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Attn: Andrew Lewis, Manager, Energy Efficiency Compliance & Reporting
Energy Efficiency Opportunities
Department of Resources, Energy and Tourism
GPO Box 1564
Canberra ACT 2601

16 December 2009

Dear Andrew

WOODSIDE ENERGY EFFICIENCY OPPORTUNITIES PROGRESS REPORT DECEMBER 2009

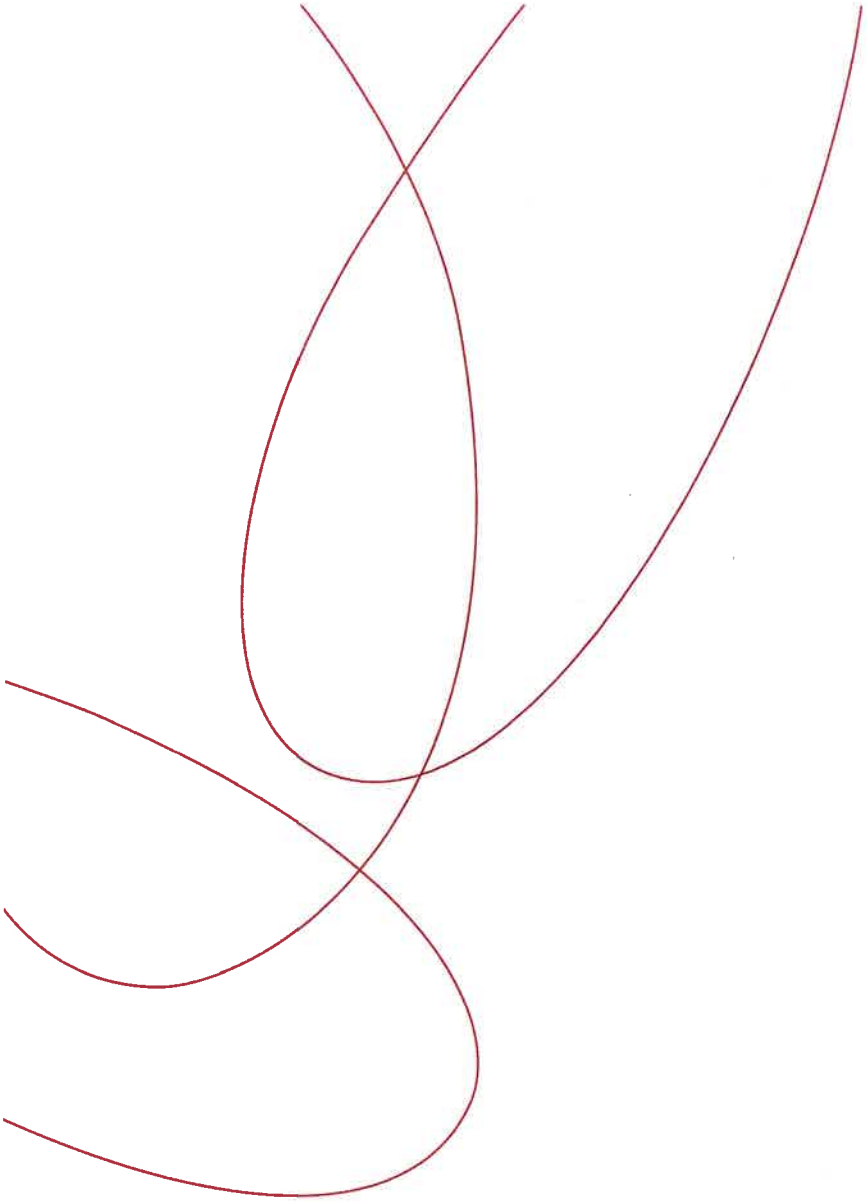
In accordance with the agreed Assessment and Reporting Schedule submitted in December 2007, please find attached the fourth government report by Woodside Petroleum Ltd (Woodside).

Woodside had committed to completing an energy efficiency assessment for the Karratha and Otway Gas Plants by February 2010, and the attached report includes the results of assessment for each facility. In addition, updates to existing assessments from the Cossack Pioneer FPSO, Northern Endeavour FPSO, Goodwyn Platform, Nganhurra FPSO and the North Rankin A Platform have also been included into this report. The financial benefits are now reported as average annualised financial benefits in accordance with the legislation, where they had previously been reported as cumulative benefits over the opportunity life.

The information included in this plan is, to the best of my knowledge, correct and in accordance with the *Energy Efficiency Opportunities Act 2006* and the *Energy Efficiency Opportunities Regulations 2006*.

Yours sincerely

Don Voelte
Managing Director and CEO



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Woodside Energy Ltd
Energy Efficiency Opportunities Public Report

16 December 2009
(Updated 9 February 2010)

1 INTRODUCTION

This public report details the Energy Efficiency Opportunity Assessments undertaken by Woodside Petroleum Ltd on behalf of its subsidiary Woodside Energy Limited and its joint venture participants, covering the period 1 July 2006 until 30 June 2009.

Three facilities were assessed during 2009; the North Rankin A Gas Platform and Karratha Gas Plant facilities from the North West Shelf Business Unit and the Otway Gas Plant from the Australian Business Unit.

2 ASSESSMENT SUMMARY

This section summarises the work completed to address the six key elements of the energy efficiency opportunities legislation. This documentation is retained in each facility's verification folder.

Key Element	Assessments Work Completed
1 – Leadership	- Scoping document - Woodside's Greenhouse Policy - Communications Plan - Allocation of Budget
2 – People	- Scoping Document - Communications Plan - Background Paper
3 – Information, data and analysis	- Communications Plan - Background Paper
4 – Opportunity Identification and Evaluation	- Background Paper - Opportunity Register - Opportunity Assessment Reports
5 – Decision Making	- Opportunity Tracking Spreadsheet - Opportunity Assessment Reports - EEO Government Report
6 – Communicating Outcomes	- EEO Government Report - EEO Public Report - Woodside Sustainable Development Report (as at early 2010) - Board Meeting Agenda and Minutes (as at early 2010)

3 ENERGY CONSUMPTION OF ASSESSED FACILITIES

Table 1 below details the energy usage of facilities operated by Woodside that completed their assessments during 2009.

Table 1 Energy use assessed and accuracy of data

Energy use assessed		
Group member and/or business unit and/or key activity and/or site that has had an assessment completed by the end of this reporting period.	**Period over which assessment was undertaken**[1]	**Energy use per annum in gigajoules (GJ) in the current reporting year**
Cossack Pioneer FPSO	March 2007 – June 2008	2,808,000
Northern Endeavour FPSO	September 2007 – June 2008	2,150,000
Goodwyn A Platform	December 2007 – December 2008	2,001,000
Nganhurra FPSO	January 2008 – December 2008	3,887,000
North Rankin A Platform	February 2008 – March 2009	2,487,000
North Rankin A	February 2008 – March 2009	2,487,000
Karratha Gas Plant	September 2007 – December 2009	99,329,000
Otway Gas Plant	January 2009 – December 2009	1,563,000
Total energy assessed to date		**61,750,000**[1]
Total energy use of the group in the current reporting year		**131,046,000**
Total energy assessed expressed as a percentage of total current energy use		47%

Accuracy of energy use data		
Entity	**% achieved**	**Reasons for not achieving data accuracy to within ±5%**
Karratha Gas Plant	**<+/-10%**	See Appendix 1
Otway Gas Plant	**<+/-10%**	See Appendix 1

How assessments are conducted at Woodside

Most of the energy consumed by Woodside operations is from own-use fuel gas, with a limited amount of energy sourced externally. There is a significant economic driver to reduce fuel gas consumption, as this enables improved recovery to Liquefied Natural Gas (LNG) and Domestic Gas.

Most of the energy use reduction opportunities identified in the facility assessments below are related to gas and diesel fuel use. For these opportunities, the energy is attributed to the energy source from where the greatest reduction occurs.

Opportunities that increase production from a facility but do not increase energy consumption are considered opportunities. These are detailed separately to differentiate between energy reduction and production enhancement initiatives. The energy savings are determined relative to the amount of energy a facility would ordinarily consume to produce a specified quantity of product.

[1] This figure is lower than the total energy consumption of the assessed facilities, as it reflects the use of representative assessments, as agreed in Woodside's Assessment and Reporting Schedule (ARS).

4 NORTH RANKIN A ASSESSMENT

The North Rankin A Platform is a gas production facility and is part of the North West Shelf Business Unit. This is the third facility Woodside has assessed in the North West Shelf Business Unit. The North Rankin A Platform is undergoing a number of upgrades. The most recent has been the completion of drilling of a number of additional wells as part of the Perseus 1C project to improve gas supply to the facility. The next project is the construction of the North Rankin B platform which will include compression facilities, enabling increased gas recovery from the Rankin and Perseus Reservoirs until end of field life. There is currently a large work program to facilitate these tie-ins and the opportunity for energy efficiency work is limited.

4.1 Assessment Outcomes

Table 2 details the outcomes of the energy efficiency assessment. North Rankin A Platform energy consumed in this reporting year: 2,487,000 GJ.

Table 2: North Rankin A Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period					Annual Energy	Energy accuracy achieved
			Natural Gas (GJ)			Diesel (GJ)			
			0 to 2	2 to 4	> 4	0 to 2	2 to 4		
Outcomes of Assessment	Identified <+/-30%	6	-	523	-	-	-	523	<+/-10%
	Identified >+/-30%	1	1,195,431	3,123	376	-	-	1,198,930	<+/-10%
	Total Identified	7	1,195,431	3,646	376	-	-	1,199,453	<+/-10%
Business Response (Identified >+/-30%)	Under further Investigation	1	-	523	-	-	-	523	<+/-10%
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-	-	<+/-10%
	Proposed to be implemented	4	381,374	-	376	-	-	381,750	<+/-10%
	To be implemented (Production)	1	-	3,123	-	-	-	3,123	<+/-10%
	Implementation Commenced	0	-	-	-	-	-	-	<+/-10%
	Implemented	1	814,057	-	-	-	-	814,057	<+/-10%
	Not to be implemented	0	-	-	-	-	-	-	<+/-10%

5 KARRATHA GAS PLANT ASSESSMENT

The Karratha Gas Plant (KGP) is located 30 km by road from Karratha at South Withnell Bay, on the Burrup Peninsula, Western Australia. Karratha is situated 1250 km north of Perth.

The KGP forms an integral part of the North West Shelf Venture integrated system. Gas and condensate from the North Rankin A Platform, Goodwyn Platform, Angel Platform (online 2008) and the export gas from the Cossack Pioneer FPSO facility are fed from two offshore pipelines into the KGP. The gas and liquids are processed into LNG, domestic gas, propane and butane.

The KGP EEO assessment concluded in 2009. Parallel processing lines, such as LNG trains, LPG stabilisers and domestic gas trains are a dominant feature of the KGP. For this reason, representative assessment of the processing lines was agreed in the Assessment and Reporting Schedule, and the assessments were conducted on this basis. Diesel use was not directly assessed as its consumption relative to fuel gas is small. Diesel is only used for power generation during unplanned process disruptions.

5.1 Assessment Outcomes

Table 3 details the outcomes of the energy efficiency assessment. Energy efficiency ideas identified prior to the assessment are not shown. KGP energy consumed in this reporting year: 99,329,000 GJ.

Table 3: KGP Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period Natural Gas (GJ)			Annual Energy	Energy accuracy achieved
			0 to 2	2 to 4	> 4		
Outcomes of Assessment	Identified <+/- 30%	11	8,738,083	6,241,049	3,377,606	18,356,738	<+/-10%
	Identified >+/- 30%	2	5,994,300	-	-	5,994,300	<+/-10%
	Total Identified	13	14,732,383	6,241,049	3,377,606	24,351,038	<+/-10%
Business Response (Identified >+/-30%)	Under further Investigation	1	999,050	-	-	999,050	<+/-10%
	Implementation Commenced	1	4,995,250	-	-	4,995,250	<+/-10%
Business Response (Identified <+/-30%)	Under further Investigation	6	3,802,776	6,977	820,575	4,630,328	<+/-10%
	Proposed to be implemented	0	-	-	-	-	<+/-10%
	Implementation Commenced	1	4,935,307	-	-	4,935,307	<+/-10%
	Implemented	0	-	-	-	-	<+/-10%
	Not to be implemented	4	-	6,234,072	2,557,031	8,791,103	<+/-10%

6 OTWAY GAS PLANT ASSESSMENT

The Otway Gas Plant is located about 220 km by road west-southwest of Melbourne, Victoria. The Thylacine gas field is located approximately 80 km offshore and feeds the Otway Gas Plant via a series of subsea wells, an unmanned platform and pipeline to shore. The gas and liquids are processed into:

- Domestic gas;
- Condensate;
- Liquefied Petroleum Gas; and,
- Propane.

The Otway Gas Plant EEO assessment concluded in 2009. Both the onshore gas plant and the offshore facilities were considered in the assessment.

6.1 Assessment Outcomes

Table 4 details the outcomes of the energy efficiency assessment. Electricity is imported from the Victorian grid. Diesel use was not considered in the assessment, as the facility only uses diesel for vehicles and emergency power generation. The Otway Gas Plant imports pipeline gas from the Victorian gas grid in the event of a full plant start up, avoiding the need for large quantities of diesel. Otway Gas Plant energy consumed in this reporting year: 1,563,000 GJ.

Table 4: Otway Gas Plant Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum						Total estimated energy savings per annum (GJ)	Energy accuracy achieved
			Natural Gas (GJ)			Electricity (GJ)				
			0 to 2	2 to 4	> 4	0 to 2	2 to 4	> 4		
Outcomes of Assessment	Identified <+/-30%	8	364,472	-	0	22,257	-	691	387,420	<+/-10%
	Identified >+/-30%	2	-	-	42,254	-	-	20,736	62,990	<+/-10%
	Identified	10	364,472	-	42,254	22,257	-	21,427	450,410	<+/-10%
Business Response (Identified >+/-30%)	Under further Investigation	2	-	-	42,254	-	-	20,736	62,990	<+/-10%
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-	-	-	<+/-10%
	To be implemented	3	54,893	-	-	57	-	691	55,641	<+/-10%
	Implementation Commenced	-	-	-	-	-	-	-	-	<+/-10%
	Implemented	2	306,579	-	-	22,200	-	-	328,779	<+/-10%
	Not to be implemented	3	3,000	-	0	-	-	-	3,000	<+/-10%

7 UPDATE OF ASSESSMENTS IN PREVIOUS REPORTING PERIODS

Updates to the four facilities assessed prior to this public reporting period are detailed below. The results of these assessments can be found in Woodside's Sustainable Development Reports, available at following web address:
http://www.woodside.com.au/Sustainable+Development/2008+Sustainable+Development+Report.htm

The total energy assessed that contributed to the results below is 10,846,000 GJ.

Cossack Pioneer FPSO energy consumed in this reporting year: 2,808,000 GJ.

Table 5: Cossack Pioneer FPSO Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period					Annual Energy
			Natural Gas (GJ)			Diesel (GJ)		
			0 to 2	2 to 4	> 4	0 to 2	2 to 4	
Outcomes of Assessment	Identified <+/-30%	18	1,164,349	159,759	227,850	-	-	1,551,958
	Identified >+/-30%	0	-	-	-	-	-	-
	Total Identified	18	1,164,349	159759	227,850	-	-	1,551,958
Business Response (Identified >+/-30%)	Under further Investigation	0	-	-	-	-	-	-
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-	-
	To be implemented (existing vessel)	2	998,492	79,879	-	-	-	1,078,371
	To be implemented (new vessel)	2	-	-	227,850	-	-	227,850
	Implementation Commenced	- -	-	-	-	-	-	-
	Implemented	10	57,639	79,879	-	-	-	137,518
	Not to be implemented	4	108,218	-	-	-	-	108,218

Northern Endeavour FPSO energy consumed in this reporting year: 2,150,000 GJ.

Table 6: Northern Endeavour FPSO Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period					Annual Energy
			Natural Gas (GJ)			Diesel (GJ)		
			0 to 2	2 to 4	> 4	0 to 2	2 to 4	
Outcomes of Assessment	Identified <+/-30%	23	128,406	-	72,533	-	-	200,939
	Identified >+/-30%	2	6,623	-	-	-	-	6,623
	Total Identified	25	135,029	-	72,533	-	-	207,562
Business Response (Identified >+/-30%)	Under further Investigation	2	6,623	-	-	-	-	6,623
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-	-
	Proposed to be implemented	10	13,403	-	-	-	-	13,403
	To be implemented (Production)	1	91,165	-	-	-	-	91,165
	Implementation Commenced	-	-	-	-	-	-	-
	Implemented	12	23,838	-	72,533	-	-	96,371
	Not to be implemented	-	-	-	-	-	-	-

Goodwyn A Platform energy consumed in this reporting year: 2,001,000 GJ.

Table 7: Goodwyn A Platform Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period					Annual Energy
			Natural Gas (GJ)			Diesel (GJ)		
			0 to 2	2 to 4	> 4	0 to 2	2 to 4	
Outcomes of Assessment	Identified <+/-30%	12	485,846	-	12,589	-	662	499,096
	Identified >+/-30%	2	93,031	-	-	-	-	93,031
	Total Identified	14	578,877	-	12,589	-	662	592,128
Business Response (Identified >+/-30%)	Under further Investigation	2	93,031	-	-	-	-	93,031
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-	-
	Proposed to be Implemented	7	398,990	-	12,589	-	-	411,579
	Proposed to be Implemented (Production)	2	26,373	-	-	-	-	26,373
	Implementation Commenced	0	-	-	-	-	-	0
	Implemented	3	60,482	-	-	-	662	61,144
	Not to be implemented	0	-	-	-	-	-	0

Nganhurra FPSO energy consumed in this reporting year: 3,887,000 GJ.

Table 8: Nganhurra FPSO Energy Efficiency Assessment Outcomes

Status of Opportunities		Number of Opportunities	Estimated Energy Savings per annum by payback period				Annual Energy
			Natural Gas (GJ)		Diesel (GJ)		
			0 to 2	2 to 4	0 to 2	2 to 4	
Outcomes of Assessment	Identified <+/-30%	10	1,173,655	361	224,133	-	1,398,149
	Identified >+/-30%	7	59,874	15,089	-	-	74,963
	Total Identified	17	1,233,529	15,450	224,133	-	1,473,112
Business Response (Identified >+/-30%)	Under further Investigation	7	59,874	15,089	-	-	74,963
Business Response (Identified <+/-30%)	Under further Investigation	0	-	-	-	-	-
	Proposed to be Implemented	8	42,655	-	224,133	-	266,788
	Implementation Commenced	1	1,131,000	-	-	-	1,131,000
	Implemented	1	-	361	-	-	361
	Not to be implemented	0	-	-	-	-	-

8 DETAILS OF SIGNIFICANT OPPORTUNITIES

8.1 From EEO assessments completed in 2009

North Rankin A - Installation of Compabloc Heat Exchanger

The North Rankin A facility is planning to install a Compabloc compact heat exchanger. This unit will improve the efficiency of heat exchange in the hot oil heaters which are major users of energy. Through improved heat exchange there will be more heat transfer and a lower demand on the Tempered Water / Sea Water system. This opportunity is estimated to save approximately 400 GJ per annum.

North Rankin A - Train 200 Instrumentation Upgrade

The Train 200 control instrumentation has been the cause of a number of process disruptions on North Rankin A. This instrumentation maintains the levels within the process and triggers flaring when the facility is not adequately controlled. By improving the quality of this instrumentation the facility will be less likely to experience process disruptions. This will result in less facility flaring and save an estimated 46,000 GJ per annum.

Karratha Gas Plant - Turn off Thermal Combustion Unit (TCU)

The KGP has a shared TCU for LNG trains four and five. The TCU combusts volatile organic compounds (in particular benzene, toluene and xylene, (BTEX)) that would otherwise be vented to the atmosphere. The Acid Gas Removal Units that produce the BTEX have undergone solvent upgrades on all LNG trains and now produce 85% less BTEX. Switching off the TCU will result in fuel gas savings of approximately 19,675 tonnes or 978,000 GJ per annum. This opportunity subject to regulatory and joint venture participant approvals.

Karratha Gas Plant - Inlet air chilling on LM6000 gas turbines

Inlet air chilling is one of the most effective ways to increase the capacity of existing gas turbines without major refit or upgrading of the machine. Allowance was made in the original design of the LM6000's to facilitate the retrofit of inlet air chilling coils. Chilling the inlet air can lead to a 25% increase in power, increasing the LNG production at the KGP. Although energy consumption would not be decreased, production would rise. Based on the estimated increased LNG production and current plant energy efficiency, inlet air chilling is estimated to save 190,000 GJ per annum.

Otway Gas Plant - Improved ramp up profile

Domestic gas markets in Victoria are subject to significant variation in supply and demand balance. When a period of increased gas production quickly succeeds a period of low production, the slugcatcher at the plant inlet can cause a production bottleneck. A slugcatcher is a gas and liquids separation device, where bulk liquids are removed from the offshore gas pipeline. If the gas flow to the plant from the offshore pipeline increases quickly, liquids can build up in the slugcatcher to the point where its design capacity for liquids is exceeded, with subsequent disruption to domestic gas production. An identified opportunity used process modelling to determine optimal 'ramp up' profiles. The process technicians will implement this opportunity by controlling the plant production rate, avoiding inefficient production disruptions. When implemented, this opportunity is estimated to save 307,000 GJ per annum.

Otway Gas Plant - Thermal Oxidiser washdowns

The Thermal Oxidiser ensures that environmental emissions conditions are met by combusting volatile organic compounds. Failure of this equipment causes back pressure through the plant resulting in increased process pressure on the amine system. The amine system plays a crucial role in meeting sales gas specifications. More energy is required to circulate the solvent at higher pressure which results in increased power consumption.

The opportunity identified that annual water washing of the Thermal Oxidiser will improve the reliability of the equipment and amine system will operate most efficiently. An estimated 22,000 GJ will be saved annually.

APPENDIX 1

Reasoning behind Woodside not achieving data accuracy to within ±5%

Typical fuel metering accuracy for Woodside facilities is within a range of 5-10% with higher accuracies for custody transfer of products at sales point (1-2%). However, the bulk of Woodside's energy consumption is sourced from fuel gas taken as a utility side stream from the main production of hydrocarbons. Due to different modes of plant operation, and changes in the production balance into facilities from different reservoirs, it is difficult to accurately measure the amount of energy contained in the fuel gas stream. As the fuel gas is not being sold to a third party, accurate metering for custody transfer has not been justified or provided in the original design.

Additionally, compositional variations in fuel gas can occur, due to plant operating modes (which may select alternative sources for fuel gas from different locations in the gas process) or due to variations in input production from reservoirs. The heating value or energy content of the fuel will continuously vary with production, processing conditions or source.

Woodside has assessed their facilities as per Table 1 and met the accuracy requirements as agreed in their Assessment and Reporting Schedule (ARS) of +/-10%.