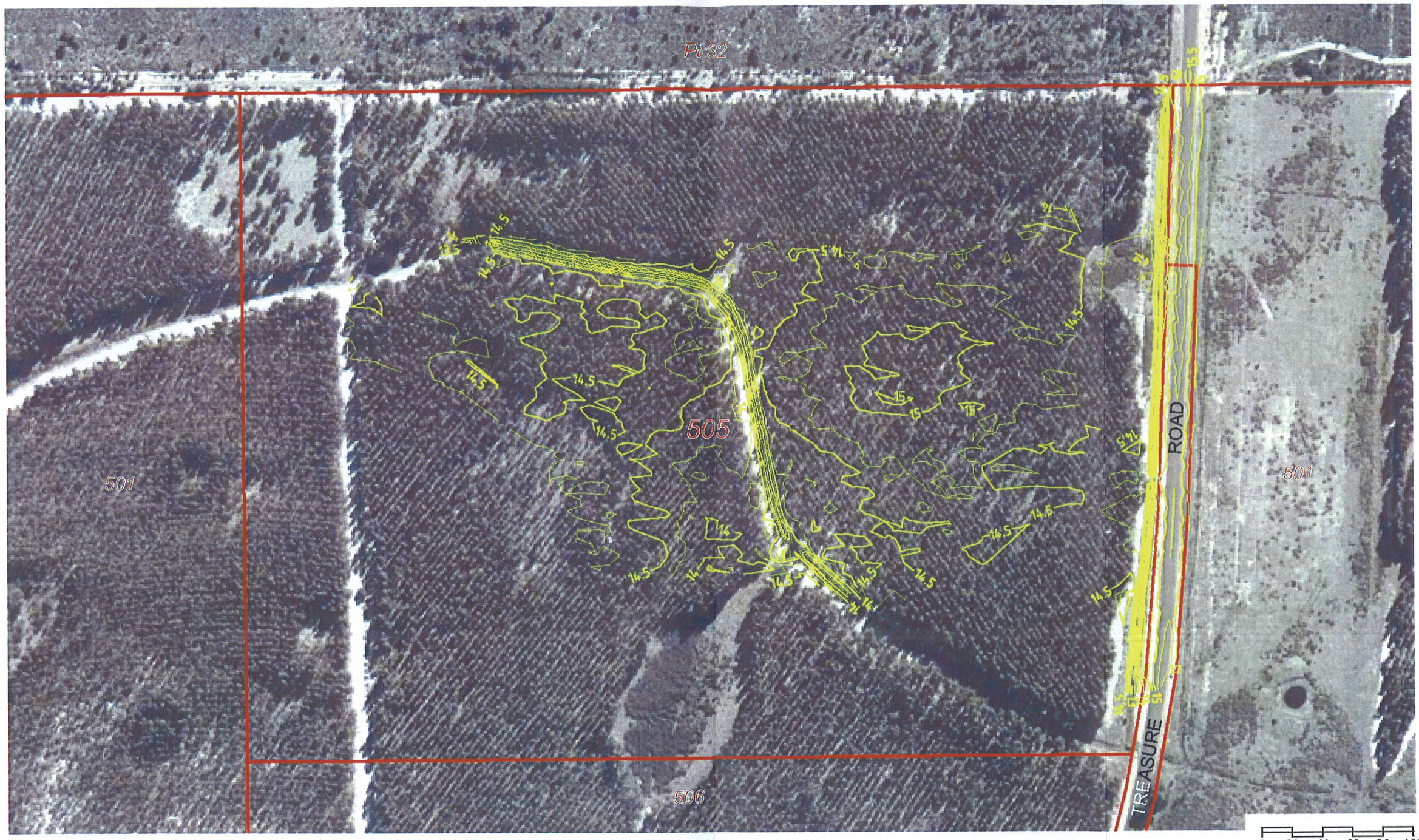
TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

TOPOGRAPHIC CONTOURS
KEMERTON INDUSTRIAL PARK

FIGURE 5



CADASTRE

0.25m CONTOUR INTERVAL

0 20 40 60 80 100

metres

0 20 40 60 80 100

APPROXIMATE SCALE 1 : 2 500 @ A3

SOURCE: Transfield Services, 2004

ATA Environmental
environmental scientists

TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

PRECONSTRUCTION TOPOGRAPHIC CONTOURS KEMERTON POWER STATION SITE

FIGURE 6

Lot 500
Lot 501
Lot 32
Road Reserve
KPS1(S&D)
SW1
LOCATION OF POWER STATION
Laydown Area
Buffer Area
SW2
KPS2(S&D)
SW5
1km
Lot 502
Noise Buffer
CORE EXPANSION AREA FOR K.I.P.
Road Reserve
KEMS9(S&D)
SW4
SW3
KEMS10(S&D)
Lot 1
Lot 18

metres

0 100 200 300 400

SCALE 1 : 6 000 @ A3

LEGEND

- Power Station Boundary
- Laydown Area Boundary
- Buffer Area Boundary
- Noise Area Boundary
- Boundary of Core Expansion for K.I.P.
- Cadastral Boundary
- SW5 Surface Water Monitoring Site
- KPS1 Groundwater Montoring Bore Location

SOURCES: KPS and Buffers - Tranfield Services, Nov. 2003
Aerial Photograph - DLI, Nov 2003, Taken Jan 2003
Cadastra - DLI, Nov. 2003
Groundwater Bores- Aquaterra 2004
Surface Water Monitoring Sites - Dept. of Environment, Feb 2004

ATA Environmental
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TRANSFIELD SERVICES
KEMERTON POWER STATION
OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

LOCATION OF WATER MONITORING STATIONS

FIGURE 7

APPENDICES

APPENDIX 1

MINISTERIAL STATEMENT 645 KEMERTON POWER STATION

MINISTER FOR THE ENVIRONMENT

Statement No.
000645

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

KEMERTON POWER STATION, KEMERTON

Proposal: The construction, operation and maintenance of a nominal 260 megawatt open cycle peaking power plant at Kemerton, as documented in schedule 1 of this statement.

Proponent: Transfield Services Kemerton Pty Limited (as trustee for Transfield Services Kemerton Trust)

Proponent Address: Level 12, Maritime Towers
201 Kent Street
Sydney NSW 2000

Assessment Number: 1499

Report of the Environmental Protection Authority: Bulletin 1121

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

Published on
- 9 FEB 2004

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E-MAIL: judy-edwards@dpc.wa.gov.au

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of the approval of the Minister for the Environment.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;

2. new, significant, environmental issues have not arisen; and

3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environmental Protection which address:

1. the status of implementation of the proposal as defined in schedule 1 of this statement;

2. evidence of compliance with the conditions and commitments; and

3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every five years after the start of the operations phase, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;

2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;

3. significant improvements gained in environmental management, including the use of external peer reviews;

4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and

5. the proposed environmental targets over the next five years, including improvements in technology and management processes.

5-3 The proponent may submit a report prepared by an auditor approved by the Department of Environmental Protection under the "Compliance Auditor Accreditation Scheme" to the Chief Executive Office of the Department of Environmental Protection on each condition/commitment of this statement which requires the preparation of a management plan, programme, strategy or system, stating that the requirements of each condition/commitment have been fulfilled within the timeframe stated within each condition/commitment.

6 Decommissioning Plans

6-1 Prior to construction, the proponent shall prepare a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Preliminary Decommissioning Plan shall address:

1 rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;

2 a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;

3 a conceptual plan for a care and maintenance phase; and

4 management of noxious materials to avoid the creation of contaminated areas.

6-2 At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;

2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and

3 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

6-3 The proponent shall implement the Final Decommissioning Plan required by condition 6-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

6-4 The proponent shall make the Final Decommissioning Plan required by condition 6-2 publicly available, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environmental Protection for the preparation of written notice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environmental Protection.

3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environmental Protection.

Notes

1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

3 Within this statement, to "have in place" means to "prepare, implement and maintain for the duration of the proposal".

Judy Edwards

Dr Judy Edwards MLA
MINISTER FOR THE ENVIRONMENT

- 9 FEB 2004

Schedule 1

The Proposal (Assessment No. 1499)

The proposal is to construct, operate and maintain a nominal 260 megawatt open cycle peaking power plant at Kemerton (location shown in Figures 1 and 2).

Table 1 – Key Proposal Characteristics

Element	Description	
Project purpose	Provide peaking power to the South West Interconnected System	
Project life	25 years	
Power generating capacity	Nominal 260MW	
Energy generated per year	Approximately 240GWh	
Thermal efficiency At 40°C, 40% relative humidity, and 101.3kPa ISO conditions 15°C, 60% relative humidity	Natural gas 28.6% HHV 31.8% LHV[3] 30.2% HHV 33.5% LHV[3]	Liquid fuel 29.3% HHV 31.4% LHV[3] 30.9 % HHV 33.0% LHV[3]
Plant operating modes	Mode 1 - Peaking plant for 5% of the time at 100% load Mode 2 - Spinning reserve for 10% of the time at 55% load	
Operating hours	Approximately 1000 hours per year	
Estimated capacity factor	Approximately 10%	
Facility footprint Site area including buffer	2 hectares 28 hectares	
Plant facilities		
Proposed technology Number and size of gas turbines Number of stacks Height of stacks Number of liquid fuel storage tanks	2 x Siemens V94.2 gas turbine generators 2 x 130.5MW 2 35m 1 x 1.5ML tank	
Construction period	Approximately 16 months	
Inputs		
Cooling water	None	
General water requirements	20kL/day - For dust suppression during construction 30kL/yr - For domestic use	
Natural gas	Approximately 3PJ per year (approximately 900 hours per year) taken from the Dampier to Bunbury Natural Gas Pipeline	

Liquid fuel (Backup)	Up to 6 ML per year ultra low sulphur diesel (less than 100 hours per year) Sulphur content of diesel – 50ppm maximum	
Outputs		
Wastewater	None	
Solid waste	Less than 10 tpa	
Air emissions: Oxides of nitrogen (NO_X) Oxides of sulphur (SO_X)[1] Oxides of sulphur (SO_X)[2] Particulate matter Carbon monoxide (CO) Polycyclic aromatic hydrocarbons (PAHs) Non-methane volatile organic compounds (NMVOCs)	Natural gas (based on 900h per year at full load) <39.1 g/s (127 tpa) 0.0 g/s (negligible tpa) 0.0 g/s (negligible tpa) 2.0 g/s (6.48 tpa) 21.7 g/s (70.3 tpa) 0.00087 g/s (0.0028 tpa) 0.83 g/s (2.69 tpa)	Liquid fuel (based on 100h per year at full load) <114.2 g/s (41.1 tpa) 4.06 g/s (1.146 tpa) 0.406 g/s (0.146 tpa 7.62 g/s (2.74 tpa) 20.9 g/s (7.54tpa) 0.016 g/s (0.0057 tpa) 0.16 g/s (0.058 tpa)
Greenhouse gas emissions Average greenhouse intensity	Approximately 160,000 tpa $CO_{2\text{-}e}$ (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel) 667.6.1 kg $CO_{2\text{-}e}$/MWh (Assuming approximately 900 hours per year operation on natural gas and 100 hours per year operation on liquid fuel)	
Predicted noise level	<28 dB(A) at closest residences	

[1] Emissions modelling based on use of normal distillate (500 ppm sulphur content)
[2] Emissions modelling based on use of ultra low sulphur diesel (50 ppm sulphur content)
[3] Lower Heating Values (LHV) are manufacture guarantee values.

Abbreviations for Table 1

°C	degrees Celsius
$CO_{2\text{-}e}$	carbon dioxide equivalent
dB(A)	decibels (A weighted)
GWh	gigawatt hours
g/s	grams per second
HHV	higher heating value
ISO	International Standards Organisation
kg	kilograms
kL/day	kilolitres per day
kL/yr	kilolitres per year
kPa	kilopascals
LHV	lower heating value
m	metres
ML	megalitres
MW	megawatts
MWh	megawatt hours
ppm	parts per million
tpa	tonnes per annum
PJ	petajoules
<	less than

Figures (attached)

Figure 1 – Regional location
Figure 2 – Location in Kemerton Industrial Park
Figure 3 – Proposed Kemerton Power Station site map

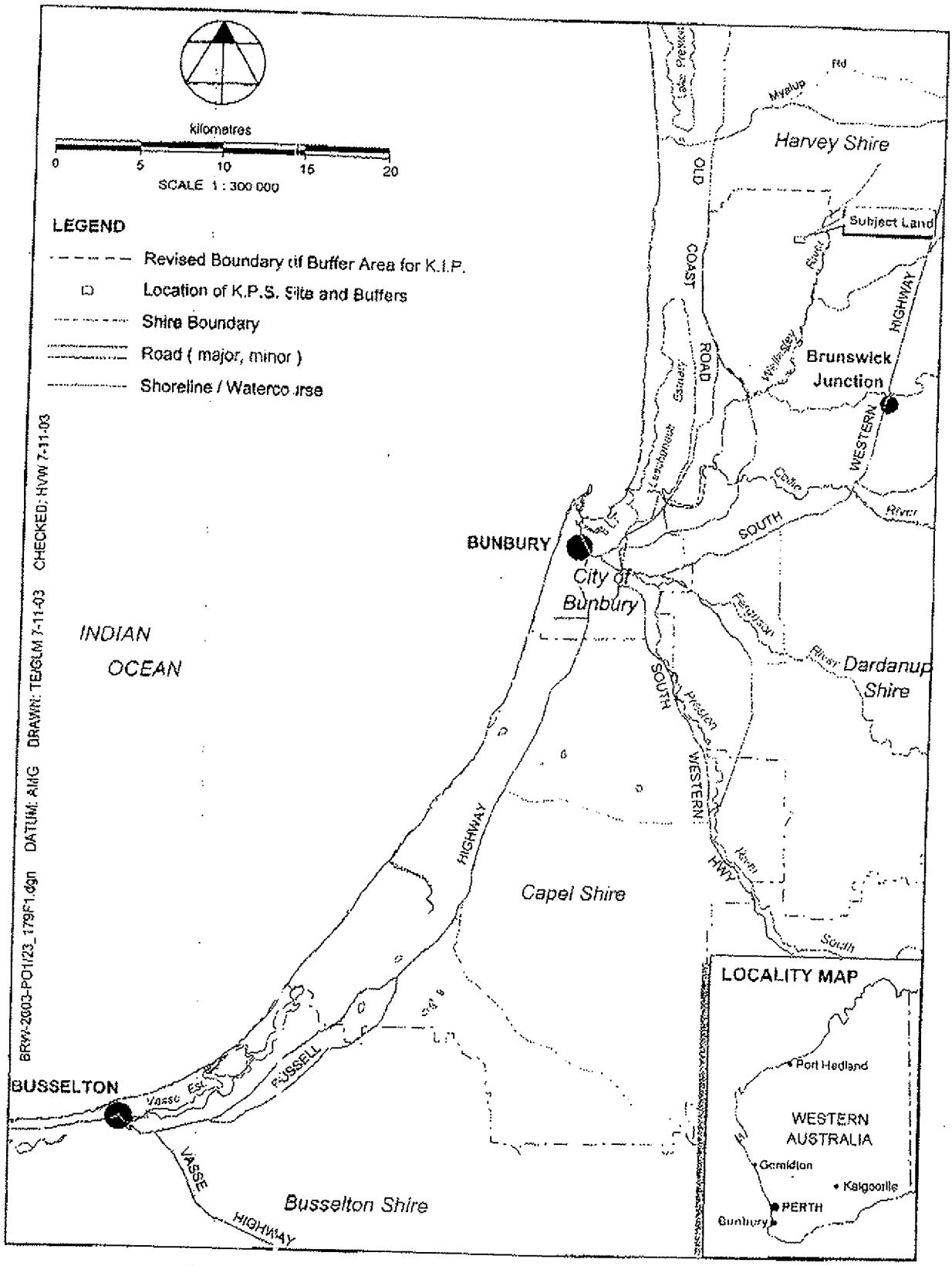

Figure 1: Regional location

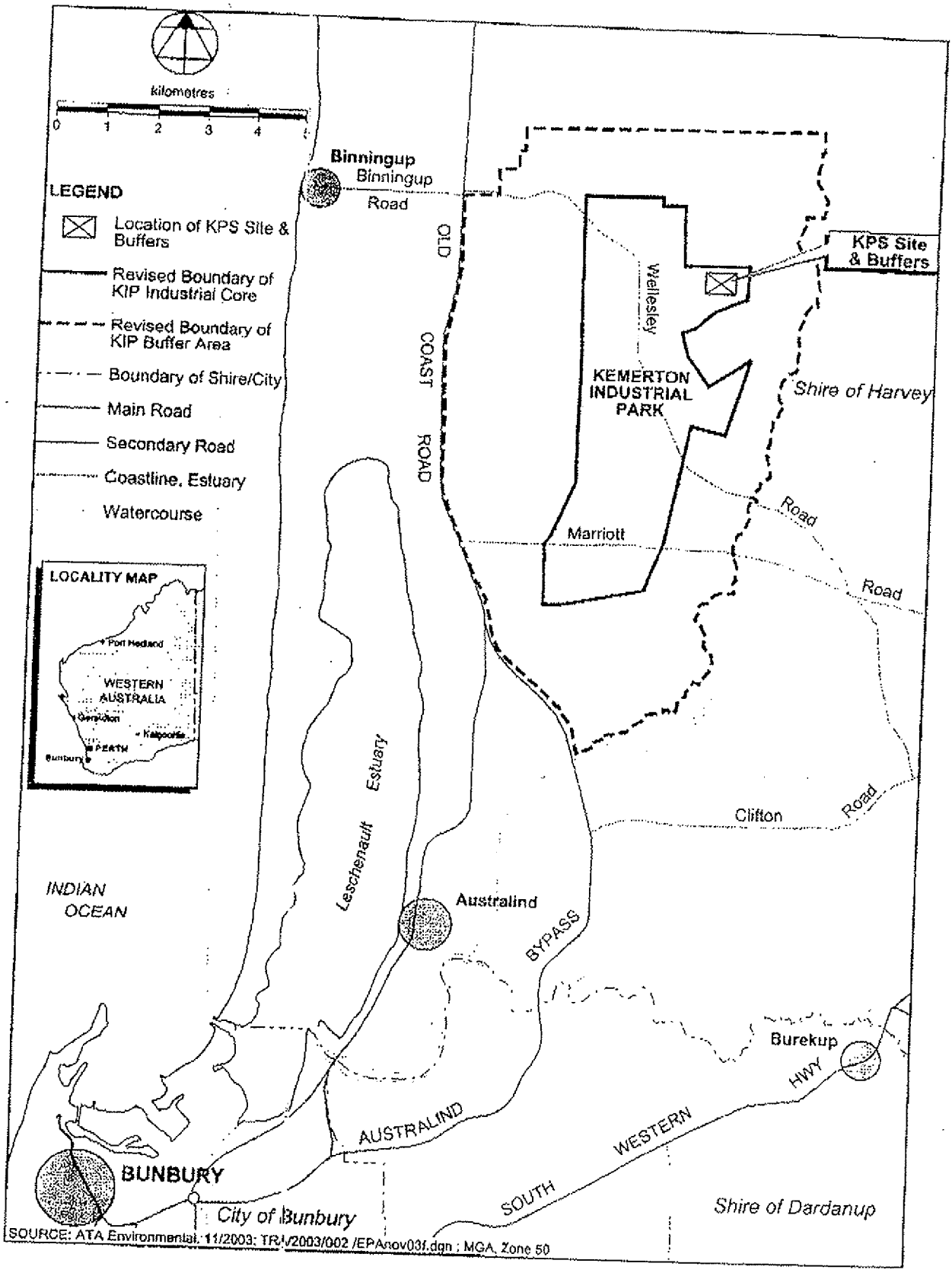

Figure 2: Location in Kemerton Industrial Park

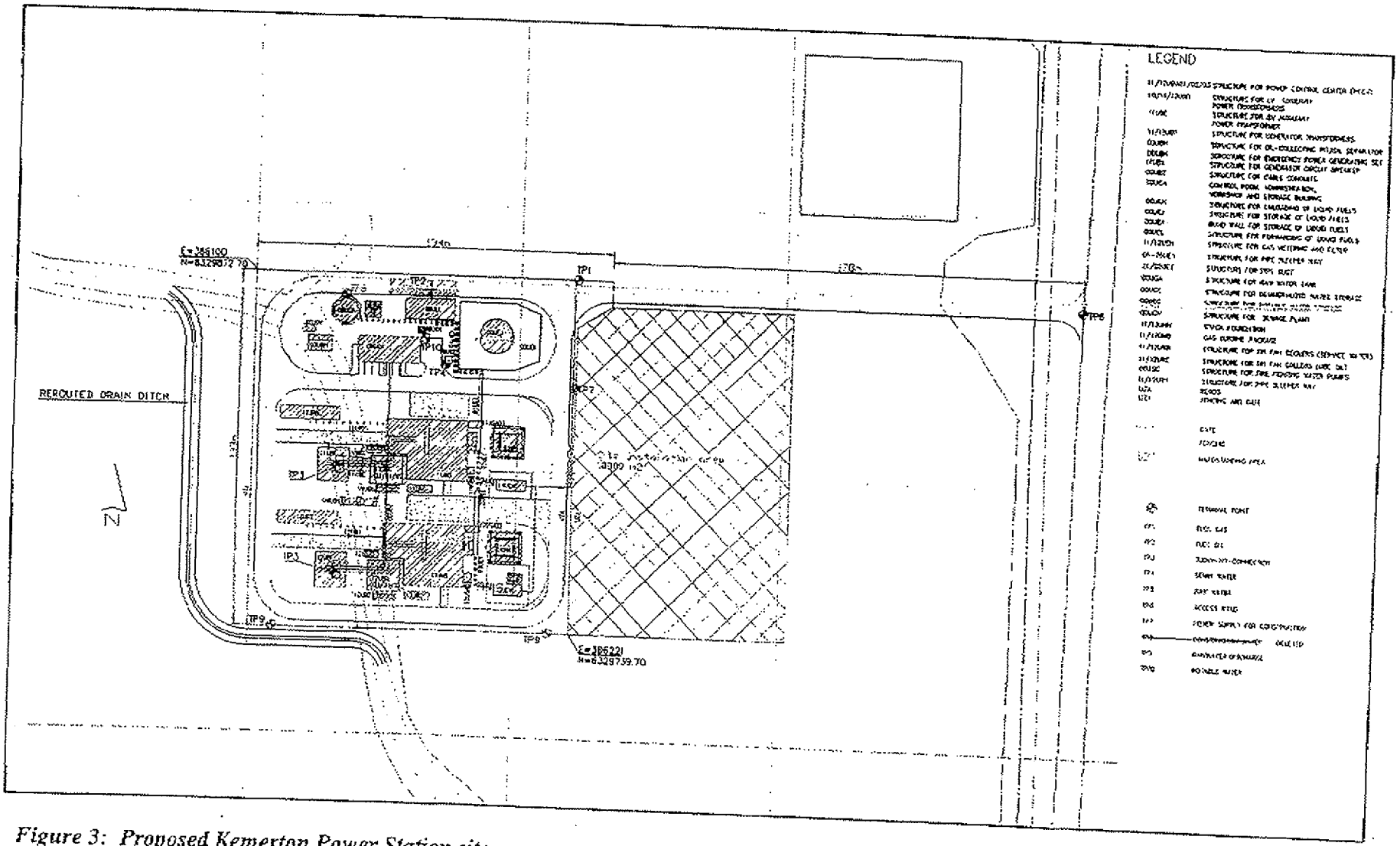

Figure 3: Proposed Kemerton Power Station site map

Schedule 2

Proponent's Environmental Management Commitments

December 2003

KEMERTON POWER STATION, KEMERTON

(Assessment No. 1499)

TRANSFIELD SERVICES KEMERTON PTY LIMITED
(AS TRUSTEE FOR TRANSFIELD SERVICES KEMERTON TRUST)

Proponent's Environmental Management Commitments – December 2003

KEMERTON POWER STATION (Assessment No. 1499)

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environmental Protection.

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
1	Construction Environmental Management	To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	1. Prepare a Construction Environmental Management Program (CEMP) which will include the following plans: • Flora and Vegetation Management Plan (see commitment 3); • Fauna Management Plan (see commitment 5); • Groundwater Management Plan (see commitment 6); • Surface and Stormwater Water Management Plan (see commitment 8); • Air Emissions and Dust Management Plan (see commitment 10); • Noise Management Plan (see commitment 13); • Solid and Liquid Waste Management Plan (see commitment 15); • Hydrocarbon and Hazardous Material Handling Plan (see commitment 17); • Aboriginal Heritage Management Plan (see commitment 19); • Community Consultation Plan (see commitment 20); and • Dewatering Management Plan (see commitment 22); 2. Implement the approved Construction Environmental Management Program (CEMP) described in 1.1 above.	Prior to Construction	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
2	Operational Environmental Management	To ensure all aspects of project operation are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with.	1. Prepare an Operational Environmental Management Program (OEMP) which will include the following plans: • Flora and Vegetation Management Plan (see commitment 4); • Groundwater Management Plan (see commitment 7); • Surface and Stormwater Water Management Plan (see commitment 9); • Air Emissions Management Plan (see commitment 11); • Noise Management Plan (see commitment 14); • Solid and Liquid Waste Management Plan (see commitment 16); • Hydrocarbon and Hazardous Material Handling Plan (see commitment 18); • Community Consultation Management Plan (see commitment 21). 2. Implement the approved Operational Environmental Management Program (OEMP) described in 2.1 above.	Prior to Commission-ing	
3	Terrestrial Flora and Vegetation	To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during construction.	1. Prepare a Construction Flora and Vegetation Management Plan which will address: • Construction Lay-down Site Rehabilitation; • Dieback Hygiene; • Weed management and control; • Clearing of blue gums; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Flora and Vegetation Management Plan described in 3.1 above.	Prior to Construction	CALM FPC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
4	Terrestrial Flora and Vegetation	To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during operation	1. Prepare an Operational Flora and Vegetation Management Plan which will address: • Dieback Hygiene; • Weed management and control; • Clearing of blue gums in buffer; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Operational Flora and Vegetation Management Plan described in 4.1 above.	Prior to Commission-ing	CALM FPC
5	Terrestrial Fauna Specially protected (Threatened) fauna.	To protect Specially Protected (Threatened) Fauna species and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950* during construction	1. Prepare a Construction Fauna Management Plan which will address: • Feral and introduced animal management; • Management of species location if required; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Fauna Management Plan described in 5.1 above.	Prior to Construction	CALM
6	Groundwater Quality	To monitor groundwater quality and identify and mitigate sources of contamination during construction	1. Prepare a Construction Groundwater Management Plan which will address: • Sample bore locations; • Parameters and sample frequency for monitoring; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Construction Groundwater Management Plan described in 6.1 above.	Prior to Construction	WRC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
7	Groundwater Quality	To monitor groundwater quality and identify and mitigate sources of contamination during operation	1. Prepare an Operational Groundwater Management Plan which will address: • Zero process water discharge; • Design and bore construction; • Sample bore locations; • Parameters and sample frequency for monitoring; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Operational Groundwater Management Plan described in 7.1 above.	Prior to Commissioning	WRC
8	Surface Water Quality	To manage the potential effects of the construction of the project on surface water quality and to maintain existing flow paths where possible	1. Prepare a Construction Surface and Storm Water Management Plan which will address: • Management of contaminated surface water runoff; • Monitoring requirements; • Mitigation and contingency measures; • Reporting requirements. 2. Implement the approved Construction Surface and Storm Water Management Plan described in 8.1 above.	Prior to Construction	WRC
9	Surface Water Quality	To manage the potential effects of the operation of the project on surface water quality and to maintain existing flow paths where possible	1. Prepare an Operational Surface and Storm Water Management Plan which will address: • Management of contaminated storm waters such that none leaves the site; • Recovery mechanisms and structures for chemical and hydrocarbon spillages. • Monitoring requirements; • Response and contingency measures; and • Reporting requirements. 2. Implement the approved Operational Surface and Storm Water Management Plan described in 9.1 above.	Prior to Commissioning	WRC

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
10	Air Quality - Gaseous Emissions	To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts.	1. Prepare a Construction Air Emissions/Dust Management Plan which will address: • the use of water sprays to wet the site during windy conditions; • the use of speed limits to minimise dust generated by vehicle movements; • the use of minimum drop heights when loading and unloading soils and other excavated materials; minimisation of areas of disturbed and/or exposed soils; • Incident management; • Responsibilities; • Reporting requirements; and • Employee training and awareness. 2. Implement the approved Construction Air Emissions / Dust Management Plan described in 10.1 above.	Prior to Construction	
11	Air Quality - Gaseous Emissions	To ensure that best practicable measures are taken to minimise discharge of gaseous and particulate emissions to the atmosphere. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical	1. Prepare an Operational Air Emissions Management Plan which will address: • Stack emission monitoring program (sampling location, frequency, parameters, standards and limits); • Reporting schedules; • Incident management; • Responsibilities; and • Employee training and awareness. 2. Implement the approved Operational Air Emissions Management Plan described in 11.1 above.	Prior to Commissioning	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
		smog are managed to minimise the generation of smog and any subsequent impacts.			
12	Greenhouse Gas Emissions	To ensure that potential greenhouse gas emissions emitted from proposed projects are adequately addressed and best practicable measures and technologies are used in Western Australia to minimise Western Australia's greenhouse gas emissions.	Pursue greenhouse gas reduction through: • Commitment to participate in the Greenhouse Challenge program. • Prepare a Greenhouse Gas Management Strategy under the Greenhouse Challenge program. • Implement a Greenhouse Gas Management Strategy under the Greenhouse Challenge program • Operate and maintain the plant to "Good Electricity Practice" as defined in the National Electricity Code.	Prior to Construction and throughout Operation	Australian Greenhouse Office
13	Noise	To protect the amenity of nearby residents from noise impacts resulting from construction activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997.*	1. Prepare a Construction Noise Management Plan which will address: • Noise management procedures for construction; • Retention of vegetation (plantation blue gums) where practicable to assist in noise mitigation; • Implementation of alternative noise attenuation packages to provide enhanced levels of noise control to meet boundary level noise limits if necessary; and • Implementation of a complaint management procedure to receive, investigate and action noise complaints. 2. Implement the approved Construction Noise Management Plan described in 13.1 above.	Prior to Construction	

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
14	Noise	To protect the amenity of nearby residents from noise impacts resulting from operational activities associated with the proposal by ensuring that noise levels meet the *Environmental Protection (Noise) Regulations 1997.*	1. Prepare an Operational Noise Management Plan which will address: • Maintenance of equipment that contributes to overall plant noise; • the use of silencers where necessary; • noise monitoring and reporting as necessary. • Implementation of a complaint management procedure to receive, investigate and action noise complaints. 2. Implement the approved Operational Noise Management Plan described in 14.1 above.	Prior to Commissioning	
15	Waste Management	Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during construction.	1. Prepare a Construction Solid and Liquid Waste Management Plan to address the following: • Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal; • Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; • General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements • Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area. • Prohibition of burning of waste onsite at all times. • Education of employees in non-hazardous solid waste management.	Prior to Construction	Shire of Harvey

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
			• Preparation of annual waste reports 2. Implement the approved Construction Solid and Liquid Waste Management Plan described in 15.1 above.		
16	Waste Management	Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during operation.	1. Prepare an Operational Solid and Liquid Waste Management Plan to address the following: • Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal ; • Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; • General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements; • Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area; • Prohibition of burning of waste onsite at all times. • Education of employees in non-hazardous solid waste management; and • Preparation of annual waste reports. 2. Implement the approved Operational Solid and Liquid Waste Management Plan described in 16.1 above.	Prior to Commissioning	Shire of Harvey

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
17	Hydrocarbon and Hazardous Materials	Design and construct (including bunding) in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the *Explosives and Dangerous Goods Act 1961*.	1. Prepare a Construction Hydrocarbon and Hazardous Materials Handling Plan to address: • Tracking of the volume of hydrocarbon and hazardous waste materials produced; • Identification of disposal options. • Appropriate transport, storage and handling procedures; • Appropriate clean-up and emergency procedures for spillages; • Monitoring requirements; • Contingency and Response Measures; • Reporting requirements. 2. Implement the approved Construction Hydrocarbon and Hazardous Materials Handling Plan described above in 17.1.	Prior to Construction	DoIR
18	Hydrocarbon and Hazardous Materials	Operate in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the *Explosives and Dangerous Goods Act 1961*.	1. Prepare an Operational Hydrocarbon and Hazardous Materials Handling Plan to address: • Tracking of the volume of hydrocarbon and hazardous waste materials produced; • Identification of disposal options. • Appropriate transport, storage and handling procedures; • Appropriate clean-up and emergency procedures for spillages; • Monitoring requirements; • Contingency and Response Measures; • Reporting requirements. 2. Implement the approved Operational Hydrocarbon and Hazardous Materials Handling Plan described above in 18.1.	Prior to Commissioning	DoIR

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
19	Heritage	To protect any sites of significance uncovered during the construction phase of the project.	1. Prepare a Construction Aboriginal Heritage Management Plan to address: • Procedures to ensure compliance with the *Aboriginal Heritage Act 1972*; • Consideration of recommendations of the Archaeological and Ethnographic Site Identification Survey Report (AIC, 2003) and adopt appropriate measures to address these recommendations where practicable. • Procedures for protection of a site of significance uncovered during construction; and • Procedure for continued liaison with relevant parties during construction. 2. Implement the approved Construction Aboriginal Heritage Management Plan described above in 19.1.	Prior to Construction	DIA
20	Social and Economic Issues	Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised.	1. Prepare a Construction Community Consultation Plan to address: • General community consultation associated with the environmental approval process; • Targeted consultation with nearby landowners and communities. • Consultation with the Shires of Harvey, (and/or Dardanup and City of Bunbury) and Kemerton Community Committee; • Local waterbody users' representative groups; • Opportunities to engage local workforces. 2. Implement the approved Construction Community Consultation Plan described above in 20.1.	Prior to Commissioning	Kemerton Community Committee

NO.	TOPIC	OBJECTIVE/S	ACTION	TIMING	ADVICE
21	Social and Economic Issues	Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised.	1. Prepare an Operational Community Consultation Plan to address: • General community consultation associated with the environmental approval process; • Targeted consultation with nearby landowners and communities; • Consultation with the Shires of Harvey,(and/or Dardanup and City of Bunbury) and Kemerton Community Committee; • Local waterbody users' representative groups; • Opportunities to engage local workforces. 2. Implement the approved Operational Community Consultation Plan described above in 21.1.	Prior to Commissioning	Kemerton Community Committee
22	Groundwater	To ensure the discharge water from de-watering activities during the construction phase will have no adverse impacts on the groundwater table, and /or the water quality or flow regime of surface water bodies (including wetlands).	1. Prepare a Construction Dewatering Management Plan to address: • Definition of the commencement date, duration, anticipated quantity and frequency of discharge; • Monitoring requirements; and • Reporting requirements. 2. Implement the approved Construction Dewatering Management Plan described above in 22.1.	Prior to Construction	WRC

Abbreviations

CALM Department of Conservation & Land Management
DEP Department of Environmental Protection
DIA Department of Indigenous Affairs
DoIR Department of Industry and Resources
EPA Environmental Protection Authority
FPC Forest Products Commission
WRC Water and Rivers Commission

APPENDIX 2

MINISTERIAL APPROVAL FOR MODIFICATION TO THE KEMERTON POWER STATION PROPOSAL

MINISTER FOR THE ENVIRONMENT

Our Reference: 26399

Mr David Jones
General Manager
Transfield Services
Level 13, 80 Albert Street
BRISBANE QLD 4000

Dear Mr Jones

PROPOSED MODIFICATION TO PROPOSAL – KEMERTON POWER STATION (ASSESSMENT 1499)

On 12 March 2004 you wrote to the Chairman of the Environmental Protection Authority regarding proposed changes to the Kemerton Power Station Proposal. These changes are an increase in the capacity of the fuel storage tank from 1.5ML to 2ML, and relocation of the fuel storage facilities from the north of the site to the south of the site. Under Section 45C of the *Environmental Protection Act 1986* I am able to approve changes to a proposal, without a revised proposal being submitted to the EPA, when it is considered that the changes will not have a significant environmental impact.

On the advice of the EPA I understand that the increase in fuel storage tank size is for logistical reasons, and will not result in an increase in emissions from the plant. Relocation of the tank provides a greater buffer to the Conservation Category wetland to the north of the site. For these reasons I consider that the increase in size is unlikely to result in a significant environmental impact. Approval is therefore granted under Section 45C of the *Environmental Protection Act 1986* for the requested changes.

Yours sincerely

Judy Edwards

Dr Judy Edwards MLA
MINISTER FOR THE ENVIRONMENT

7 APR 2004

29th FLOOR, ALLENDALE SQUARE, 77 ST. GEORGE'S TERRACE, PERTH 6000 TELEPHONE: (08) 9220 5050 FACSIMILE: (08) 9221 4665/8
E-MAIL: judy-edwards@dpc.wa.gov.au

APPENDIX 3

AUDIT TABLE

KEMERTON POWER STATION

Department of Environmental Protection

AUDIT TABLE

Environmental Audit Branch

PROJECT: Kemerton Power Station, Kemerton (Assessment 1499, Statement 645)

DATE

Note:

- Phases that apply in this table = **Pre-Construction, Construction, Operation, Decommissioning, Overall (several phases)**
- This audit table is a summary and timetable of conditions and commitments applying to this project. Refer to the Minister's Statement of 9/2/04 for full detail/precise wording of individual elements.
- Code prefixes: M = Minister's condition; P = Proponent's commitment; A = Audit specification; N = Procedure.
- Any elements with status = "Audited by proponent only" are legally binding but are not required to be addressed specifically in compliance reports, if complied with.
- Acronyms list:- Minister for the Environment - Min for Env; Chief Executive Officer - CEO; Department of Environmental Protection - DEP; Evaluation Division - Part IV; Pollution Prevention Division - Part V; Waste Management Division - WMD; Department of Conservation and Land Management - CALM; Department of Minerals and Energy - DME; Environmental Protection Authority - EPA; Health Department of WA - HDWA; Water and Rivers Commission - WRC; Bush Fires Board - BFB.

• Audit Code • Subject	• What action must be taken • How action must be taken and/or objective of action • Objective • Evidence that action has been taken	• Project phase • When action to be taken • Where it is to be taken	• To req' ments of • On advice from	Status
645:G	Action	Construction		
645:M1.1 Implementation	Action Implement the proposal as documented in Schedule 1 of Statement 645, subject to the conditions of this statement Objective To avoid any unforeseen impacts Evidence As required by (Compliance Audit Condition)	Overall Throughout the life of the project	DEP	
645:M1.2 Change to proposal	Action Refer any change to the proposal, as documented in Schedule 1, to the EPA if the Min for Env determines it is substantial Objective To ensure substantial changes to the proposal are referred to the EPA Evidence Document describing changes to the proposal and possible impacts of proposed changes	Overall Prior to any substantial changes to the proposal being made	Min for Env **EPA**	
645:M1.3 Change to proposal (non substantial)	Action Changes to the proposal, as documented in Schedule 1, may be effected where the Minister for Environment determines that those changes are not substantial«If*** The text replacing this argument is too long ***<>""» How The criteria are that the proposed change: 1) has no additional, significant environmental impacts; 2) is not a significant and environmentally adverse change to a key proposal characteristic as shown in Schedule 1; 3) has addressed any justifiable environmental concerns of relevant stakeholders; 4) is manageable under the existing conditions of this statement and 5) status of compliance reporting is satisfactory Objective To ensure that any non-substantial change is consistent with the factors considered by the EPA in the impact assessment of the proposal. Evidence Document describing changes to the proposal and possible impacts of proposed changes	Overall	DEP	
645:M2.1 Proponent Commitments	Action Implement the environmental management commitments documented in Schedule 2 of Statement 645 Objective To minimise unforeseen impacts Evidence As appropriate	Overall	DEP	
645:M3.1 Nominated Proponent	Action The proponent nominated by the Minister for the Environment, under S38(6) or (7) of the EP Act is responsible for the implementation of the proposal until the Minister has revoked this nomination and nominated another person in respect of the proposal under S38(7) of the EP Act Objective To ensure legal responsibility for the project rests with a nominated proponent	Overall	EPA	

• Audit Code • Subject	• What action must be taken • How action must be taken and/or objective of action • Objective • Evidence that action has been taken	• Project phase • When action to be taken • Where it is to be taken	• To req' ments of • On advice from	Status
645:M3.2 Change in Proponent	Action Any request for a change in proponentship shall be accompanied by a copy of the Minister's statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in Statement 645. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided. Objective To ensure that the Minister is able to appoint a replacement proponent Evidence 1. Letter applying for a transfer of proponent and a copy of the Statement endorsed by the proposed replacement proponent, 2. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal	Overall Before transfer of ownership of the proposal	EPA **DEP**	
645:M3.3 Proponent	Action Notify the DEP of any change of proponent contact name and address Objective To ensure the DEP is able to maintain contact with the proponent Evidence Notification of change of proponent contact name and address	Overall Within 60 days of any change of address	DEP	
645:M4.1 Commencement	Action Provide evidence to the Minister for the Environment within five years of the date of Statement 645 that the proposal has been substantially commenced otherwise the approval granted in this statement shall lapse and be void Evidence As required by (Compl Auditing Condition)	Overall By 9 February 2009	Min for Env **DEP**	
645:M4.2 Commencement	Action Make an application to the Minister for the Environment for any extension of approval for the substantial commencement of the proposal beyond five years from the date of Statement 645«If*** The text replacing this argument is too long ***<>""» How An approval may be granted for an extension of the approval period if 1. The environmental factors of the proposal have not changed significantly; 2. new, significant environmental issues have not arisen; and 3. all relevant government authorities have been consulted . Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal. Objective To ensure that the project is implemented using the most recent information and technology available Evidence Letter regarding extension required, stating that the proposal is to be implemented as approved.	Design At least six months prior to the expiration date of the five year period (9 February 2009)	DEP	
645:M5.1 Compliance Auditing	Action Prepare an audit programme and submit compliance reports (CRs) to the DEP«If*** The text replacing this argument is too long ***<>""» How Compliance reports to address 1. the status of implementation of the proposal as defined in Schedule 1 of Statement 645; 2. evidence of compliance with the conditions and commitments; and 3. the performance of the environmental management plans and programmes. Note - Under sections 48(1) and 47(2) of the Environmental Protection Act 1986, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Objective To provide evidence that the proposal is being implemented as approved, and the relevant conditions and commitments are being met.«If*** The text replacing this argument is too long ***<>""» Evidence Design phase CR addressing all Design phase elements and relevant Overall phase elements, Construction phase CR addressing all Construction phase elements and any relevant Overall phase elements, Annual CR's during operation for the first four years addressing all Operation phase and relevant Overall phase elements, then as required by the DEP, Closure CR-as required by DEP	Overall 1) Design phase CR 2) Construction phase CR-at the end of construction 3) Operation phase CR annually for 4 years after construction is completed, and then as required by the DEP, 4) Closure CR-as required by DEP.	DEP	9/7/04 Satisfactory to date {Report on Acid Sulphate Soil investigations (that may necessitate a Contingency Plan) required prior to Dewatering commencing in October 2004. } - Audit Branch

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645:M5.2 Performance Review	Action Submit a Performance Review«If*** The text replacing this argument is too long ***<>""» How Addressing - (1) the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets; (2) the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; (3) significant improvements gained in environmental management, including the use of external peer reviews; (4) stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and (5) the proposed environmental targets over the next five years, including improvements in technology and management processes Objective To document the outcomes, beneficial or otherwise; and, to review the success of goals, objectives and targets; and, to evaluate the environmental performance over five years. Evidence Performance Review	Operation Each five years after the start of the operations phase	EPA **DEP**	
645:M5.3 Report prepared by an auditor	Action The proponent may submit a report prepared by an auditor (approved by the DEP under the' Compliance Auditor Accreditation Scheme') on each condition/commitment of this statement which requires the preparation of a management plan, programme, strategy or system How Stating that the requirements of each condition/commitment have been fulfilled within the timeframe stated within each condition/commitment Evidence Auditor's report	Overall	EPA **DEP**	
645:M6.1 Preliminary Decommissioning Plan	Action Prepare a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition «If*** The text replacing this argument is too long ***<>""» How Addressing: 1. rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure; 2. a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders; 3. a conceptual plan for a care and maintenance phase; and 4. management of noxious materials to avoid the creation of contaminated areas Objective To provide a framework to ensure that the site is left in an environmentally acceptable condition Evidence Preliminary Decommissioning Plan	Design Prior to construction	DEP	9/7/04 Cleared
645:M6.2 Final Decommissioning Plan	Action Prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition «If*** The text replacing this argument is too long ***<>""» How Address: 1) removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders; 2) rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and 3) identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities Objective To ensure that the site is left in an environmentally acceptable condition Evidence Final Decommissioning Plan	Operation At least twelve months prior to the anticipated date of decommissioning	DEP	

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645:M6.3 Final Decommissioning Plan	Action Implement the Final Decommissioning Plan Objective To ensure that the site is left in an environmentally acceptable condition Evidence CR-closure	Closure Until such time as the Minister for the Environment determines on advice of the EPA that the proponent's decommissioning responsibilities have been fulfilled	DEP	
645:M6.4 Final Decommissioning Plan	Action Make the Final Decommissioning Plan required by Condition 6-2 publicly available«If*** The text replacing this argument is too long ***<>""» How Carry out the following: 1) Request DEP to advertise the availability in the EPA/DEP weekly advertisement in the Monday edition of "The West Australian" newspaper; 2) Provide free copies of the documentation when approved for release to organisations nominated by EPA, such as the DEP library (2 copies), Battye Library (2 copies) and local Government libraries (2 copies each). Objective To ensure the public is kept informed Evidence CR-operation	Operation When the Plan has been approved for release	DEP	
645:P1.1 Construction Environmental Management Plan	Action Prepare a Construction Environmental Management Program (CEMP)«If*** The text replacing this argument is too long ***<>""» How Including the following plans: Flora and Vegetation Management Plan (see commitment 3) Fauna Management Plan (see commitment 5); Groundwater Management Plan (see commitment 6) Surface and Stormwater Water Management Plan (see commitment 8); Air Emissions and Dust Management Plan (see commitment 10) Noise Management Plan (see commitment 13); Solid and Liquid Waste Management Plan (see commitment 15); Hydrocarbon and Hazardous Material Handling Plan (see commitment 17); Aboriginal Heritage Management Plan (see commitment 19); Community Consultation Plan (see commitment 20); and Dewatering Management Plan (see commitment 22) Objective To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with Evidence See commitments 3,5,6,8,10,13,15,17,19,20,22	Design Prior to construction	DEP	9/7/04 Cleared {Also incorporates P3.1, 5.1, 6.1, 8.1, 10.1, 13.1, 15.1, 17.1, 19.1, 20.1 and 22.1. } - Audit Branch
645:P1.2 Construction Environmental Management Plan	Action Implement the Construction Environmental Management Program (CEMP) Objective To ensure all aspects of project construction are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with Evidence See commitments 3,5,6,8,10,13,15,17,19,20,22	Construction	DEP	

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645:P2.1 Operational Environmental Management Program	Action Prepare an Operational Management Program«If*** The text replacing this argument is too long ***<>""» How Include the following plans: Flora and Vegetation Management Plan (see commitment 4); Groundwater Management Plan (see commitment 7);, Surface and Stormwater Management Plan (see commitment 9); Air Emissions management Plan (see commitment 11); Noise Management Plan (see commitment 14); Solid and Liquid Waste Management Plan (see commitment 16); Hydrocarbon and hazardous Material Handling Plan (see commitment 18); Community consultation Management Plan (see commitment 21) Objective To ensure all aspects of project operation are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with Evidence See commitments 4,7,9,11,14,16,18,21	Construction Prior to commissioning	DEP	
645:P2.2 Operational Environmental Management	Action Implement the Operational Environmental Management Program Objective To ensure all aspects of project operation are conducted such that environmental impacts are minimised as far as practicable, and that regulatory requirements are complied with Evidence See commitments 4,7,9,11,14,16,18,21	Operation	DEP	
645:P3.1 Terrestrial Flora and Vegetation	Action Prepare a Construction Flora and Vegetation Management Plan How Address: Construction Lay-down Site Rehabilitation; Dieback Hygiene; Weed management and control; Clearing of blue gums; Monitoring requirements; and Reporting requirements Objective To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during construction Evidence Construction Flora and Vegetation Management Plan	Design Prior to construction	DEP **CALM, FPC**	9/7/04 Cleared
645:P3.2 Terrestrial Flora and Vegetation	Action Implement the Construction Flora and Vegetation Management Plan Objective To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during construction Evidence CR	Construction	DEP	
645:P4.1 Terrestrial Flora and Vegetation	Action Prepare an Operational Flora and Vegetation Management Plan How Address: Dieback Hygiene; Weed management and control; Clearing of blue gums in buffer; Monitoring requirements; and Reporting requirements Objective To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during operation Evidence Operational Flora and Vegetation Management Plan	Construction Prior to commissioning	DEP **CALM, FPC**	
645:P4.2 Terrestrial Flora and Vegetation	Action Implement the approved Operational Flora and Vegetation Management Plan described in 4.1 Objective To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities during operation Evidence CR	Operation	DEP	
645:P5.1 Construction Fauna Management Plan	Action Prepare a Construction Fauna Management Plan How Address: Feral and introduced animal management; Management of species location if required; Monitoring requirements; and Reporting requirements Objective To protect Specially Protected (Threatened) Fauna species and their habitats, consistent with the provisions of the Wildlife Conservation Act 1950 during construction Evidence Construction Fauna Management Plan	Design Prior to construction	DEP **CALM**	9/7/04 Cleared
645:P5.2 Construction Fauna Management Plan	Action Implement the Construction Fauna Management Plan Objective To protect Specially Protected (Threatened) Fauna species and their habitats, consistent with the provisions of the Wildlife Conservation Act 1950 during construction Evidence CR	Construction	DEP	

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645:P6.1 Groundwater Quality	Action Prepare a Construction Groundwater Management Plan Objective To monitor groundwater quality and identify and mitigate sources of contamination during construction	Design	DEP	9/7/04 Satisfactory to date {Refer M5.1. Further investigations to be carried out and reported to DoE prior to Fulfilment. } - Audit Branch
645:P6.2 Groundwater Quality	Action Implement the Construction Groundwater Management Plan Objective To monitor groundwater quality and identify and mitigate sources of contamination during construction	Construction	DEP	18/3/04 Not audited {Managed under Part V of EP Act} - Audit Branch
645:P7.1 Groundwater quality	Action Prepare an Operational Groundwater Management Plan How Address: Zero process water discharge; Design and bore construction; Sample bore locations; Parameters and sample frequency for monitoring; Mitigation and contingency measures; Reporting requirements Objective To monitor groundwater quality and identify and mitigate sources of contamination during operation Evidence Operational Groundwater Management Plan	Construction Prior to commissioning	DEP **WRC, DEP South West Region office**	
645:P7.2 Groundwater quality	Action Implement the Operational Groundwater Management Plan Objective To monitor groundwater quality and identify and mitigate sources of contamination during operation	Operation	DEP	18/3/04 Not audited {Managed under Part V of EP Act} - Audit Branch
645:P8.1 Surface Water quality	Action Prepare a Construction Surface and Storm Water Management Plan How Address: Management of contaminated surface water runoff; Monitoring requirements; Mitigation and contingency measures; Reporting requirements Objective To manage the potential effects of the construction of the project on surface water quality and to maintain existing flow paths where possible Evidence Construction Surface and Storm Water Management Plan	Design Prior to construction	DEP **WRC, South West Region office**	9/7/04 Cleared
645:P8.2 Surface Water quality	Action Implement the Construction Surface and Storm Water Management Plan Objective To manage the potential effects of the construction of the project on surface water quality and to maintain existing flow paths where possible	Construction	DEP	18/3/04 Not audited {Managed under Part V of the EP Act} - Audit Branch
645:P9.1 Surface Water quality	Action Prepare an Operational Surface and Storm Water Management Plan How Address: Management of contaminated storm waters such that none leaves the site; Recovery mechanisms and structures for chemical and hydrocarbon spillages, Monitoring requirements; Response and contingency measures; and Reporting requirements Objective To manage the potential effects of the operation of the project on surface water quality and to maintain existing flow paths where possible Evidence Operational Surface and Storm Water Management Plan	Construction Prior to commissioning	DEP **WRC, South West Region office**	
645:P9.2 Surface Water quality	Action Implement the Operational Surface and Storm Water Management Plan Objective To manage the potential effects of the operation of the project on surface water quality and to maintain existing flow paths where possible	Operation	DEP	18/3/04 Not audited {Managed under Part V of EP Act} - Audit Branch

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645:P10.1 Air Quality Gaseous Emissions	Action Prepare a Construction Air Emissions/Dust Management Plan «If*** The text replacing this argument is too long ***<>""» How Address: the use of water sprays to wet the site during windy conditions; the use of speed limits to minimise dust generated by vehicle movements; the use of minimum drop heights when loading and unloading soils and other excavated materials; minimisation of areas of disturbed and/or exposed soils; Incident management; Responsibilities; Reporting requirements; and Employee training and awareness«If*** The text replacing this argument is too long ***<>""» Objective 1. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. 2. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts. Evidence Construction Air Emissions/Dust Management Plan	Design Prior to construction	DEP	9/7/04 Cleared
645:P10.2 Air Quality Gaseous Emissions	Action Implement the Construction Air Emissions/Dust Management Plan «If*** The text replacing this argument is too long ***<>""» Objective 1. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. 2. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts.	Construction	DEP	18/3/04 Not audited {Managed under Part V of the EP Act} - Audit Branch
645:P11.1 Operational Air Emissions Management Plan	Action Prepare an Operational Air Emissions Management Plan How Address: Stack emission monitoring program (sampling location, frequency, parameters, standards and limits); Reporting schedules; Incident management; Responsibilities; and Employee training and awareness «If*** The text replacing this argument is too long ***<>""» Objective To ensure that best practicable measures are taken to minimise discharge of gaseous and particulate emissions to the atmosphere. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts. Evidence Operational Air Emissions Management Plan	Construction Prior to commissioning	DEP	
645:P11.2 Operational Air Emissions Management Plan	Action Implement the Operational Air Emissions Management Plan «If*** The text replacing this argument is too long ***<>""» Objective To ensure that best practicable measures are taken to minimise discharge of gaseous and particulate emissions to the atmosphere. To protect surrounding land users such that gaseous and particulate emissions will not adversely affect their welfare and amenity or cause health problems. To ensure that conditions which could promote the formation of photochemical smog are managed to minimise the generation of smog and any subsequent impacts.	Operation	DEP	18/3/04 Not audited {Managed under Part V of the EP Act} - Audit Branch
645:P12.1 Greenhouse Gas Emissions	Action Pursue greenhouse gas reduction How By preparation of a Greenhouse Gas Management Strategy under the Greenhouse Challenge program Evidence Greenhouse Gas Management Strategy	Design	DEP AGO	9/7/04 Satisfactory to date {Draft Greenhouse Strategy submitted to AGO. } - Audit Branch
645:P12.2 Greenhouse Gas Emissions	Action Pursue greenhouse gas reduction How By implementation of the Greenhouse Gas Management Strategy under the Greenhouse Challenge program Evidence CR	Overall	DEP	

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645:P12.3 Greenhouse Gas Emissions	Action Pursue greenhouse gas reduction How By Operating and maintaining the plant to "Good Electricity Practice" as defined in the National Electricity Code Evidence CR	Operation	DEP	
645:P13.1 Construction Noise Management Plan	Action Prepare a Construction Noise Management Plan «If*** The text replacing this argument is too long ***<>""» How Address: Noise management procedures for construction; Retention of vegetation (plantation blue gums) where practicable to assist in noise mitigation: Implementation of alternative noise attenuation packages to provide enhanced levels of noise control to meet boundary level noise limits if necessary; and Implementation of a complaint management procedure to receive, investigate and action noise complaints. Objective To protect the amenity of nearby residents from noise impacts resulting from construction activities associated with the proposal by ensuring that noise levels meet the Environmental Protection (Noise) Regulations 1997 Evidence Construction Noise Management Plan	Design Prior to construction	DEP	9/7/04 Cleared
645:P13.2 Construction Noise Management Plan	Action Implement the Construction Noise Management Plan Objective To protect the amenity of nearby residents from noise impacts resulting from construction activities associated with the proposal by ensuring that noise levels meet the Environmental Protection (Noise) Regulations 1997	Construction	DEP	18/3/04 Not audited {Managed under Part V of the EP Act} - Audit Branch
645:P14.1 Operational Noise Management Plan	Action Prepare an Operational Noise Management Plan«If*** The text replacing this argument is too long ***<>""» How Address: Maintenance of equipment that contributes to overall plant noise; the use of silencers where necessary; noise monitoring and reporting as necessary. Implementation of a complaint management procedure to receive, investigate and action noise complaints. Objective To protect the amenity of nearby residents from noise impacts resulting from operational activities associated with the proposal by ensuring that noise levels meet the Environmental Protection (Noise) Regulations 1997. Evidence Operational Noise Management Plan	Construction Prior to commissioning	DEP	
645:P14.2 Operational Noise Management Plan	Action Implement the Operational Noise Management Plan Objective To protect the amenity of nearby residents from noise impacts resulting from operational activities associated with the proposal by ensuring that noise levels meet the Environmental Protection (Noise) Regulations 1997.	Operation	DEP	18/3/04 Not audited {Managed under Part V of the EP Act} - Audit Branch

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645:P15.1 Waste Management	Action Prepare a Construction Solid and Liquid Waste Management Plan «If*** The text replacing this argument is too long ***<>""» How Address the following: Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal; Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements; Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area; Prohibition of burning of waste onsite at all times. Education of employees in non-hazardous solid waste management; Preparation of annual waste reports. Objective Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during construction Evidence Construction Solid and Liquid Waste Management Plan	Design Prior to construction	DEP **Shire of Harvey**	9/7/04 Cleared
645:P15.2 Waste Management	Action Implement the Construction Solid and Liquid Waste Management Plan Objective Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during construction Evidence CR	Construction	DEP	
645:P16.1 Waste Management	Action Prepare an Operational Solid and Liquid Waste Management Plan«If*** The text replacing this argument is too long ***<>""» How Address the following: Compliance with the requirements of the DEP and Regulations in relation to the management, handling and storage of wastes including application of the waste hierarchy of reduction, reuse, recycling, treatment, and disposal; Implementation of waste reduction and recycling initiatives where recyclable wastes will be removed by an approved contractor; General refuse and putrescible (domestic and industrial) solid waste and inert materials (not suitable for recycling) will be disposed of at the nearby Kemerton landfill in accordance with the Department of Health and Landfill Board requirements; Solvents and hazardous liquids will be collected and removed from the site for recycling or disposal in an approved liquids disposal area; Prohibition of burning of waste onsite at all times. Education of employees in non-hazardous solid waste management; and Preparation of annual waste reports Objective Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during operation Evidence Operational Solid and Liquid Waste Management Plan	Construction Prior to commissioning	DEP **Shire of Harvey**	
645:P16.2 Waste Management	Action Implement the Operational Solid and Liquid Waste Management Plan Objective Ensure that the generation of all wastes follows consideration of waste reduction in accordance with the waste hierarchy of reduction, reuse, recycling, treatment, and disposal during operation Evidence CR	Operation	DEP	

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645:P17.1 Hydrocarbon and Hazardous Materials	Action Prepare a Construction Hydrocarbon and Hazardous Materials Handling Plan: «If*** The text replacing this argument is too long ***<>""» How Address: Tracking of the volume of hydrocarbon and hazardous waste materials produced; Identification of disposal options. Appropriate transport, storage and handling procedures; Appropriate clean-up and emergency procedures for spillage; Monitoring requirements; Contingency and Response Measures; Reporting requirements. Objective Design and construct (including bunding) in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the Explosives and Dangerous Goods Act 1961 Evidence CR	Design Prior to construction	DEP **DoIR**	9/7/04 Cleared {Received DoIR approval of management plan.} - Audit Branch
645:P17.2 Hydrocarbon and Hazardous Materials	Action Implement the Construction Hydrocarbon and Hazardous Materials Handling Plan. Objective Design and construct (including bunding) in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the Explosives and Dangerous Goods Act 1961 Evidence CR	Construction	DEP	18/3/04 Monitored by other agency {DoIR} - Audit Branch
645:P18.1 Hydrocarbon and hazardous Materials Handling Plan	Action Prepare an Operational Hydrocarbon and Hazardous Materials Handling Plan: «If*** The text replacing this argument is too long ***<>""» How Address: Tracking of the volume of hydrocarbon and hazardous waste materials produced; Identification of disposal options. Appropriate transport, storage and handling procedures; Appropriate clean-up and emergency procedures for spillages; Monitoring requirements; Contingency and Response Measures; Reporting requirements. Objective Operate in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the Explosives and Dangerous Goods Act 1961. Evidence CR	Construction Prior to commissioning	DEP **DoIR**	18/3/04 Monitored by other agency {DoIR} - Audit Branch
645:P18.2 Hydrocarbon and Hazardous Materials Handling Plan	Action Implement the Operational Hydrocarbon and Hazardous Materials Handling Plan. Objective Operate in accordance with Australian Standards AS 1940 (Standards Australia 1993) and requirements of the DoIR and the Explosives and Dangerous Goods Act 1961. Evidence CR	Operation	DEP	18/3/04 Monitored by other agency {DoIR} - Audit Branch
645:P19.1 Heritage	Action Prepare a Construction Aboriginal Heritage Management Plan«If*** The text replacing this argument is too long ***<>""» How Address: Procedures to ensure compliance with the Aboriginal Heritage Act 1972; Consideration of recommendations of the Archaeological and Ethnographic Site Identification Survey Report (AIC, 2003) and adopt appropriate measures to address these recommendations where practicable. Procedures for protection of a site of significance uncovered during construction; and Procedure for continued liaison with relevant parties during construction Objective To protect any sites of significance uncovered during the construction phase of the project. Evidence Construction Aboriginal Heritage Management Plan	Design Prior to construction	DEP **DIA**	9/7/04 Cleared {Received DIA approval of management plan on 8 July 2004.} - Audit Branch
645:P19.2 Heritage	Action Implement the Construction Aboriginal Heritage Management Plan Objective To protect any sites of significance uncovered during the construction phase of the project. Evidence CR	Construction	DEP	18/3/04 Monitored by other agency {DIA} - Audit Branch

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645:P20.1 Social and Economic Issues	Action Prepare a Construction Community Consultation Plan «If*** The text replacing this argument is too long ***<>""» How Address: General community consultation associated with the environmental approval process; Targeted consultation with nearby landowners and communities. Consultation with the Shires of Harvey, (and/or Dardanup and City of Bunbury) and Kemerton Community Committee; Local waterbody users' representative groups; Opportunities to engage local workforces Objective Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised Evidence Construction Community Consultation Plan	Design	DEP **Kemerton Community Committee**	9/7/04 Cleared {Received KIPCC approval of management plan.} - Audit Branch
645:P20.2 Social and Economic Issues	Action Implement the Construction Community Consultation Plan Objective Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised Evidence CR	Construction	DEP	
645:P21.1 Social and Economic Issues	Action Prepare a Operational Community Consultation Plan «If*** The text replacing this argument is too long ***<>""» How Address: General community consultation associated with the environmental approval process; Targeted consultation with nearby landowners and communities; Consultation with the Shires of Harvey,(and/or Dardanup and City of Bunbury) and Kemerton Community Committee; Local waterbody users' representative groups; Opportunities to engage local workforces Objective Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised Evidence Operational Community Consultation Plan	Construction Prior to commissioning	DEP **Kemerton Community Committee**	
645:P21.2 Social and Economic Issues	Action Implement the Operational Community Consultation Plan Objective Ensure that any potential impacts from the development on the nearby community are minimised. Ensure that recreational use of the areas surrounding the Kemerton Industrial Park is not compromised Evidence CR	Operation	DEP	
645:P22.1 Groundwater	Action Prepare a Construction Dewatering Management Plan How Address: Definition of the commencement date, duration, anticipated quantity and frequency of discharge; Monitoring requirements; and Reporting requirements Objective To ensure the discharge water from de-watering activities during the construction phase will have no adverse impacts on the groundwater table, and /or the water quality or flow regime of surface water bodies (including wetlands) Evidence Construction Dewatering Management Plan	Design Prior to construction	DEP **WRC**	9/7/04 Satisfactory to date {Refer M5.1. Further report on Acid Sulphate Soils investigations required prior to Dewatering activities can commence in October 2004. } - Audit Branch
645:P22.2 Groundwater	Action Implement the Construction Dewatering Management Plan Objective To ensure the discharge water from de-watering activities during the construction phase will have no adverse impacts on the groundwater table, and /or the water quality or flow regime of surface water bodies (including wetlands) Evidence CR	Construction	DEP	

APPENDIX 4

ENVIRONMENTAL PROTECTION LICENCE NO. 8026/2

Department of Environment

Your ref:

Our ref:
L5/04 SWB2675-02

Enquiries:
Belinda Walker

Direct tel:
9726 4128

COPY

The Manager
Transfield Services Kemerton Pty Limited
Level 12, 201 Kent Street
Sydney NSW 2000

Dear Sir/Madam

ENVIRONMENTAL PROTECTION ACT 1986 - LICENCE
Kemerton Power Station, Lot 505
Kemerton WA 6230

You are advised that your application for a licence to operate the works prescribed under the *Environmental Protection Act 1986* at the above-mentioned location has been approved subject to the attached conditions. Enclosed is your licence together with receipt number, 00870 for the prescribed fee.

If any aspect of the conditions of licence aggrieves you, you may lodge an appeal, accompanied by the $50.00 fee, with the Minister for the Environment; Science within 21 days from the date on which this licence is received. Members of the public may also appeal conditions. Please contact the Appeals Registrar at the Appeal Convenor's Office on 9221 8711 after the closing date of appeals to check whether any appeals were received.

Under Section 58 of the *Environmental Protection Act 1986*, it is an offence to contravene a licence condition. This offence carries a penalty of up to $125,000, with a daily penalty of up to $25,000. The Department considers that a breach of this section, or any other section, of the *Environmental Protection Act 1986* to be extremely serious.

If you have any questions relating to the licence or licence conditions, please do not hesitate to contact Belinda Walker of the South West Region on 9726 4111.

Yours faithfully

Wayne Tingey
REGIONAL MANAGER, SOUTH WEST
REGIONAL OPERATIONS DIVISION

Tuesday, 25 October 2005

Encls

copy to: Local Government Authority: Harvey Shire

South West Region
35-39 Ardcombe Road
Bunbury Western Australia 6230
PO Box 261 Bunbury Western Australia 6231
Telephone (08) 9726 4111 Facsimile (08) 9726 4100
www.environment.wa.gov.au

WESTERN AUSTRALIA

DEPARTMENT OF ENVIRONMENT

Environmental Protection Act 1986

LICENCE

LICENCE NUMBER: 8026/2 **FILE NUMBER: L5/04**

NAME OF OCCUPIER:

Transfield Services Kemerton Pty Limited

ADDRESS OF OCCUPIER:

Level 12, 201 Kent Street
Sydney NSW 2000

NAME AND LOCATION OF PREMISES:

Kemerton Power Station
Lot 505
Kemerton WA 6230

Environmental Protection Regulations 1987
CLASSIFICATION(S) OF PREMISES:

Category 52 - Electric power generation

COMMENCEMENT DATE OF LICENCE: Tuesday, 1 November 2005

EXPIRY DATE OF LICENCE: Tuesday, 31 October 2006

CONDITIONS OF LICENCE:
As described and attached:

DEFINITIONS
GENERAL CONDITION(S) (2)
AIR POLLUTION CONTROL CONDITION(S) (5)
WATER POLLUTION CONTROL CONDITION(S) (3)
ATTACHMENTS (4)

.....
Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Tuesday, 25 October 2005

WESTERN AUSTRALIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Environmental Protection Act 1986

LICENCE NUMBER: 8026/2 **FILE NUMBER: L5/04**

PREAMBLE

The following statements in this Preamble either reflect important sections of the Environmental Protection Act 1986 or provide relevant background information for the licensee. They should not be regarded as conditions of licence.

Applicability

This licence is issued to Transfield Services Kemerton Pty Ltd for a gas fired power station to be located on part Lot 505 on Plan 39528, Wellesley, in the north eastern section of the Kemerton Industrial Park, approximately 17 kilometres north east of Bunbury, which is the prescribed premises within Schedule 1 of the *Environmental Protection Regulations 1997.*

Table 1:Categories under which the premises are prescribed.

Category number	Category name	Description
84	Electric power generation	Premises (other than premises within category 53 or an emergency or stand-by power generating plant) on which electrical power is commercially generated using natural gas as a fuel.

These licence conditions relate to, but are not necessarily limited to, the following:

- Two Siemens V94.2 gas turbine generators (260.9 MW capacity), fitted with low NO_x burners operating in simple cycle mode, that can operate on either natural gas or ultra low sulphur diesel;
- Two 35 metre high stacks from the gas turbine generators;
- 2 megalitre Ultra Low Sulphur Diesel (ULSD) storage tank and associated unloading and transfer infrastructure;
- Other infrastructure such as hardstand, office, workshop, stormwater runoff collection and treatment and fencing.

The power station will be a peaking plant expected to operated for approximately 1 000 hours per year. There is an expectation that the plant will be run using both fuels in each year.

The power plant and associated infrastructure will have a footprint of two hectares.

The site's environmental values were assessed as part of the Kemerton Power Station Section 38 Referral Documentation, refer to Environmental Protection Authority, Bulletin 1121, issued 8 December 2003. The Shire of Harvey have been advised of the project.

Under the operation phase, the site will be managed under the Operation Environmental Management Plan required by the Ministerial conditions.

MINISTERIAL CONDITIONS

This premises is also subject to conditions set by the Minister for the Environment under Part IV of the *Environmental Protection Act 1986.* The licensee is required to comply with the requirements of the Minister's Statements (Statement 654) as well as those in this licence.

CONDITIONS OF LICENCE

DEFINITIONS

In these conditions of licence, unless inconsistent with the text or subject matter:
"APHA-AWWA-WEF" means American Public Health Association - American Water Works Association - Water Environment Federation;

"AS1940-1993" means Australian Standard 1940-1993: The storage and handling of flammable and combustible liquids;

"AS4323.1-1995" means Australian Standard 4323.1-1995: Stationary source emissions - Selection of Sample Positions;

"BTEX" means Benzene, Toluene, Ethylbezene, and Xylene;

"Director" means Director, Environmental Management Division of the Department of Environment for and on behalf of the Chief Executive Officer as delegated under Section 20 of the *Environmental Protection Act 1986*;

"Director" and "Department of Environment" for the purpose of correspondence means:

South West Regional Office
Department of Environment
PO Box 261
BUNBURY WA 6231

Telephone: 9726 4111
Facsimile: 9726 4100

"inspector" means a person appointed as an Inspector under Section 88 of the *Environmental Protection Act 1986*;

"NATA" means National Association of Testing Authorities, Australia; and

"premises" means Lot 505 on Plan 39528, Treasure Road, Wellesley, Shire of Harvey approximately 17 kilometres north east of Bunbury, as outlined in **Attachment 1**;

"Reporting year" means 1 November to 31 October

"US EPA" means the United States Environmental Protection Agency;

"US EPA Method 10" means the promulgated Test Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources;

"US EPA Method 20" means the promulgated Test Method 20 - Determination of Nitrogen Oxides, Sulfur Dioxide, and Oxygen Emissions from Stationary Gas Turbines;

GENERAL CONDITIONS

REPORTING OF INCIDENTS

G1(a) The licensee shall maintain a permanent record of any incident or activity on the premises which has, or may have caused pollution or environmental harm.

G1(b) The information required by condition G1(a) shall include:

(i) the date, time and probable reason for the incident;

(ii) an estimate of the period over which the incident was or is likely to be in effect;

(iii) the potential or known environmental consequences of the incident and the extent of these;

(iv) corrective action taken or planned to mitigate any adverse environmental consequences, and;

(v) corrective action taken or planned to prevent reoccurrence of the incident.

G1(c) The record required by condition G1(a) shall be retained on site and made available to an Inspector upon request.

ANNUAL REPORT

G2 The licensee shall provide to the Director a copy of the annual monitoring report. This report shall contain data collected from reporting year and shall be provided prior to 1 **February the following year**. Two copies of the report (one electronic) shall be forwarded to the Department of Environment and shall contain:

(i) a brief background on the approval of the project and an overview of the project and its processes, a current plan of the premises and a table showing quantities of raw materials used and the quality and quantity of wastes produced;

(ii) the monitoring data and other collected data required by any condition of this licence for the described period;

(iii) a discussion of the results of any monitoring programs against background data, guidelines and/or limits set in the licence (data should be provided in tables and significant results should be presented in a graphical format);

(iv) a summary of incident and exceedance reports and discussion of any significant responses taken to minimise the likelihood of reoccurrence;

(v) a discussion of the operation of the project, compliance with conditions and its environmental performance to date;

AIR POLLUTION CONTROL CONDITIONS

DUST - GENERAL REQUIREMENT

A1 The licensee shall prevent visible dust from crossing the boundary of the premises.

STACK MONITORING PORTS

A2 The licensee shall maintain emission sampling and monitoring ports in accordance with AS4323.1-1995.

STACK MONITORING

A3 The licensee shall, take and have analysed, for the following analytes outlined in column 1 of Table 2, using methods outlined in column 3 of Table 2, air emissions from Stack 11 and 12 UHN (See **Attachment 2**) annually when using natural gas:

Table 2: Stack air emission monitoring programme

Parameter (mass emission and concentration	**Unit**	**Method**
Oxides of nitrogen	mgm^{-3}	US EPA Method 20
Oxides of sulphur	mgm^{-3}	Calculated
Carbon monoxide	mgm^{-3}	US EPA Method 10

A4 The licensee shall, take and have analysed, for the following analytes outlined in column 1 of Table 3, using methods outlined in column 3 of Table 3, air emissions from Stack 11 and 12 UHN (See **Attachment 2**) annually when ultra low sulphur diesel was used as a fuel source in the reporting year:

Table 3: Stack air emission monitoring programme

Parameter (mass emission and concentration	**Unit**	**Method**
Oxides of nitrogen	mgm^{-3}	US EPA Method 20
Oxides of sulphur	mgm^{-3}	Calculated
Carbon monoxide	mgm^{-3}	US EPA Method 10

A5 The licensee shall provide the following information together with the results of each set of source tests required by condition A3 and A4:

(i) plant production feedrate relevant to the emissions at the time of the test;
(ii) in stack moisture content;
(iii) in stack volume flow rate;
(iv) in stack temperature;
(v) a statement of compliance with the test method; and
(vi) any other information relevant to the test results.

WATER POLLUTION CONTROL CONDITIONS

MANAGEMENT OF WATER

W1 The licensee shall manage process water and potentially contaminated stormwater on the premises by:

(i) directing potentially contaminated water from plant washdown to a collection basin that includes an oily water separator;

(ii) allowing the removal of the remaining effluent in part (i) above by an approved controlled waste contractor;

GROUNDWATER AND SURFACE WATER MONITORING SITES

W2 The licensee shall maintain groundwater and surface water monitoring sites, at the locations depicted in **Attachments 3 and 4** to allow representative water samples to be collected.

GROUNDWATER AND SURFACE WATER MONITORING

W3 (a) The licensee shall, at the frequencies stated in column 2 of Table 3, take and have analysed, for the parameters outlined in column 3 of Table 3, representative water samples from the monitoring sites outlined in column 1 of Table 3 in accordance with conditions W3 (b) and W3 (c):

Table 3: Water Monitoring Sites for the Kemerton Power Station

Monitoring site	Frequency	Parameters to be measured
Monitoring bores GW1S and GW2S (see **Attachment 3**)	**6 monthly** (nominally March and September)	pH, total dissolved solids or electrical conductivity, BTEX and total petroleum hydrocarbons.
Surface Water Sites SW1, SW2, (see **Attachment 3 and 4**)	**Twice per year** when flowing (nominally separated by 4 weeks)	pH, total dissolved solids, total suspended solids, electrical conductivity, BTEX and total petroleum hydrocarbons.

With the exception of pH and conductivity, all measurements are to be reported in milligrams or micrograms per litre.

W3(b) The licensee shall collect all water samples in accordance with Australian Standard 5667.1,1998.

W3(c) The licensee shall submit all water samples to a laboratory with current NATA accreditation for the analyses specified, and analysed in accordance with the current "Standard Methods for Examination of Water and Wastewater-APHA-AWWA-WEF".

W3(d) The licensee shall measure and record the results of the Standing Water Level (in metres Australian Height Datum), prior to sampling each groundwater monitoring bore outlined in column 1 of Table 3.

SEVERANCE

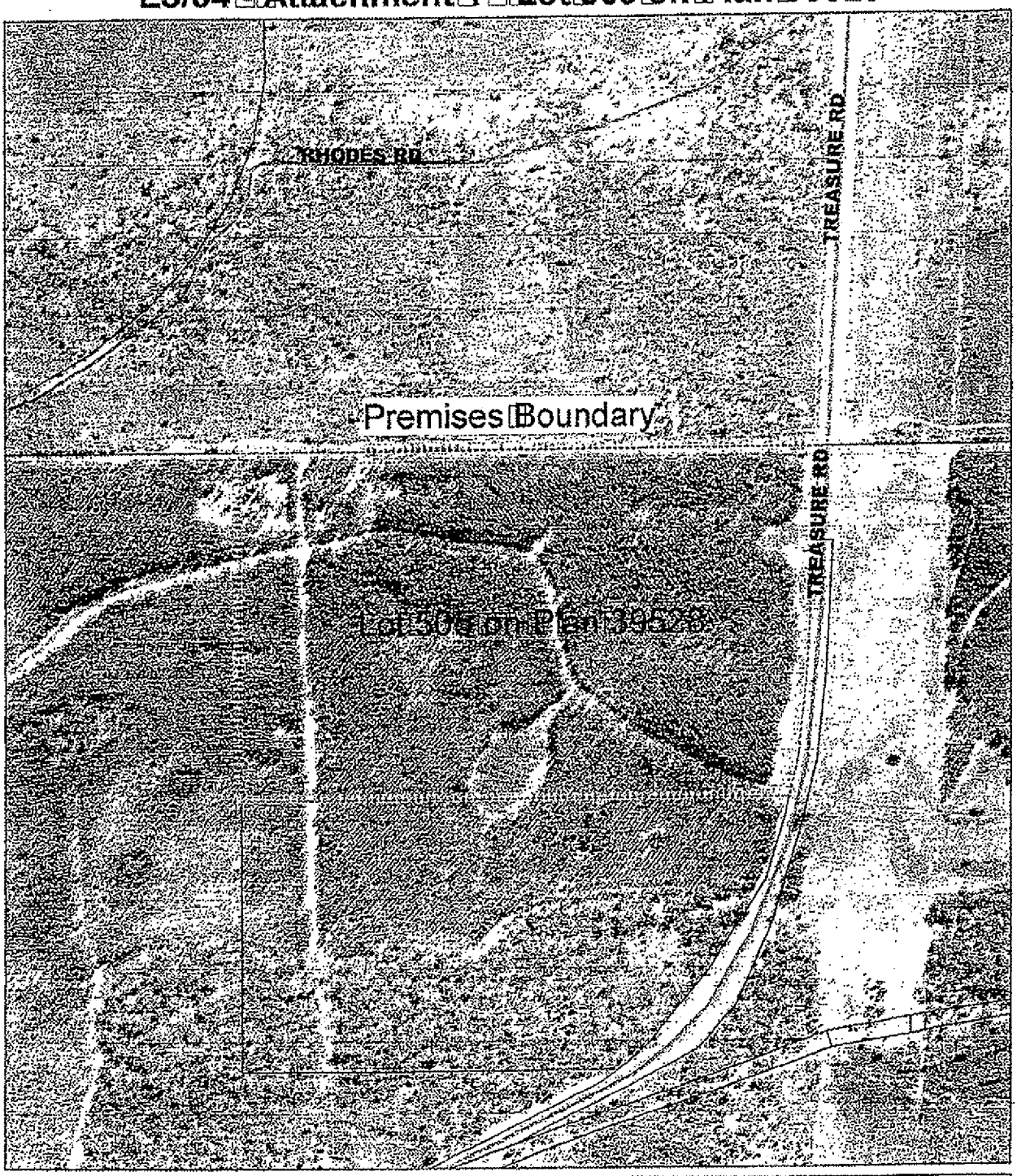
It is the intent of these works approval conditions that they shall operate so that, if a condition or a part of a condition is beyond my power to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within my power to impose and are not otherwise *ultra vires* or invalid.

.....

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

Date of Issue: Tuesday, 25 October 2005

L5/04 - Attachment 1 - Lot 505 on Plan 39528



LEGEND

- Road Centrelines - DLI 1/5/04
- Cadastre - DLI 1/05/05
- Bunbury 1m Orthomosaic - DLI 03

N

0 200m

Scale: 1:6719

(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: The data in this map have been projected. This may result in geometric distortion in measurement accuracies.

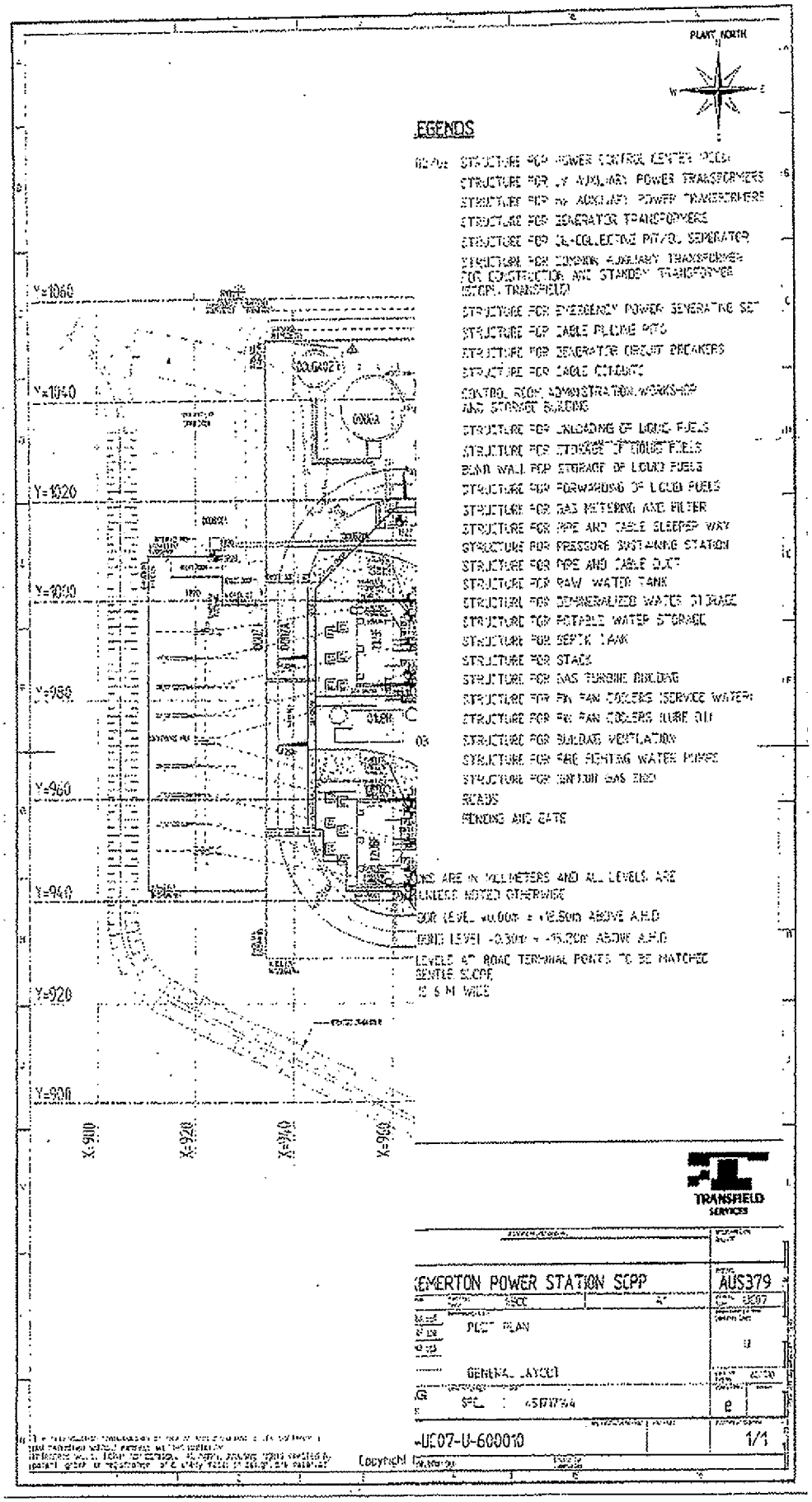
Prepared by: JWalker
Prepared on: 0
Date: 07/07/05 1:17:35

Information derived from this map should be confirmed with the data custodian (acknowledged by the agency acronym in the legend).

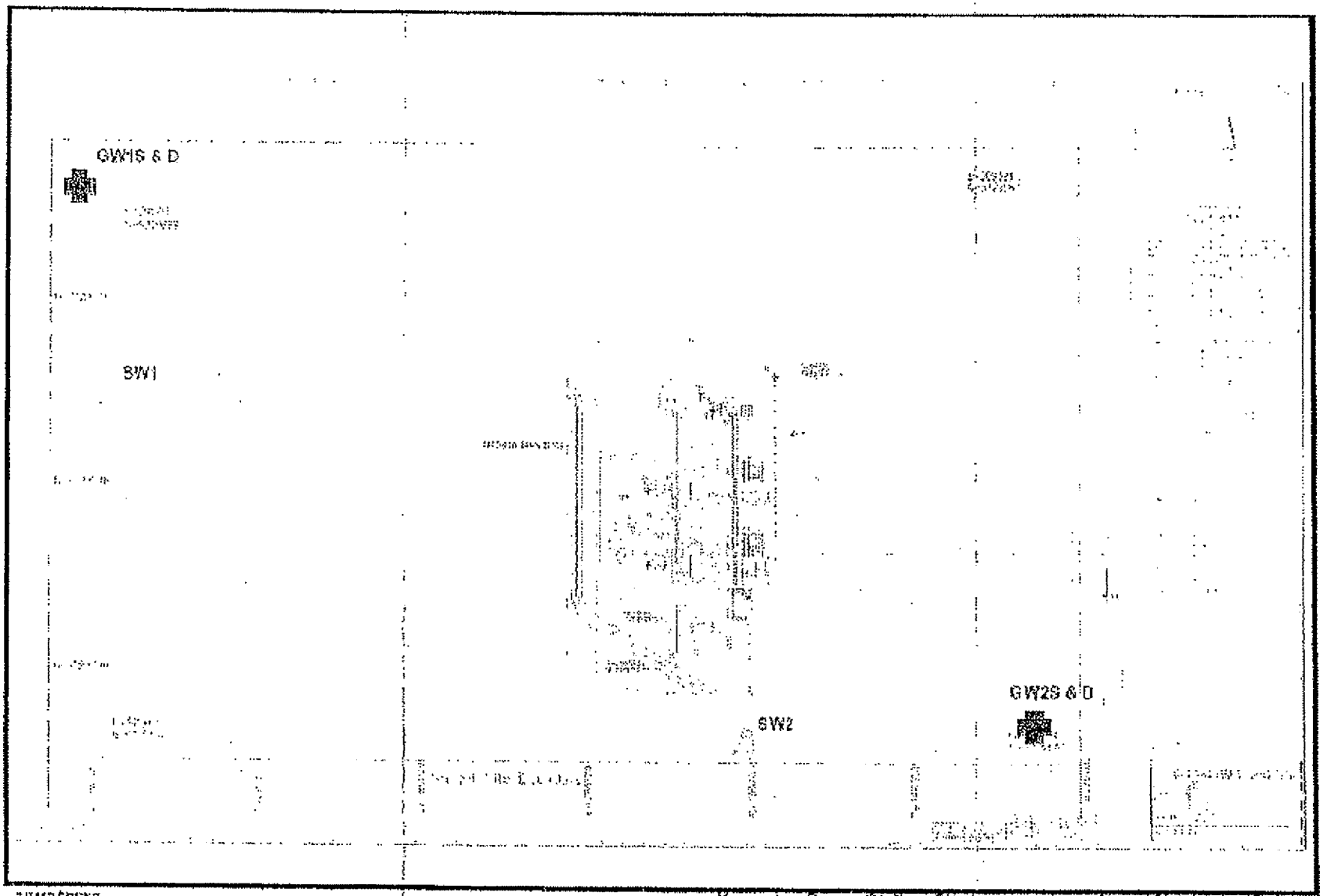
Department of Environment

Western Australia

L5/04 – Attachment 2 – Air E



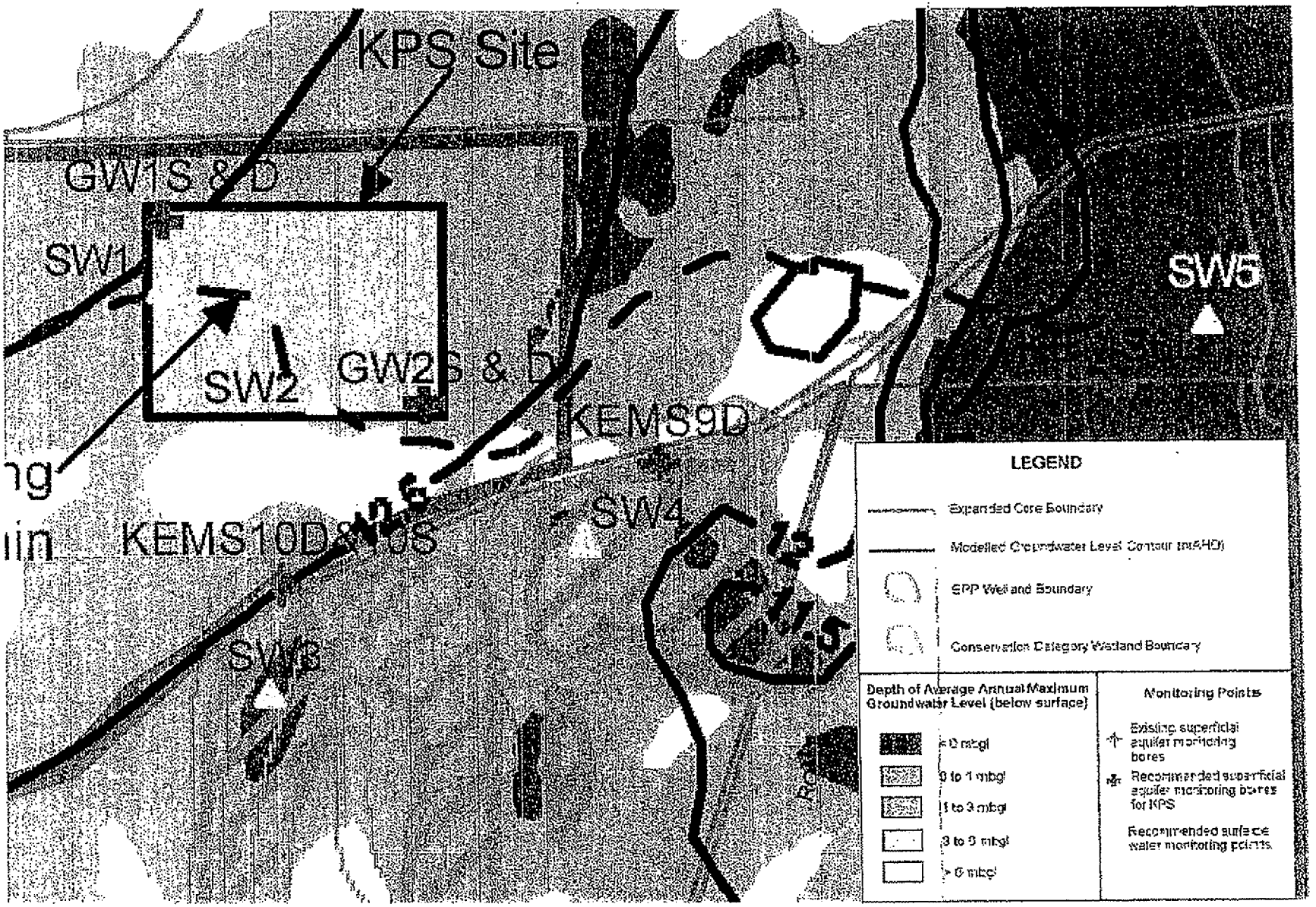
L5/04 – Attachment 3 – Onsite Water Monitoring Sites



aquaterra

Kemerton Power Station Site Layout – Location of Monitoring Points

L5/04 – Attachment 4 – Water Monitoring Sites



APPENDIX 5

TRANSFIELD SERVICES LIMITED

SPILL RESPONSE PLAN

SPILL CLEANUP PROCEDURE

DOCUMENT No. TMP-6023-EV-0010

1.0 PURPOSE

The purpose of this procedure is to ensure the containment of all spills on the Kemerton Power Station site, to prevent the entry of spilled materials/debris into stormwater systems and public waterways and reducing the risk of environmental pollution and exposure to breaches and penalties under environmental pollution legislation.

2.0 SCOPE

This procedure applies to a spill of any material at any location outside of bunded areas on the Kemerton Power Station site.

3.0 DEFINITIONS

Minor Spill A minor spill is one that can be contained quickly and efficiently using the provisions of the Spill Kits located at various points around the site.

Minor spills can result from the following sources:

- *Drum / Container Rupture;*
- *Drum / Container Overflow*
- *Leaks from Plant and Equipment;*
- *Overfilling of a fuel tank on mobile equipment.*

Major Spill A major spill has the potential to leave the site and is characterised by the spillage of a quantity greater than 205 L (44 gal).

4.0 PROCEDURE

4.1 Minor Spill

Minor Spill Response Procedure - A General Spill Response process is to be followed.

1. On discovering a minor spill the person shall identify the source of the spill and **isolate the source** where practicable, assistance may be required from Operations personnel in determining and effecting the isolations required.

2. On discovering a minor spill and isolating the source the person is to immediately **contain the spill** and prevent the spillage from entering any surface drains, open channels, watercourses, trenches, etc.

3. Spill kits are identified as bright yellow wheelie bins and are located at various locations around the facility.

4. Enretec Premium Floor sweep, or similar approved product, contained in the Spill Kits is to be used for Oil, Diesel, Petrol and other such Hydrocarbon based liquids spills on hard surfaces.

5. Enretec 1, or similar approved, is to be used for Oil, Diesel, Petrol and other such Hydrocarbon based liquids spills on Land surfaces, and is located in the Mechanical Workshop Store.

If assistance is required, the person is to contact or report to the Control Room explaining the location, size and identity of the spilt substance, Control Room personnel will organise assistance.

4.2 Major Spill

Major spills can result from the following sources if not contained within bunded areas:

- *Tanker Delivery breaching bunded area;*
- *Tank Overflow or Rupture;*
- *Fuel Oil and Lubricating Oil Line Failures.*

- *Multiple Drum / Container Spill >200L.*
- *Leakage from Equipment*

4.2.1 Major Spill Response

1. On discovering a Major Spill the person is to immediately **Contact or report to the Control Room** explaining the location, size and identity of the spilt substance, Control Room personnel will organise assistance.
2. Emergency Procedures are to be implemented with Emergency Services being contacted dependent on the nature and size of the spill.
3. The person/s shall identify the source of the spill and **isolate the source** where practicable; assistance may be required from Operations personnel in determining and effecting the isolations required.
4. On discovering a Major Spill and isolating the source the person/s is to immediately **contain the spill** and prevent the spillage from entering any surface drains, open channels, watercourses, trenches, etc.
5. The Plant Manager, Health Safety and Environmental Co-ordinator and the are to be notified of the spill as soon as practicable
6. Once the spill has been contained it is the responsibility of the Plant Manager to oversee the clean up of the spill, ensure that the incident report and investigation are completed.

4.3. Spill Control Equipment Maintenance

1. If emergency equipment is used or borrowed for any purpose it must be replenished or replaced as soon as practicable. Use of any spill control equipment is to be reported to the Plant Superintendent.
2. Spill kits are to be checked and maintained on a routine monthly basis.

3. Spill Kits are for holding clean absorbent materials for the use in spills. Under no circumstances should they be used for the disposal of general waste.

4.4 Removal / Disposal of Waste

All contaminated waste shall be removed from the site by licensed waste removal companies and be disposed of at the appropriate licensed tip for that waste.

The waste disposal register, TMF-6023-EV-0001, shall be updated accordingly.

4.5 Long Term Decontamination / Remediation

The facility has been designed such that areas of significant storage have bunded containment areas, such that Long Term Decontamination / Remediation should not be an issue at this facility.

This matter will be addressed in more detail in the Facility Operational Environmental Plan

5.0 RESPONSIBILITY

The following personnel are responsible for the actions below:

a. All personnel, including sub-contractors and personnel involved with deliveries to site.

All actions outlined in this procedure in terms of safety, containment and notification to the Control Room.

b. Control Room personnel

Notifying the following personnel if they are contacted regarding a spill:

- WA Health Safety and Environmental Co-ordinator
- Operations Superintendent

c. Operations Superintendent

- Ensure spillage is isolated from entering and or dissipating across environmental ponds, storm water drains, waterways, etc.

- Initiate Emergency Procedure dependent on the nature of the spill
- Report and assist in investigation of incident.
- Provide guidance and assistance where applicable

6.0 REFERENCE DOCUMENTATION

TMF-6023-EV-0001 - Waste Disposal Register

TMI-6023-SA-0001 Chemical Material Handling & Storage

APPENDIX 6

TRANSFIELD SERVICES LIMITED

EMERGENCY RESPONSE PLAN

KEMERTON POWER STATION
WESTERN AUSTRALIA

EMERGENCY RESPONSE PLAN

CONTROLLED COPY NO.: 1

Issue Date:

Issued By:

[Uncontrolled unless numbered and dated (in **red**)]

Approved by:

Name:

Position:

CONTENTS

Controlled Distribution List

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3.0 Definitions
4.0 Procedure
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- 4.3 Specific Response
- 4.4 Emergency Notification
- 4.5 Media Liaison
- 4.6 Training
- 4.7 Post-Emergency Activities
- 4.8 Emergency Equipment Location
- 4.9 Layout Drawings
- 4.10 Emergency Devices & Lights
- 4.11 Emergency Power Supply
- 4.12 Inspection & Maintenance
- 4.13 Review of Emergency Equipment
- 4.14 Emergency Response Plan Review

5.0 Reference Documentation

Controlled Distribution List

Copy No.	Job Title	Name	Location	Date Issued
1	Operations Superintendent	Wayne Roberts	Kemerton	
2	Operations Technician	Chris Summasson	Kemerton	
3	Manager PO&M Group	Ramesh Liyanagedera	Melbourne	
4	WA HSE & R Manager	Amanda McCaughey	Perth	
5	Tech Support (Brisbane)	Miro Tischljar	Brisbane	
6	Tech Support (Collie PS)	Les Brook	Collie PS	
7	Fire Services		Bunbury	
8	Police Services			
9	Ambulance Services			
10	SES			
11				
12				

1.0 PURPOSE

To ensure that a state of readiness is maintained in order to effectively deal with foreseeable emergencies in order to minimise the impact on health, safety or environment.

To ensure all required emergency equipment is properly located, installed, available and consistently maintained in good working order. Also, to ensure people are aware of the location of, and use of emergency equipment, including those trained in the use of specialised emergency equipment.

2.0 SCOPE

This instruction applies to all authorised Transfield Services Personnel, including employees, contractors and visitors, engaged on, or visiting the Kemerton Power Station.

3.0 DEFINITIONS

Emergency

A significant event that threatens life, property or the environment. This includes fire, explosion, spills (to land, water, etc), gas leaks (explosives, flammable, toxic), off-site events (road accidents), civil disturbances (riots or bomb threats), natural disasters (earthquakes, cyclones, bushfires, floods, mud slides, tidal waves, etc.) terrorist attack and chemical, biological and radiological emergencies.

Emergency Equipment

Includes equipment such as eye baths, drench showers, warning lights, alarms, sirens, evacuation lighting and fire fighting equipment.

4.0 PROCEDURE

4.1 General

This Emergency Response Plan identifies all foreseeable emergencies and the specific response to each of these.
Potential emergencies may include:

- Fire (including bush fires)
- Explosion
- Major spills (to land, water, etc)
- Major gas leaks (explosives, flammable, toxic)
- Road accidents (including major spills)
- Civil disturbances (eg. riots)
- Acts of terrorism (eg. bomb threats, and chemical, biological and radiological emergencies)
- Natural disasters (earthquake, cyclones/tornadoes, bush fires, floods, mud slides, etc)

The geographic location of the facility shall also be considered (eg. proximity to other sites where large quantities of hazardous materials are stored)

In addition, potential technological failures and their ability to impact on the process, or on response to emergencies, shall also be considered (eg. Computer system failure, communications failures, power failure, etc)

Potential hazards are identified in the Kemerton Power Station HSE Hazard Register, document number TMD-6023-SA-0001, which details the impacts associated with the identified hazards and the control measures in place to eliminate or reduce their effect.
Insert hyperlink to TMD-6023-SA-0001

4.2 Responsibilities

4.2.1 Operations Superintendent

The Operations Superintendent has overall responsibility for ensuring all levels of management, employees & sub-contractors understand and are trained in this emergency response plan and any other emergency response requirements of Transfield Services.

Specific responsibilities of the Operations Superintendent include but are not limited to:

- Command, control and coordinate in accordance with this Emergency Response Plan until the arrival of responding emergency services (where applicable); Note: The alternate / back up emergency coordinator is the onsite Operations Technician.
- Be contactable at all times;
- Wear the appropriate identifiable helmet (red) during emergency events and exercises;
- Ascertain the nature of the emergency and determine the appropriate action as per the building response plan;
- Order the evacuation of the site if deemed necessary or appropriate
- Ensure the appropriate emergency services are notified;
- Be responsible for officially terminate the site emergency and providing a full debriefing to all staff & contractors on site.

The TS Operations Superintendent shall brief the Commander of the Emergency Services (CES) on his/her arrival at the KPS Facility.

Once fully briefed on the Emergency the CES shall take command of the emergency
Assisted by the OS who is fully familiar with the facility systems & safeguards.

The OS shall provide information on his assessment of Emergency, providing an overview of what has happened?

- Type of emergency
- Source if known
- Extent of damage, escalation / under control
- Facility emergency equipment activated / status

- Hazards
- Personnel evacuated / roll call / all accounted for?

What injuries (if any), how many, severity

Who has been informed? (Other services, authorities, neighbours etc)

Following the end of the emergency the CES will inform the OS that the emergency has been contained/dealt with and provide full briefing/details etc and then hand-back the operation of the facility.
Once the facility has been handed back to the OS, the OS will officially terminate the site emergency by signalling the "All Clear" siren.

The OS will then conduct a full debriefing meeting with all staff and contractors onsite, conveying information received from the CES.

The Operations Superintendent is also responsible for ensuring the following items: -

- Emergency contact numbers (internal and external) are displayed on appropriate noticeboards using TMF-6023-SA-0002 Emergency Contact Number;
- The Evacuation Report checklist, TMF-6023-SA-0005, is completed and sufficient quantities available for each work area.

4.2.2 All employees & sub-contractors

Upon becoming aware of an emergency situation any person may initiate an emergency response by sounding the general evacuation alarm and notifying their relevant line supervisor.

In the event of an emergency all employees are to:

- Obey the directions of the Operations Superintendent;
- Switch off powered equipment and tools;
- Cease your current work activity eg mobile phone use;
- Proceed to assembly area in an orderly manner and await roll call; and
- Remain at assembly area until instructed otherwise by their line supervisor.

No person is to re-enter the site for any reason after evacuation has been completed until the Operations Superintendent gives the **ALL CLEAR**.

Visitors/contractors are to be made aware of emergency procedures by the person organising their visit at the time they first enter the site or at induction.

4.3 Specific Response

4.3.1 Facility Operations Centre

The designated Facility Operations Centre (FOC) for the Kemerton Power Station is the Administration Office situated in the Central Control Room Building (UCA)

This office area shall be utilised by key personnel for the purposes of coordinating the Company's, and that of the Emergency Services if applicable, emergency response activities and operations.

This office shall be equipped with, but not limited to, the following:

- First Aid Kit, Stretcher, portable breathing apparatus, spill kits etc
- Operation & Maintenance Manuals
- Current facility drawings: including P&ID's, electrical safeguarding, shutdown systems & controls, firefighting equipment status, building escape plans, etc
- Dangerous Goods Manifest
- MSD Sheets
- Plant Datasheets

The FOC will contain all communications equipment including:

- Main Emergency Siren Alarm
- WPC "Hot Line" telephone, linked directly to WPC networks
- Computers & Servers with automatic tape back up (fire proof safe provided for storage) & UPS system
- Email, telephones, mobile phones, facsimile etc
- Backup Uninterrupted Power Supply

The Operations Supervisor is responsible for the upkeep of the FOC ensuring currency of all documentation updates & maintenance of equipment.

4.3.2 Emergency Response Flowchart

The Emergency Response Flowchart is detailed in document number TMF-6023-SA-0006 *(insert hyperlink – copy attached for reference)*

4.3.3 Overview of the Fire Detection, Control and Alarm Systems

Purpose of the System
The Fire Detection, Control and Alarm System is provided to detect a fire, to control remote released fire extinguishing systems, and to warn personnel in the case of a fire.

Design of the System
A Main Fire Alarm Panel (MFAP) is provided in the control room building (00UCA).
Fire detection loops, starting and ending at the MFAP and signal lines are provided in various areas of the plant and transmit signals between the MFAP, Local Fire Alarm Panels (LFAP's), fire detection, fire alarm and fire extinguishing systems.

All Operation and Trouble Signals of the connected LFAP, Fire Pump Controllers, and Fire Extinguishing Systems will be transmitted to the MFAP.

The MFAP / LFAP are provided with back-up battery power supply to ensure the operation in the case of a power outage.

Fire Detection
Automatic electrical fire alarm detectors (smoke, heat, flame), mechanical detectors (detection sprinklers), and manual call points (push buttons) are provided for buildings, outdoor facilities and components.

The detection devices transmit fire alarm signals to the MFAP / LFAP.
All fire detection devices installed in loops are addressable. This allows the MFAP / LFAP to display the relevant identification number and the detector location in the case of fire alarm or system trouble.

Fire Alarms
Alarm devices (horns, sirens, strobe lights) are provided inside buildings and at outdoor facilities to warn personnel in case of a fire alarm.

Fire Extinguishing Systems
Systems include:

- Outdoor Ring-main Hydrant System
- Indoor Hydrant Systems
- Spray Deluge Systems
- Foam Fire Fighting Systems
- CO2 Fire Fighting Systems

Operation of the System
The Fire Detection, Control and Alarm Systems work automatically.
All signals will be displayed at the MFAP / LFAP and printed out by a connected event printer.

Fire Alarm Signals must be manually RESET by the Operating Personnel at the MFAP in the Control Room / at the relevant LFAP.

Confirmation & Cancellation of Alarms will be by the Operations Superintendent.

Testing of Alarm System
The alarm siren shall be tested each Wednesday at 10:00am for 5-6 seconds.
All personnel on site are made aware of the test times during Site Induction Training. Any variation to this testing procedure will be communicated via a Site Instruction.

An evacuation is not required during this testing period. Should a "real" emergency occur during this testing time, the siren will sound continuously until the Operations Superintendent ceases the alarm.

In other emergency situations / circumstances, such as spills, road accidents, civil disturbances etc, where alarms may not be raised automatically the observer of the incident shall immediately report to the Operations Superintendent (OS) either by mobile phone or in person in order that the appropriate emergency response sequence can be initiated by the OS

4.3.4 Site Location & Layout

Advise Emergency Services:

Organisation Name: Transfield Services Kemerton Pty Ltd

Exact Site Location: Kemerton Power Station
Lot 505 (Extension to Treasure Road)

Kemerton Industrial Estate
Shire of Harvey
WA 6220

Point of Site Entry: 3 km North of intersection of Treasure Road and Wellesley Road, along Kemerton Silica Sands Private Haul Road

Advice should also include, but not be limited to:

- What has happened
- What injuries (if known)
- Who is involved
- Name of person reporting the incident
- Name and contact details of Facility Emergency Coordinator

Insert Hyperlinks to
TMF-6023-SA-0003 – Regional Location Plan
TMF-6023-SA-0008 – DG Location Plan & Emergency Assembly / Evacuation Points
TMF-6023-SA-0010 – Detailed Road Access to Kemerton Power Station
AUS379-UC07-U-600010 – Plot Plan General Layout
AUS379-UC07-U-600013 – Outdoor Facilities Part 1 General Layout
AUS379-UC07-U-600014 – Outdoor Facilities Part 2 General Layout
AUS379-XH01-UZ-551101 – FF System Hydrant & Ring Main
AUS379-UG00-00UCA-610103 – Escape Route & Fire Protection – Control Room
AUS379-UG00-01UEJ-610123 – Escape Route & Fire Protection – Fuel Oil Tank (Foam)
AUS379-UG00-11UMB-610227 – Escape Route & Fire Protection Gas Turbine Building

Alternate emergency personnel exits from the facility are indicated on TMF-6023-SA-0008

The Outdoor Facilities drawings Part 1 & 2 indicate the location of the fire fighting ring main, site drainage systems and underground services layout

4.3.5 Emergency Contact Numbers (External & Internal)

***Insert Hyperlink to*TMF-6023-SA-0002 - Emergency Contact Numbers**

4.3.6 Hazardous Materials on Site

Insert Hyperlink to
TMF-6023-SA-0009 – Dangerous Goods Manifest
TMP-6023-SA-0002 – MSDS Procedure
TMF-6023-SA-0007 – MSDS Register
TMD-6023-SA-0001 – HSE Hazards Register

c. Raise the alarm;
d. Contact the Emergency Services - Dial 000;
e. Assist any person in immediate danger (if safe to do so);
f. Put the fire out using appropriate fire fighting equipment (if safe to do so);
g. If the threat to life exists, evacuate all occupants to the assembly areas immediately;
h. Check that all areas have been cleared and close all doors while exiting to slow the spread of fire (do not lock the doors);
i. Once the building / facility has been evacuated, remain outside. Do not allow people to go back into a burning building to get valuables;
j. Proceed to the evacuation assembly area;
k. Make sure that all occupants remain at the assembly area and ensure that everybody is accounted for; and
l. Send someone to guide the emergency vehicles and ensure that no unauthorised persons enter the facility (e.g.: the media or general public).

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.3.7.(c) Explosion

In the event of an explosion, personnel should comply with the following:

a. Raise the alarm;
b. If the area can be made, make safe;
c. Contact the Emergency Services - Dial 000;
d. Attend to human life in danger, if safe to do so;
e. Establish a hazard zone that will keep non-emergency response personnel and vehicles well out of danger;
f. Line manager is to be immediately advised;
g. Wait at a safe distance from the area for the arrival of Emergency Services;
h. Await instructions; and
i. Standby for an immediate evacuation

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.3.7.(d) Major Spills (to land, water etc)

a. Raise the alarm;
b. If the area can be made, make safe;
c. Contact the Emergency Services - Dial 000;
d. Establish a hazard zone that will keep non-emergency response personnel and vehicles well out of danger;
e. Line manager is to be immediately advised;

f. Wait at a safe distance from the area for the arrival of Emergency Services;

g. Await instructions; and

h. Standby for an immediate evacuation

i. Inform DEP

Minor Spills
At all sites where the threat of spill exists as a result of stored chemicals / fuels the Operations Superintendent is to ensure that a chemical spill kit is available and employees have received training in the use of the spill kit.

- Chemical Spills –
  - Chemical Material Handling and Storage – TMI-6023-SA-0001
  - Spills Cleanup Procedure – TMP-6023-EV-0010
- Refer to file Dangerous Goods Licence for specific information on chemicals etc.
  - Dangerous Goods Assessment
  - MSDS Register/Index
  - MSDS File

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 Incident Management & Investigation

4.3.7.(e) **Major Gas Leaks**
In the event of a gas leak, personnel should comply with the following:

a. Raise the alarm;

b. Isolate the gas at the gas main if safe to do so;

c. Ensure no-one smokes and remove any obvious source of ignition;

d. Contact the Emergency Services - Dial 000;

e. Notify the relevant Gas Service.

f. Attend to human life in danger, if safe to do so;

g. Establish a hazard zone that will keep non-emergency response personnel and vehicles well out of danger;

h. Keep personnel upwind to avoid coming in contact with vapour;

i. Line manager is to be immediately advised;

j. Wait at a safe distance from the area for the arrival of Emergency Services;

k. Await instructions; and

l. Standby for an immediate evacuation

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.3.7.(f) Road Accidents

In the event of a road accident, personnel should comply with the following:

a. Raise the alarm
b. If the area can be made, make safe;
c. Contact the Emergency Services - Dial 000;
d. Attend to human life in danger, if safe to do so;
e. Line manager is to be immediately advised;
f. Wait at a safe distance from the area for the arrival of Emergency Services;

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.3.7.(g) Civil Disturbances

In the event of a protest, civil disorder, or demonstration occurring inside or in the vicinity of the building, personnel shall do the following:

a. Notify the relevant Emergency Service(s) by dialling "000" and requesting assistance;
b. Do not say or do anything that may encourage irrational behaviour;
c. Alert other members of site personnel – this may be through the use of runners or telephone;
d. Attempt to restrict access to the building or confine the disaffected group to a specific area by locking doors;
e. Notify nominated managers – managers may contribute in a practical way to the satisfactory resolution of these emergencies by ensuring withdrawal of their staff where necessary (to avoid confrontation), supervising the locking up of offices, securing records, files, cash and other valuable property, and promoting an air of confidence and calm;
f. Remain calm and do not antagonise the group;
g. Evacuation should be considered (only if safe to do so); and
h. Have as many people as possible complete the Offender Description Form TMF-6023-SA-0004.
i. All media requests to be referred to Transfield Services Head office – See Section 4.5

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.3.7.(h) Bomb Threats / Acts of Terrorism

A suspect object is any object found on the premises including items of mail and parcels delivered by courier, which could be considered a possible threat due to their physical nature, location and/or circumstances. If a suspected explosive device is discovered the following steps should be taken:

By Phone

The Operations Superintendent is responsible for ensuring a Bomb Threat Checklist is displayed next to each Transfield employee phone/workstation and employees familiarised with its procedures.
Employees are also to be made aware that they are not to hang up the telephone as it may be possible to trace the call even of the caller has hung up. Utilise TMF-6023-SA-0001 Bomb Threat Checklist

If a Bomb Is Found

1. Do not touch it – clear immediate area of personnel;
2. Advise your supervisor and/or line manager immediately;
3. Report the package to the relevant Police Service.
4. Prevent other personnel from entering the area;
5. Ensure no radio transmitters are used;
6. Do not close doors, or open any which are closed.

Await arrival & instructions of the emergency services.

Suspicious Mail Articles

A mail bomb is an item which has come through the postal system eg suspected explosive device, powder, suspicious tampering. Delivery should be refused if the item is suspicious.
If a suspect item is discovered, the Operations Superintendent is to be notified, the immediate area evacuated (the room the item is in and the rooms immediately surrounding) in accordance with the building emergency response plan and are to be contacted immediately and advised of:

- The exact building location building
- A description of the package or device
- Action taken, package isolated in building within mail centre

Under no circumstances attempt to open the item as this may trigger the device.

4.3.7.(i) **Natural Disasters**

In the event of a natural disaster, personnel should comply with the following:

a. If the area can be made, make safe;
b. Contact the Emergency Services - Dial 000;
c. Attend to human life in danger, if safe to do so;
d. Line manager is to be immediately advised;
e. Wait at a safe distance from the area for the arrival of Emergency Services;
f. Await instructions;

Reporting & Investigation is to be in accordance with TMP-0000-SA-0001 - Incident Management & Investigation

4.4 Emergency Notification

The relevant emergency services (fire brigade, police, ambulance, FESA, etc) must be notified immediately in the event of an emergency.

In addition, arrangements shall be in place to immediately notify neighbours and the public in the vicinity in the event of an emergency which may effect them.

Nearest neighbours are Kemerton Silica Sands (KSS) who are located further north along the dead end 'haul road'. Contact person & number is included in the Emergency Contact List.

If it is deemed necessary to have informed KSS, then following the end of the incident the Operations Superintendent shall contact KSS to debrief and give the all clear.

There are no other public transport facilities or infrastructure within a 4 km radius of the power station.

Where there is an incident on the power station site and it is decided that local residents should be contacted; any such contact will be the responsibility of the relevant emergency services authority (Police)

The incident shall be internally reported in accordance with TMP-0000-SA-0001 Incident Reporting & Investigation procedure.

4.5 Media Liaison

The Transfield Services Public Relations department (with assistance from the GM Operational Services) shall deal with any media inquiries and public statements.

4.6 Training

Proper training shall be conducted for personnel who have responsibilities in an emergency situation (eg. Firefighters, evacuation wardens, etc). This training as a minimum will include:

- fire-fighting equipment and use;
- emergency evacuation drills;
- hazardous substance recognition and spills management.

Evacuation drills shall be conducted for all personnel, on a minimum annual basis.

Training exercise – An activity simulating an emergency event through activation of alarms and deployment of personnel in order to review/test the planning process and procedures, identify needs and planning inadequacies, demonstrate capabilities and communication, and foster the need to work together as a team.

The Emergency Alarm will be activated by the Operations Superintendent and all personnel on site at the time will upon hearing the alarm shall immediately walk to their designated Assembly Area. A 'roll call' will then be conducted to ensure all personnel are present.

A debriefing session after each exercise (or actual) evacuation will be conducted to review the effectiveness of the evacuation procedure and to identify any positive or negative facets of the evacuation or procedures.
The debriefing is to be documented and filed appropriately.

A copy of the completed TMF-6023-SA-0005 Evacuation Report is to filed at the service office.

Records of training for Transfield Services Wardens are to be recorded on a Training Broadsheet.

All personnel shall be trained in the location and use of all emergency equipment within their specified working environment.

Emergency Response requirements, including evacuation, location and use of emergency equipment etc shall be included in the induction process.

All personnel entering site whether Transfield Services staff, contractors, subcontractors, service-men, tanker drivers, delivery contactors, visitors or guests shall undergo a basic Site Safety Induction Course, a major component of which shall include the recognition of and action to be taken during any given emergency situation and the location of all fire-fighting equipment and supporting documentation including plans and notices.

Responsibility of review and update of emergency evacuation procedures rests with the TS Operations Superintendent.

4.7 Post-Emergency Activities

Following an emergency, a full investigation shall be carried out. At the completion of the investigation, the site Emergency Response Plan shall be revised, if necessary.

Where required, trauma counselling shall be provided to personnel affected by the emergency TMP-0000-HR-0030 Employee Assistance Program & Critical Incident Response & Trauma Counselling.

4.8 Emergency Equipment Locations

A Hazard Identification process shall be conducted to identify all locations where emergency equipment may be required.

This shall include equipment such as:

- Fire fighting equipment.
- Drench showers and eye-wash stations where workers are at risk of being in contact with harmful substances (particularly corrosive substances such as acids).
- Spill control equipment.
- Transport spill control equipment.

Emergency equipment shall be located in easily accessible locations and within a reasonable distance from the source of hazard.

Such locations shall be sign-posted, including directions from areas where they cannot be seen.

4.9 Layout Drawings

The Plant Manager is responsible for ensuring each building in which Transfield Services personnel are located, has a current Building Evacuation Plan displayed prominently.

The locations of all emergency equipment eg fire equipment, assembly points, exits, hose reels etc shall be clearly marked on layout drawings.

4.10 Emergency Devices and Lights

Warning devices such as lights, sirens, bells, etc shall be installed in all locations where personnel need to be warned of a hazard or an emergency (eg. over pressure, release of toxic gasses, etc). Refer AS 2220.

Emergency evacuation lighting, in accordance AS 2293 and Local Government requirements shall be installed, and regularly inspected and maintained.

4.11 Emergency Power Supply

Emergency power supply (independent of the normal mains supply) shall be provided for all plant and equipment which may present a significant HSE risk in the event of an interruption to their normal power supply.
This shall also apply to equipment required in the event of an emergency (eg. fire, pumps, extraction fans, etc) and to instrumentation and control systems necessary for safe shutdown.
Where required, battery-powered emergency supply shall also be provided (eg. for control systems).
Emergency power supply systems shall be inspected and tested in accordance with a formal schedule.

4.12 Inspection and Maintenance

The Plant Manager shall ensure that all emergency equipment is regularly inspected and maintained by suitably qualified personnel in accordance with AS 1851 to ensure it is in proper working order and a state of readiness.

Full records of inspections and testing of emergency equipment shall be kept.

The following is a TS requirement:
Workplace Inspections - inspections of work areas to check compliance with documented HSE procedures in relation to housekeeping, equipment, work practices, use of personal protective equipment, emergency equipment, environmental controls etc.
Inspections will be conducted in accordance with a controlled scheduled, to ensure each area is inspected at least once a month.

The Operations Superintendent shall in consultation the WA National HSE Coordinator will develop the schedule

The formal workplace inspections will be carried out for all nominated areas using TMF-0000-SA-0008 Workplace Inspection Checklist which will include, for each of the areas to be inspected, at least the following:

- Housekeeping,
- Equipment condition, (including machine guarding and interlocks)
- Work practices and personnel behaviour,
- Levels of competency,
- Availability and use of Personal Protective Equipment,
- Availability and condition of fire and emergency equipment and means of escape,

- Availability and accessibility of procedures and work instructions,
- First-aid equipment,
- Environmental hazards, risks and controls

All actions arising from the inspections will be documented and prioritised by the individual who conducted the inspection or their delegate.
Additionally, those inspecting the plant will generate Corrective & Preventative Actions by issuing work orders in SAP whenever the corrective task warrants a work order.

4.13 Reviews of Emergency Equipment

Reviews shall be conducted at least once a year, to ensure emergency equipment is of sufficient quantities and of the correct type for any foreseeable emergencies.

Fire extinguishers are to be visually checked during every inspection and tested every six months in accordance with AS 1851.

4.14 Emergency Response Plan

This Emergency Response Plan, in accordance with AS 3745, shall be reviewed annually and if required, revised, authorised and re-issued/distributed to all appropriate personnel.

Any Revisions / Amendments to the Emergency Response Plan is the responsibility of the TS Operations Superintendent in consultation with the TS HSE Coordinator.
Approval of changes is the responsibility of the Manager Power Operations and Maintenance Group or his authorised nominee.

The document shall have a Controlled Issue.

Distribution List
The latest 'soft copy' revision of the document will be placed on the Transfield Services "Transnet"and will be available (read only) to relevant TS managers and staff.
Note: Any copies taken from the Transnet are marked "not controlled"

Hard Copies, issued as Controlled Documents, list to be finalised - but should include as a minimum:

- Local Emergency Services
  - Fire
  - Police
  - Ambulance
  - SES
- TS Operations Superintendent(s)
- Manager Power Operations & Maintenance Group
- WA HSE & R Manager
- Technical Support (Brisbane Office)

5.0 Reference Documentation

Australian Standards

AS 3745 – Emergency control organisation and procedures for buildings, structures and workplaces
AS 1851 – Maintenance of fire protection equipment – Portable extinguishers and fire blankets
AS 1678 – Emergency procedure guide – transport
AS 2220 – Emergency warning & intercommunication systems in buildings
AS 2293 – Emergency evacuation lighting for buildings
Building Code of Australia

TMP-0000-SA-0001 Incident Reporting & Investigation
TMP-0000-HR-0030 Employee Assistance Program & Critical Incident Response & Trauma Counselling
TMI-0000-EV-0010 - Dangerous Goods & Hazardous Substances
TMI-6023-SA-0001 – Chemical Material Handling & Storage
TMF-0000-SA-0008 – Workplace Inspection Checklist
TMP-6023-EV-0010 – Spills Cleanup Procedure
TMP-6023-SA-0002 – MSDS Procedure
TMD-6023-SA-0001 – HSE Hazard Register
TMF-6023-SA-0001 – Bomb Threat Checklist
TMF-6023-SA-0002 – Emergency Contact Numbers
TMF-6023-SA-0003 – Regional Location Map
TMF-6023-SA-0004 – Offender Description Form
TMF-6023-SA-0005 – Evacuation Report
TMF-6023-SA-0006 – Emergency Response Flowchart
TMF-6023-SA-0007 – MSDS Register
TMF-6023-SA-0008 – Dangerous Goods Location Plan
TMF-6023-SA-0009 – DG Manifest
TMF-6023-SA-0010 – Detailed Road Access to Kemerton Power Station
TMF-6023-EV-0001 – Waste Disposal Register

APPENDIX 7

TRANSFIELD SERVICES LIMITED

HEALTH, SAFETY AND ENVIRONMENTAL POLICY

HEALTH, SAFETY AND ENVIRONMENT (HSE) POLICY

Transfield Services is committed to protecting the health and safety of all employees and ensuring that our activities are not harmful to the environment and the greater community.

Our Principles

- All accidents can be prevented;
- No task is so important that risk of injury to people or damage to the environment is justified; and
- Effective HSE management is a critical foundation for sustainable management.

Our Objectives

- Zero harm to people and the environment;
- To show leadership in the field of HSE management; and
- To work in a responsible and sustainable manner.

Our Methods

Transfield Services will meet these objectives by:

- Promoting a positive culture based on improving our HSE performance;
- Complying with all legal and regulatory requirements;
- Maintaining externally certified safety and environmental management systems;
- Eliminating hazards, practices and behaviours that could cause accidents, injuries or illness;
- Implementing controls to eliminate pollution and environmental harm;
- Providing training and resources for staff to maintain safe systems of work;
- Integrating HSE management into all aspects of the organisation;
- Employing contractors who aspire to the same HSE standards; and
- Reporting publicly and annually on HSE performance, measured against objectives and targets.

This Policy applies to all sites where Transfield Services is performing work and covers all our activities and services.

This commitment to HSE is our highest priority and will not be compromised.

Peter Watson
Managing Director
Transfield Services (Australia) Pty. Limited

TRANSFIELD SERVICES

APPENDIX 9

KEMERTON POWER STATION
AIR QUALITY IMPACT OF WET COMPRESSION
(AIR ASSESSMENTS, 2006)

Air Assessments

IJH Holdings Pty Ltd ACN 101 552 505
as trustee for NKH Family Trust
ABN 21 796 617 294

Address: 23 Lexington Avenue
Canning Vale WA 6155

Phone/Fax: (08) 9256 3004
Email: opitts@iinet.net.au

To: ATA Environmental	Fax No: E-mail to noel.davies@ataenvironmental.com.au
Attention: Noel Davies	Date: 20 December 2006
From: Owen Pitts	Pages: 5
Subject: Kemerton Power Station – Air Quality Impact of Wet Compression	

Noel

Please find below our assessment of the air quality impact of the Kemerton Power Station with the introduction of wet compression. It is concluded that for NO_2 (the pollutant of most concern), there will be a decrease in ground level concentrations of a little more than 7 to 10% when gas fired and 4.1 to 4.3% when distillate fired. This occurs due to the decrease in mass emission of NO_X with wet compression, and to a lesser extent from the better dispersion due to an increase of between 3.5 to 4% in the buoyancy of the plume.

It is noted that modelling of the existing gas turbines in SKM (2003) indicated maximum NO_2 concentrations from the power station were at most 6.9% of the NEPM standard outside the industrial buffer such that the concentrations were low. As such, the low concentrations at ground level from the gas turbines will be reduced even further.

For other pollutants such as SO_2 and CO, the change in emissions will be zero or negligible. As such, with the slight increase in buoyancy these concentrations should decrease slightly.

Yours sincerely

Owen Pitts

Introduction

Wet compression is a relatively new technology (introduced in the early nineties) and is applied to gas turbines as it results in significant power gains. *"Wet compression is the process in which excessive amount of water in the form of fine droplets is intentionally sprayed into the compressor inlet, which evaporates within the blade path to provide thermodynamic inter-cooling affect. The resulting adiabatic process causes the air temperature to drop. Since it takes less energy to compress relatively cooler air, there is savings in compressor work. Any reduction in compressor work translates to increase in net turbine output because one-half to two-thirds of turbine output is typically used to drive the compressor"* Shepherd and Fraser (2005). Wet compression has the advantage over other inlet cooling technologies as it is not limited by ambient conditions. For example evaporative cooling systems are dependent on the dryness of the air, with less benefit at high humidity's.

The benefits as also summarised by Siemens, (2006a) are the potential:

- Power increase of up to 20% on systems without evaporative cooling and by as much as 12% to 15% with systems with evaporative cooling;
- Improved Gas Turbine Heat Rate by as much as 1.5%;
- Potential NOX Reductions between 30% and 50% (for non-dry low NOX units); and
- Exhaust flow rate is increased between 1% and 1.5% which is of benefit if the exhaust is used for combined cycle steam production.

Previous Assessment of the Air Quality Impact of the Kemerton Power Station

The impact of the Kemerton Power Station (KPS) on air quality was assessed by SKM (2003) with the ground level concentrations predicted to be a relatively low percentage of their respective guidelines and standards.

The pollutant closest to the ambient criteria was NO_2 with predicted maximum 1-hour NO_2 concentrations at most 2.6% and 6.9% of the NEPM standard when operating on gas and distillate respectively. Other pollutants were much lower, with PM_{10} at most 0.6% of the NEPM standard, $PM_{2.5}$ at most 1.2% of the reporting standard with SO_2 at most 0.18% of the NEPM SO_2 standards.

Predicted Changes to the Kemerton Power Station with Wet Compression

Emission characteristics with and without wet compression at ISO conditions (15 deg C, relative humidity of 60% and pressure of 101.3 kPa) and at HWM (41 degrees, relative humidity of 40% and pressure of 101.3 kPa) are listed in **Table 1** and **Table 2**. These are given for typical emissions and are based on the:

- Maximum concentrations measured during the commissioning tests; and

- Expected decrease of 20% in NO_X concentrations (dry at 15% O_2) with the introduction of wet compression (Siemens, 2006b).

Table 1 Emission Characteristics per Unit at ISO Conditions (15 deg C and RH of 60%)

Parameter	Value	Gas Fired		Distillate Fired	
		Standard	Wet Compression	Standard	Wet Compression
Fuel Consumption	(kg/s)	9.5	9.5	-	-
Net Gross Power	(MW)	159	173	146	165
Mass Flow	(kg/s)	531	546	531	546
Exit Volume, wet	(m^3/s), wet, Actual	1229	1278	1181	1228
Exit Temperature	(deg C)	538	538	517	517
Plume Buoyancy	(m^4/s^3)	2471	2571	2347	2435
H_2O mass flow in the flue gas	(g/s)	23800	36800	15600	28400
O_2 mass flow in the flue gas	(g/s)	82500	78600	85200	79200
Moisture Content	(% volume)	7.16	10.65	4.76	8.33
O_2 Content	(% volume, dry)	15.05	14.32	15.35	14.26
NOx Concentration (Typical)	(ppmvd, 15% O_2)	20.1	16.1	62.9	50.3
NOx Emission Rate (Typical)	(g/s)	15.8	14.2	47.3	45.3
CO Concentrations	(ppm)	<25	<10	<25	<10
SO_2 Emission Rate	(g/s)	Negl	Negl	1	1

Notes:

1) Data from Siemens (2006b).

2) NO_X concentrations for normal operation are based on the maximum of the commissioning test results in May 2006. These are below the guaranteed limits, which when gas fired are 25ppmvd (15% O_2). NO_X concentrations (15% O_2 dry) with wet compression are estimated to be 20% lower than for normal operation (Siemens, 2006b).

3) SO_2 emissions from an email from Miro Tischljar, (Transfield, 2006a).

Table 2 Emission Characteristics per Unit at HWM Conditions (41 deg C and RH of 40%)

Parameter	Value	Gas Fired		Distillate Fired	
		Standard	Wet Compression	Standard	Wet Compression
Fuel Consumption	(kg/s)	8.4	8.4	-	-
Net Gross Power	(MW)	131	150	119	136
Mass Flow	(kg/s)	455	472	473	488
Exit Volume, wet	(m^3/s), wet, Actual	1078	1122	1088	1134
Exit Temperature	(deg C)	568	561	537	537
Plume Buoyancy	(m^4/s^3)	2315	2397	2187	2278
H_2O mass flow in the flue gas	(g/s)	30969	42697	19600	31200
O_2 mass flow in the flue gas	(g/s)	68645	65828	75200	70100
Moisture Content	(% volume)	11.02	14.48	6.66	10.17
O_2 Content	(% volume, dry)	15.45	14.68	15.39	14.30
NOx Concentrations	(ppmvd, 15% O_2)	20.1	16.1	62.9	50.3
NOx Emission Rate	(g/s)	11.9	11.0	41.4	39.7
CO Concentrations	(ppm)	<25	<10	<25	<10
SO_2 Emission Rate	(g/s)	Negl	Negl	1	1

Note:

1) Data from Siemens (2006b).

2) NO_X concentrations for normal operation are based on the maximum of the commissioning test results in May 2006. These are below the guaranteed limits, which when gas fired are 25ppmvd (15% O_2). NO_X concentrations (15% O_2 dry) with wet compression are estimated to be 20% lower than for normal operation (Siemens, 2006b).

3) SO_2 emissions from an email from Miro Tischljar, (Transfield, 2006a).

Table 1 and **2** indicate for the two ambient conditions with wet compression the:

- Fuel consumption does not change though there is a corresponding large increase in the power generated. Therefore the turbine is more efficient and will produce significantly less greenhouse gas emissions per MW of power generated;
- Exit volume will increase. This along with the temperatures remaining approximately constant results in the buoyancy of the plumes slightly increasing. An increase in buoyancy of the plume will result in slightly higher plume rise and therefore lower ground level concentrations;
- Emissions of the key pollutant NO_X decrease when operating on gas by 7.5% to 10% over the two conditions and by 4.1% to 4.3% when operating on distillate. Emissions of SO_2 will be constant as this is proportional to the fuel usage; and
- Therefore in terms of ground level concentrations, for the gas fired case it is considered that NO_X concentrations will decrease with wet compression by at least 7.5% to 10%. When operating on distillate the decrease will be less, but will be at least 4.1% to 4.3%. It is noted that above small decrease are in the context that the predicted concentrations with normal operation were low (max 6.9% of the standard outside the buffer). As such, the

resultant low ground level concentrations from the gas turbines will be reduced even further.

References

Shepherd, D.W. and Fraser, D. (2000 Impact of heat rate, emissions and reliability fro the application of wet compression on combustion turbines. P*resented at POWER-GEN International 2005*. Available from www.powergeneration.siemens.com/download/pool/PGI2005_Shepard_Fraser.pdf

Siemens 2006a. Siemens Power Generation. Web page http://www.powergeneration.siemens.com/en/services/lsp/pep/mu/gas/wc/index.cfm

Siemens 2006b. Email of 19 December 2006 from Graeme Pascoe (Siemens) to Miro Tischljar (Transfield) with accompanying documents (20006 12 19 Emission Calculation.doc and 2006 12 19 Recalcualted_KPS_emissions.xls)

Sinclair Knight Merz (SKM) 2003. Kemerton Power Station. Air Quality Assessment. November 2003.

Transfield 2006a . E-mail from Tischljar Miro of Transfield Services Limited, Brisbane on 24 February 2006.

APPENDIX 10

NEWSPAPER ADVERTISEMENT OF KEMERTON POWER STATION ENHANCEMENT PROJECT (DECEMBER 2006)

KEMERTON POWER STATION

Transfield Services Kemerton Pty Limited operates a 260 Megawatt duel fuel peak load power station within the Kemerton Industrial Park approximately 20km north of Bunbury. Transfield Services proposes to enhance the power station in order to increase the plant output during hot summer days, so providing additional capacity during periods of Power System shortages. The Project involves the construction of a 4km water pipeline to deliver water required for the proposed enhancement of the plant.

Construction is proposed to commence in April 2007 with commissioning in November 2007.

The Project is being considered by the WA Environmental Protection Authority and Department of Environment and Conservation. Environmental information on the Project can be obtained from ATA Environmental. Comments or queries on the project are invited.

For more information please contact:
Noel Davies at ATA Environmental on 08-9328 3488 or
Miro Tischljar at Transfield Services on 07-3248 8786
Wayne Roberts at Transfield Services on 08-9729 0821

APPENDIX 11

LAND ACCESS AGREEMENT WITH MR C. GALATI

TRANSFIELD
SERVICES

ABN 69 106 619 112

Transfield Services Kemerton Pty Limited
Level 13
80 Albert Street
Brisbane QLD 4000
Australia
Telephone: 61 7 3248 8700
Facsimile: 61 7 3248 8790
www.transfieldservices.com

Con Galati
Angus
Bernies Road, Benger
WA 6223

To Whom It May Concern:

I have reviewed the attached pipeline route and approve its construction through my land being Lot 503 Benger under the condition that the pipeline route remains to be within the designated road reserve at per the provided drawing and that all care is taken to respect my property and that gates will be positioned in as found condition, namely closed.

Comments:

You have asked for a comment!
I was wondering if you would consider leaving us a water point. It is in your hands.
Thanking you.

CON GALATI

C Galati

APPENDIX 12

PRESENTATION TO KEMERTON INDUSTRIAL PARK COORDINATING COMMITTEE & KEMERTON COMMUNITY COMMITTEE (FEBRUARY 2007)

Kemerton Power Station Enhancement Project

Transfield Services Kemerton Pty Ltd
ATA Environmental

Purpose of Presentation

- Provide background information on Transfield Services Kemerton Pty Ltd ('Transfield) proposal to upgrade the current cooling system to a Wet Compression System.
- The installation of the Wet Compression System will improve the performance of the turbines under hot conditions.
- The plant will therefore require water to be brought on site.

Background – History of Project

- As a result of Western Power Corporations (WPC) power demand forecasts, a need for an additional 220-260 MW of peaking capacity at Hot Weather Maximum conditions (HWM) was identified.

- Transfield Services was selected by WPC as part of the competitive procurement process for peak load generation on the SWIS, to construct and operate the Kemerton Power Station (KPS) to help meet forecasted demand.

Background – History of Project

- KPS is a peaking plant, providing support to the grid during times of excessive load, or when during times of rapid change, such as when other generators fail.
- March 2004 – October 2005 (182 days), the station operated for a total of 125.5hrs over a total of 22 days.
- KPS operates on 2 Siemens Gas Turbines with ISO rating of 155 MW each, however this output reduces with higher ambient temperature so that at HWM conditions, the load is only 130 MW.

Background – Enhancement Project

- KPS operates under a Power Purchase Agreement (PPA) to Verve Energy
- Verve Energy's focus is on obtaining greater value from its generating assets (e.g. KPS)
- Transfield therefore wishes to offer Verve Energy a low cost capacity upgrade at ambient conditions, and reduce the overall heat rate of KPS
- This can be achieved by the installation of a Wet Compression System, which is not limited by ambient conditions as per the current inlet (air) cooled system

Benefits

- Proposed modification allows the provision of additional energy by optimisation of an existing power generation asset designed to industry best practice standards with minimal emissions
- Power increase of up to 9-15% with no increase in fuel consumption
- Increase in greenhouse gas efficiency

Environmental Approvals Process

- Transfield has recently submitted the proposal to both the DEC and EPA for their assessment
- It is possible that the proposal will require formal assessment from the EPA, and Transfield has prepared the documentation to this standard should it be required
- The DEC will reserve its comments on the proposal until a level of assessment has been set by the EPA

Key Additional Infrastructure Req'd

- Establishment of a 4km water pipeline to deliver water to Wet Compression Circuit
- Installation of a Wet Compression Skid and associated infrastructure
- Installation of a demineralised water treatment plant
- Installation of a 1ML demineralised water storage tank
- Construction of a 20ML lined evaporation pond
- Apart from the water pipeline, all other infrastructure will be within the existing footprint

Key Issues

- Water supply
- Surface & groundwater quality/protection
- Gaseous & particulate emissions
- Location of proposed pipeline easement (flora, fauna, wetlands constraints)
- Disposal of reject water generated from Reverse Osmosis Plant

Water Supply

- Water will be sourced under a Water Supply Agreement with Harvey Water, who will be responsible for construction of the pipeline
- Up to 79.2 ML/yr will be sourced from the Stirling Dam which supplies the Harvey Weir
- Harvey Water has a water distribution pipe ~4km from KPS
- Other alternatives have been considered but discounted for various reasons

Surface & groundwater quality/protection

- Surface and groundwater impacts will be managed by maintaining the zero process water discharge philosophy of the project
- Reject water from the wet compression process will be directed to a lined evaporation pond to avoid impacts to groundwater, surrounding wetlands and water courses
- Pipeline alignment carefully selected to avoid wetlands of conservation significance in the region

Gaseous & particulate emissions

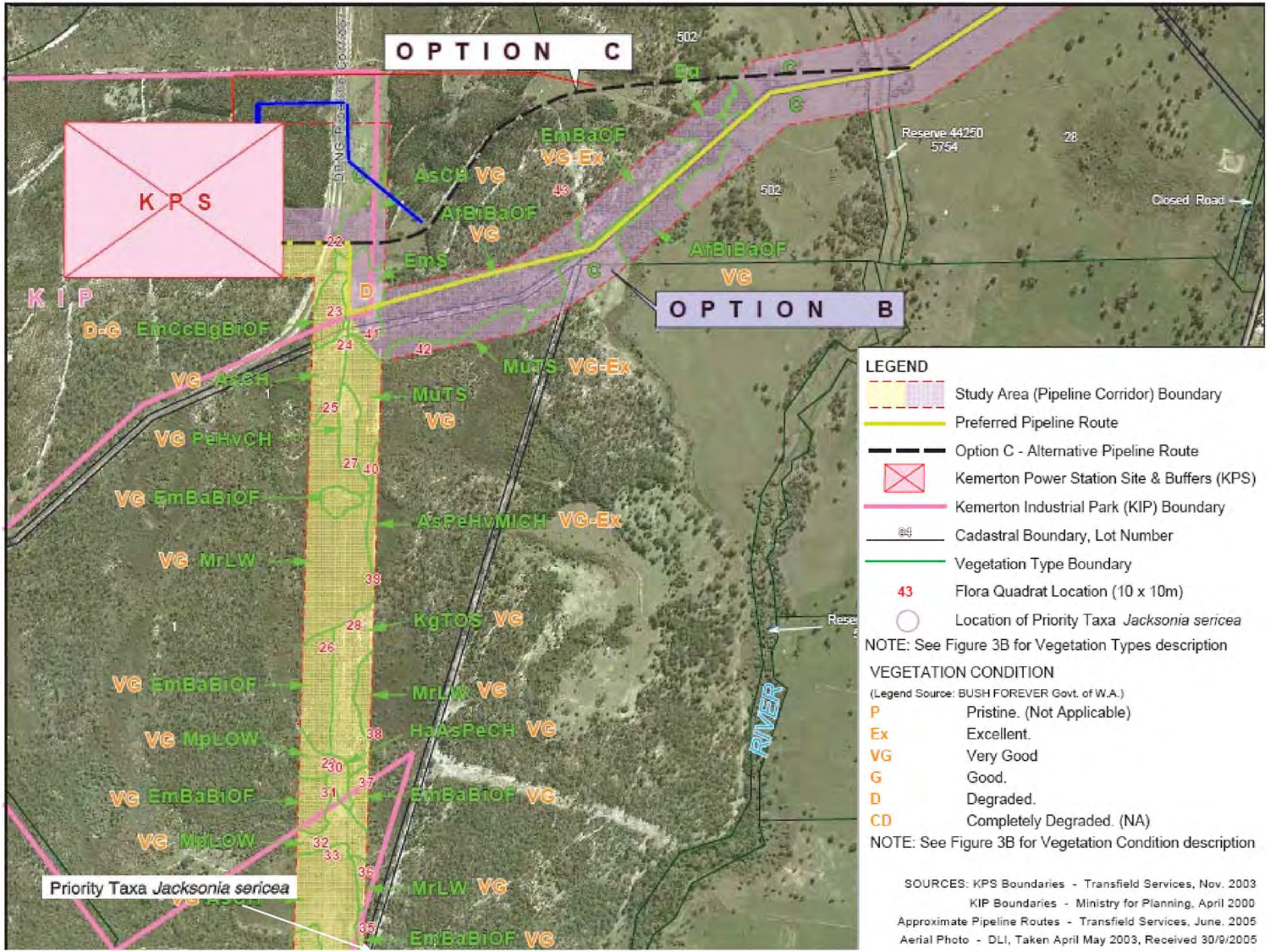
- Predicted changes in air emissions have been reviewed by an air quality consultant, and are predicted to slightly decrease
- Cumulative ground level concentrations of key pollutants will remain a fraction of the applicable ambient air quality criteria (e.g. NOx, SOx)
- The results of this review are reported within the documentation supplied to the DEC and EPA

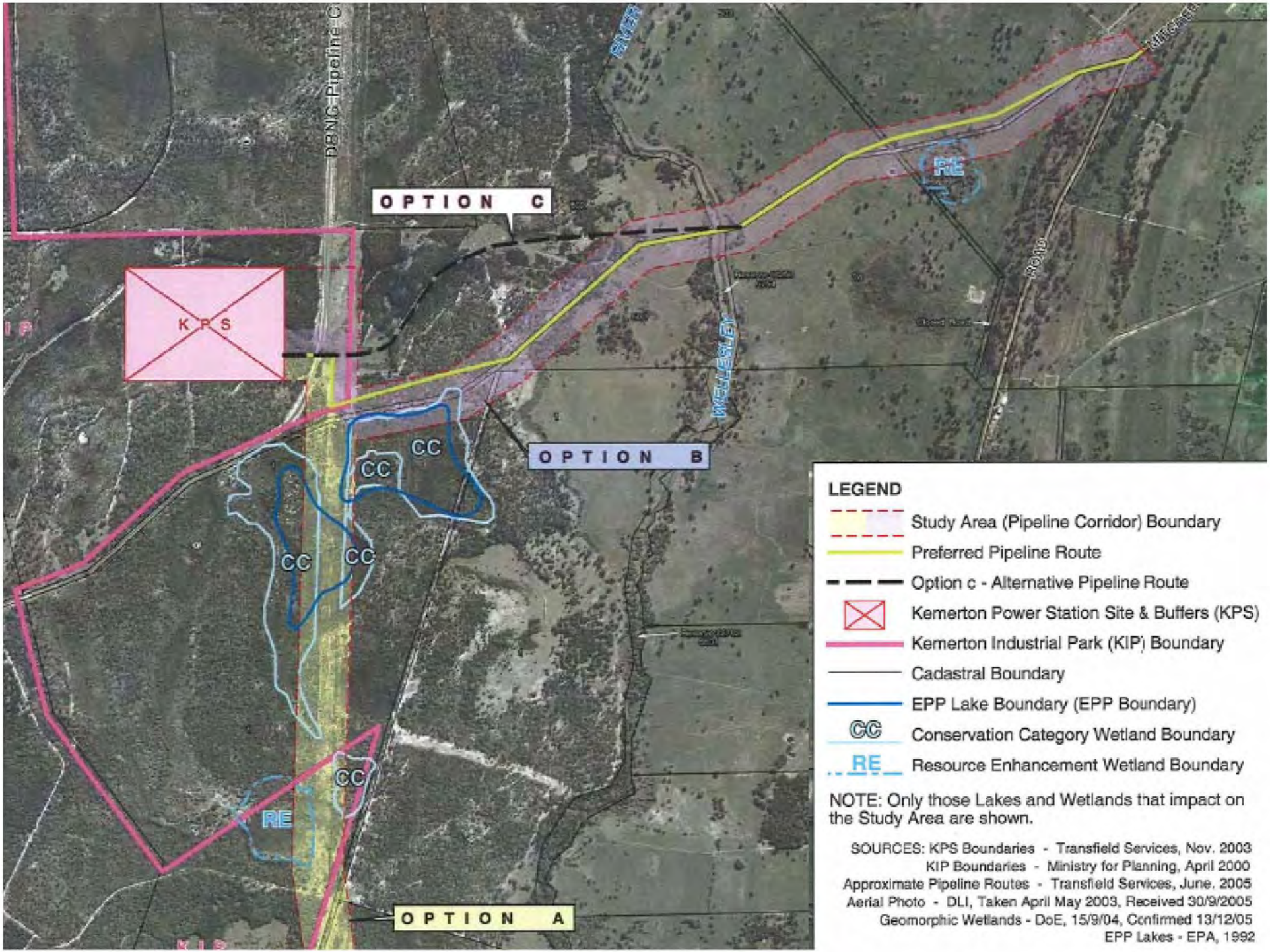
Gaseous & particulate emissions cont.

- There will be no increase in the amount of fuel consumed within the power station compared to the original proposal
- As a result, there will be no net change in greenhouse gas emissions
- However the *greenhouse intensity* of the project will improve by up to 16% given the net increase in energy output

Pipeline Alignment Options

- **Option A:** No significant flora/fauna present, however significant risk to CCW & EPP wetlands
- **Option B:** No significant fauna or vegetation constraints, does not intersect with wetland boundaries, however will potentially impact on habitat of the western ringtail possum (EPBC Act listed)
- **Option C:** Avoids the requirement to clear native vegetation through the utilisation of existing tracks, the proposed alignment passes through previously cleared farm land or bluegum plantations which hold no conservation value


OPTION C
OPTION B
KPS
KIP
Reserve 44250
5754
Closed Road
RIVER
Priority Taxa *Jacksonia sericea*
AsCH VG
EmBaOF VG-Ex
AfBiBaOF VG
EmS
D-G EmCcBgBiOF
MuTS VG-Ex
MuTS VG
VG PeHvCH
VG EmBaBiOF
AsPeHvMlCH VG-Ex
VG MrLW
KgTOS VG
MrLW VG
HaAsPeCH VG
VG MpLOW
EmBaBiOF VG
VG MpLOW
MrLW VG
EmBaBiOF VG
LEGEND
Study Area (Pipeline Corridor) Boundary
Preferred Pipeline Route
Option C - Alternative Pipeline Route
Kemerton Power Station Site & Buffers (KPS)
Kemerton Industrial Park (KIP) Boundary
Cadastral Boundary, Lot Number
Vegetation Type Boundary
43 Flora Quadrat Location (10 x 10m)
Location of Priority Taxa *Jacksonia sericea*
NOTE: See Figure 3B for Vegetation Types description
VEGETATION CONDITION
(Legend Source: BUSH FOREVER Govt. of W.A.)
P Pristine. (Not Applicable)
Ex Excellent.
VG Very Good
G Good.
D Degraded.
CD Completely Degraded. (NA)
NOTE: See Figure 3B for Vegetation Condition description
SOURCES: KPS Boundaries - Transfield Services, Nov. 2003
KIP Boundaries - Ministry for Planning, April 2000
Approximate Pipeline Routes - Transfield Services, June. 2005
Aerial Photo - DLI, Taken April May 2003, Received 30/9/2005


OPTION C
OPTION B
OPTION A
KPS
RE
CC
CC
CC
CC
CC
RE
DBNG Pipeline
WESTERN
LEGEND
Study Area (Pipeline Corridor) Boundary
Preferred Pipeline Route
Option c - Alternative Pipeline Route
Kemerton Power Station Site & Buffers (KPS)
Kemerton Industrial Park (KIP) Boundary
Cadastral Boundary
EPP Lake Boundary (EPP Boundary)
CC Conservation Category Wetland Boundary
RE Resource Enhancement Wetland Boundary
NOTE: Only those Lakes and Wetlands that impact on the Study Area are shown.
SOURCES: KPS Boundaries - Transfield Services, Nov. 2003
KIP Boundaries - Ministry for Planning, April 2000
Approximate Pipeline Routes - Transfield Services, June. 2005
Aerial Photo - DLI, Taken April May 2003, Received 30/9/2005
Geomorphic Wetlands - DoE, 15/9/04, Confirmed 13/12/05
EPP Lakes - EPA, 1992

Disposal of reject water generated from Reverse Osmosis Plant

- The water to be piped on site is high quality (~300mg/L TDS), however it will require further treatment prior to use within the Wet Compression circuit
- A Reverse Osmosis (RO) treatment unit will produce demineralised water for the circuit
- ~15.8 ML/yr of ‘wastewater’ will be generated as concentrate from the RO plant
- This water will be directed to a lined evaporation pond (20 ML capacity)

Summary

- Proposal provides an opportunity for increased electricity generation with no additional fuel use
- Increased greenhouse gas efficiency
- Water to be sourced from Harvey Water, within their licence allocation, with minimal impact on native vegetation

Additional Slides

Water Supply Alternatives

Water Source	Constraints
Future Brunswick River Dam	Limited resource influenced by drought conditions
Surplus from Harvey Dam	Limited resource influenced by drought conditions
Wellington Dam abstracted from the Collie River	Poor water quality, extensive environmental and other approvals process, costs
Wellington Dam via dedicated pipeline to KPS	Poor water quality, extensive environmental and other approvals process, costs
Groundwater	Extensive hydrogeological investigations required, will delay schedule, costs
Kemerton Wastewater Treatment Plant	Poor water quality requiring additional treatment prior to reuse, limited volumes
Stirling Dam via Marriott Road	Significant environmental constraints (protected wetlands), requires pumping station
Stirling Dam via Campbell Road offtake	Gravity fed, low environmental impact, good quality water from consistent source

Wet Compression

Wet compression systems as compared to air cooled systems, introduce demineralised water into the compressor inlet in a controlled and sequenced manner. The Wet Compression water is injected via a spray rack in the inlet duct of the Gas Turbine. As a function of the relative humidity and ambient temperature and the design of the spray rack and the spray nozzles, a portion of the injected water evaporates before entering the compressor and evaporation cools down the air entering the compressor.

APPENDIX 13

SUBMISSION RECEIVED FROM THE KEMERTON ACTION GROUP (FEBRUARY 2007)

Submission by the
Kemerton Action Network

in response to the proposed
Kemerton Power Station Enhancement Project

February 2007

presented by
ATA Environmental
Report No. 2006/259
on behalf of
Transfield Services Kemerton PTY LTD

The Kemerton Action Network
This is a community group which formed in response to the proposal to site a hazardous waste treatment precinct at Kemerton in 2006. The group continued after Kemerton was removed from the short list. We have built on the knowledge gained in 2006 by continuing to research the area recognising the environmental values of Kemerton. Through our work 18 wetlands in the eastern wetland chain have been reassessed, 13 of which have been nominated for upgrade to conservation value and the remaining 5 to resource enhancement. We have also recently identified acidification of the soil within the pine plantations as is seen on the Gnangara mound.

Response to the Proposal
We recognise the proposed modification to the Power Station should have a net environmental gain and therefore support this proposal as presented provided the water supply pipeline follows the route identified as option C in the proposal.

Exceptions
This proposal would be opposed under the following conditions.
If the water supply pipeline was to use the route identified as option B this proposed modification would be opposed. Some significant wetlands and remnant native vegetation would be threatened or compromised by using this route.

If the water supply pipeline were to use the route identified as option A we would strongly oppose this proposed modification as this route would have an adverse affect on a large number of significant wetlands whose value has only just been fully recognised.

Irrigation of the Blue gum plantations with the wastewater from this proposal would also attract opposition from our group as we believe an accumulative affect over years would have an adverse outcome.

Issues of concern.
An issue of concern has been raised by group members relating to section:
6.2.3.3.2 Commissioning and Operating Phase
Surface Water Management
Which states:
The pond will be designed and constructed to hold up to 20ML, and will have sufficient freeboard to prevent overtopping in the event of extreme rainfall events.
And goes on to state:
The pond will be visually inspected daily by site personnel, and measures will be immediately implemented where the freeboard appears to be compromised.

Over time the TDS concentration in the evaporation pond will rise. The management of this has not been discussed and only one pond is mentioned. The loss of containment if the pond becomes highly concentrated would have a detrimental affect on the environment and groundwater with possible contamination of the underlying Leederville aquifer. Connectivity between the Leederville and the unconfined superficial aquifer is well known. The discussed raised aspect of the pond could result in massive loss if wash out of the pond walls occurs. This kind of saline pollution has already occurred form industries in the south of the KIP by a different mechanism and has resulted in the loss of large amounts of water to ocean outfall to control the resultant contaminated groundwater plume. Water resources are becoming increasingly valuable so another such pollution event would be unacceptable. The management of the wastewater appears to require more thought.

6.2.3.2 Potential Environmental Impacts
Impacts on Surface Water

A drainage feature comprising of a large ditch which passes through a wetland area on route to the Wellesley River is identified in this section and can be seen on the left of the photo presented below. Although this drain appears to be blocked with sand before it reaches the Wellesley River it does represent a possible transport route if a polluting event occurs. This drain should be blocked closer to the power station to minimize the risk of pollution reaching the Wellesley River and being transported on to the Leschenault Estuary.

Comment.
Members of the Kemerton Wetland Watch, a subgroup of the Kemerton Action Network have raised issues related to the Vegetation, Flora and Fauna Habitat Assessment section of the ATA report. These concerns are that while mostly accurate, the report underestimates the value of the wetland and surrounding vegetation at the south end of route option A. The areas selected for flora assessment represent the worst case and thus fails to recognise the true value of the area. This wetland shows a much higher level of diversity than reported and is usually a permanent water body, drying up for the first time we know of this year under the influence of the low rainfall experienced last year. As such it has significant value to fauna in the area during summer months. As can be seen from the photo below, the presence of Typha O. is limited to small stands on the north and south ends. The Kemerton Wetland Watch group will control these if necessary, however they provide breeding habitat for Purple Swamp Hen and have not grown in area for some years. The area to the east of this wetland supports a large number of orchid species in spring.

The second issue raised relating to this section of the report concerns the identification of Leptocarpus tenax. To the best of our knowledge this does not occur in the Kemerton wetlands. The more significant Leptocarpus diffuses which can be recognised by its tufted habit and larger inflorescence occurs increasingly as you head north.

While these issues do not relate to this proposal unless the pipeline route option A is used, the concern is that this study may be used in the future for other developments. For this reason we wish these comments to be noted.

Contact for this submission - Mike Whitehead 08 97960982