

BORAL ENERGY RESOURCES LIMITED

Yolla Development

Scoping Study

Study

Project: 084/07903

12 April 1999



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**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

SYNOPSIS

This report presents capital and operating cost estimates for two scenarios to develop the Yolla gas field, offshore Tasmania in Bass Strait. The study describes, sizes, costs and provides high level schedules for the following scenarios:

Scenario 1 Navigation, Communication and Control (NCC) Buoy and subsea production system;

Scenario 2 Steel jacket structure with minimal offshore processing.

Both scenarios have been costed for a base case sales gas flow rate of 45.3 TJ/day with high and low flow rates of 60.4 and 30.2 TJ/day respectively costed as sensitivities.

REPORT NO 08407903-01

REVISION	DESCRIPTION	ORIGINATOR	REVIEWER	APPROVAL	DATE	CLIENT APPROVAL	DATE
C	Issued For Final Report	S Kennedy/I Neill	B Smith	M. Mollison	12/4/1999		
B	Issued For Client Review	S Kennedy/I Neill	B Smith	M. Mollison			
A	Issued For Review	S Kennedy/I Neill	B Smith				



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

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A. Scenario Sketches	(2 Pages)
B. Detailed Cost Estimates – Scenario 1	(59 Pages)
C. Detailed Cost Estimates – Scenario 2	(57 Pages)
D. Process Flow Diagrams	(6 Pages)
E. Heat and Material Balances	(4 Pages)
F. Schedules	(2 Pages)
G. Yolla Reservoir Fluid Composition and Product Specifications	(2 Pages)
H. Document Register	(2 Pages)

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**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

1 EXECUTIVE SUMMARY

Worley Limited has been contracted by Boral Energy Resources Limited to perform a scoping study of two scenarios to develop the Yolla gas field, offshore Tasmania in Bass Strait. The study describes, sizes, costs and provides high level schedules for the following scenarios (sketches in Attachment A):

Scenario 1 Navigation, Communication and Control (NCC) Buoy and subsea production system;

Scenario 2 An unmanned wellhead platform with minimal offshore processing.

The cost estimates for both scenarios include the offshore facilities, pipeline to shore and an onshore gas processing plant. Both scenarios have been costed for three sales gas flow rates: 30.2, 45.3 and 60.4 TJ/day; with 45.3 TJ/day rate taken as the base case.

The capital cost estimates of the two scenarios for the base case flow rate are presented below:

Capital Costs

	Scenario 1 NCC Buoy (A\$M)	Scenario 2 Wellhead Platform (A\$M)
Total excluding drilling	312	309
Total including drilling	345	346
Abandonment	20	44

Full capital cost summaries for both scenarios and the flow rate variations are presented in the following tables:

Table 1.1.1 NCC Buoy 45.3 TJ/day (Calculation No. 7903-CAL-012 page 1 of 3)

Table 1.1.2 NCC Buoy 30.2 TJ/day (Calculation No. 7903-CAL-012 page 2 of 3)

Table 1.1.3 NCC Buoy 60.4 TJ/day (Calculation No. 7903-CAL-012 page 3 of 3)

Table 1.2.1 Wellhead Platform 45.3 TJ/day (Calculation No. 7903-CAL-029 page 1 of 3)

Table 1.2.2 Wellhead Platform 30.2 TJ/day (Calculation No. 7903-CAL-029 page 2 of 3)

Table 1.2.3 Wellhead Platform 60.4 TJ/day (Calculation No. 7903-CAL-029 page 3 of 3)



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
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Operational cost estimates for the two scenarios for the base case flow rate are presented below:

Operational Costs

Scenario 1 NCC Buoy (A\$M)	Scenario 2 Wellhead Platform (A\$M)
17.3	14.5

Detailed breakdown of both the capital and operating cost estimates are provided in Attachments B and C of this report for Scenarios 1 and 2 respectively.

The estimated overall development schedules are 29 months for the NCC Buoy and 30 months for the wellhead platform. Indicative development schedules are presented in Attachment F for both scenarios.



Cost Estimate Summary

Yolla Development Scenario 1 - NCC Buoy(45.3TJ/d)



Calc No 7903-CAL-012

Project Title Yolla Study
 Client Boral Energy Resources Limited
 Calculation Title CAPEX

Project No 084/07903
 Phase / CTR 000
 Page 1 of 3

File Location K:\WL\08407903\COST\NCCSUM.XLS\summ1 base

By B. Smith
 Checked I. Neill

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000)	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies	-	-	2,500	-	-	-	-	2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	429	-	-	-	-	429	-
OF 01	Offshore Installation	-	-	77,984	-	-	-	-	77,984	-
PL 01	Pipelines	-	-	43,030	-	-	-	-	43,030	-
SS 01	Subsea Equipment	-	-	18,446	-	-	-	-	18,446	-
BY 01	NCC Buoy	2,112	41	586	84	3,173	1,655	8,560	14,515	1,695
SC 01	Pipeline Shore Crossing	-	-	4,000	-	-	-	-	4,000	-
GP 01	Onshore Gas Plant	18,232	1,554	-	-	9,025	-	24,026	51,283	1,554
Totals		20,344	1,595	146,974	84	12,198	1,655	32,586	212,186	3,250

Indirects										
	Freight (6% on procured items and bulk materials)	0.06							1,953	
	Certification (0.5% on total direct cost)	0.005							1,061	
	Design - Preliminary (1.5% on total direct cost)	0.015							3,183	
	Design - Detailed (7.5% on total direct cost)	0.075							15,914	
	Insurance (2% on total direct cost)	0.02							4,244	
	Project Management and Own Costs (10% on total direct cost)	0.1							21,219	
	Subtotal								259,758	
	Contingency - 20%	0.2							51,952	

Total Cost of Development (ex drilling & abandonment) 311,710

Drilling Costs 33,000

TOTAL COST(ex abandonment) 344,710

FA 01	Field Abandonment - Decommissioning			64					64	
FA 02	Field Abandonment - Removal			13473					13,473	
				13538					13,538	

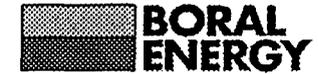
	Indirects 21.5%	0.215							2,911	
	Subtotal								16,448	
	Contingency - 20%	0.2							3,290	
	Abandonment Cost								19,738	

643006



Cost Estimate Summary

Yolla Development Scenario 1 - NCC Buoy (30.2 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-012
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCSUM.XLS\summ1 base	Page	2 of 3
		By	B. Smith <i>BS</i>
		Checked	I. Neill <i>IN</i>

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000)	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies	-	-	2,500	-	-	-	-	2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	429	-	-	-	-	429	-
OF 01	Offshore Installation	-	-	77,984	-	-	-	-	77,984	-
PL 01	Pipelines	-	-	43,030	-	-	-	-	43,030	-
SS 01	Subsea Equipment	-	-	18,030	-	-	-	-	18,030	-
BY 01	NCC Buoy	2,112	41	565	84	3,080	4,410	8,106	13,947	4,451
SC 01	Pipeline Shore Crossing	-	-	4,000	-	-	-	-	4,000	-
GP 01	Onshore Gas Plant	16,676	1,493	-	-	8,255	-	23,010	47,940	1,493
Totals		18,788	1,534	146,537	84	11,334	4,410	31,115	207,859	5,944

Indirects										
	Freight (6% on procured items and bulk materials)	0.06							1,807	
	Certification (0.5% on total direct cost)	0.005							1,039	
	Design - Preliminary (1.5% on total direct cost)	0.015							3,118	
	Design - Detailed (7.5% on total direct cost)	0.075							15,589	
	Insurance (2% on total direct cost)	0.02							4,157	
	Project Management and Own Costs (10% on total direct cost)	0.1							20,786	
	Subtotal								254,356	
	Contingency - 20%	0.2							50,871	

Total Cost of Development (ex drilling & abandonment) 305,227

Drilling Costs 33,000

TOTAL COST(ex abandonment) 338,227

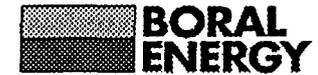
FA 01	Field Abandonment - Decommissioning			64					64	
FA 02	Field Abandonment - Removal			13473					13,473	
				13538					13,538	

	Indirects 21.5%	0.215							2,911	
	Subtotal								16,448	
	Contingency - 20%	0.2							3,290	
	Abandonment Cost								19,738	



Cost Estimate Summary

Yolla Development Scenario 1 - NCC Buoy (60.4 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-012
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCSUM.XLS\summ1 base	Page	3 of 3
		By	B. Smith <i>BS</i>
		Checked	I. Neill <i>IN</i>

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000) ?	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies	-	-	2,500					2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	429					429	-
OF 01	Offshore Installation	-	-	77,984					77,984	-
PL 01	Pipelines	-	-	46,629					46,629	-
SS 01	Subsea Equipment	-	-	23,760					23,760	-
BY 01	NCC Buoy	2,112	41	623	84	3,333	4,591	9,336	15,488	4,632
SC 01	Pipeline Shore Crossing	-	-	4,000					4,000	-
GP 01	Onshore Gas Plant	19,411	1,592			9,609		24,796	53,816	1,592
Totals		21,523	1,633	155,925	84	12,942	4,591	34,132	224,606	6,225
	Indirects									
	Freight (6% on procured items and bulk materials)	0.06							2,068	
	Certification (0.5% on total direct cost)	0.005							1,123	
	Design - Preliminary (1.5% on total direct cost)	0.015							3,369	
	Design - Detailed (7.5% on total direct cost)	0.075							16,845	
	Insurance (2% on total direct cost)	0.02							4,492	
	Project Management and Own Costs (10% on total direct cost)	0.1							22,461	
	Subtotal								274,964	
	Contingency - 20%	0.2							54,993	
	Total Cost of Development (ex drilling & abandonment)								329,956	
	Drilling Costs								48,000	
	TOTAL COST(ex abandonment)								377,956	
FA 01	Field Abandonment - Decommissioning			64					64	
FA 02	Field Abandonment - Removal			13473					13,473	
				13538					13,538	
	Indirects 21.5%	0.215							2,911	
	Subtotal								16,448	
	Contingency - 20%	0.2							3,290	
	Abandonment Cost								19,738	



Cost Estimate Summary

Yolla Development Scenario 2 - Platform(45.3 TJ/d)



Project Title	Yolla Study	Calc No	7903-CAL-029
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\PLATSUM.XLS\summ2 base	Page	1 of 3
		By	B. Smith <i>BS</i>
		Checked	I. Neill <i>IN</i>

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000)	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies- Offshore & Onshore	-	-	2,500	-	-	-	-	2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	6,233	-	-	-	-	6,233	-
OF 01	Offshore Installation-Platform & Pipeline	-	-	86,662	-	-	-	-	86,662	-
PL 01	Pipelines	-	-	20,366	-	-	-	-	20,366	-
JK 01	Steel Jacket & Piles - 6 slots	2,580	2,015	583	6,817	-	-	-	9,980	2,015
TS 01	Process Topsides	12,176	269	1,187	352	10,895	1,100	10,005	34,615	1,369
SC 01	Pipeline Shore Crossing	-	-	4,000	-	-	-	-	4,000	-
GP 01	Onshore Gas Plant	15,761	1,441	-	-	7,802	-	21,855	45,417	1,441
Totals		30,516	3,725	121,531	7,169	18,697	1,100	31,860	209,773	4,824

Freight (6% on procured items and bulk materials)	0.06	2,953
Certification (0.5% on total direct cost)	0.005	1,049
Design - Preliminary (1.5% on total direct cost)	0.015	3,147
Design - Detailed (7.5% on total direct cost)	0.075	15,733
Insurance (2% on total direct cost)	0.02	4,195
Project Management and Own Costs (10% on total direct cost)	0.1	20,977
Subtotal		257,827
Contingency - 20%	0.2	51,565

Total Cost of Development (ex drilling & abandonment)		309,392
Drilling Costs		36,000
Conductors		200
TOTAL COST(ex abandonment)		345,592

FA 01	Field Abandonment - Decommissioning	935	935
FA 02	Field Abandonment - Removal	29,397	29,397
		30,332	30,332

Indirects 21.5%	0.215	6,521
Subtotal		36,853
Contingency - 20%	0.2	7,371
Abandonment Cost		44,224

126

645009



Cost Estimate Summary

Yolla Development Scenario 2 - Platform (30.2 TJ/day)



Calc No 7903-CAL-029

Project Title Yolla Study
 Client Boral Energy Resources Limited
 Calculation Title CAPEX

Project No 084/07903
 Phase / CTR 000
 Page 2 of 3

File Location K:\W\108407903\COST\PLATSUM.XLS\summ2 base

By B. Smith *BS*
 Checked I. Neill *IN*

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000)	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies- Offshore & Onshore	-	-	2,500	-	-	-	-	2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	5,666	-	-	-	-	5,666	-
OF 01	Offshore Installation-Platform & Pipelines	-	-	86,662	-	-	-	-	86,662	-
PL 01	Pipelines	-	-	20,366	-	-	-	-	20,366	-
JK 01	Steel Jacket - 6 slots	2,580	2,015	583	6,817	-	-	-	9,980	2,015
TS 01	Process Topsides	11,212	241	1,079	326	9,688	1,003	9,056	31,361	1,244
SC 01	Pipeline Shore Crossing	-	-	4,000	-	-	-	-	4,000	-
GP 01	Onshore Gas Plant	14,672	1,405	-	-	7,263	-	21,178	43,113	1,405
Totals		28,464	3,661	120,855	7,143	16,951	1,003	30,234	203,646	4,664

Freight (6% on procured items and bulk materials)	0.06	2,725
Certification (0.5% on total direct cost)	0.005	1,018
Design - Preliminary (1.5% on total direct cost)	0.015	3,055
Design - Detailed (7.5% on total direct cost)	0.075	15,273
Insurance (2% on total direct cost)	0.02	4,073
Project Management and Own Costs (10% on total direct cost)	0.1	20,365
Subtotal		250,155
Contingency - 20%	0.2	50,031

Total Cost of Development (ex drilling & abandonment) 300,186

Drilling Costs	36,000
Conductors	200
TOTAL COST(ex abandonment)	336,386

FA 01	Field Abandonment - Decommissioning	850	850
FA 02	Field Abandonment - Removal	29397	29,397
		30247	30,247

Indirects 21.5%	0.215	6,503
Subtotal		36,750
Contingency - 20%	0.2	7,350

Abandonment Cost 44,100

126

645010



Cost Estimate Summary

Yolla Development Scenario 2 - Platform (60.4 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-029
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\PLATSUM.XLS\summ2 base	Page	3 of 3
		By	B. Smith
		Checked	i. Neill

Item	Description	Proc Items Cost (A\$,000)	Proc Items Weight (tonne)	Lump Sum Cost (A\$,000)	Fab Cost Proc Items (A\$,000)	Bulk Matl Cost (A\$,000)	Bulk Matl Weight (tonne)	Fab Cost Bulk Matl (A\$,000)	Total Cost (A\$,000)	Total Weight (tonne)
GE 01	Geotechnical and Environmental Studies- Offshore & Onshore	-	-	2,500	-	-	-	-	2,500	-
HK 01	Offshore Hookup and Commissioning	-	-	6,563	-	-	-	-	6,563	-
OF 01	Offshore Installation-Platform & Pipeline	-	-	86,662	-	-	-	-	86,662	-
PL 01	Pipelines	-	-	22,293	-	-	-	-	22,293	-
JK 01	Steel Jacket - 6 slots	2,580	2,015	583	6,817	-	-	-	9,980	2,015
TS 01	Process Topsides	13,147	286	1,250	368	11,632	1,156	10,539	36,936	1,441
SC 01	Pipeline Shore Crossing	-	-	4,000	-	-	-	-	4,000	-
GP 01	Onshore Gas Plant	16,490	1,471	-	-	8,162	-	22,308	46,961	1,471
Totals		32,216	3,771	123,850	7,185	19,795	1,156	32,848	215,894	4,927

Freight (6% on procured items and bulk materials)	0.06	3,121
Certification (0.5% on total direct cost)	0.005	1,079
Design - Preliminary (1.5% on total direct cost)	0.015	3,238
Design - Detailed (7.5% on total direct cost)	0.075	16,192
Insurance (2% on total direct cost)	0.02	4,318
Project Management and Own Costs (10% on total direct cost)	0.1	21,589
Subtotal		265,432
Contingency - 20%	0.2	53,086

Total Cost of Development (ex drilling & abandonment) 318,518

Drilling Costs	54,000
Conductors	300
TOTAL COST(ex abandonment)	372,818

FA 01	Field Abandonment - Decommissioning	984	984
FA 02	Field Abandonment - Removal	29397	29,397
		30381	30,381

Indirects 21.5%	0.215	6,532
Subtotal		36,913
Contingency - 20%	0.2	7,383
Abandonment Cost		44,296



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

2 INTRODUCTION

Boral Energy Resources Limited (Boral) has an interest in the Yolla gas field (permit T/RL1) located in western Bass Strait, approximately 135 km north of Burnie in 78 m water depth. Two appraisal wells have been drilled in the T/RL1 block, Yolla-1 (1985) and Yolla-2 (1998). Drilling results and interpretations have indicated moderate reserves of liquids-rich gas in place. Boral asked Worley Limited (Worley) to investigate the costs of two development scenarios of this gas field.

The objectives of this study were to provide capital and operating cost estimates for both development scenarios of the Yolla field for a base case flow rate, to investigate the impact on the costs of higher and lower flowrates and prepare overall schedules for each development option. The development scenarios to be evaluated are as follows

- Offshore subsea production with 2 or 3 initial wells incorporating a NCC buoy; a multiphase pipeline to shore and an onshore gas processing plant; and,
- A normally unmanned minimal facilities platform with up to 6 well slots, a two-phase pipeline to shore and an onshore gas processing plant.

The basis for the study is set out in Section 3 of the report together with key assumptions made. The facilities and process for each of the Scenarios are described in Section 4, while Sections 5 and 6 present the capex, opex and schedules in greater detail.



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

3 STUDY BASIS

3.1 General

The design parameters used in this study have generally been supplied by Boral and are listed in the following sections.

3.2 Reservoir and Production

Reservoir fluid composition and product specifications are given in Attachment G.

Parameter	Study Basis	Comments
Number of Production Wells	2 initially, 2km apart	30.2 TJ/day & 45.3 TJ/day cases
Scenario 1 - NCC Buoy	3 initially, 2km apart	60.4 TJ/day case
	2 future wells, 2km and 4km from Well 1	All flow rate cases
Number of Production Wells	2 initially	30.2 TJ/day & 45.3 TJ/day cases
Scenario 2 WH Platform	3 initially	60.4 TJ/day case
	2 future wells	All flow rate cases
		Platform to have 6 well slots and to be suitable for jack-up drilling in cantilever mode
Production Facility Capacity	15 PJ/year (45.3 TJ/day)	10 PJ/year (30.2 TJ/day) low case
	base case	20 PJ/year (60.4 TJ/day) high case
CO ₂ content	19%	
Condensate Production	49 BBL per MMSCF of gas	
Water Production	5 BBL per MMSCF of reservoir fluid	Worley assumption
Wellhead Pressure	Shut-In 3400 psi (23440 kPa)	
	Flowing 3000 psi (20680 kPa)	
Wellhead Temperature	90°C	
Sales Gas Delivery Pressure	600 psi (4137 kPa)	
Condensate Storage	350,000 bbls	Boral



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

3.3 Environmental

Parameter	Study Basis	Comments
Location	Permit T/RL1 in western Bass Strait	120 km offshore from Port Latta
Water Depth	78 m	
10 Year Return Period Wave	$H_s = 6.8 \text{ m} / T_p = 13.3$	
10 Year Return Period Wind	22.8 m/s	
100 Year Return Period Current	2.00 m/s near surface	
Seabed Temperature	10 – 14.4 °C	
Soil Conditions	Calcareous	



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

4 DEVELOPMENT SCENARIOS

4.1 General

The two scenarios investigated for the Yolla gas field development are listed in Table 4-1.

Table 4-1 Development Scenarios

Scenario 1	NCC Buoy and Subsea Production
Scenario 2	Wellhead Platform with Minimal Processing

For each scenario, three sales gas rates are considered: 30.2, 45.3 and 60.4 TJ/day (10, 15 and 20 PJ/year).

4.2 Scenario 1: NCC Buoy and Subsea Production

4.2.1 Description

The NCC (Navigation, Communication and Control) Buoy and subsea production system concept is based on the East Spar development in the North West Shelf. The unmanned NCC Buoy will provide electrical power, hydrate/corrosion inhibitor storage and pumping facilities, and a communication system to allow remote control of the offshore facilities from an onshore base via radio and satellite links.

The control buoy comprises a bottle-like structure which houses the minimum facilities necessary to generate power for liquids injection and well control. The buoy is unmanned, with maintenance work being conducted by planned offshore campaigns. Monitoring and control of injection and product export is achieved by means of telecommunications from shore. This telecommunications requirement generates the need for a high antenna and a stable platform (e.g. East Spar design was based upon less than 3 degrees roll and pitch). To achieve minimal motions a small waterplane area is required which, combined with stability requirements, leads to the characteristic bottle shape. Further reduction of motions is achieved by the use of a tension leg mooring.

Production from the subsea wells will be tied back to a subsea manifold via DN150 (6-inch) CRA flowlines connected at either end by flexible jumpers. The manifold will be designed to accommodate up to five subsea wells and incorporate a diverless subsea pig launcher. Export of the commingled product will be via a 118 km DN300 (12-inch) pipeline to the onshore gas plant in Port Latta.

The multiphase product is anticipated to be extremely corrosive due to the high CO₂ levels (19%) coupled with the elevated temperature and water production. The use of Corrosion Resistant Alloy (CRA) material is required for an approximate distance of 30 km from the subsea manifold where the product temperature has decayed to ambient conditions. This length has been quoted by Boral; however, initial hydraulic and corrosion analyses by Worley have indicated a shorter length of approximately 10 km should be satisfactory.



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The East Spar buoy was sized based on hydrate and corrosion inhibitor storage requirements that came to approximately 60 m³, based on replenishment intervals of 4 months. This volume was based on the results of a sea bed temperature survey at the East Spar location which indicated that there was likely to be only an intermittent requirement for hydrate inhibition. Wellstream fluids at the East Spar field contain approximately 1.6% CO₂, compared to 19% at Yolla.

In Bass Strait the seabed water temperatures are such that hydrate inhibition will be required continuously and, with the assumed water production rate of 5bbls/MMscf, it has been estimated that daily injection rate of MEG/corrosion inhibitor will be 15.7m³/day. Based on a storage capacity of 40 days a NCC buoy development at Yolla would require 630 m³ of storage. The injection rate and storage volume is directly related to the water production rate and this figure should be confirmed in order to progress this concept.

Such storage volumes are considered not practical in a tension leg buoy which is extremely weight sensitive, and therefore for this study it has been assumed that chemical storage tanks can be integrated into the gravity base. In order to progress the NCC buoy concept the feasibility of this approach needs to be confirmed, particularly in regard to the impact on overall field availability.

4.2.2 Process

The onshore processing facilities required for this scenario include the following items:

- slug catcher for the incoming pipeline;
- separation of the wellstream fluid;
- heating of the wellstream fluids prior to separation;
- dehydration of the gas;
- gas dew pointing to achieve sales gas specification;
- gross dewatering of the condensate;
- water treatment and disposal; and,
- condensate stabilisation;

No allowance has been made for sales gas compression. The sales gas delivery pressure of 600 psi (~4140 kPa) has been assumed to be the operating pressure of the low temperature separator.

Offshore Facilities

The process requirements on the NCC Buoy are limited to control functions and chemical injection.

Chemical Injection

To prevent hydrate formation MEG will be continuously injected at the subsea wellhead. A corrosion inhibitor will also be used to prevent corrosion in the subsea pipeline to shore. The MEG and corrosion inhibitor are premixed to simplify chemical injection and storage requirements on the Buoy.

The volume of inhibitor required is proportional to the expected water production rate. Hence the calculated chemical injection and storage requirements are dependent on the Worley assumption that



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the reservoir will produce 5 bbls of water per MMscf of dry reservoir fluid. A review of the chemical injection facilities will be required when water production data becomes available.

Onshore Facilities

Separation

Bulk liquid gas separation will occur at the inlet to the gas plant in the slug catcher. Gas will be routed to the dehydration facilities while the condensate water mixture will be routed to the Inlet liquid separator. The feed from the three-phase pipeline will be heated prior to entering the slug catcher to increase the gas that is recovered at the slug catcher.

The inlet liquid separator will operate at a lower pressure than the slug catcher. Hydrocarbon vapour generated as a result of the pressure drop will be recycled to the gas dehydration facilities, condensate will be transferred to the condensate stabilization facilities and the water will be sent to the produced water handling facilities.

Note: Slugging in the pipeline has not been investigated. A slug volume of 20m³ has been assumed for sizing purposes. A dynamic pipeline simulation would be required to accurately predict slug sizes.

Gas Treatment

Gas off the slug catcher will pass through a coalescing filter to ensure that there is no liquid carry over into the glycol dehydration unit. TEG will be contacted with the wet gas stream to remove water to the required dew point specification of 112 mg/Sm³.

The gas will then pass through a gas/gas exchanger where it will be cooled against the sales gas off the Low Temperature separator. After this preliminary cooling the dehydrated gas will be flashed across a Joule Thomson valve. The purpose of the valve is to drop the temperature to remove enough condensate to achieve the sales gas condensate dew point of 2°C at all pressures. The liquid condensed will be removed in the Low Temperature Separator and routed to the inlet liquid separator. The dew pointed gas will be cross-exchanged with the dehydrated gas before export to gas distribution system via the gas metering skid.

Minimum Operating Pressures

The inlet pressure to the J-T valve to achieve the hydrocarbon dew point when the LTS is operating at 4190 kPa (608 psi) is approximately 5900 kPa (856 psi). This equates to a minimum arrival pressure to the plant of approximately 6000 kPa.

Condensate Treatment

To achieve the Reid Vapour specification on the condensate of 12 psia at 100°F (82.7 kPa at 37.8°C) the condensate liquid from the inlet liquid separator will be fed to a fractionation column. The light ends of the column are compressed and recycled to the dehydration column feed. The stabilized condensate will be sent to tank farm for storage.



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Produced Water

Produced water from the Inlet Liquid Separator will be sent to the MEG regeneration facilities. MEG regeneration facilities are required to recycle the large volumes of MEG injection required for hydrate inhibition in the offshore pipeline.

Water from the MEG regeneration facilities plus water recovered from the TEG regeneration package are combined with water from the open drains and fed to an aeration pond. Water from the aeration pond will be combined with storm water and routed to holding ponds. Final water treatment will occur in an artificial wetland. The artificial wetland will need to be sized to meet an oil-in-water specification in the range of 10-20 ppm depending on regulatory requirements.

The proposed wetland cannot be sized specifically for Yolla at this stage as there is insufficient data available for the proposed onshore site. However, Worley has sized similar wetlands for other onshore gas plants including those for the Underground Gas Storage Project and the Minerva project. For the purposes of the cost estimate the UGS Project has been used as a basis as it is considered as most representative of the likely Yolla facilities. The UGS sizes can be considered as indicative of likely size of the Yolla facilities. The size of the UGS facilities are as follows:

- Primary Holding Tank – surface area when full 195m².
- Artificial wetland – surface area when full 270m².
- Storm Water Collection Pond – storage 5.6 mega litres, surface area when full 2290m².

There are other options for treating disposed water onshore if conditions at the Yolla site are not suited to this method.

Chemical Injection

The only allowance that has been made for chemical injection onshore is the injection of a stenchant into the sales gas stream.

Sales Gas Specification

The high level of carbon dioxide in the Yolla gas prevents the sales gas Wobbe Index meeting the specification range of 46-51 MJ/Sm³ without CO₂ removal facilities. The estimated Wobbe Index that could be achieved without CO₂ removal facilities is 39.4 MJ/Sm³. The gas gross heating value of the gas is 36.3 MJ/Sm³ which falls just inside the acceptable sales gas specification range of 36-42 MJ/Sm³.

Approximately 53% of the CO₂ would need to be removed to achieve a gas with a Wobbe Index value of 46 MJ/Sm³. At this level of CO₂ removal the GHV increases to 40.5 MJ/Sm³.

Methods of carbon dioxide removal are:

- Amine Absorption Contactor
- Membrane units
- Solid absorption beds



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In an amine absorption contactor the gas is contacted with a water amine solution, the CO₂ reacts with the amine and is taken with the amine solution to the amine regeneration package. As the amine is in solution with water the gas exiting the absorption contactor is saturated with water. Hence an amine contactor would need to be installed upstream on the dehydration unit.

Membrane units are suitable for carbon dioxide removal from dehydrated and dew pointed gas streams. A membrane unit could be installed for the gas stream exiting the low temperature separator.

Solid absorption beds are not believed to be suitable for this concentration of carbon dioxide.

The amine absorption contactor option has been selected for the cost estimation, but further investigation would be required to select the most suitable carbon dioxide removal option. It is estimated that an amine plant would cost in the order of A\$ 7 to 10 million.

If the gas is being sold to industrial users the option exists to relax the Wobbe specification and install burners suitable for the low Wobbe gas. This would need to be further investigated with the potential gas users to determine if their equipment could be modified.

4.2.3 Pipeline

Assuming the minimum required arrival pressure at the onshore processing facilities is 6000 kPa, the pressures required at the inlet to the 118 km pipeline have been estimated for various pipe sizes. Detailed pipeline simulations will be required to confirm these pressures.

Gas Rate	30.2 TJ/d	45.3 TJ/d	60.4 TJ/d
250 mm NS	8100 kPa	10000 kPa	12100 kPa
300 mm NS	7000 kPa	7900 kPa	9000 kPa
350 mm NS	6500 kPa	7000 kPa	7500 kPa
400 mm NS	6300 kPa	6600 kPa	6900 kPa

The three phase fluid flow in the pipeline forms a very corrosive environment. However as the temperature drops the corrosion rate associated with the carbon dioxide decreases rapidly. Preliminary calculations using the De Waards, Milliams and Lotz method have estimated the CO₂ corrosion rate listed in the table below. The use of corrosion inhibitor was not included in these calculations.



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Temperature	CO ₂ Corrosion Rate (mm/yr)	Years to 3.0 mm
0	0.027	112.4
10	0.051	58.4
35	0.181	16.6
45	0.286	10.5
60	0.539	5.6
75	0.953	3.1
90	1.625	1.8

The data indicates that once the fluid cools to seabed temperature (10°C), the corrosion associated with the high CO₂ levels will be acceptable. Preliminary pipeline models indicate that the temperature will reach 10°C in approximately 10 km, hence CRA cladding of the pipeline wall will only be required for the initial 10 km of line. Detailed calculations for the corrosion rate and heat transfer from the pipeline will need to be completed to confirm the above data. The cost estimate has been based on 30 km of CRA clad line. In the event that it is confirmed that 10 kms of CRA clad line is acceptable the cost of the NCC buoy development scenario will reduce by approximately A\$22.4 million.

Corrosion inhibitor is injected into the pipeline with the MEG stream. It may be possible to remove the need for CRA material in the pipeline by doing a more detailed study on the corrosion inhibitor concentrations. At the high CO₂ levels in the pipeline extensive testing of the corrosion inhibitors would be required to ensure that protection was adequate for the initial section of line.

4.2.4 Critique

Advantages:

- Well locations can be optimised to suit reservoir.
- Installation of the buoy is relatively simple with the buoy wet towed to site, upended and submerged via a clump weight attached to the bottom of the buoy. At the correct trim the tethers are locked to the gravity base by a ROV.
- Buoy can be fabricated in Australia.



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Disadvantages:

- Well intervention is more difficult and costly with subsea wells.
- Handling wet product requires the use of CRA clad export line for 10 to 30 km and/or high rates of chemical injection.
- High class rating for export pipeline due the absence of a PSV.
- Access for maintenance/refueling is limited by the sea state. This is anticipated to be a major problem in Bass Strait where a significant wave height greater than 2 m is exceeded 30% of the time. During construction boarding the East Spar buoy was considered hazardous in sea states exceeding a significant wave height of 1.5 m. In operational phase access has been considered hazardous at even lower sea states.
- Reliability of the communications links not proven over 120 kms.

4.2.5 Areas For Further Study for Scenario 1

Once the level of water production is confirmed, the issues relating to the offshore storage and injection of MEG/corrosion inhibitor need to be investigated. These include:

- Storage volumes and injection rates to be confirmed
- Confirm feasibility of subsea storage of MEG/corrosion inhibitor

Confirm the extent of CRA pipeline required by:

- Developing a detailed heat transfer model of the pipeline
- Carry out testing to assess if the injection of corrosion inhibitor would ensure that protection was adequate for the initial section of line.

Perform a slugging analysis of the pipeline in order to ensure design of adequate slug handling facilities onshore.

Confirm the communications requirements for the NCC Buoy. Preliminary advice is that a different system to that used on East Spar will be required for the Yolla location because of the greater distance involved.

In relation to the Buoy itself, preliminary analyses should be conducted as follows, to confirm size estimates and firm-up on costs:

- Determine antenna height and platform motion criteria for the communications requirements specific to the location;
- Determine sensitivity of the control buoy concept costs (fabrication and installation) to weight growth (since, in general, tension leg moored structures are sensitive to weight growth through pre-tension, buoyancy, displacement, hydrodynamic loading design spiral issues);
- Conduct a parametric study to investigate the influence of payload/motion requirements on the buoy displacement, gravity base structure size and mooring pre-tensions;



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- Conduct motion analyses to confirm communications uptime and boat access availability for replenishment of consumables and maintenance; and
- Consider alternative installation options.

Carry out preliminary RAM modelling to assess overall availability and confirm that it meets project requirements.

Perform further investigation into carbon dioxide removal options, to enable the produced gas to meet the Wobbe specification.

Perform an analysis of compression requirements by investigating operation at reduced reservoir pressures. Reduced reservoir pressures could also have an impact on equipment and pipeline sizes.

Perform a preliminary site investigation at the onshore gas plant site and prepare preliminary plant layouts to confirm quantity estimates.

Perform preliminary environmental and geotechnical site investigations at the offshore site to establish design criteria in these areas. The suitability of the seabed for the gravity based foundation needs to be verified.

4.3 Scenario 2: Steel Jacket, Minimal Offshore Processing

4.3.1 Description

A wellhead platform development with minimal offshore processing would consist of a four leg steel jacket to support a topsides weight of approximately 1,400 tonnes. Minimal processing would be performed on the platform and dry condensate/gas product exported to the onshore gas plant in Port Latta.

Helicopter and equipment/supplies by boat would transport maintenance personnel, at regular service intervals. The topsides will include a day room and an emergency living quarters for maintenance crews.

The topsides is expected to be a two level deck with the equipment generally located on the lower or cellar deck. The main deck will generally be kept clear to facilitate access by the jack-up drill rig and to provide a working area for well intervention equipment. Access to the wells by the jack-up is not considered to be an issue as similar platforms have been configured to give jack-up access to up to 18 wells. The topsides will also support a pedestal crane, a 50m flare boom and a helideck.

The jacket will be a four leg steel jacket with an estimated lift weight of 1836t. Foundations have been assumed to be two-stage drilled and grouted piles similar to those employed on the existing Bass Strait platforms.



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4.3.2 Process

In this option gas dehydration and condensate dewatering facilities will be located on an offshore platform. The dehydrated gas and condensate streams will then be recombined for export to shore via a two-phase line.

The processing facilities required on the platform for this scenario include the following items:

- cooling of the wellstream fluids prior to separation;
- separation of the wellstream fluid;
- dehydration of the gas;
- gross dewatering of the condensate;
- water treatment and disposal.

The multiphase gas/condensate pipeline to the onshore processing plant at Port Latta has been sized at DN300 (12-inch).

The onshore processing facilities required for this scenario include the following items:

- slug catcher for the incoming pipeline;
- heating of the wellstream fluids prior to separation;
- gas dew pointing to achieve sales gas specification;
- condensate stabilisation;

No allowance has been made for sales gas compression. The sales gas delivery pressure of 600 psi (~4140 kPa) has been assumed to be the operating pressure of the low temperature separator.

Offshore Facilities

Water dew pointing offshore will prevent hydrate formation and corrosion in the subsea pipeline to shore. The process facilities on the offshore platform will be for dehydration and produced water treatment only.

The topsides facilities have been designed for a minimum operating pressure of 8000 kPa based on the 300 mm NS subsea pipeline. If a larger pipeline size is selected, it is anticipated that the topsides will operate at a lower pressure and the size of the three-phase separator and gas contactor will need to be increased. A drop in operating pressure to 7000 kPa would increase the actual gas flow rate by 20%. The impact on the liquid handling facilities is not expected to be dramatic.

Separation

The wellstream will be cooled using air coolers to enable better separation in the three phase separator and to achieve a suitable gas temperature for feed to the gas dehydrator. Gas off the three phase separator will be routed to the dehydration facilities while the condensate phase will be sent to a coalescing filter for further water removal. The water off the separator, coalescing filter and TEG regeneration package will be sent to the produced water treatment facilities.



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Gas Treatment

Gas off the three-phase separator passes through a coalescing filter to ensure that there will be no liquid carry over into the glycol dehydration unit. TEG will be contacted with the wet gas stream to remove water so that when combined with the oil phase the combined two-phase stream dew point will be 112 mg/Sm³.

Produced Water

Produced water from the three-phase separator will be routed to a hydrocyclone unit before disposal overboard. The oil content of the discharged water will be reduced to less than 40 ppm in the hydrocyclone.

Onshore Facilities

Separation

Bulk liquid gas separation will occur at the inlet to the gas plant in the slug catcher. Gas will be routed to the gas dew pointing facilities while the condensate will be routed to the condensate flash vessel. The feed from the two-phase pipeline will be heated prior to entering the slug catcher to increase the gas that is recovered at the slug catcher.

Note: Slugging in the pipeline has not been investigated. A slug volume of 20m³ has been assumed for sizing purposes. A dynamic pipeline simulation would be required to accurately predict slug sizes.

Gas Dew Pointing

Gas off the slug catcher will pass through a gas/gas exchanger where it will be cooled against the sales gas off the Low Temperature separator. After this preliminary cooling the dehydrated gas will be flashed across a Joule Thomson valve. The purpose of the valve is to drop the temperature to remove enough condensate to achieve the sales gas condensate dew point of 2°C at all pressures. The liquid condensed will be removed in the Low Temperature Separator and routed to the condensate flash vessel. The dew pointed gas will be cross-exchanged with the dehydrated gas before export to gas distribution.

Minimum Operating Pressures

The inlet pressure to the J-T valve to achieve the hydrocarbon dew point when the LTS is operating at 4190 kPa (608 psi) is approximately 5900 kPa (856 psi). This equates to a minimum arrival pressure to the plant of approximately 6000 kPa.

Condensate Treatment

To achieve the Reid Vapour specification on the condensate of 12 psia at 100°F (82.7 kPa at 37.8°C) the condensate liquid from the inlet liquid separator will be fed to a fractionation column. The light ends of the column are compressed and recycled to the gas dew pointing facilities. The stabilized condensate will be sent to tank farm for storage.



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Chemical Injection

The only allowance that has been made for chemical injection onshore will be the injection of a stenchant into the sales gas stream.

Sales Gas Specification

As with Scenario 1 the high level of carbon dioxide in the Yolla gas prevents the sales gas Wobbe Index meeting the specification range of 46-51 MJ/Sm³ without CO₂ removal facilities. The estimated Wobbe Index that could be achieved without CO₂ removal facilities is 39.3 MJ/Sm³. The gas gross heating value of the gas is 36.2 MJ/Sm³ which falls just inside the acceptable sales gas specification range of 36-42 MJ/Sm³.

Approximately 53% of the CO₂ would need to be removed to achieve a gas with a Wobbe Index value of 46 MJ/Sm³ and a GHV of 40.5 MJ/Sm³.

For information on CO₂ removal options refer to comments in the Sales Gas Specification section in the NCC Buoy development scenario. It should be noted that the use of an amine absorption contactor in this option would also require the addition of a dehydration unit to the onshore plant. It is therefore considered that the use of membrane units should be considered for this scenario. The indicative cost of a membrane CO₂ removal unit is approximately A\$6 million.

4.3.3 Pipeline

Assuming a required arrival pressure at the onshore processing facilities is 6000 kPa, the pressures required at the inlet to the 118 km pipeline have been estimated as shown in the following table for various pipeline sizes.

Gas Rate	30.2 TJ/d	45.3 TJ/d	60.4 TJ/d
250 mm NS	7700 kPa	9400 kPa	11200 kPa
300 mm NS	6800 kPa	7600 kPa	8500 kPa
350 mm NS	6400 kPa	6800 kPa	7300 kPa
400 mm NS	6300 kPa	6500 kPa	6700 kPa

4.3.4 Platform Installation

The study has identified a topsides factored lift weight in the range of 1360 to 1575 tonnes (excluding lifting slings) depending on the flow rate. The jacket lift weight is estimated at approximately 1840 tonnes excluding lifting slings. This indicates that a crane barge with a capacity of around 2500 tonnes capacity will be required. There are currently four barges in the South East Asia region with capacities in this range. The barges are:

- McDermott - DLB30 Capacity 3100 s.t. (2820 tonnes) at 100 ft (33.5 m)
- Nippon Steel Corp. – Kuroshio 1 Capacity 2500 s.t. (2273 tonnes) at 40 m



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- Hyundai – HD-2500 Capacity 2500 s.t. (2273 tonnes) at 33 m
- Saipem – Pearl Marine data not available, but similar to Kuroshio 1

The first three barges are all combination derrick lay barges and therefore provide the option of using the barge to install the pipelines. The Pearl Marine does not have a pipe laying capacity but should not be excluded from consideration on this basis as there may be other options for installing the pipeline.

All of the barges above are flat bottomed and previous experience in Bass Strait indicates that weather downtime may be high with this type of barge. This should be investigated in future installation studies.

If it is decided to utilise one of the appraisal wells as a development well, the jacket could be docked over this existing well and the well tied back by the jack-up drill rig. To facilitate the docking of the jacket it would be necessary to provide a docking system to guide the jacket accurately to position and to protect the well. This docking system may take the form of two docking piles that would be installed adjacent to the well by means of a temporary template. Once the docking piles were installed, the relative positions of the piles and well would be accurately surveyed and a docking frame based on these measurements would be incorporated into the bottom bay of the jacket.

The major incremental costs associated with this scheme would be the cost of fabricating and installing the template and docking piles. This work needs to be carried out well in advance of the completion of the fabrication of the jacket to allow the results of the survey to be incorporated into the jacket fabrication. This potentially therefore needs the mobilisation of an additional vessel to install the template and piles. Alternatively the jack-up drill rig could carry out this work if it was planned in advance.

4.3.5 Critique

Advantages:

- Suited to long term application.
- Traditional structure with well proven fabrication/installation techniques.
- Well intervention is relatively simple compared to subsea wells, as the wellheads are out of the water and the platform provides a steady work base.
- The conductors, wellheads and risers are protected by the jacket structure.
- Jacket can be fabricated in Australia.
- Facility is not normally manned.
- Lower OPEX

Disadvantages:

- Slower shutdown response than a manned facility.
- Installation requires a crane barge. Installation barges in the South East Asian region are generally flat bottomed and these generally have a high rate of weather downtime in Bass Strait.



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4.3.6 Areas For Further Study for Scenario 2

Perform preliminary environmental and geotechnical site investigations at the offshore site to establish design criteria in these areas. Installation of the piled foundations is a major cost driver for the platform and the validity of the assumptions made in this study need to be verified.

Perform a preliminary site investigation at the onshore gas plant site and prepare preliminary plant layouts to confirm quantity estimates.

Perform installation workability studies to assess the level of weather downtime that may be expected with flat bottomed derrick barges.

Installation costs for the platform and pipeline are a major cost driver for this concept. A number of avenues could be investigated to reduce costs in this area including:

- Alternative installation vessels
- Alternative platform concepts e.g. a gravity based substructure (concrete or steel), a converted jack-up production barge, a "Stag" style concept with jackup barge carrying the topsides supported on a steel jacket.

Investigate the potential for slugging in the pipeline, in order to provide adequate slug handling facilities onshore.

Perform further investigation into carbon dioxide removal options, to enable the produced gas to meet the Wobbe specification.

Perform an analysis of compression requirements by investigating operation at reduced pressures. Reduced pressures could also have an impact on equipment and pipeline sizes.



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5 COSTING

5.1 Capital Cost Estimates

The scenarios described in Section 4 have been costed for capital expenditure. The capital costs are summarised in Table 5-1.

Detailed costing spreadsheets have been included in Attachments B and C.

Assumptions used in the capital cost estimates were:

- All costs are in 1999 Australian dollars (A\$).
- A conversion rate of 1 A\$ = 0.63 US\$.
- Scenario 1, pipeline and facilities installed by Allseas "Lorelay" pipelay vessel (US\$12.2M Mob/Demob, US\$250,000 day rate) with 10% weather downtime.
- Scenario 2, pipeline and facilities installed by McDermott "DLB30" derrick lay barge (US\$11.4M Mob/Demob, US\$275,000 day rate) with 30% weather downtime.
- For Scenario 1 the "first fill" of the MEG/corrosion inhibitor storage is included in the subsea equipment cost.
- Project contingency of 20% has been applied to all scenarios.
- Fabrication of facilities is assumed to occur in South Eastern Australia.
- Abandonment costs have been estimated as 15% of the offshore hookup and commissioning capital cost plus 70% of the buoy or platform installation cost. It has been assumed that the pipeline is abandoned in-situ.

The approach to the preparation of the capital cost estimates has been to use cost data available from other recent similar projects for which more detailed engineering has been completed.

The jacket weight for the WH platform has been estimated on the basis of a similar jacket from another project. A preliminary in-place analysis was performed using a maximum wave height of 19.5m which is typical for the existing Bass Strait platforms.

There has been some preliminary sizing of major equipment for the base case. Equipment sizes for other flow rates have been pro-rata'd and minor equipment and utilities equipment has been based on other similar equipment. The weight of bulks for the offshore facilities have been estimated by using bulk factors applied to the equipment weights. The bulk factors have been verified on a number of recent projects.

The accuracy of the capital costs has been subjectively assessed as being plus or minus 40% which is typical of this screening level study. A contingency of 20% has been applied to the base estimate to give the P₅₀ estimate i.e. where there is an equal chance of overrunning and underrunning the estimate within its accuracy range.



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Table 5-1 Capital Cost Estimates (A\$M)

Component	Scenario 1			Scenario 2		
	NCC Buoy and Subsea Production			Steel Jacket with Minimal Processing		
	Flow Case [TJ/day]			Flow Case [TJ/day]		
	30.2	45.3	60.4	30.2	45.3	60.4
Geotech/Environ Studies	2.5	2.5	2.5	2.5	2.5	2.5
Offshore Hook-up / Commissioning	0.4	0.4	0.4	5.7	6.2	6.6
Offshore Installation	78.0	78.0	78.0	86.7	86.7	86.7
Pipeline	43.0	43.0	46.6	20.4	20.4	22.3
Subsea Equipment	18.0	18.4	23.8	-	-	-
Buoy	13.9	14.5	15.5	-	-	-
Jacket	-	-	-	10.0	10.0	10.0
Topsides	-	-	-	31.4	34.6	36.9
Shore Crossing	4	4	4	4	4	4
Onshore Gas Plant	47.9	51.3	53.8	43.1	45.4	47.0
Indirects	46.5	47.6	50.4	46.5	48.1	49.5
Contingency	50.9	52.0	55.0	50.0	51.6	53.1
Total excluding drilling	305.2	311.7	330.0	300.2	309.4	318.5
Drilling	33.0	33.0	48.0	36.2	36.2	54.3
Total including drilling	338.2	344.7	378.0	336.4	345.6	372.8
Abandonment	19.7	19.7	19.7	44.1	44.2	44.3
FUTURE WELL COSTS (incl. Drilling)						
2007 Well (2 km)	39.3	39.3	39.3	23.6	23.6	23.6
Late Stage Well (4 km)	41.1	41.1	41.1	24.6	24.6	24.6



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5.2 Operating Cost Estimates

Operating cost (OPEX) forecasts have been developed for the two scenarios for which the capital cost estimates have been made and are presented in Table 5-2.

Detailed operating cost spreadsheets have been included in Attachments B and C.

Assumptions used in the operational cost estimates were:

- All costs are in 1999 Australian dollars (A\$).
- Internal pipeline survey using intelligent pigging, once every 5 years at A\$1M.
- Offshore pipeline external survey, once every 2 years at A\$250,000.
- Chemical injection costs A\$2/L.
- For Scenario 1 it has been assumed that 80% of the MEG/corrosion inhibitor injected offshore is recovered in the onshore MEG regeneration package and recycled.
- Offshore asset insurance, 0.7% of Capex of offshore assets.
- Onshore asset insurance, 0.4% of Capex of onshore assets.
- Contingency of 15%.

Table 5-2 Operational Cost Estimate (A\$/year)

	Scenario 1 NCC Buoy and Subsea Production	Scenario 2 Steel Jacket with Minimal Processing
45.3 TJ/day	17.3	14.5
30.2 TJ/day	16.3	14.3
60.4 TJ/day	18.9	15.1



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

6 SCHEDULING

High level project schedules have been produced for the two scenarios. These schedules include all activities from regulatory approvals, contract award, design, procurement, fabrication and installation to first gas. An arbitrary start date of 1st June 2000 has been assumed. These schedules are included in Attachment F.

In all cases the critical path runs through, regulatory approvals, contract award, design, long lead item procurement, fabrication and commissioning.

Overall schedule durations are presented in Table 6-1.

Table 6-1 Overall Schedule Duration

Scenario 1	Scenario 2
NCC Buoy and Subsea Production	Steel Jacket with Minimal Processing
29 months	30 months

There are several long lead items for the production facilities, including TEG and unit compressors, these are required to be purchased early on in the design to minimise the impact of the delivery time on the schedule. The subsea trees for Scenario 1 are also likely to be long lead items.



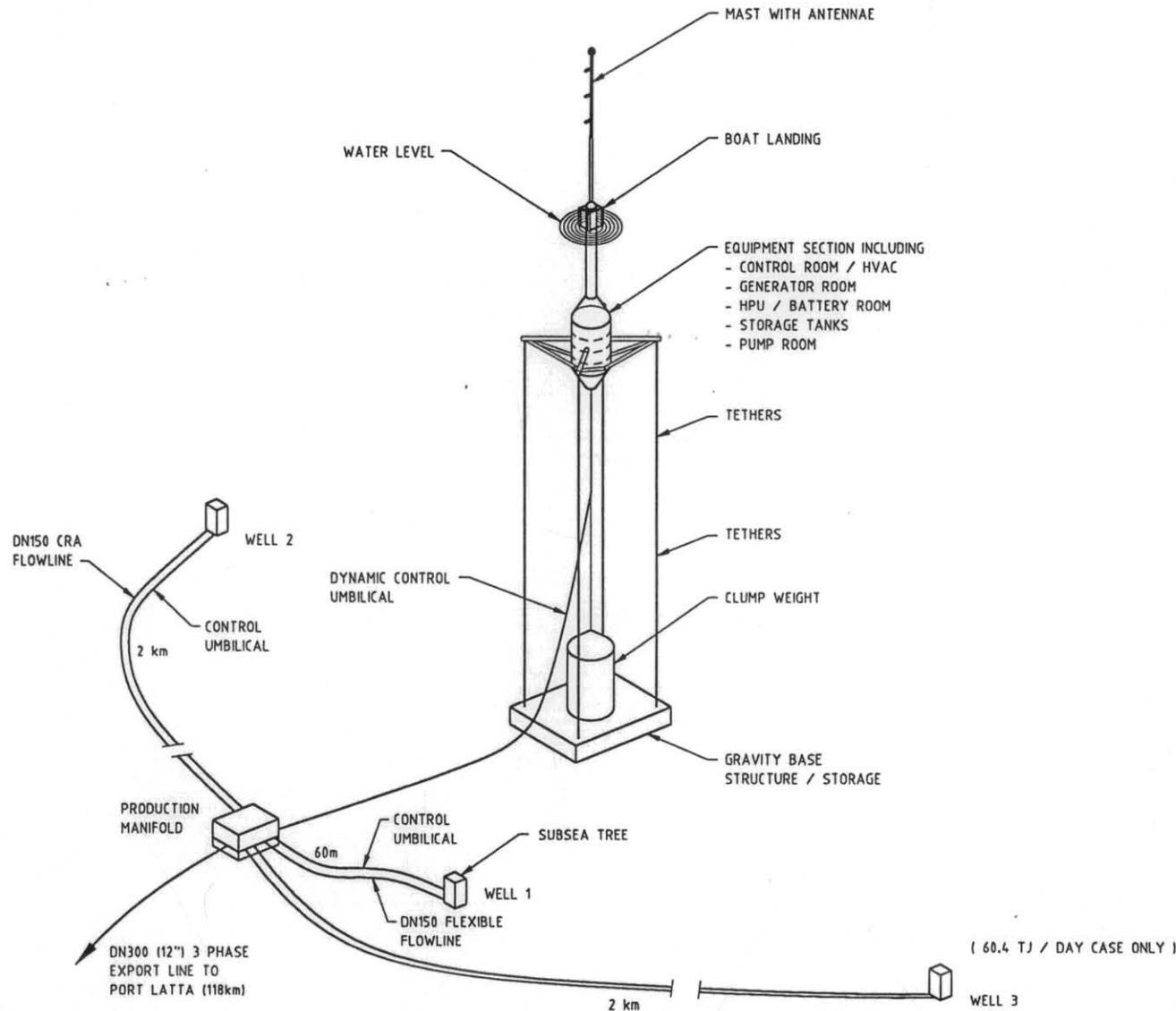
**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT A

Scenario Sketches

(2 Pages)

SCENARIO 1 - NCC BUOY, SUBSEA PRODUCTION



MAIN FEATURES

NCC BUDY

- RADIO / SATELITE LINK TO LAND
- CONTROL SYSTEM FOR SUBSEA WELLS
- POWER GENERATION
- BATTERY BACKUP
- DIESEL STORAGE
- PUMPING
- BOAT ACCESS
- MONTHLY REFILLING OF CONSUMABLES

SUBSEA PRODUCTION SYSTEM

- DN150 CRA FLOWLINES
- 5 WELL MANIFOLD
- CHEMICAL INJECTION VIA UMBILICAL
- DN300 EXPORT LINE (CRA CLAD FOR 10 TO 30 km)

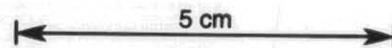
ONSHORE PRODUCTION SYSTEM

- SLUG CATCHER
- SEPARATOR
- DEHYDRATION GAS - TEG
- GAS DEWPOINTING
- CONDENSATE STABILISATION
- COMPRESSION
- CO₂ REMOVAL (OPTIONAL)

WELLS DRILLED BY JACK-UP RIG

PROS

- SUITED TO LONG TERM APPLICATION



CONS

- WELL INTERVENTION MAY BE DIFFICULT
- COMMUNICATIONS
- BOAT ACCESS LIMITED TO Hs ≤ 1.5m
- STORAGE OF MEG / CORROSION INHIBITOR
- CRA CLAD EXPORT LINE

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Worley

YOLLA - SCOPING STUDY

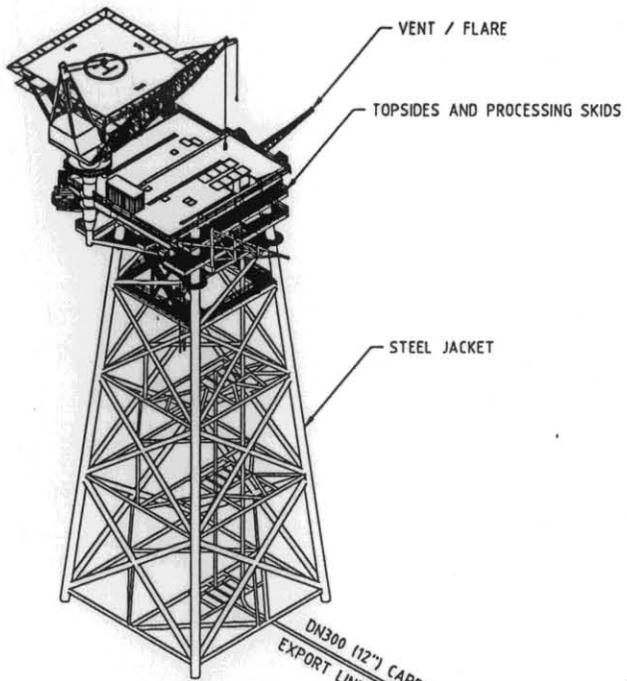


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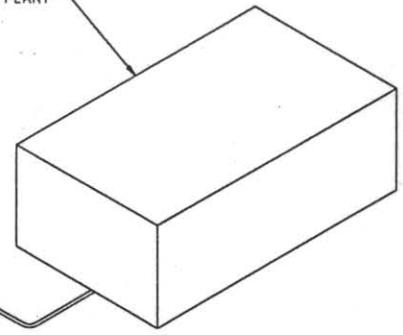
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SCENARIO 2 - STEEL JACKET, MINIMUM PROCESSING OFFSHORE



DN300 (12") CARBON STEEL 2 PHASE
EXPORT LINE TO PORT LATTA (118 km)

ONSHORE PROCESSING PLANT



PORT LATTA

MAIN FEATURES

OFFSHORE PROCESS FACILITIES

- COOLING
- SEPARATOR
- DEHYDRATION GAS - TEG
- DEWATER CONDENSATE - GROSS
- WATER HANDLING
- NO PUMPS / COMPRESSORS
- VENT / FLARE
- WELLHEADS ON JACKET (UP TO 6)
- NOT NORMALLY MANNED
- HELICOPTER ACCESS

ONSHORE PROCESS FACILITIES

- SLUG CATCHER
- GAS DEWPOINTING
- CONDENSATE STABILISATION
- COMPRESSION
- CO₂ REMOVAL (OPTIONAL)

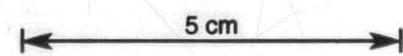
WELLS DRILLED BY JACK-UP RIG

PROS

- SUITED TO LONG TERM APPLICATION
- WELL INTERVENTION FROM PLATFORM
- WIRELINE ACTIVITIES CAN BE PREFORMED FROM PLATFORM

CONS

- REQUIRES CRANE BARGE FOR INSTALLATION
- COMMUNICATIONS



YOLLA - SCOPING STUDY



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**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT B

Detailed Cost Estimates – Scenario 1

(59 Pages)

Calculation No.	Description	No. of Pages
7903-CAL-001	NCC Buoy Equipment Cost Estimate	1
7903-CAL-002	NCC Buoy Procurement & Fabrication Cost Estimate	6
7903-CAL-003	Subsea Equipment Cost Estimate	3
7903-CAL-004	Pipeline Cost Estimate	2
7903-CAL-005	Offshore Installation Cost Estimate	3
7903-CAL-006	Onshore Gas Plant Equipment Cost Estimate	6
7903-CAL-007	Onshore Gas Plant Construction Cost Estimate-45.3 TJ/d	11
7903-CAL-008	Onshore Gas Plant Construction Cost Estimate-30.2 TJ/d	11
7903-CAL-009	Onshore Gas Plant Construction Cost Estimate-60.4 TJ/d	11
7903-CAL-010	Future Wells Cost Estimate	2
7903-CAL-011	Opex Estimate	3

BORAL ENERGY			Calc. No: 7903-CAL-001		Page: 1 of 1						
Yolla Field Development			Revision: A		Project No.: 08407903						
Scenario 1: NCC Buoy			By: S Kennedy		Date: 15-Mar-99						
NCC Buoy Equipment Cost Estimate			Checked: B Smith		 Worley Limited						
			File K:\WL\08407903\COST\NCCOFFEQ.XLS\NCC								
Equipment No	Number off	Capacity each (%)	Description	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost US\$,000	Procurement Cost US\$,000	Comments
				Dry tonnes	Operating	Total					
Subsea											
W-1001/2/3/4	2	50	Subsea Wellhead								3 & 4 Future- Incl. in subsea cost
V-1001	1	100	Pig Launcher	4.0							Temporary Subsea Launcher - Incl. in subsea cost
NCC Buoy											
U-1003	1	100	Hydraulic Power Unit	2.0			10%	2.2			Incl. in subsea cost.
U-1005	1	100	Inhibitor Injection Package	2.0			10%	2.2	47.5	104.5	MEG and Corrosion Inhibitor are premixed
T-1005	1	100	Inhibitor Storage Tank	0.7			10%	0.8	5.5	4.2	
P-1005A/B	2	100	Inhibitor Lift Pumps	0.5			10%	1.1	50.0	55.0	
Diesel Fuel System											
T2801	1	100	Diesel Storage Tank	10.0			10%	11.0	7.5	82.5	
P-2802A/B	2	100	Diesel Transfer Pumps	0.2			10%	0.4	28.0	12.3	
F-2801	1	100	Diesel Transfer filter	0.5			10%	0.6	25.5	14.0	
Power Generation											
BC-2801	1	100	24 V DC System	2.5			10%	2.8	25.0	68.8	Incl. in generator weight
CP-2801	1	100	Diesel Engine Generator Control Panel				10%	0.0			
G-2801A/B/C/D	4	100	415V Diesel Generator	2.0			10%	8.8	30.0	264.0	
UPS-2801	1	100	UPS System	2.5			10%	2.8	25.0	68.8	
	1	100	Navaisds System	0.5			10%	0.6	81.0	44.6	
Telecomms											
	1		Telecomms System	1.5			10%	1.7	100.0	165.0	
Instrument/Controls											
	1		DCS/PSS	0.5			10%	0.6		200.0	Allowance
Miscellaneous											
	1	100	Electric Hoist	1.5			10%	1.7		50.0	Allowance
	2	100	Ballast Pumps	0.5			10%	1.1	22.0	24.2	
	1	100	HVAC Fans & Chiller	1.0			10%	1.1	46.7	51.4	
	1	100	Subsea Control Panel	1.0			10%	1.1			Incl. in subsea cost
	1	100	J Tube Termination	0.3			10%	0.3		20.0	
	1	100	Materials Handling	0.2			10%	0.2	13.1	20.0	

40.8	Subtotal	1249.2
Commissioning Spares 1.5%		18.7
Operating Spares 5%		62.5
TOTAL EQUIPMENT COST		1330.4

Bulks Estimate			
	Weight(t)	Rate	
Electrical	4.1	15.0	61.2
Instruments	4.1	35.0	142.8
Piping	20.4	16.3	332.6
Structural	27.8	0.8	20.8
	56.3		557.5

TOTAL 1887.9

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BORAL ENERGY

Yolla Field Development



Calc. No: 7903-CAL-002

Page : 1 of 6

By: Brian Smith *BS*Checked: Ian Neill *IN***Scenario 1: NCC Buoy - Base Case****NCC Buoy Procurement Cost Estimate Bulk Items**

File K:\WL\08407903\COST\NCCOFFBY.XLS]Buoy Procure

Item	Quantity	Unit	Procurement Rate US\$,000/Unit	Procurement Cost US\$,000
Mooring Component Costs				
Tethers 102mm dia sheather spiral strand - 4 d	85	m	0.284	96.56
Terminations & Shackles	1	LS	100.0	100
Buoy Costs				
Buoy Structure	367.0	t	0.75	275.3
Bulks				
Electrical	4.1	t	15.0	61.2
Instruments	4.1	t	35.0	142.8
Piping	20.4	t	16.3	332.6
Fitout Steel	27.8	t	0.8	20.8
Clump Weight Costs				
Clump Weight Structure	135.8	t	0.750	101.9
Ballast(Iron Ore)	407.5	t	0.045	18.3
Flooding System	5.0	t	1.500	7.5
Anodes	11.3	t	2.511	28.3
GBS Costs				
Gravity Base Structure	235.2	t	0.750	176
Ballast (Iron Ore)	2822.4	t	0.045	127
MEG/Inhibitor Tanks	382.0	t	0.750	286.5
Piping for MEG/Inhibitor	5.0	t	20.000	100.0
Anodes	49.4	t	2.511	124.0
TOTAL PROCUREMENT	4477			1999.2

BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-002

Page :

2 of 6

By: Brian Smith

Checked: Ian Neill

Scenario 1: NCC Buoy-Base Case
NCC Buoy Fabrication Cost Estimate

File K:\WL08407903\COST\NCCOFFBY.XLS]Buoy Fabrication

Item	Quantity	Unit	Fabrication Rate US\$,000/unit	Fabrication Cost US \$,000
Buoy Costs*				
Equipment	40.8	t	1.30	53.1
Sub-Total	40.8			53.1
Buoy Structure	367.0	t	4.5	1651.5
Bulks				
Electrical	4.1	t	12.0	49.0
Instruments	4.1	t	6.0	24.5
Piping	20.4	t	10.0	204.1
Fitout Steel	27.8	t	5.0	138.8
Clump Weight Costs				
Clump Weight Structure	135.8	t	4.5	611.3
Ballast(Iron Ore)	407.5	t	0.2	81.5
Flooding System	5.0	t	4.5	22.5
Anodes	11.3	t	1.400	15.8
GBS Costs				
Gravity Base Structure	235	t	3.000	705.6
MEG/Inhibitor Tanks	382.0	t	4.500	1719.0
Piping for MEG/Inhibitor	5.0	t	20.000	100.0
Anodes	49.4	t	1.400	69.1
Sub-Total	1654.6			5392.6
Onshore Commissioning				
10 people x 50hrs/wk x 6 wks	3000	m-hrs	0.04	120.0
Loadout				
1655t-408t iron ore x 5 m-hr/t	6235	m-hrs	0.04	249.4
Sub-Total	9235			369.4
TOTAL FABRICATION				5815.1
Offshore Commissioning	3000	m-hrs	0.09	270.0

BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-002

Page : 3 of 6

By: Brian Smith

Checked: Ian Neill

Scenario 1: NCC Buoy-30.2 TJ/day

NCC Buoy Procurement Cost Estimate Bulk Items

File: K:\WL\08407903\COST\NCCOFFBY.XLS\Buoy Procure (30.2)

Item	Quantity	Unit	Procurement Rate US\$,000/Unit	Procurement Cost US\$,000
Mooring Component Costs				
Tethers 102mm dia sheather spiral strand - 4 c	85	m	0.284	96.56
Terminations & Shackles	1	LS	100.0	100
Buoy Costs*				
Buoy Structure	367.0	t	0.75	275.3
Bulks				
Electrical	4.1	t	15.0	61.2
Instruments	4.1	t	35.0	142.8
Piping	20.4	t	16.3	332.6
Fitout Steel	27.8	t	0.8	20.8
Clump Weight Costs				
Clump Weight Structure	135.8	t	0.750	101.9
Ballast(Iron Ore)	407.5	t	0.045	18.3
Flooding System	5.0	t	1.500	7.5
Anodes	11.3	t	2.511	28.3
GBS Costs				
Gravity Base Structure	235.2	t	0.750	176
Ballast (Iron Ore)	2822.4	t	0.045	127
MEG/Inhibitor Tanks	320.0	t	0.750	240.0
Piping for MEG/Inhibitor	5.0	t	20.000	100.0
Anodes	44.4	t	2.511	111.5
TOTAL PROCUREMENT	4410			1940.2

BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-002

Page : 4 of 6

By: Brian Smith *BS*Checked: Ian Neill *IN*

Scenario 1: NCC Buoy-30.2 TJ/day
NCC Buoy Fabrication Cost Estimate

File K:\WL\08407903\COST\NCCOFFBY.XLS\Buoy Fabrication (30.2)

Item	Quantity	Unit	Fabrication Rate US\$,000/unit	Fabrication Cost US \$,000
Buoy Costs*				
Equipment	40.8	t	1.30	53.1
Sub-Total	40.8			53.1
Buoy Structure	367.0	t	4.5	1651.5
Bulks				
Electrical	4.1	t	12.0	49.0
Instruments	4.1	t	6.0	24.5
Piping	20.4	t	10.0	204.1
Fitout Steel	27.8	t	5.0	138.8
Clump Weight Costs				
Clump Weight Structure	135.8	t	4.5	611.3
Ballast(Iron Ore)	407.5	t	0.2	81.5
Flooding System	5.0	t	4.5	22.5
Anodes	11.3	t	1.400	15.8
GBS Costs				
Gravity Base Structure	235	t	3.000	705.6
MEG/Inhibitor Tanks	320.0	t	4.500	1440.0
Piping for MEG/Inhibitor	5.0	t	20.000	100.0
Anodes	44.4	t	1.400	62.2
Sub-Total	1587.6			5106.7
Onshore Commissioning				
10 people x 50hrs/wk x 6 wks	3000	m-hrs	0.04	120.0
Loadout				
1588t-408t iron ore x 5 m-hr/t	5900	m-hrs	0.04	236.0
Sub-Total	8900			356.0
TOTAL FABRICATION				5515.7
Offshore Commissioning	3000	m-hrs	0.09	270.0

BORAL ENERGY		BORAL ENERGY		Calc. No: 7903-CAL-002	
Yolla Field Development				Page : 5 of 6	
Scenario 1: NCC Buoy-60.4 TJ/day				By: Brian Smith	
NCC Buoy Procurement Cost Estimate Bulk Items				Checked: Ian Neill	
File K:\WL\08407903\COST\NCCOFFBY.XLS]Buoy Procure (60.4)					
Item	Quantity	Unit	Procurement Rate US\$,000/Unit	Procurement Cost US\$,000	
Mooring Component Costs					
Tethers 102mm dia sheather spiral strand - 4 c	85	m	0.284	96.56	
Terminations & Shackles	1	LS	100.0	100	
Buoy Costs*					
Buoy Structure	367.0	t	0.75	275.3	
Bulks					
Electrical	4.1	t	15.0	61.2	
Instruments	4.1	t	35.0	142.8	
Piping	20.4	t	16.3	332.6	
Fitout Steel	27.8	t	0.8	20.8	
Clump Weight Costs					
Clump Weight Structure	135.8	t	0.750	101.9	
Ballast(Iron Ore)	407.5	t	0.045	18.3	
Flooding System	5.0	t	1.500	7.5	
Anodes	11.3	t	2.511	28.3	
GBS Costs					
Gravity Base Structure	235.2	t	0.750	176	
Ballast (Iron Ore)	2822.4	t	0.045	127	
MEG/Inhibitor Tanks	488.0	t	0.750	366.0	
Piping for MEG/Inhibitor	5.0	t	20.000	100.0	
Anodes	57.9	t	2.511	145.3	
TOTAL PROCUREMENT	4591			2100.0	

BORAL ENERGY		BORAL ENERGY		Calc. No: 7903-CAL-002	
Yolla Field Development				Page : 6 of 6	
Scenario 1: NCC Buoy-60.4 TJ/day				By: Brian Smith <i>BS</i>	
NCC Buoy Fabrication Cost Estimate				Checked: Ian Neill <i>IN</i>	
File K:\WL\08407903\COST\NCCOFFBY.XLS\Buoy Fabrication (60.4)					
Item	Quantity	Unit	Fabrication Rate US\$,000/unit	Fabrication Cost US \$,000	
Buoy Costs*					
Equipment	40.8	t	1.30	53.1	
Sub-Total	40.8			53.1	
Buoy Structure	367.0	t	4.5	1651.5	
Bulks					
Electrical	4.1	t	12.0	49.0	
Instruments	4.1	t	6.0	24.5	
Piping	20.4	t	10.0	204.1	
Fitout Steel	27.8	t	5.0	138.8	
Clump Weight Costs					
Clump Weight Structure	135.8	t	4.5	611.3	
Ballast(Iron Ore)	407.5	t	0.2	81.5	
Flooding System	5.0	t	4.5	22.5	
Anodes	11.3	t	1.400	15.8	
GBS Costs					
Gravity Base Structure	235	t	3.000	705.6	
MEG/Inhibitor Tanks	488.0	t	4.500	2196.0	
Piping for MEG/Inhibitor	5.0	t	20.000	100.0	
Anodes	57.9	t	1.400	81.0	
Sub-Total	1769.0			5881.5	
Onshore Commissioning					
10 people x 50hrs/wk x 6 wks	3000	m-hrs	0.04	120.0	
Loadout					
1769t-408t iron ore x 5 m-hr/t	6807	m-hrs	0.04	272.3	
Sub-Total	9807			392.3	
TOTAL FABRICATION				6326.8	
Offshore Commissioning	3000	m-hrs	0.09	270.0	



Subsea Equipment Cost Estimate

Yolla Development Scenario 1 - NCC Buoy(45.3 TJ/d)



Project Title	Yolla Study	Calc No	7903-CAL-003
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL108407903\COST\NCCSUBEQ.XLS\subsea		
		Page	1 of 3

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in <i>W</i>	<i>FGM</i>						

	Description	Unit	A\$/Unit	Quantity	A\$
1	Subsea Trees				
1.1	Subsea Completions (inc. tree, choke, wellhead & tubing hanger sys	ea	4300000	2	8,600,000
1.2	Wellhead/Tubing hanger running and test tool	lot	750000	1	750,000
1.3	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				9,500,000
2	Manifold				
2.1	5 well manifold	ea	5500000	1	5,500,000
2.2	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				5,650,000
3	Flowlines				
3.1	DN150 Jumpers between flowline and well or manifold	ea	75000	3	225,000
	Subtotal				225,000
4	Connectors				
4.1	DN150 Jumper - Diverless	ea	100000	6	600,000
4.2	DN300 Export - Flange	ea	15000	1	15,000
	Subtotal				615,000
5	Control System				
5.1	Hydraulic power unit	ea	500000	1	500,000
5.2	Well control panel	lot	450000	1	450,000
5.3	Control umbilical (dynamic)	m	1000	150	150,000
5.4	Umbilical jumpers	ea	50000	2	100,000
	Subtotal				1,200,000
6	Chemical Injection				
6.1	First fill of injection fluid	L	2	628000	1,256,000
	Subtotal				1,256,000
	TOTAL				18,446,000



Subsea Equipment Cost Estimate

Yolla Development Scenario 1 - NCC Buoy(30.2 TJ/d)



Project Title	Yolla Study	Calc No	7903-CAL-003
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCSUBEQ.XLS\subsea	Page	2 of 3

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in <i>MS</i>	FL						

	Description	Unit	AS/Unit	Quantity	AS
1	Subsea Trees				
1.1	Subsea Completions (inc. tree, choke, wellhead & tubing hanger sys)	ea	4300000	2	8,600,000
1.2	Wellhead/Tubing hanger running and test tool	lot	750000	1	750,000
1.3	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				9,500,000
2	Manifold				
2.1	5 well manifold	ea	5500000	1	5,500,000
2.2	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				5,650,000
3	Flowlines				
3.1	DN150 Jumpers between flowline and well or manifold	ea	75000	3	225,000
	Subtotal				225,000
4	Connectors				
4.1	DN150 Jumper - Diverless	ea	100000	6	600,000
4.2	DN300 Export - Flange	ea	15000	1	15,000
	Subtotal				615,000
5	Control System				
5.1	Hydraulic power unit	ea	500000	1	500,000
5.2	Well control panel	lot	450000	1	450,000
5.3	Control umbilical (dynamic)	m	1000	150	150,000
5.4	Umbilical jumpers	ea	50000	2	100,000
	Subtotal				1,200,000
6	Chemical Injection				
6.1	First fill of injection fluid	L	2	420000	840,000
	Subtotal				840,000
	TOTAL				18,030,000



Subsea Equipment Cost Estimate

Yolla Development Scenario 1 - NCC Buoy (60.4 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-003
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCSUBEQ.XLS\subsea	Page	3 of 3

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in (signature)	FL						

	Description	Unit	AS/Unit	Quantity	AS
1	Subsea Trees				
1.1	Subsea Completions (inc. tree, choke, wellhead & tubing hanger sys)	ea	4300000	3	12,900,000
1.2	Wellhead/Tubing hanger running and test tool	lot	750000	1	750,000
1.3	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				13,800,000
2	Manifold				
2.1	5 well manifold	ea	5500000	1	5,500,000
2.2	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				6,650,000
3	Flowlines				
3.1	DN150 Jumpers between flowline and well or manifold	ea	75000	5	375,000
	Subtotal				375,000
4	Connectors				
4.1	DN150 Jumper - Diverless	ea	100000	10	1,000,000
4.2	DN300 Export - Flange	ea	15000	1	15,000
	Subtotal				1,015,000
5	Control System				
5.1	Hydraulic power unit	ea	500000	1	500,000
5.2	Well control panel	lot	450000	1	450,000
5.3	Control umbilical (dynamic)	m	1000	150	150,000
5.4	Umbilical jumpers	ea	50000	3	150,000
	Subtotal				1,250,000
6	Chemical Injection				
6.1	First fill of injection fluid	L	2	835240	1,670,480
	Subtotal				1,670,480
	TOTAL				23,760,480



Offshore Pipeline Cost Estimate

Yolla Development Scenario 1 - NCC Buoy (45.3 & 30.2 TJ/d)



REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in	FL		B	9 April 1999	in	FL	

Calc No 7903-CAL-004
 Project No 084/07903
 Phase / CTR 000
 Page 1 of 2

Project Title Yolla Study
 Client Boral Energy Resources Limited
 Calculation Title CAPEX
 File Location K:\WL\08407903\COST\NCCSUM.XLS\summ1 base

DN300 118 km 3 phase export line to Port Latta
 API Grade X65 seamless ANSI class 1500 10 km of CRA (316L) lined 3 mm CS wall thickness 12.7/ 15.9 mrr
 FBE coated 1-inch high density concrete weight coating

	Description	Unit	AS/Unit	Quantity	AS
1	Line Pipe				
1.1	DN300 3 Phase Export, CRA lined (3mm) CS wt = 12.7	m	750	30900	23,175,000
1.2	DN300 3 Phase Export, CS wt = 15.9	m	145	90640	13,142,800
1.3	DN150 CRA lined infield flowlines	m	375	2000	750,000
1.4	Transportation of coated line pipe to barge	tonne	150	24091	3,613,656
	Subtotal				37,067,800
2	Connectors				
	Included in subsea equipment				
3	Coatings				
3.1	Anti-corrosion coating	sq-m	15	123655	1,854,831
3.2	Concrete weight coating	cub-m	800	3340	2,671,659
3.3	Field joint coating	ea	80	9963	797,040
	Subtotal				5,323,529
4	Cathodic Protection				
4.1	Aluminium Anodes	tonne	3500	147	513,701
4.2	Installation of anodes to line pipe	ea	125	997	124,625
	Subtotal				638,326
	SUBTOTAL				43,029,655



Offshore Pipeline Cost Estimate

Yolla Development Scenario 1 - NCC Buoy (60.4 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-004
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCSUM.XLS\summ1 base		
		Page	2 of 2

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in	FL		A	9 Apr. 99	<i>[Signature]</i>	<i>[Signature]</i>	

DN350 118 km 3 phase export line to Port Latt:
 API Grade X65 seamless ANSI class 1500 10 km of CRA (316L) lined 3 mm CS wall thickness 12.7/ 15.9 mm
 FBE coated 1-inch high density concrete weight coating

	Description	Unit	A\$/Unit	Quantity	AS
1	Line Pipe				
1.1	DN350 3 Phase Export, CRA lined (3mm) CS wt = 12.7	m	815	30900	25,183,500
1.2	DN350 3 Phase Export, CS wt = 15.9	m	148	90640	13,414,720
1.3	DN150 CRA lined infield flowlines	m	375	4000	1,500,000
1.4	Transportation of coated line pipe to barge	tonne	150	24091	3,613,656
	Subtotal				40,098,220
2	Connectors				
	Included in subsea equipment				
3	Coatings				
3.1	Anti-corrosion coating	sq-m	15	135778	2,036,677
3.2	Concrete weight coating	cub-m	800	3633	2,906,484
3.3	Field joint coating	ea	90	9963	896,670
	Subtotal				5,839,830
4	Cathodic Protection				
4.1	Aluminium Anodes	tonne	3500	162	566,577
4.2	Installation of anodes to line pipe	ea	125	997	124,625
	Subtotal				691,202
	SUBTOTAL				46,629,252

BORAL ENERGY		Calc :	7903-CAL-005	Page :	1 of 3
Yolla Field Development		By :	Brian Smith <i>BS</i>	Revision :	A
Scenario 2- NCC Buoy		Checked By :	Ian Neill <i>IN</i>	Date :	15-Mar-99
Installation Cost Summary		File Location :	K:\WL\08407903\COST\NCCOFFIC.XLS\SUMMARY		
DESCRIPTION	COST USD	VESSEL(S) ASSUMED FOR COSTING			
INSTALLATION OF NCC Buoy					
OIC Management/Engineering/Procurement	827,500				
Transport Structures to Site	3,402,180	Tugs & Cargo Barges			
Install Structures	7,896,275	Pipelay Vessel "Lorelay"			
	12,125,955				
INSTALLATION & TRENCHING OF PIPELINE					
OIC Management/Engineering/Procurement	365,000				
Installation of Pipeline	32,103,665	Pipelay Vessel "Lorelay"			
Trenching of Pipeline	4,535,000				
	37,003,665				
ESTIMATED COST OF INFIELD FACILITIES INSTALLATION		\$49,129,620			

BORAL ENERGY		Calc :	7903-CAL-005	Page :	2 of 3
Yolla Field Development		By :	Brian Smith <i>BS</i>	Revision :	A
Scenario 2- NCC Buoy		Checked By :	Ian Neill <i>IN</i>	Date :	15-Mar-99
Buoy Installation Cost Estimate		File Location :	K:\WL\08407903\COST\NCCOFFIC.XLS\NCC BUOY		
		Unit	No. Off	Unit Rate US\$	Cost US\$
OIC Management/Engineering/Procurement					
Project Management		hrs	2,000	100	200,000
Engineering		hrs	3,000	90	270,000
Fabrication & Procurement - from breakdown in Data Base		LS	1	357,500	357,500
				Subtotal	827,500
Total Cost of OIC Management/Engineering/Procurement					827,500
Transport Structures & Temporary Works to Site					
Transportation					
Grillages & Seafastening - Jacket/Piles/Deck		LS	1	79,200	79,200
Mob/Demob Transport Barge (400') Spread at Singapore		LS	1	79,100	79,100
Tow Transport Barge Singapore Area-Fabrication Site(Adelaide)		days	35	29,900	1,046,500
Load Out & Seafasten Storage Tanks & Gravity Anchor Box		days	4	27,200	108,800
Tow Transport Barge Fabrication Site-Site		days	4	29,900	119,600
Barge at Site		days	25	27,200	684,080
Tow Barge Site-Singapore		days	33	29,900	986,700
Clean Up Barge		days	2	7,000	14,000
Load-out Buoy		days	2	20,200	40,400
Wet Tow Buoy Fab Site to Site		days	4	22,900	91,600
Load-out Clump Weight		days	2	20,200	40,400
Wet Tow Clump Weight Fab Site to Port Latta		days	4	22,900	91,600
Ballast Clump Weight with Iron Ore		days	1	20,200	20,200
Wet Tow Clump Weight Port Latta to Site		days	1	22,900	11,450
		days	116	Subtotal	3,402,180
Total Cost of Transportation					3,402,180
Install Structures					
Mobilise/Demobilise Fall Pipe Spread					
Mob/Demob Fallpipe Vessel Spread Singapore-Site		LS	1	3,520,000	3,520,000
				Subtotal	3,520,000
Platform Installation					
Laybarge at Site Setup/Seabed Survey		days	1	250,000	250,000
Lift and Install GBS Box		days	1	250,000	250,000
Fill GBS with Ballast		days	6	55,000	330,000
Attach Buoy tethers to GBS		days	0.5	250,000	125,000
Prepare Clump Weight and Buoy		days	1.0	250,000	250,000
Ballast Clump Weight and Upend Buoy		days	2	250,000	500,000
Attach Tethers to Buoy		days	2	250,000	500,000
Lift and Install Corrosion Inhibitor Tank Pod No1		days	1	250,000	250,000
Lift and Install Corrosion Inhibitor Tank Pod No2		days	1	250,000	250,000
Tie-In Tanks at Base		days	1	250,000	250,000
30% Weather Downtime		days	5.0	250,000	1,237,500
		days	21.5	Subtotal	4,192,500
Helicopters					
Helicopter Costs Allocated to this Part of the Work				Subtotal	183,775
Total Cost of Installation					7,896,275
ESTIMATED COST FOR TRANSPORTATION & INSTALLATION OF GBS, CLUMP WEIGHT & BUOY				US\$	12,125,955
BARGE DURATIONS AT OFFSHORE SITE					
GBS & Storage Tank Barge					
Standby on Arrival at Offshore Site		5.0			
Install WHP Jacket & Deck		15.5			
30% Weather Downtime		4.7			
	Duration at Offshore Site	25.2	days		

BORAL ENERGY			Calc :	7903-CAL-005	Page :	3 of 3
Yolla Field Development			By :	Brian Smith <i>BS</i>	Revision :	A
Scenario 2- NCC Buoy			Checked By :	Ian Neill <i>IN</i>	Date :	15-Mar-99
Pipeline Installation Cost Estimate			File Location :	K:\WL\08407903\COST\NCCOFFIC.XLS\PIPELINE		
	Unit	No. Off	Unit Rate US\$	Cost US\$		
OIC Management/Engineering/Procurement						
OIC - Pipelines Installation						
Project Management	hrs	700	100	70,000		
Engineering	hrs	1,500	90	135,000		
Fabrication & Procurement - from breakdown in Data Base	LS	1	160,000	160,000		
			Subtotal	365,000		
Total Cost of OIC Management/Engineering/Procurement				Subtotal	365,000	
Pipeline Installation						
Mobilise/Demobilise Lay Barge Spread						
Rig Up and Mob/Demob Derrick Vessel Spread Singapore-Site	LS	1	12,100,100	12,100,100		
			Subtotal	12,100,100		
Tie In at Shore Crossing	days	2	250,000	500,000		
Lay CS Pipeline @ 3000m/day for 88 km	days	29.33	250,000	7,332,500		
Change over /setup for CRA	days	1	250,000	250,000		
Lay CRA Pipeline @ 1000m/day for 30 km	days	30	250,000	7,500,000		
Install manifold connected to export Line	days	2	250,000	500,000		
Lay DN 150 CRA Flowlines to wells @ 1000m/day for 2 km	days	2	250,000	500,000		
Tie In Jumper lines/umbilicals at Buoy	days	4	250,000	1,000,000		
10% Weather Downtime	days	7.0	250,000	1,758,250		
		77.4	Subtotal	19,340,750		
Helicopters						
Helicopter Costs Allocated to this Part of the Work			Subtotal	662,815		
Total Cost Install Pipeline					32,103,665	
Pipeline Stabilisation						
Mobilise/Demobilise Stabilisation Spread						
Mob/Demob Stabilisation Vessel Spread Singapore-Site	LS	1	2,000,000	2,000,000		
			Subtotal	2,000,000		
Trenching/Additional Stabilisation 10.0km @ 500m day	days	20	65,000	1,300,000		
Span rectification	days	10	65,000	650,000		
30% Weather Downtime	days	9.0	65,000	585,000		
		39	Subtotal	2,535,000		
Total Cost For Trenching Pipeline					4,535,000	
ESTIMATED COST FOR INSTALLATION & TRENCHING OF PIPELINE					37,003,665	

BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-006 Sheet: 1 of 3 (a)
Revision: A Project No.: 08407903
By: S Kennedy *SK* Date: 15/3/99
Checked: B Smith *BS*
File: K:\WL\08407903\COST\NCCONSEQ.XLS\NCC



Worley Limited

Scenario 1: NCC Buoy - Base Case
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity each (%)	Description	Electrical Power KW	Duty KW	Unit Size L x W x H or T/T x ID m	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost A\$,000/t	Procurement Cost A\$,000	Comments
							Dry tonnes	Operating	Total					
Inlet and Gas Conditioning														
V-2002	1	100	Pig Receiver			4.4 x 0.4	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater		1032	4.9 x 0.4	2.4	2.6		10%	2.64	25.0	68.0	Shell and Tube
E-2121	1	100	Dry Gas/Gas Cooler		635	3.7 x 0.89	10.5	10.7		10%	11.55	15.0	173.3	Shell and Tube
F-2111A/B	2	100	Inlet Gas Filter			2.0 x 0.45	2.8			10%	6.16	24.5	150.9	Horizontal
V-2101	1	100	Slug catcher			10.0 x 2.0	41	57		10%	45.1	15.6	703.8	Horizontal
V-2201	1	100	Inlet Liquid Separator			3.3 x 0.9	2.4	3		10%	2.64	24.5	64.7	Horizontal
Cold Separation														
V-2122	1	100	Low Temperature Separator			2.5 x 0.8	2.9	3.3		10%	3.19	8.2	26.2	Vertical
Glycol Dehydration Unit														
V-2111	1	100	TEG Contactor			2.96 x 1.61	11.2			10%	12.32	23.8	293.2	
U-2111	1	100	TEG Regeneration Unit		127	5.0 x 2.5 x 2.0	2.5			10%	2.75	23.8	65.5	Skid Mounted Electric
Sales Gas														
U-2131	1	100	Sales Gas Metering			12 x 8 x 2	18.5			10%	20.35	25.0	508.8	
Condensate Stabilisation														
C-2201	2	100	Flash Gas Compressor	60.0		3 x 2 x 2	2.5			10%	5.5	175.0	962.5	
E-2201	2	100	Flash Gas Cooler		60	1.2 x 1.5 x 4	1.8	2.6		10%	3.96	60.0	237.6	Fin fan cooler
C-2202A/B	2		Condensate Vapour Compressor	130		6 x 4 x 2	5			10%	11	175.0	1925.0	
E-2202A/B	2		Condensate Vapour Cooler		210	2.4 X 3.0 x 4.0	3			10%	6.6	22.5	148.5	Fin fan Cooler
E-2222A/B	2	100	Condensate Trim Cooler		500	1.8 x 2.7 x 4.0	3.0			10%	6.6	22.5	148.5	Vertical - Hot Oil heated
U-2211	1	100	Condensate Stabiliser Package		780	4.0 x 2.0 x 4.0	4.0			10%	4.4	36.2	159.3	
Condensate Storage														
P-2231A/B	2	100	Condensate Loadout Pump	12.5		1.0 x 0.5 x 0.5	0.25			10%	0.55	60.0	33.0	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank			15.0 25.0	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas														
E-2301A/B	2	100	HP Fuel Gas Heater		30	4 x 0.8	1.5			10%	3.3	24.5	80.9	
E-2303	1	100	Heating Gas Cooler	2	65	1.8 x 1 x 4	2.0			10%	2.2	24.5	53.9	
F-2301	1	100	Fuel Gas Filter/Coalescer			2 x 0.6	1.0			10%	1.1	24.5	27.0	
V-2301	1	100	Heating Gas KO Drum			4.3 x 1.1	4.0			10%	4.4	7.5	33.0	
MEG Regeneration														
F-2421	1	100	Lean MEG Injection Filter			1.2 x 0.4	0.1			10%	0.11	23.8	2.6	
P-2411A/B	2	100	Rich MEG Transfer Pump	1		1 x 0.5 x 0.5	0.2			10%	0.44	23.8	10.5	
P-2421	4	50	Lean MEG Loadout Pump	10		2.2 x 1.5 x 0.6	0.5			10%	2.2	23.8	52.4	
V-2401	1	100	Rich MEG Degasser			2.8 x 1.0	0.4			10%	0.44	23.8	10.5	Vertical
T-2401A/B	2	100	Rich MEG Buffer Tank			6 x 4	6.0			10%	13.2	23.8	314.2	Cone-roof tank
T-2421A/B	2	50	Lean MEG Storage Tank			10 x 5	15.5			10%	34.1	23.8	811.6	40 days
U-2411	1	100	MEG Regeneration Package	20.0	1800	10 x 10 x 8	13.0			10%	14.3	23.8	340.3	MEG regen will be heated using hot oil
Instrument / Service Air														
U-2601	1	100	Instrument Air Package	50.0		8 x 4 x 3	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package														
U-2603	1	100	Gas Stenchant Injection Package	1		6 x 3 x 4				10%	0		10.0	
Hot Oil System														
H-2621A/B	2	100	Hot Oil Furnace		5000	6.0 x 4.0 x 8.0	34.5			10%	75.9	14.5	1100.6	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	20		1.5 x 0.6 x 0.6	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel			5.0 x 2.0	4.5			10%	4.95	7.5	37.1	
E-2621	1	100	Hot Oil Dump Cooler	5	3000	4.9 x 3.1 x 4.0	7.9			10%	8.69	7.5	65.2	
Drains														
P-2701 A/B	2	100	Closed Drain Pumps	2.5		1.0 x 0.5 x 0.5	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	2.5		0.5 x 0.5 x 3.0	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	2.5		1.0 x 0.5 x 0.5	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit			4.0 x 2.0 x 3.0				10%	0			
T-2702	1	100	Slops Tank			4.0 x 4.0	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	25		4.0 x 2.0	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY

Yolla Field Development

Scenario 1: NCC Buoy - Base Case

Onshore Gas Plant Equipment Cost Estimate



Calc. No: 7903-CAL-006 Sheet : 1 of 3 (b)
 Revision: A Project No.: 08407903
 By: S Kennedy Date : 15/3/99
 Checked: B Smith
 File: K:\W\08407903\COST\NCCONSEQ.XLS\NCC



Worley Limited

Equipment No	Number off	Capacity each (%)	Description	Electrical Power kW	Duty kW	Unit Size L x W x H or T/T x ID m	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost \$,000/t	Procurement Cost \$,000	Comments
							Dry tonnes	Operating	Total					
Relief and Blowdown														
P-2802A/B	2	100	LP Flare Drum Pumps	5		1 x 0.6 x 0.6	0.2			10%	0.44	60.0	26.4	
V-2801	1	100	HP Flare KO Drum			4 x 2.5	36.6			10%	40.26	7.5	302.0	
V-2802	1	100	LP Flare KO Drum			4 x 1.5	22.9			10%	25.19	7.5	188.9	
U-2801	1	100	LP/HP Flare Tip			14.5 x 5.5 x 12	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment														
P-2901A/B	2	100	Water Recovery Pump	10.0		0.5 x 0.5 x 2	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System			2 x 2 x 2								Flow Diverter System
A-2902	1	100	Triple Interceptor			3 x 9 x 2								In Ground
A-2903	1	100	Primary Holding Pond			35 x 35 x 3								Pond
A-2904	1	100	Artificial Wetlands			40 x 57 x 0.3								Pond
A-2905	1	100	Water Collection Pond			30 x 30 x 4								Pond
Produced Water Handling														
A-2911	1	100	Aeration Pond			25 x 25 x 3								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	15.0		0.7 x 0.7 x 2	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	2.0		1.5 x 0.5 x 0.5	0.2			10%	0.44	25.0	11.0	
P-2902 A/B	2	100	Holding Pond Pumps				0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water														
P-2921	1	100	Electric Fire Water Pump	110		2 x 0.6 x 0.6	2.0			10%	2.2	35.0	77.0	
P-2922	1	100	Diesel Fire Water Pump		110	3 x 1.2 x 2	2.5			10%	2.75	25.0	68.8	
P-2923 A/B	2	100	Utility Water Pumps	7.5		1.2 x 0.5 x 0.5	0.3			10%	0.66	25.0	16.5	
T-2921	1	100	Water Storage Tank			6 x 20	56.0			10%	61.6	5.0	308.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank			2 x 1.2	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2931	1	100	Potable Water Tank			3 x 4	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	1		1 x 0.5 x 0.5	0.1			10%	0.22	22.0	4.8	
Power Generation														
BC-2801	1	100	24 V DC System	2.5		3 x 1 x 2.5	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel			1.5 x 1 x 2.5				10%	0			
G-2801	1	100	415V Diesel Generator	850		6 x 1.5 x 2.5	9.0			10%	9.9		600.0	
T-2801	1	100	Generator Diesel Storage Tank			2 x 1.2	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers			3 x 3 x 3	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	240 V UPS	21		4 x 1.0 x 2.5	3.0			10%	3.3	25.0	82.5	
Instruments/Controls														
	1	100	Control System										750.0	

1554.2 Sub Total 18232.0

Bulk Materials		
Electrical	8% of Equipment Cost	1458.6
Instruments	10.5% of Equipment Cost	1914.4
Piping - Material	21% of Equipment Cost	3828.7
Piping - Valves	9% of Equipment Cost	1640.9
Structural	1% of Equipment Cost	182.3
Sub-Total		9024.9
		27256.9

643030

Equipment			Description	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost A\$,000/t	Procurement Cost A\$,000	Comments
No	Number off	Capacity each (%)		Dry tonnes	Operating	Total					
BORAL ENERGY											
Yolla Field Development						Calc. No: 7903-CAL-006		Sheet : 2 of 3 (a)			
Scenario 1: NCC Buoy - 30.2 TJ/day						Revision: A		Project No.: 08407903			
Onshore Gas Plant Equipment Cost Estimate						By: S Kennedy		Date: 15/3/99			
						Checked: B Smith		File: K:\WL\08407903\COST\NCCONSEQ.XLS\NCC 30.2		Worley Limited	
Inlet and Gas Conditioning											
V-2002	1	100	Pig Receiver	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater	1.9	2.6		10%	2.09	25.0	52.3	Shell and Tube
E-2121	1	100	Dry Gas/Gas Cooler	8.2	10.7		10%	9.02	15.0	135.3	Shell and Tube
F-2111A/B	2	100	Inlet Gas Filter	2.2			10%	4.84	24.5	118.6	
V-2101	1	100	Slug catcher	32	57		10%	35.2	15.6	549.1	Horizontal
V-2201	1	100	Inlet Liquid Separator	1.9	3		10%	2.09	24.5	51.2	Horizontal
Cold Separation											
V-2122	1	100	Low Temperature Separator	2.3	3.3		10%	2.53	8.2	20.7	Vertical
Glycol Dehydration Unit											
V-2111	1	100	TEG Contactor	8.7			10%	9.57	23.8	227.8	
U-2111	1	100	TEG Regeneration Unit	2			10%	2.2	23.8	52.4	Skid Mounted Electric
Sales Gas											
U-2131	1	100	Sales Gas Metering	18.5			10%	20.35	25.0	508.8	
Condensate Stabilisation											
C-2201	2	100	Flash Gas Compressor	2.0			10%	4.4	175.0	770.0	
E-2201	2	100	Flash Gas Cooler	1.4	2.6		10%	3.08	60.0	184.8	Fin fan cooler
C-2202A/B	2	100	Condensate Vapour Compressor	3.9			10%	8.58	175.0	1501.5	
E-2202A/B	2	100	Condensate Vapour Cooler	2.3			10%	5.08	22.5	113.9	
E-2222A/B	2	100	Condensate Trim Cooler	2.3			10%	5.06	22.5	113.9	Fin fan Cooler
U-2211	1	100	Condensate Stabiliser Package	3.1			10%	3.41	36.2	123.4	Vertical - Hot Oil heated
Condensate Storage											
P-2231A/B	2	100	Condensate Loadout Pump	0.25			10%	0.55	60.0	33.0	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas											
E-2301A/B	2	100	HP Fuel Gas Heater	1.2			10%	2.64	24.5	64.7	
E-2303	1	100	Heating Gas Cooler	1.6			10%	1.76	24.5	43.1	
F-2301	1	100	Fuel Gas Filter/Coalescer	0.8			10%	0.88	24.5	21.6	
V-2301	1	100	Heating Gas KO Drum	3.1			10%	3.41	7.5	25.6	
MEG Regeneration											
F-2421	1	100	Lean MEG Injection Filter	0.1			10%	0.11	23.8	2.6	
P-2411A/B	2	100	Rich MEG Transfer Pump	0.2			10%	0.44	23.8	10.5	
P-2421	4	50	Lean MEG Loadout Pump	0.5			10%	2.2	23.8	52.4	
V-2401	1	100	Rich MEG Degasser	0.3			10%	0.33	23.8	7.9	Vertical
T-2401A/B	2	100	Rich MEG Buffer Tank	4.7			10%	10.34	23.8	246.1	Cone-roof tank
T-2421A/B	2	50	Lean MEG Storage Tank	12.1			10%	26.62	23.8	633.6	40 days
U-2411	1	100	MEG Regeneration Package	13.0			10%	14.3	23.8	340.3	MEG regen will be heated using hot oil
Instrument / Service Air											
U-2601	1	100	Instrument Air Package	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package											
U-2603	1	100	Gas Stenchant Injection Package				10%	0		10.0	
Hot Oil System											
H-2621A/B	2	100	Hot Oil Furnace	34.5			10%	75.9	14.5	1100.6	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel	1.6			10%	1.76	7.5	13.2	
E-2621	1	100	Hot Oil Dump Cooler	4.8			10%	5.28	7.5	39.6	
Drains											
P-2701 A/B	2	100	Closed Drain Pumps	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit				10%	0			
T-2702	1	100	Slops Tank	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-006 Sheet : 2 of 3 (6)
Revision: A Project No.: 08407903
By: S Kennedy *SK* Date : 15/3/99
Checked: B Smith *BS*
File: K:\ML\08407903\COST\NCCONSEQ.XLS\NCC 30.2



Worley Limited

Scenario 1: NCC Buoy - 30.2 TJ/day
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity each (%)	Description	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost A\$,000/t	Procurement Cost A\$,000	Comments
				Dry tonnes	Operating	Total					
Relief and Blowdown											
P-2802A/B	2	100	LP Flare Drum Pumps	0.2			10%	0.44	60.0	26.4	
V-2801	1	100	HP Flare KO Drum	28.5			10%	31.35	7.5	235.1	
V-2802	1	100	LP Flare KO Drum	17.9			10%	19.69	7.5	147.7	
U-2801	1	100	LP/HP Flare Tip	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment											
P-2901A/B	2	100	Water Recovery Pump	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System								Flow Diverter System
A-2902	1	100	Triple Interceptor								In Ground
A-2903	1	100	Primary Holding Pond								Pond
A-2904	1	100	Artificial Wetlands								Pond
A-2905	1	100	Water Collection Pond								Pond
Produced Water Handling											
A-2911	1	100	Aeration Pond								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	0.2			10%	0.44	25.0	11.0	
P-2902 A/B	2	100	Holding Pond Pumps	0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water											
P-2921	1	100	Electric Fire Water Pump	2.0			10%	2.2	35.0	77.0	
P-2922	1	100	Diesel Fire Water Pump	2.5			10%	2.75	25.0	68.8	
P-2923 A/B	2	100	Utility Water Pumps	0.3			10%	0.66	25.0	16.5	
T-2921	1	100	Water Storage Tank	56.0			10%	61.6	5.0	308.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2931	1	100	Potable Water Tank	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	0.1			10%	0.22	22.0	4.8	
Power Generation											
BC-2801	1	100	24 V DC System	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel				10%	0			
G-2801	1	100	415V Diesel Generator	9.0			10%	9.9		600.0	
T-2801	1	100	Generator Diesel Storage Tank	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	240 V UPS	3.0			10%	3.3	25.0	82.5	
Instruments/Controls											
	1	100	Control System							750.0	

1493.1 Sub Total 16676.1

Bulk Materials		
Electrical	8% of Equipment Cost	1334.1
Instruments	10.5% of Equipment Cost	1751.0
Piping - Material	21% of Equipment Cost	3502.0
Piping - Valves	9% of Equipment Cost	1500.9
Structural	1% of Equipment Cost	166.8
Sub-Total		8254.7
		24930.8

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BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-006 Sheet : 3 of 3 (a)
Revision: A Project No. 08407903
By: S Kennedy *SK* Date : 15/3/99
Checked: B Smith *BS*
File K:\W\08407903\COST\NCCONSEQ.XLS\NCC 60.4



Worley Limited

Scenario 1: NCC Buoy - 60.4 TJ/day
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity each (%)	Description	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost AS,000/t	Procurement Cost AS,000	Comments
				Dry tonnes	Operating	Total					
Inlet and Gas Conditioning											
V-2002	1	100	Pig Receiver	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater	2.832	2.6		10%	3.1152	25.0	77.9	Shell and Tube
E-2121	1	100	Dry Gas/Gas Cooler	12.39	10.7		10%	13.629	15.0	204.4	Shell and Tube
F-2111A/B	2	100	Inlet Gas Filter	3.3			10%	7.2688	24.5	178.1	
V-2101	1	100	Slug catcher	48.38	57		10%	53.218	15.6	830.2	Horizontal
V-2201	1	100	Inlet Liquid Separator	2.832	3		10%	3.1152	24.5	76.3	Horizontal
Cold Separation											
V-2122	1	100	Low Temperature Separator	3.4	3.3		10%	3.7642	8.2	30.9	Vertical
Glycol Dehydration Unit											
V-2111	1	100	TEG Contactor	13.2			10%	14.5376	23.8	346.0	
U-2111	1	100	TEG Regeneration Unit	2.95			10%	3.245	23.8	77.2	Skid Mounted Electric
Sales Gas											
U-2131	1	100	Sales Gas Metering	18.5			10%	20.35	25.0	508.8	
Condensate Stabilisation											
C-2201	2	100	Flash Gas Compressor	3.0			10%	6.49	175.0	1135.8	
E-2201	2	100	Flash Gas Cooler	2.1	2.6		10%	4.6728	60.0	280.4	Fin fan cooler
C-2202A/B	2	100	Condensate Vapour Compressor	5.9			10%	12.98	175.0	2271.5	
E-2202A/B	2	100	Condensate Vapour Cooler	3.5			10%	7.788	22.5	175.2	
E-2222A/B	2	100	Condensate Trim Cooler	3.5			10%	7.788	22.5	175.2	Fin fan Cooler
U-2211	1	100	Condensate Stabiliser Package	4.7			10%	5.192	36.2	188.0	Vertical - Hot Oil heated
Condensate Storage											
P-2231A/B	2	100	Condensate Loadout Pump	0.25			10%	0.55	60.0	33.0	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas											
E-2301A/B	2	100	HP Fuel Gas Heater	1.5			10%	3.3	24.5	80.9	
E-2303	1	100	Heating Gas Cooler	2.0			10%	2.2	24.5	53.9	
F-2301	1	100	Fuel Gas Filter/Coalescer	1.0			10%	1.1	24.5	27.0	
V-2301	1	100	Heating Gas KO Drum	4.0			10%	4.4	7.5	33.0	
MEG Regeneration											
F-2421	1	100	Lean MEG Injection Filter	0.1			10%	0.1298	23.8	3.1	
P-2411A/B	2	100	Rich MEG Transfer Pump	0.2			10%	0.44	23.8	10.5	
P-2421	4	50	Lean MEG Loadout Pump	0.5			10%	2.2	23.8	52.4	
V-2401	1	100	Rich MEG Degasser	0.4			10%	0.44	23.8	10.5	Vertical
T-2401A/B	2	100	Rich MEG Buffer Tank	7.1			10%	15.578	23.8	370.7	Cone-roof tank
T-2421A/B	2	50	Lean MEG Storage Tank	18.3			10%	40.238	23.8	957.7	40 days
U-2411	1	100	MEG Regeneration Package	13.0			10%	14.3	23.8	340.3	MEG regen will be heated using hot oil
Instrument / Service Air											
U-2601	1	100	Instrument Air Package	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package											
U-2603	1	100	Gas Stenchant Injection Package				10%	0		10.0	
Hot Oil System											
H-2621A/B	2	100	Hot Oil Furnace	34.5			10%	75.9	14.5	1100.6	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel	2.0			10%	2.2	7.5	16.5	
E-2621	1	100	Hot Oil Dump Cooler	6.2			10%	6.82	7.5	51.2	
Drains											
P-2701 A/B	2	100	Closed Drain Pumps	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit				10%	0			
T-2702	1	100	Slops Tank	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY
Yolla Field Development



Calc. No: 7903-CAL-006 Sheet : 3 of 3 (b)

Revision: A Project No. 08407903

By: S Kennedy Date : 15/3/99

Checked: B Smith

File K:\ML\08407903\COST\NCCONSEQ.XLS\NCC 60.4



Worley Limited

Scenario 1: NCC Buoy - 60.4 TJ/day
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity each (%)	Description	Weight per Unit			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost A\$,000/1	Procurement Cost A\$,000	Comments
				Dry tonnes	Operating	Total					
Relief and Blowdown											
P-2802A/B	2	100	LP Flare Drum Pumps	0.2			10%	0.44	60.0	26.4	
V-2801	1	100	HP Flare KO Drum	43.2			10%	47.5068	7.5	356.3	
V-2802	1	100	LP Flare KO Drum	27.0			10%	29.72222	7.5	222.9	
U-2801	1	100	LP/HP Flare Tip	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment											
P-2901A/B	2	100	Water Recovery Pump	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System								Flow Diverter System
A-2902	1	100	Triple Interceptor								In Ground
A-2903	1	100	Primary Holding Pond								Pond
A-2904	1	100	Artificial Wetlands								Pond
A-2905	1	100	Water Collection Pond								Pond
Produced Water Handling											
A-2911	1	100	Aeration Pond								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	0.2			10%	0.44	25.0	11.0	
P-2902 A/B	2	100	Holding Pond Pumps	0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water											
P-2921	1	100	Electric Fire Water Pump	2.0			10%	2.2	35.0	77.0	
P-2922	1	100	Diesel Fire Water Pump	2.5			10%	2.75	25.0	68.8	
P-2923 A/B	2	100	Utility Water Pumps	0.3			10%	0.66	25.0	16.5	
T-2921	1	100	Water Storage Tank	58.0			10%	61.6	5.0	308.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2831	1	100	Potable Water Tank	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	0.1			10%	0.22	22.0	4.8	
Power Generation											
BC-2801	1	100	24 V DC System	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel				10%	0			
G-2801	1	100	415V Diesel Generator	9.0			10%	9.9		600.0	
T-2801	1	100	Generator Diesel Storage Tank	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	240 V UPS	3.0			10%	3.3	25.0	82.5	
Instruments/Controls											
	1	100	Control System							750.0	

1592.3 Sub Total 19411.3

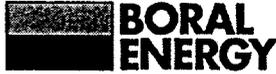
Bulk Materials		
Electrical	8% of Equipment Cost	1552.9
Instruments	10.5% of Equipment Cost	2038.2
Piping-Material	21% of Equipment Cost	4076.4
Piping - Valves	9% of Equipment Cost	1747.0
Structural	1% of Equipment Cost	194.1
Sub-Total		9608.6
		29019.8

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BORAL Energy Resources Ltd

Yolla Field Development

Scenario 1: NCC Buoy - Base Case

**Worley**

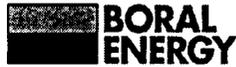
Calc : 7903-CAL-007	Sheet 1 of 4
By : Brian Smith	Revision : A
Checked By : Ian Neill	Date : 22-Mar-99
File Location : K:\WL108407903\COST\NCCONSOP.XLS\Summary	

Onshore Construction Cost Summary

Activity	Description	Cost A\$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$3,828,727
	Sub-Total	\$4,088,727
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$14,160,348
	Site Restoration	\$100,000
	Sub-Total	\$19,615,128
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
	Sub-Total	\$322,075
	TOTAL	\$24,025,929

Yolla Field Development

1. Fabrication



Calc : 7903-CAL-007	Sheet 2 of 4
By : Brian Smith	Revision : A
Checked By : <i>[Signature]</i>	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONSOP.XLS]1. Fabrication	



Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost A\$	Unit	Total Cost A\$	Remarks
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1	\$260,000	
			<u>Sub-Total</u>	<u>\$260,000</u>	
PIPING	Fabricate Spool Pieces	\$3,828,727	1	\$3,828,727	
			<u>Sub-Total</u>	<u>\$3,828,727</u>	
			TOTAL	\$4,088,727	(Fabrication)

Yolla Field Development

2. Construction



Calc : 7903-CAL-007	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : <i>JD</i>	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONSOP.XLS\2. Construction	



Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waare Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
	Waare Road Underpass	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
Sub-Total					\$732,380	

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Yolla Field Development

2. Construction



Calc : 7903-CAL-007	Sheet 3 of 4
By : Brian Smith	Revision : A
Checked By : <i>[Signature]</i>	Date : 22-Mar-99
File Location : K:\WL108407903\COST\NCCONSOP.XLS\2. Construction	



Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost AS		Unit	Total Cost AS	Remarks
CAMP SET-UP						
Mobilisation of Camp						
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation Based on Using site septic system Based on camp being at construction site
	Perimeter Fence	\$40	600	m	\$24,000	
	Hardstand	\$50,000	1	item	\$50,000	
	Plumbing	\$30,000	1	item	\$30,000	
	Electrical Reticulation	\$30,000	1	item	\$30,000	
	Septic System	\$20,000	1	item	\$20,000	
	Power Supply to Site	\$0	1	item	\$0	
	Water	\$20,000	1	item	\$20,000	
	Telephone Connections	\$10,000	1	item	\$10,000	
	Supply Camp (80 man) includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's Transportation Craneage and Dogman	\$1,000,000	1	item	\$1,000,000	
	Paths and Plinths	\$50,000	1	item	\$50,000	
	Covered Areas	\$50,000	1	item	\$50,000	
				Sub-Total	\$1,320,000	

Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
CAMP RUNNING COSTS						
Camp Running Cost	Electricity	\$700	60	wks	\$42,000	
	Potable Water	\$200	60	wks	\$12,000	
	Septic Disposal	\$200	60	wks	\$12,000	
	Catering	\$35	20000	m-days	\$700,000	\$35 per man per day, approx. 20,000man days
				Sub-Total	\$766,000	

645061

Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost AS		Unit	Total Cost AS	Remarks
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

045062

Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SITE PERSONNEL						
Site Support Personnel						
	Store Manager	\$3,300	52	wks	\$171,600	Estimated unit Cost
	Store Assistant	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Crane Drivers	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Dogman	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Gate person (day)	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Gate person (night)	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Nurse	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Peggy	\$4,400	52	wks	\$228,800	2 people @ \$2200/wk
				Sub-Total	\$1,086,800	

645063

Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost AS		Unit	Total Cost AS	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

645064

Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		A\$			A\$	
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
	Buildings Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analysar Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
	Site Civil Work Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	9150	hrs	\$732,000	6 man -hours/tonne for approx. 1525t

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
Piping	Installation of Piping - Permanent facilities	\$6,837,012	1	item	\$6,837,012	
E & I	Installation of Field Elect. Install Utility	\$350,000	1	item	\$350,000	
	Generator	\$50,000	1	item	\$50,000	
	Main Switchboards	\$10,000	1	item	\$10,000	
	Distribution Boards	\$20,000	1	item	\$20,000	
	Variable Frequency Drives	\$15,000	1	item	\$15,000	
	Motor Control Equipment	\$50,000	1	item	\$50,000	
	General Area Lighting	\$70,000	1	item	\$70,000	
	Process Area Lighting	\$50,000	1	item	\$50,000	
	Cable & Assoc.	\$620,000	1	item	\$620,000	
	Cathodic Protection System	\$20,000	1	item	\$20,000	
	UPS	\$20,000	1	item	\$20,000	
	24 Vdc System	\$40,000	1	item	\$40,000	
	Telephone Facilities	\$40,000	1	item	\$40,000	
	Site Radio	\$15,000	1	item	\$15,000	
	Installation of Field Instr. - Permanent facilities	\$1,244,336	1	item	\$1,244,336	
	- Permanent facilities-Cabling	\$95,000	1	item	\$95,000	
				Sub-Total	\$14,160,348	
SITE RESTORATION	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$19,615,128	

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Yolla Field Development

3. Commissioning



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Worley

Scenario 1: NCC Buoy - 45TJ/d

Personnel	Description	Rate A\$	Manhours (hours)	Total Cost A\$	Remarks
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @\$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @ 1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	

645067

BORAL Energy Resources Ltd

Yolla Field Development

Scenario 1: NCC Buoy - 30.2 TJ/day

**Worley**

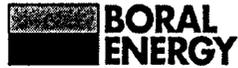
Calc : 7903-CAL-008	Sheet 1 of 4
By : Ian Neil <i>IN</i>	Revision : A
Checked By : Brian Smith <i>BS</i>	Date : 22-Mar-99
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Onshore Construction Cost Summary

Activity	Description	Cost \$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$3,501,989
	Sub-Total	\$3,761,989
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$13,470,697
	Site Restoration	\$100,000
Sub-Total	\$18,925,477	
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
	Sub-Total	\$322,075
TOTAL	\$23,009,541	

Yolla Field Development

1. Fabrication



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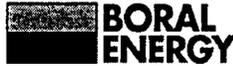
Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost	Unit	Total Cost	Remarks
		\$		\$	
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1	\$260,000	
			<u>Sub-Total</u>	<u>\$260,000</u>	
PIPING	Fabricate Spool Pieces	\$3,501,989	1	\$3,501,989	
			<u>Sub-Total</u>	<u>\$3,501,989</u>	
			TOTAL	\$3,761,989	(Fabrication)

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2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waarre Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite Cost to be supplied by Shire of Corangamite
	Waare Road Underpass	\$0	-	item	\$0	
Sub-Total					\$732,380	

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks	
CAMP SET-UP							
Mobilisation of Camp							
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation	
	Perimeter Fence	\$40	600	m	\$24,000		
	Hardstand	\$50,000	1	item	\$50,000		
	Plumbing	\$30,000	1	item	\$30,000		
	Electrical Reticulation	\$30,000	1	item	\$30,000		
	Septic System	\$20,000	1	item	\$20,000		Based on Using site septic system
	Power Supply to Site	\$0	1	item	\$0		Based on camp being at construction site
	Water	\$20,000	1	item	\$20,000		
	Telephone Connections	\$10,000	1	item	\$10,000		
	Supply Camp (80 man) includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's	\$1,000,000	1	item	\$1,000,000	UGS Quotation from AUSCO for 96 man camp (\$1.126M)	
	Transportation Craneage and Dogman	\$2,000	12	days	\$24,000		
	Paths and Plinths	\$50,000	1	item	\$50,000		
	Covered Areas	\$50,000	1	item	\$50,000		
				Sub-Total	\$1,320,000		

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
SITE PERSONNEL						
Site Support Personnel						
	Store Manager	\$3,300	52	wks	\$171,600	Estimated unit Cost
	Store Assistant	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Crane Drivers	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Dogman	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Gate person (day)	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Gate person (night)	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Nurse	\$2,200	52	wks	\$114,400	Estimated unit Cost
	Peggy	\$4,400	52	wks	\$228,800	2 people @ \$2200/wk
				Sub-Total	\$1,086,800	

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr (prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

645075

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
Buildings	Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analyser Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
Site Civil Work	Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	9150	hrs	\$732,000	6 man -hours/tonne for approx. 1525t

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Yolla Field Development

2. Construction



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
Piping	<u>Installation of Piping</u> - Permanent facilities	\$6,253,551	1	item	\$6,253,551	
E & I	<u>Installation of Field Elect.</u> Install Utility Generator Main Switchboards Distribution Boards Variable Frequency Drives Motor Control Equipment General Area Lighting Process Area Lighting Cable & Assoc. Cathodic Protection System UPS 24 Vdc System Telephone Facilities Site Radio	\$350,000 \$50,000 \$10,000 \$20,000 \$15,000 \$50,000 \$70,000 \$50,000 \$620,000 \$20,000 \$20,000 \$40,000 \$40,000 \$15,000	1 1 1 1 1 1 1 1 1 1 1 1 1 1	item item item item item item item item item item item item item item	\$350,000 \$50,000 \$10,000 \$20,000 \$15,000 \$50,000 \$70,000 \$50,000 \$620,000 \$20,000 \$20,000 \$40,000 \$40,000 \$15,000	
	<u>Installation of Field Instr.</u> - Permanent facilities - Permanent facilities-Cabling	\$1,138,146 \$95,000	1 1	item item	\$1,138,146 \$95,000	
				Sub-Total	\$13,470,697	
SITE RESTORATION	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$18,925,477	

Yolla Field Development

3. Commissioning



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Worley

Scenario 1: NCC Buoy - 30.2 TJ/day

Personnel	Description	Rate \$	Manhours (hours)	Total Cost \$	Remarks
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @\$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	

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BORAL Energy Resources Ltd

Yolla Field Development

Scenario 1: NCC Buoy - 60.4 TJ/day

**Worley**

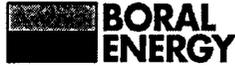
Calc : 7903-CAL-009	Sheet 1 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONS60.XLS\Summary	

Onshore Construction Cost Summary

Activity	Description	Cost \$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$4,076,364
	Sub-Total	\$4,336,364
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$14,683,040
	Site Restoration	\$100,000
Sub-Total	\$20,137,820	
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
Sub-Total	\$322,075	
TOTAL	\$24,796,260	

Yolla Field Development

1. Fabrication



Calc : 7903-CAL-009	Sheet 2 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL108407903\COST\NCCONS60.XLS\1. Fabrication	



Worley

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1		\$260,000	
			<u>Sub-Total</u>		<u>\$260,000</u>	
PIPING	Fabricate Spool Pieces	\$4,076,364	1		\$4,076,364	
			<u>Sub-Total</u>		<u>\$4,076,364</u>	
			TOTAL		\$4,336,364	(Fabrication)

Yolla Field Development

2. Construction



Calc :	7903-CAL-009	Sheet	3 of 4
By :	Ian Neill	Revision :	A
Checked By :	Brian Smith	Date :	22-Mar-99
File Location :	K:\WL108407903\COST\NCCONS60.XLS]2. Construction		



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waarre Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
	Waarre Road Underpass	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
Sub-Total					\$732,380	

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Yolla Field Development

2. Construction



Calc : 7903-CAL-009	Sheet 3 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL08407903\COST\NCCONS60.XLS\2. Construction	



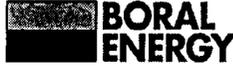
Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks	
CAMP SET-UP							
Mobilisation of Camp							
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation	
	Perimeter Fence	\$40	600	m	\$24,000		
	Hardstand	\$50,000	1	item	\$50,000		
	Plumbing	\$30,000	1	item	\$30,000		
	Electrical Reticulation	\$30,000	1	item	\$30,000		
	Septic System	\$20,000	1	item	\$20,000		Based on Using site septic system
	Power Supply to Site	\$0	1	item	\$0		Based on camp being at construction site
	Water	\$20,000	1	item	\$20,000		
	Telephone Connections	\$10,000	1	item	\$10,000		
	Supply Camp (80 man) Includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's Transportation Craneage and Dogman	\$1,000,000	1	item	\$1,000,000		UGS Quotation from AUSCO for 96 man camp (\$1.126M)
	Paths and Plinths	\$50,000	1	item	\$50,000		
	Covered Areas	\$50,000	1	item	\$50,000		
				Sub-Total	\$1,320,000		

645080

2. Construction



Calc : 7903-CAL-009	Sheet 3 of 4
By : Ian Neill <i>IN</i>	Revision : A
Checked By : Brian Smith <i>BS</i>	Date : 22-Mar-99
File Location : K:\WL108407903\COST\NCCONS60.XLS]2. Construction	



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
CAMP RUNNING COSTS						
Camp Running Cost	Electricity	\$700	60	wks	\$42,000	\$35 per man per day, approx. 20,000man days
	Potable Water	\$200	60	wks	\$12,000	
	Septic Disposal	\$200	60	wks	\$12,000	
	Catering	\$35	20000	m-days	\$700,000	
				Sub-Total	\$766,000	

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Yolla Field Development

2. Construction



Calc :	7903-CAL-009	Sheet	3 of 4
By :	Ian Neill <i>IN</i>	Revision :	A
Checked By :	Brian Smith <i>BS</i>	Date :	22-Mar-99
File Location :	K:\WL\08407903\COST\NCCONS60.XLS\2. Construction		



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

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Yolla Field Development

2. Construction



Calc : 7903-CAL-009	Sheet 3 of 4
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Checked By : Brian Smith <i>BS</i>	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONS60.XLS\2. Construction	



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

Yolla Field Development

2. Construction



Calc : 7903-CAL-009	Sheet 3 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONS60.XLS\2. Construction	



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		\$			\$	
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
Buildings	Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analyser Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
Site Civil Work	Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	9150	hrs	\$732,000	6 man -hours/tonne for approx. 1525t

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Yolla Field Development

2. Construction



Calc : 7903-CAL-009	Sheet 3 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONS60.XLS\2. Construction	



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Activity	Description	Unit Cost \$		Unit	Total Cost \$	Remarks
Piping	Installation of Piping - Permanent facilities	\$7,279,222	1	Item	\$7,279,222	
E & I	Installation of Field Elect. Install Utility	\$350,000	1	item	\$350,000	
	Generator	\$50,000	1	item	\$50,000	
	Main Switchboards	\$10,000	1	item	\$10,000	
	Distribution Boards	\$20,000	1	item	\$20,000	
	Variable Frequency Drives	\$15,000	1	item	\$15,000	
	Motor Control Equipment	\$50,000	1	item	\$50,000	
	General Area Lighting	\$70,000	1	item	\$70,000	
	Process Area Lighting	\$50,000	1	item	\$50,000	
	Cable & Assoc.	\$620,000	1	item	\$620,000	
	Cathodic Protection System	\$20,000	1	item	\$20,000	
	UPS	\$20,000	1	item	\$20,000	
	24 Vdc System	\$40,000	1	item	\$40,000	
	Telephone Facilities	\$40,000	1	item	\$40,000	
	Site Radio	\$15,000	1	item	\$15,000	
	Installation of Field Instr. - Permanent facilities	\$1,324,818	1	item	\$1,324,818	
	- Permanent facilities-Cabling	\$95,000	1	item	\$95,000	
				Sub-Total	\$14,683,040	
SITE RESTORATION	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$20,137,820	

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Yolla Field Development

3. Commissioning



Calc : 7903-CAL-009	Sheet 4 of 4
By : Ian Neill	Revision : A
Checked By : Brian Smith	Date : 22-Mar-99
File Location : K:\WL\08407903\COST\NCCONS60.XLS\3. Commissioning	



Worley

Scenario 1: NCC Buoy - 60.4 TJ/day

Personnel	Description	Rate \$	Manhours (hours)	Total Cost \$	Remarks
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @ \$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @ 1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	

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2007 Well Cost Estimate

Yolla Development Scenario 1 - NCC Buoy



Project Title	Yolla Study	Calc No	7903-CAL-010
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL08407903\COST\NCCFUT.XLS\late		
		Page	1 of 2

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in / D	FCN						

Well drilled in 2007 and tie-in to the production manifold 2 km away.

	Description	Unit	A\$/Unit	Quantity	A\$
1	Subsea Trees				
1.1	Subsea Completions (inc. tree, choke, wellhead & tubing hanger sys)	ea	4300000	1	4,300,000
1.2	Wellhead/Tubing hanger running and test tools	lot	750000	1	750,000
1.3	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				5,200,000
2	Flowlines				
2.1	DN150 Flexible flowline between well and manifold	m	600	2000	1,200,000
2.2	Terminations	ea	30000	2	60,000
	Subtotal				1,260,000
3	Connectors				
3.1	DN150 Jumper - Diverless	ea	100000	2	200,000
	Subtotal				200,000
4	Umbilicals				
4.1	Umbilical jumpers	ea	50000	1	50,000
	Subtotal				50,000
	PROCUREMENT COST TOTAL				6,710,000
5	Installation Vessel Operations	Unit	Rate	Quantity	Duration
	DP DSV		(day/unit)		(days)
5.1	DP trials / ROV survey	ea	1	1	1
5.2	Lay flowline / umbilical	lot	1	1	1
5.3	Tie-in flowline / umbilical	ea	0.3	2	0.6
5.4	Hydrotest / commissioning	lot	2.5	1	2.5
	Unfactored Vessel Duration				5.10
	Weather/Equipment Downtime	%	30		1.53
	TOTAL VESSEL DURATION				6.63
6	Construction		Duration	Rate	Cost
			(days)	(A\$/day)	(A\$)
6.1	Offshore Activities		6.63	240000	1,591,200
6.2	Mob/Demob				5,950,000
	INSTALLATION COST TOTAL				7,541,200
	TOTAL				14,251,200
7.1	Freight (6% on procured items)			6%	402,600
7.2	Certification			0.5%	71,256
7.3	Design			9%	1,282,608
7.4	Insurance			2%	285,024
7.5	Project Management and Own Costs			10%	1,425,120
	SUBTOTAL				17,717,808
8	Contingency			20%	3,543,562
	Total Cost (ex drilling)				21,261,370
9	Drilling Costs				18,000,000
	TOTAL COST				39,261,370



Late Stage Well Cost Estimate

Yolla Development Scenario 1 - NCC Buoy



Project Title	Yolla Study	Calc No	7903-CAL-010
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\NCCFUT.XLS]late		
		Page	2 of 2

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in (A)	FL						

Late-stage producing well - tied-in to the production manifold 4 km away.

	Description	Unit	A\$/Unit	Quantity	AS
1	Subsea Trees				
1.1	Subsea Completions (inc. tree, choke, wellhead & tubing hanger sys)	ea	4300000	1	4,300,000
1.2	Wellhead/Tubing hanger running and test tool	lot	750000	1	750,000
1.3	Factory acceptance tests	lot	150000	1	150,000
	Subtotal				5,200,000
2	Flowlines				
2.1	DN150 Flexible flowline between well and manifold	m	600	4000	2,400,000
2.2	Terminations	ea	30000	2	60,000
	Subtotal				2,460,000
3	Connectors				
3.1	DN150 Jumper - Diverless	ea	100000	2	200,000
	Subtotal				200,000
4	Umbilicals				
4.1	Umbilical jumpers	ea	50000	1	50,000
	Subtotal				50,000
	PROCUREMENT COST TOTAL				7,910,000
5	Installation Vessel Operations:	Unit	Rate	Quantity	Duration
	DP DSV		(day/unit)		(days)
5.1	DP trials / ROV survey	ea	1	1	1
5.2	Lay flowline / umbilical	lot	1	1	1
5.3	Tie-in flowline / umbilical	ea	0.3	2	0.6
5.4	Hydrotest / commissioning	lot	2.5	1	2.5
	Unfactored Vessel Duration				5.10
	Weather/Equipment Downtime	%	30		1.53
	TOTAL VESSEL DURATION				6.63
6	Construction		Duration	Rate	Cost
			(days)	(A\$/day)	(A\$)
6.1	Offshore Activities		6.63	240000	1,591,200
6.2	Mob/Demob				5,950,000
	INSTALLATION COST TOTAL				7,541,200
	TOTAL				15,451,200
7.1	Freight (6% on procured items)			6%	474,600
7.2	Certification			0.5%	77,256
7.3	Design			9%	1,390,608
7.4	Insurance			2%	309,024
7.5	Project Management and Own Costs			10%	1,545,120
	SUBTOTAL				19,247,808
8	Contingency			20%	3,849,562
	Total Cost (ex drilling)				23,097,370
9	Drilling Costs				18,000,000
	TOTAL COST				41,097,370



Operational Cost Estimate
 Yolla Development Scenario 1 - NCC Buoy
 Low Flow Case - 30.2 TJ/day



Job Number	084 / 07903	Calc. No.	7903-CAL-011
Prepared by	L.Neill	Rev	A
Checked by	B. Smith	Date	9-Apr-99
K:\WL08407903\COST\NCCSUM.XLS\summl base			

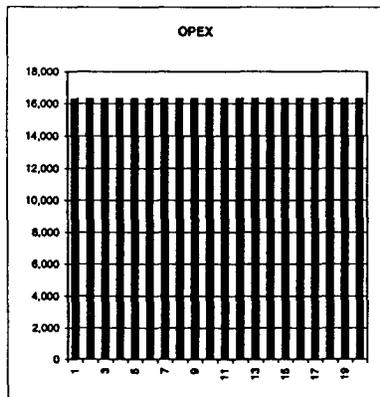
Capex			
Current estimate	338,227 AUDk		
Offshore	264,878		
Onshore	73,349		
		Day staff	
Human resources		Supvr	1
Shift length	12 h	Oper	2
All supervisors are working supervisors		Elec	1
Offshore	Nil regular, neither daily visits or living offshore!	Mech	1
Onshore - weekday	8 "staff"	Rot Eq	0
	2 contractor	PIM	0
Onshore - weeknight and all weekend	2 "staff"	Labour	1
		Engr	0
		Admin	1
		Whouse	1
			8
		Nights, weekend days	
		Supvr	1
		Oper	1
			2

Main components of opex	Status	AUDk
Reservoir studies and well work	A\$2M per year (Boral)	2,000
Well interventions	A\$1M per year (Boral)	1,000
Internal pipeline survey - intelligent pigging	A\$1M every 5 years	200
Pipeline external inspns offshore	Once every 2 years @ A\$250k	125
Communications links		200
Supply boat for refilling	Monthly @ A\$30k	360
Diving spread when needed	Once per two years @A\$300k	150
Fishing damage	No allowance here	
Chemical injection	A\$2/L, 10,500 L/day with 80% recovery	1,533
Diesel fuel - offshore use	A\$1/L	80
Control fluid		3
Stenchant	Allow	5
Diesel fuel - onshore use	Allow	20
Personnel vehicle lease	Half of capital cost - 2 vehicles @ avg 40k	40
Major overhauls - rotating equip	Allow	300
Warehousing - degradation of stocks	1.5% of capex * 10% per year	507
Parts usage	1% of capex per year	3,382
Insurance - assets offsh	0.7% of offshore capex	1,854
Insurance - assets onsh	0.4% of onshore capex	293
Insurance - wells	2wells	15
Insurance - public risk	Allow	250
Meter proving	Allow	25
Personnel - day 12h	8	560
Personnel - night/weekend 12h	4	360
Contract labour full time	2	140
Contract services - maintenance etc	Allow	300
Laboratory services	Allow equiv of one chemist and equip charge - approx	75
Engineering services	Allow	250
Corporate overhead	Allow equiv of one fulltime senior person/director incl oh	150
Subtotal		14,178
Contingency	15%	2,127
TOTAL		16,305

Opex relative weighting

This table shows how opex varies year by year as operation changes

Year	Base	Due to complexity	Due to cutting/decline	Net effect	Opex by year ASk
1	1.00	0.000	0.000	1.00	16,304.87
2	1.00	1.00	1.00	1.00	16,304.87
3	1.00	1.00	1.00	1.00	16,304.87
4	1.00	1.00	1.00	1.00	16,304.87
5	1.00	1.00	1.00	1.00	16,304.87
6	1.00	1.00	1.00	1.00	16,304.87
7	1.00	1.00	1.00	1.00	16,304.87
8	1.00	1.00	1.00	1.00	16,304.87
9	1.00	1.00	1.00	1.00	16,304.87
10	1.00	1.00	1.00	1.00	16,304.87
11	1.00	1.00	1.00	1.00	16,304.87
12	1.00	1.00	1.00	1.00	16,304.87
13	1.00	1.00	1.00	1.00	16,304.87
14	1.00	1.00	1.00	1.00	16,304.87
15	1.00	1.00	1.00	1.00	16,304.87
16	1.00	1.00	1.00	1.00	16,304.87
17	1.00	1.00	1.00	1.00	16,304.87
18	1.00	1.00	1.00	1.00	16,304.87
19	1.00	1.00	1.00	1.00	16,304.87
20	1.00	1.00	1.00	1.00	16,304.87



Reality check

Opex as percentage of capex	
Should be in range of 3-5%	
Capex	338,227
Check As percentage of base opex value	4.82%



Operational Cost Estimate
 Yolla Development Scenario 1 - NCC Buoy
 High Flow Case - 60.4 TJ/day



Job Number	084 / 07903	Calc. No.	7903-CAL-011
Prepared by	L.Neill	Rev	B
Checked by	B. Smith	Date	9-Apr-99
K:\WL\08407903\COST\NCCSUM.XLS\sum1 base			

Capex			
Current estimate	377,956 AUDk		
Offshore	295,618		
Onshore	82,339		
		Day staff	
Human resources		Supvr	1
Shift length	12 h	Oper	2
All supervisors are working supervisors		Elec	1
Offshore	Nil regular, neither daily visits or living offshore!	Mech	1
Onshore - weekday	8 "staff"	Rot Eq	0
	2 contractor	PIM	0
Onshore - weeknight and all weekend	2 "staff"	Labour	1
		Engr	0
		Admin	1
		Whous	1
			8
		Nights, weekend days	
		Supvr	1
		Oper	1
			2

Main components of opex	Status	AUDk
Reservoir studies and well work	A\$2M per year (Boral)	2,000
Well interventions	A\$1M per year (Boral)	1,000
Internal pipeline survey - intelligent pigging	A\$1M every 5 years	200
Pipeline external inspns offshore	Once every 2 years @ A\$250k	125
Communications links		200
Supply boat for refilling	Monthly @ A\$30k	360
Diving spread when needed	Once per two years @ A\$300k	150
Fishing damage	No allowance here	
Chemical Injection	A\$2/L, 20,900 L/day with 80% recovery	3,051
Diesel fuel - offshore use	A\$1/L	80
Control fluid		3
Stenchant	Allow	5
Diesel fuel - onshore use	Allow	20
Personnel vehicle lease	Half of capital cost - 2 vehicles @ avg 40k	40
Major overhauls - rotating equip	Allow	300
Warehousing - degradation of stocks	1.5% of capex * 10% per year	567
Parts usage	1% of capex per year	3,780
Insurance - assets offsh	0.7% of offshore capex	2,069
Insurance - assets onsh	0.4% of onshore capex	329
Insurance - wells	2wells	15
Insurance - public risk	Allow	250
Meter proving	Allow	25
Personnel - day 12h	8	560
Personnel - night/weekend 12h	4	360
Contract labour full time	2	140
Contract services - maintenance etc	Allow	300
Laboratory services	Allow equiv of one chemist and equip charge - approx	75
Engineering services	Allow	250
Corporate overhead	Allow equiv of one fulltime senior person/director incl oh	150
Subtotal		16,405
Contingency	15%	2,461
TOTAL		18,865

Opex relative weighting
 This table shows how opex varies year by year as operation changes

Year	Base	Due to complexity	Due to cutting/decline	Net effect	Opex by year A\$K
1	1.00	1.00	1.00	1.00	18,865.26
2	1.00	1.00	1.00	1.00	18,865.26
3	1.00	1.00	1.00	1.00	18,865.26
4	1.00	1.00	1.00	1.00	18,865.26
5	1.00	1.00	1.00	1.00	18,865.26
6	1.00	1.00	1.00	1.00	18,865.26
7	1.00	1.00	1.00	1.00	18,865.26
8	1.00	1.00	1.00	1.00	18,865.26
9	1.00	1.00	1.00	1.00	18,865.26
10	1.00	1.00	1.00	1.00	18,865.26
11	1.00	1.00	1.00	1.00	18,865.26
12	1.00	1.00	1.00	1.00	18,865.26
13	1.00	1.00	1.00	1.00	18,865.26
14	1.00	1.00	1.00	1.00	18,865.26
15	1.00	1.00	1.00	1.00	18,865.26
16	1.00	1.00	1.00	1.00	18,865.26
17	1.00	1.00	1.00	1.00	18,865.26
18	1.00	1.00	1.00	1.00	18,865.26
19	1.00	1.00	1.00	1.00	18,865.26
20	1.00	1.00	1.00	1.00	18,865.26

Reality check

Opex as percentage of capex
 Should be in range of 3-5%
 Capex 377,956
 Check As percentage of base opex value 4.99%



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT C

Detailed Cost Estimates – Scenario 2

(57 Pages)

Calculation No.	Description	No. of Pages
7903-CAL-020	Platform Topsides Weight & Cost Estimate	7
7903-CAL-021	Platform Jacket Weight & Cost Estimate	1
7903-CAL-022	Pipelines Cost Estimate	2
7903-CAL-023	Offshore Installation Cost Estimate	5
7903-CAL-024	Onshore Gas Plant Equipment Cost Estimate	6
7903-CAL-025	Onshore Gas Plant Construction Cost Estimate-45.3 TJ/d	11
7903-CAL-026	Onshore Gas Plant Construction Cost Estimate-30.2 TJ/d	11
7903-CAL-027	Onshore Gas Plant Construction Cost Estimate-60.4 TJ/d	11
7903-CAL-028	Opex Estimate	3

BORAL ENERGY
Yolla Field Development



Calc. No. 7903-CAL-020	Sheet No. 2 of 4
By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-99
File Location: K:\W\08427903\COST\PLTOFFEQ.XLS\Case 2 Deck	



Worley Limited

Weight & Cost Estimate Platform Topside - Base Case

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT EQUIPMENT + BULKS (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/1	Procurement Cost US\$,000	Fab. Cost US\$,000/1	Fab. Cost US\$,000	Technical Notes
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)								
	Wellhead				ZEROBULK	0	0	0	0	0	0	0			300.0			
	Wellhead				ZEROBULK	0	0	0	0	0	0	0			300.0			
V-1001	Pig Launcher			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	15.6	42.9	0.6	1.7
WM-101	Production Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0
WM-102	Test Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0
E-1110	Wellstream Cooler			22300	OFFRCOOL	2230	1115	20070	1784	49874	75073	97373	10%	24530	18.3	448.9	0.6	14.7
V-1110	Production Separator			21400	OFGASSEP	1926	14980	10272	2140	53254	82572	103972	10%	23540	15.6	367.2	0.6	14.1
V-1120	Test Separator			18700	OFGASSEP	1683	13090	8976	1870	46535	72154	90854	10%	20570	15.6	320.9	0.6	12.3
	Gas Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
	Oil Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
	Water Cut Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
V-1111	TEG Contactator			21500	OFGASDEH	1935	5805	8600	1290	41087	58717	80217	10%	23650	15.0	354.8	0.6	14.2
U-1111	TEG Regeneration Skid			3800	OFGASDEH	342	1026	1520	228	7262	10378	14178	10%	4180	15.0	62.7	0.6	2.5
F-1111	Condensate Filter Coalescer			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	25.5	70.1	0.6	1.7
U-1401	Produced Water Treatment			3800	OFWATRET	532	380	2698	266	8050	11936	15736	10%	4180	37.5	156.8	0.6	2.5
E-1301	Fuel Gas Heater			1500	ORUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	24.5	40.4	0.6	1.0
V-1301	Fuel Gas Filter Coalescer			1000	ORUTILITY	140	90	1000	120	2468	3818	4818	10%	1100	25.5	28.1	0.6	0.7
V-1801	HP Flare Knock Out Drum			4700	OFGASSEP	423	3290	2256	470	11696	18135	22835	10%	5170	7.5	38.8	0.6	3.1
P-1801	HP Flare Knock Out Drum Pump			500	OFGASSEP	45	350	240	50	1244	1929	2429	10%	550	60.0	33.0	0.6	0.3
U-1801	Flare Tip			2500	OFGASSEP	225	1750	1200	250	6221	9646	12146	10%	2750	55.0	151.3	0.6	1.7
	Flare Boom			107500	OFFRTWR	2150	1075	10750	538	6101	20513	128113	10%	118250	0.0	0.0	0.0	0.0
U-1601	Instrument & Plant Air Package			9800	ORUTILITY	1372	882	9800	1176	24182	37412	47212	10%	10780	24.5	264.1	0.6	6.5
V-1701	Closed Drains Drum			5500	ORUTILITY	770	495	5500	660	13571	20996	26496	10%	6050	8.3	50.2	0.6	3.6
P-1702	Open Drains Pump			100	ORUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1
P-1701	Closed Drains Pump			100	ORUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1
T-1702	Open Drains Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
T-1112	Glycol Storage Tank			2200	ORUTILITY	308	198	2200	264	5429	8399	10599	10%	2420	5.5	13.3	0.6	1.5
P-1112	Glycol Make-up Pump			50	ORUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0
T-1113	Glycol Transport Tank			340	ORUTILITY	48	31	340	41	830	1298	1638	10%	374	10.7	4.0	0.6	0.2
T-1560	Chemical Storage Tank			1000	ORUTILITY	140	90	1000	120	2468	3818	4818	10%	1100	5.5	6.1	0.6	0.7
P-1560	Chemical Injection Pump			50	ORUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0
T-1561	Chemical Transport Tank			340	ORUTILITY	48	31	340	41	830	1298	1638	10%	374	10.7	4.0	0.6	0.2
P-1501	Service Water Lift Pump			150	ORUTILITY	21	14	150	18	370	573	723	10%	165	62.5	10.3	0.6	0.1
T-1501	Service Water Lift Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
U-1920	Diesel Fire Water Pump Package			7500	ORUTILITY	1050	675	7500	900	18506	28631	36131	10%	8250	35.0	288.8	0.6	5.0
T-1930	Fire Water Pump Diesel Tank			1200	ORUTILITY	168	108	1200	144	2961	4581	5781	10%	1320	5.0	6.6	0.6	0.8
T-1920	Fire Water Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
P-1921	FW Jockey Pump			20	ORUTILITY	3	2	20	2	49	76	96	10%	22	125.0	2.8	0.6	0.0
Y-551	Pedestal Crane			35000	OFMTHDG	1050	0	1750	0	39690	42490	77490	10%	38500	16.7	643.0	0.6	23.1
Y-552	Miscellaneous Materials Handling			1000	OFMTHDG	30	0	50	0	1134	1214	2214	10%	1100	13.1	14.4	0.6	0.7
U-391	HVAC package inc. controls			1000	ORUTILITY	140	90	1000	120	2468	3818	4818	10%	1100	46.7	51.4	1.2	1.3
T-1800	Diesel Bulk Storage Tank No. 1 (Pedestal Crane "South")			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
F-1801	Diesel Trans Filter			500	ORUTILITY	70	45	500	60	1234	1909	2409	10%	550	25.5	14.0	0.6	0.3
P-1801	Diesel Trans Pump			200	ORUTILITY	28	18	200	24	494	764	964	10%	220	28.0	6.2	0.6	0.1
U-1966	Sewage Treatment Unit Skid			160	ORUTILITY	22	14	160	19	395	611	771	10%	176	43.7	7.7	0.6	0.1
T-1980 A	Portable Water Storage Tank A			1500	ORUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0
T-1980 B	Portable Water Storage Tank B			1500	ORUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0
P-1980	Portable Water Pump			200	ORUTILITY	28	18	200	24	494	764	964	10%	220	22.0	4.8	0.6	0.1
	Fire Hyd. Hose Cab., & Foam Tank			2000	OFSAFETY	60	100	100	200	2583	3043	5043	10%	2200	25.0	55.0	1.0	2.2
	Duct Agent Skid (CO2/ARF)			3750	OFSAFETY	113	188	188	375	4843	5706	9456	10%	4125	13.0	53.6	1.0	4.1
	Deluge Valve skid (2 off)			800	OFSAFETY	24	40	40	80	1033	1217	2017	10%	880	80.0	70.4	1.0	0.9

BORAL ENERGY
Yolla Field Development



Calc. No. 7903-CAL-020	Sheet No. 2 of 4
By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-09
File Location: K:\W\08407903\COST\PLTOFFEQ.XLS\Case 2 Deck	



Worley Limited

Weight & Cost Estimate Platform Topside - Base Case

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT EQUIPMENT + BULKS (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/1	Procurement Cost US\$,000	Fab. Cost US\$,000/1	Fab. Cost US\$,000	Technical Notes	
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)									
	Equipment Room Inergen System			450	OFSAFETY	14	23	23	45	581	685	1135	10%	495	21.6	10.7	1.0	0.5	
	Fire Protection Std for Gens			360	OFSAFETY	11	18	18	36	465	548	908	10%	396	44.5	17.6	1.0	0.4	
	Fire Protection Std for Gens			360	OFSAFETY	11	18	18	36	465	548	908	110%	756	45.5	34.4	1.0	0.8	
	Fremont Equip. Cab			350	OFSAFETY	11	18	18	35	452	533	883	10%	385	52.0	20.0	1.0	0.4	
	Helicopter Crash Equip. Cab			250	OFSAFETY	8	13	13	25	323	380	630	10%	275	16.0	4.4	1.0	0.3	
	Survival Craft A			7650	OFSAFETY	230	383	383	765	9880	11639	19289	10%	8415	12.8	107.3	1.0	8.4	
	Life Rafts			300	OFSAFETY	9	15	15	30	387	456	756	10%	330	36.0	11.9	1.0	0.3	
A	Generator Package			10000	OPWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
B	Generator Package			10000	OPWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
C	Generator Package			10000	OPWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
	Generator Control Panel			500	OPWRGEN	115	25	50	25	751	966	1466	10%	550	30.0	16.5	1.2	0.7	
	Switchboard			2000	OPWRDBN	460	180	0	100	2877	3617	5617	10%	2200	45.0	99.0	1.2	2.6	
	Generator Diesel day tank			2500	OPWRGEN	575	125	250	125	3754	4829	7329	10%	2750	5.5	15.1	1.2	3.3	
	UPS System			3000	OPWRDBN	690	270	0	150	4316	5426	8426	10%	3300	25.0	82.5	1.2	4.0	
	Telecomms DC Supply System			2500	OPWRDBN	575	225	0	125	3596	4521	7021	10%	2750	25.0	68.8	1.2	3.3	
	Navais System			1000	OPWRDBN	230	90	0	50	1439	1809	2809	10%	1100	81.0	89.1	1.2	1.3	
	Telecomms System			1500	OFCOMCON	300	375	0	75	2363	3113	4613	10%	1650	100.0	165.0	6.5	10.7	
	DCS/PSS			1100	OFCOMCON	220	275	0	55	1733	2283	3383	10%	1210	700.0	847.0	6.5	7.9	
	Hydraulic Package Unit			1000	OFCOMCON	200	250	0	50	1575	2075	3075	10%	1100	40.0	44.0	6.5	7.2	
	Day Room			10000	OFACCOMM	70	500	50	500	1112	2232	12232	10%	11000		0.0			Costs included in Bulks
	Equipment room			10000	OFACCOMM	70	500	50	500	1112	2232	12232	10%	11000		0.0			Costs included in Bulks
	Heldeck			80000	OFMODSP	0	0	0	0	8000	8000	88000	10%	88000		0.0			Costs included in Bulks
	Workover Equipment			200000	OFDRLLG	1400	1000	1000	1000	51100	55500	55500	10%	220000		0.0			To generate bulks weight
	Pipelines			5000	OFGENERAL	500	450	2000	500	8873	12323	17323	10%	5500		0.0			Costs included in Bulks

244280 31732 59448 121726 20116 554256 787277 289068 7202.6 221.8
244.28 787277 787.276756
TOTAL MODULE WEIGHT (KGS): 1246557
TOTAL MODULE WEIGHT (TONNES): 1247

Commissioning Materials & Spares 1.5% of Equipment Costs 108.0
Capital Spares - 5% of Equipment Costs 360.1
Total Equipment Cost 7670.8 222

	Weight	Procurement Allowance	Fabrication Allowance	Proc. Cost US\$,000/1	Fab. Cost US\$,000/1		
Electrical	31732	15%	10%	15.0	12.0	547.4	418.9
Instrument	59448	15%	10%	35.0	6.0	2392.8	392.4
Piping	144226	15%	10%	16.3	10.0	2703.5	1586.5
Other	20116	15%	10%	25.0	10.0	578.3	221.3
Structural	744256	15%	10%	0.75	4.5	641.9	3684.1
	999777					6863.9	6303.0

Total Equipment + Bulks 14534.7 6524.8

Onshore Commissioning @ 10 man-hour/1 & US\$40/hr 498.6
Loadout 5 man-hour/1 & US\$40/hr 249.3

Total Fabrication 7272.8

Offshore Hook-up and Commissioning

Total Cost Incl HSV 35 manhours/1 @ US\$90/hr = 3926.7

BORAL ENERGY
Yolla Field Development
Weight & Cost Estimate Platform Topsides - (30.2 TJM)



Calc. No. 7903-CAL-000	Sheet No. 3 of 4
By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-99
File Location: K:\WV\9903\W000001\TOPFEED\RLB\Case 2 Deck 30.2	



Worley Limited

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT EQUIPMENT + BULK (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/1	Procurement Cost US\$,000	Fab. Cost US\$,000/1	Fab. Cost US\$,000	Technical Notes	
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)									
	Wellhead				ZEROBULK	0	0	0	0	0	0	0		300.0					
	Wellhead				ZEROBULK	0	0	0	0	0	0	0		300.0					
V-1001	Pig Launcher			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	15.6	42.9	0.6	1.7	
WM-101	Production Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0	
WM-102	Test Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0	
E-1110	Wellstream Cooler			17400	OFFRCOOL	1740	870	15660	1392	38915	58577	75977	10%	19140	18.3	350.3	0.6	11.5	Cost Estimate Basis: in-house data, duplex bundle
V-1110	Production Separator			16700	OFGASSEP	1503	11690	8016	1670	41558	64437	81137	10%	18370	15.6	286.6	0.6	11.0	
V-1120	Test Separator			18700	OFGASSEP	1683	13090	8976	1870	46535	72154	90854	10%	20570	15.6	320.9	0.6	12.3	
	Gas Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1	
	Oil Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1	
	Water Cut Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1	
V-1111	TEG Contactor			16800	OFGASDEH	1512	4536	6720	1008	32105	45881	62681	10%	18480	15.0	277.2	0.6	11.1	
U-1111	TEG Regeneration Skid			3000	OFGASDEH	270	810	1200	180	5733	8193	11193	10%	3300	15.0	49.5	0.6	2.0	
F-1111	Condensate Filter Cooler			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	25.5	70.1	0.6	1.7	
U-1401	Produced Water Treatment			3000	OFWATRET	420	300	2130	210	6363	9423	12423	10%	3300	37.5	123.8	0.6	2.0	
E-1301	Fuel Gas Heater			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	24.5	40.4	0.6	1.0	
V-1301	Fuel Gas Filter Cooler			800	OFUTILITY	112	72	800	96	1974	3054	3854	10%	880	25.5	22.4	0.6	0.5	
V-1801	HP Flare Knock Out Drum			4700	OFGASSEP	423	3290	2256	470	11696	18135	22835	10%	5170	7.5	38.8	0.6	3.1	Cost Basis BU Prelim Eng.
P-1801	HP Flare Knock Out Drum Pump			500	OFGASSEP	45	350	240	50	1244	1929	2429	10%	550	60.0	33.0	0.6	0.3	Cost Basis BU Prelim Eng.
U-1801	Flare Tip			2500	OFGASSEP	225	1750	1200	250	6221	9646	12146	10%	2750	55.0	151.3	0.6	1.7	Cost Basis BU Prelim Eng.
	Flare Boom			107500	OFFRTWR	2150	1075	10750	538	6101	20613	128113	10%	118250	0.0	0.0	0.0	0.0	Costs included in Bulks
U-1601	Instrument & Plant Air Package			500	OFUTILITY	70	45	500	60	1234	1909	2409	10%	550	24.5	13.5	0.6	0.3	Cost Basis BU Prelim Eng.
V-1701	Closed Drains Drum			5500	OFUTILITY	770	495	5500	660	13571	20996	26496	10%	6050	8.3	50.2	0.6	3.6	
P-1702	Open Drains Pump			100	OFUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1	
P-1701	Closed Drains Pump			100	OFUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1	
T-1702	Open Drains Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0	Costs included in Bulks
T-1112	Glycol Storage Tank			2200	OFUTILITY	308	198	2200	264	5429	8399	10599	10%	2420	5.5	13.3	0.6	1.5	
P-1112	Glycol Make-up Pump			50	OFUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0	
T-1113	Glycol Transport Tank			340	OFUTILITY	48	31	340	41	839	1298	1638	10%	374	10.7	4.0	0.6	0.2	
T-1560	Chemical Storage Tank			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	5.5	9.1	0.6	1.0	
P-1560	Chemical Injection Pump			50	OFUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0	
T-1561	Chemical Transport Tank			340	OFUTILITY	48	31	340	41	839	1298	1638	10%	374	10.7	4.0	0.6	0.2	
P-1501	Service Water Lift Pump			150	OFUTILITY	21	14	150	18	370	573	723	10%	165	62.5	10.3	0.6	0.1	
T-1501	Service Water Lift Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0	Costs included in Bulks
U-1920	Diesel Fire Water Pump Package			7500	OFUTILITY	1050	675	7500	900	18506	28631	36131	10%	8250	35.0	288.8	0.6	5.0	
T-1930	Fire Water Pump Diesel Tank			1200	OFUTILITY	168	108	1200	144	2961	4581	5781	10%	1320	5.0	6.6	0.6	0.8	
T-1920	Fire Water Calson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0	Costs included in Bulks
P-1921	PW Jockey Pump			0	OFUTILITY	0	0	0	0	0	0	0	10%	0	125.0	0.0	0.6	0.0	
Y-551	Pedestal Crane			35000	OFMTHDG	1050	0	1750	0	39690	42490	77490	10%	38500	16.7	643.0	0.6	23.1	17.6 t @ 15m with 2.4dot, also 27.7 t @ 10m for 1.5 m seatate. Cost basis BU Prelim Eng.
Y-552	Miscellaneous Materials Handling			1000	OFMTHDG	30	0	50	0	1134	1214	2214	10%	1100	13.1	14.4	0.6	0.7	Cost Basis BU Prelim Eng.
U-391	HVAC package inc. controls			1000	OFUTILITY	140	90	1000	120	2468	3818	4818	10%	1100	46.7	51.4	1.2	1.3	Cost Basis BU Prelim Eng.
T-1800	Diesel Bulk Storage Tank No. 1 (Pedestal Crane "South")			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0	Costs included in Bulks
F-1801	Diesel Trans Filter			100	OFUTILITY	14	9	100	12	247	382	482	10%	110	25.5	2.8	0.6	0.1	
P-1801	Diesel Trans Pump			200	OFUTILITY	28	18	200	24	494	764	954	10%	220	28.0	6.2	0.6	0.1	
U-1966	Sewage Treatment Unit Skid			160	OFUTILITY	22	14	160	19	395	611	771	10%	176	43.7	7.7	0.6	0.1	
T-1980 A	Potable Water Storage Tank A			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0	
T-1980 B	Potable Water Storage Tank B			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0	
P-1980	Potable Water Pump			200	OFUTILITY	28	18	200	24	494	764	954	10%	220	22.0	4.8	0.6	0.1	
	Fire Hyd. Hose Cab., & Foam Tank			2000	OFSAFETY	60	100	100	200	2583	3043	5043	10%	2200	25.0	55.0	1.0	2.2	
	Duct Agent Skid (CO2/APP)			3750	OFSAFETY	113	188	188	375	4843	5706	9456	10%	4125	13.0	53.6	1.0	4.1	
	Deluge Valve skid (2 off)			800	OFSAFETY	24	40	40	80	1033	1217	2017	10%	880	80.0	70.4	1.0	0.9	
	Equipment Room Inergen System			450	OFSAFETY	14	23	23	45	581	685	1135	10%	495	21.6	10.7	1.0	0.5	

BORAL ENERGY
Yolla Field Development



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By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-99
File Location: K:\W\040792\COBTP\TOPFEQ\XLS\Case 2 Deck 30.2	



Worley Limited

Weight & Cost Estimate Platform Topdeck - (30.2 TJA)

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT (EQUIPMENT + BULKS) (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/1	Procurement Cost US\$,000	Fcb. Cost US\$,000/1	Fcb. Cost US\$,000	Technical Notes	
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)									TOTAL (kg)
	Fire Protection Skid for Gens			360	OFSAFETY	11	18	18	36	465	548	908	10%	396	44.5	17.6	1.0	0.4	
	Fire Protection Skid for Gens			360	OFSAFETY	11	18	18	36	465	548	908	110%	756	45.5	34.4	1.0	0.8	
	Firemans Equip. Cab			350	OFSAFETY	11	18	18	35	452	533	883	10%	385	52.0	20.0	1.0	0.4	
	Helicopter Crash Equip. Cab			250	OFSAFETY	8	13	13	25	323	380	630	10%	275	16.0	4.4	1.0	0.3	
	Survival Craft A			7650	OFSAFETY	230	383	383	765	9680	11639	19269	10%	8415	12.8	107.3	1.0	8.4	
	Life Rafts			300	OFSAFETY	9	15	15	30	387	456	756	10%	330	36.0	11.9	1.0	0.3	
A	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
B	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
C	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
	Generator Control Panel			500	OFFWRGEN	115	25	50	25	751	966	1466	10%	550	30.0	16.5	1.2	0.7	
	Switchboard			2000	OFFWRDBN	460	180	0	100	2877	3617	5617	10%	2200	45.0	99.0	1.2	2.6	
	Generator Diesel day tank			2500	OFFWRGEN	575	125	250	125	3754	4829	7329	10%	2750	5.5	15.1	1.2	3.3	
	UPS System			3000	OFFWRDBN	690	270	0	150	4316	5426	8426	10%	3300	25.0	82.5	1.2	4.0	
	Telecomms DC Supply System			2500	OFFWRDBN	575	225	0	125	3596	4521	7021	10%	2750	25.0	68.8	1.2	3.3	
	Navaid System			1000	OFFWRDBN	230	90	0	50	1439	1809	2809	10%	1100	81.0	89.1	1.2	1.3	
	Telecomms System			1500	OFCOMCON	300	375	0	75	2363	3113	4613	10%	1650	100.0	165.0	6.5	10.7	
	DCS/PSS			1100	OFCOMCON	220	275	0	55	1733	2283	3383	10%	1210	700.0	847.0	6.5	7.9	
	Hydraulic Package Unit			1000	OFCOMCON	200	250	0	50	1575	2075	3075	10%	1100	40.0	44.0	6.5	7.2	
	Day Room			10000	OFACCOMM	70	500	50	500	1112	2232	12232	10%	11000					Costs included in Bulks
	Equipment room			10000	OFACCOMM	70	500	50	500	1112	2232	12232	10%	11000					Costs included in Bulks
	Helideck			80000	OFFMODSP	0	0	0	0	8000	8000	88000	10%	88000					Costs included in Bulks
	Workover Equipment			20000	OFDRLLG	1400	1000	1000	1000	51100	55500	55500	10%	22000					To generate bulk weight
	Pipelines			5000	OFGENERAL	500	450	2000	500	8873	12323	17323	10%	5500					Costs included in Bulks

218960 28893 53501 102872 17737 496150 699152 241216 6632.4 205.1
218.96 699152 699.151805
TOTAL MODULE WEIGHT (KGS): 1133112
TOTAL MODULE WEIGHT (TONNES): 1133

Commissioning Materials & Spares 1.5% of Equipment Costs 99.5
Capital Spares - 5% of Equipment Costs 331.6
Total Equipment Cost 7063.5 205

	Weight	Procurement Allowance	Fabrication Allowance	Proc. Cost US\$,000/1	Fcb. Cost US\$,000/1		
Electrical	28893	15%	10%	15.0	12.0	498.4	361.4
Instrument	53501	15%	10%	35.0	6.0	2153.4	353.1
Piping	125372	15%	10%	16.3	10.0	2350.1	1379.1
Other	17737	15%	10%	25.0	10.0	509.9	195.1
Structural	686150	15%	10%	0.75	4.5	501.8	3396.4
	911652					6103.6	5705.1

Total Equipment + Bulks 13167.1 5910.2

Onshore Commissioning @ 10 man-hour/1 & US\$40/hr 453.2
Loadout 5 man-hour/1 & US\$40/hr 226.6

Total Fabrication 6590.1

Offshore Hook-up and Commissioning

Total Cost incl HSV 35 manhours/1 @ US\$90/hr = 3569.3

BORAL ENERGY
Yolla Field Development



Calc. No. 7903-CAL-020	Sheet No. 4 of 4
By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-09
File Location: K:\W\0807903\020\PLTOPFECLXLS\Case 2 Deck 60.4	



Worley Limited

Weight & Cost Estimate Platform Topdecks - (60.4 TJK)

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT EQUIPMENT + BULKS (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/1	Procurement Cost US\$,000	Fab. Cost US\$,000/1	Fab. Cost US\$,000	Technical Notes
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)								
	Wellhead				ZEROBULK	0	0	0	0	0	0	0		300.0			Estimate from Cameron.	
	Wellhead				ZEROBULK	0	0	0	0	0	0	0		300.0			Estimate from Cameron.	
	Wellhead				ZEROBULK	0	0	0	0	0	0	0		300.0			Estimate from Cameron.	
V-1001	Pig Launcher			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	15.6	42.9	0.6	1.7
WM-101	Production Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0
WM-102	Test Manifold			4500	OFWELHDA	405	3150	4050	5	12715	20324	24824	10%	4950	22.1	109.4	0.6	3.0
E-1110	Wellstream Cooler			26314	OFPRCOOL	2631	1316	23683	2105	58851	85586	114900	10%	28945	18.3	529.7	0.6	17.4
V-1110	Production Separator			25252	OFGASSEP	2273	17676	12121	2525	62840	97435	122687	10%	27777	15.6	433.3	0.6	16.7
V-1120	Test Separator			18700	OFGASSEP	1683	13090	8976	1870	46535	72154	90854	10%	20570	15.6	320.9	0.6	12.3
	Gas Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
	Oil Test Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
	Water Cut Meter			100	OFGENERAL	10	9	40	10	177	246	346	10%	110	25.0	2.8	0.6	0.1
V-1111	TEG Contactor			25370	OFGASDEH	2283	6650	10148	1522	48482	69285	94655	10%	27907	15.0	418.6	0.6	16.7
U-1111	TEG Regeneration Skid			4484	OFGASDEH	404	1211	1794	269	8569	12246	16730	10%	4932	15.0	74.0	0.6	3.0
F-1111	Condensate Filter Coalescer			2500	OFGENERAL	250	225	1000	250	4436	6161	8661	10%	2750	25.5	70.1	0.6	1.7
U-1401	Produced Water Treatment			4484	OFWATRET	628	448	3184	314	9511	14084	18568	10%	4932	37.5	185.0	0.6	3.0
E-1301	Fuel Gas Heater			1770	OFUTILITY	248	159	1770	212	4367	6757	8527	10%	1947	24.5	47.7	0.6	1.2
V-1301	Fuel Gas Filter Coalescer			1180	OFUTILITY	165	106	1180	142	2912	4505	5685	10%	1298	25.5	33.1	0.6	0.8
V-1801	HP Flare Knock Out Drum			5546	OFGASSEP	499	3882	2662	555	13801	21399	26945	10%	6101	7.5	45.8	0.6	3.7
P-1801	HP Flare Knock Out Drum Pump			500	OFGASSEP	45	350	240	50	1244	1929	2429	10%	550	40.0	33.0	0.6	0.3
U-1801	Flare Tip			2500	OFGASSEP	225	1750	1200	250	6221	9646	12146	10%	2750	55.0	151.3	0.6	1.7
	Flare Boom			107500	OFFLRTWR	2150	1075	10750	538	6101	20613	128113	10%	118250	0.0	0.0	0.0	0.0
U-1601	Instrument & Plant Air Package			9800	OFUTILITY	1372	882	9800	1176	24182	37412	47212	10%	10780	24.5	264.1	0.6	6.5
V-1701	Closed Drains Drum			5500	OFUTILITY	770	495	5500	660	13571	20996	26496	10%	6050	8.3	50.2	0.6	3.6
P-1702	Open Drains Pump			100	OFUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1
P-1701	Closed Drains Pump			100	OFUTILITY	14	9	100	12	247	382	482	10%	110	125.0	13.8	0.6	0.1
T-1702	Open Drains Colson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
T-1112	Glycol Storage Tank			2200	OFUTILITY	308	198	2200	264	5429	8399	10599	10%	2420	5.5	13.3	0.6	1.5
P-1112	Glycol Make-up Pump			50	OFUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0
T-1113	Glycol Transport Tank			340	OFUTILITY	48	31	340	41	839	1298	1638	10%	374	10.7	4.0	0.6	0.2
T-1560	Chemical Storage Tank			1770	OFUTILITY	248	159	1770	212	4367	6757	8527	10%	1947	5.5	10.7	0.6	1.2
P-1560	Chemical Injection Pump			50	OFUTILITY	7	5	50	6	123	191	241	10%	55	125.0	6.9	0.6	0.0
T-1561	Chemical Transport Tank			340	OFUTILITY	48	31	340	41	839	1298	1638	10%	374	10.7	4.0	0.6	0.2
P-1501	Service Water Lift Pump			150	OFUTILITY	21	14	150	18	370	573	723	10%	165	62.5	10.3	0.6	0.1
T-1501	Service Water Lift Colson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
U-1920	Diesel Fire Water Pump Package			7500	OFUTILITY	1050	675	7500	900	18506	28631	36131	10%	8250	35.0	288.8	0.6	5.0
T-1930	Fire Water Pump Diesel Tank			1200	OFUTILITY	168	108	1200	144	2961	4581	5781	10%	1320	5.0	6.6	0.6	0.8
T-1920	Fire Water Colson			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
P-1921	PW Jockey Pump			20	OFUTILITY	3	2	20	2	49	76	96	10%	22	125.0	2.8	0.6	0.0
Y-551	Pedestal Crane			35000	OFMTHDG	1050	0	1750	0	39690	42490	77490	10%	38500	16.7	643.0	0.6	23.1
Y-552	Miscellaneous Materials Handling			1000	OFMTHDG	30	0	50	0	1134	1214	2214	10%	1100	13.1	14.4	0.6	0.7
U-391	HVAC package inc. controls			1000	OFUTILITY	140	90	1000	120	2468	3818	4818	10%	1100	46.7	51.4	1.2	1.3
T-1800	Diesel Bulk Storage Tank No. 1 (Pedestal Crane "South")			0	ZEROBULK	0	0	0	0	0	0	0	10%	0	0.0	0.0	0.0	0.0
F-1801	Diesel Trans Filter			500	OFUTILITY	70	45	500	60	1234	1909	2409	10%	550	25.5	14.0	0.6	0.3
P-1801	Diesel Trans Pump			200	OFUTILITY	28	18	200	24	494	764	964	10%	220	28.0	6.2	0.6	0.1
U-1966	Sewage Treatment Unit Skid			160	OFUTILITY	22	14	160	19	395	611	771	10%	176	43.7	7.7	0.6	0.1
T-1980 A	Potable Water Storage Tank A			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0
T-1980 B	Potable Water Storage Tank B			1500	OFUTILITY	210	135	1500	180	3701	5726	7226	10%	1650	7.5	12.4	0.6	1.0
P-1980	Potable Water Pump			200	OFUTILITY	28	18	200	24	494	764	964	10%	220	22.0	4.8	0.6	0.1
	Fire Hyd. Hose Cab., & Foam Tank			2000	OFSAFETY	60	100	100	200	2583	3043	5043	10%	2200	25.0	55.0	1.0	2.2
	Duct Agent Skid (CO2/AFFF)			3750	OFSAFETY	113	188	188	375	4843	5705	9456	10%	4125	13.0	53.6	1.0	4.1
	Deluge Valve skid (2 off)			800	OFSAFETY	24	40	40	80	1033	1217	2017	10%	880	80.0	70.4	1.0	0.9

BORAL ENERGY
Yolla Field Development



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By: Brian Smith	Revision: A
Checked By: S. Kennedy	Date: 23-Mar-09
File Location: K:\M\084702\02\TOP\TOP\TOP\TOP Case 2 Deck 00.4	



Worley Limited

Weight & Cost Estimate Platform Topsides - (60.4 TJK)

Tag No.	Equipment Description	Deck	Module	Equipment Dry Weight (kg)	Bulk Factor Code	BULK MATERIAL WEIGHTS					TOTAL WEIGHT EQUIPMENT + BULKS (kg)	Design Allowance	Factored Weight (kg)	Proc. Cost US\$,000/7	Procurement Cost US\$,000	Fab. Cost US\$,000/7	Fab. Cost US\$,000	Technical Notes	
						Electrical (kg)	Instrument (kg)	Piping (kg)	Other (kg)	Structural (kg)									
	Equipment Room Inergen System			450	OFSAFETY	14	23	23	45	581	665	1135	10%	495	21.6	10.7	1.0	0.5	
	Fire Protection Skid for Gens			360	OFSAFETY	11	18	18	36	465	548	908	10%	396	44.5	17.6	1.0	0.4	
	Fire Protection Skid for Gens			360	OFSAFETY	11	18	18	36	465	548	908	110%	756	45.5	34.4	1.0	0.8	
	Fremont Equip. Cab			350	OFSAFETY	11	18	18	35	452	533	883	10%	385	52.0	20.0	1.0	0.4	
	Helicopter Crash Equip. Cab			250	OFSAFETY	8	13	13	25	323	380	630	10%	275	16.0	4.4	1.0	0.3	
	Survival Craft A			7650	OFSAFETY	230	383	383	765	9880	11639	19289	10%	8415	12.8	107.3	1.0	8.4	
	Life Rafts			300	OFSAFETY	9	15	15	30	387	456	756	10%	330	36.0	11.9	1.0	0.3	
A	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
B	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
C	Generator Package			10000	OFFWRGEN	2300	500	1000	500	15015	19315	29315	10%	11000	30.0	330.0	1.2	13.2	
	Generator Control Panel			500	OFFWRGEN	115	25	50	25	751	966	1466	10%	550	30.0	16.5	1.2	0.7	
	Switchboard			2000	OFFWRDBN	460	180	0	100	2877	3617	5617	10%	2200	45.0	99.0	1.2	2.6	
	Generator Diesel day tank			2500	OFFWRGEN	575	125	250	125	3754	4829	7329	10%	2750	5.5	15.1	1.2	3.3	
	UPS System			3000	OFFWRDBN	690	270	0	150	4316	5426	8426	10%	3300	25.0	82.5	1.2	4.0	
	Telecomms DC Supply System			2500	OFFWRDBN	575	225	0	125	3596	4521	7021	10%	2750	25.0	68.8	1.2	3.3	
	Navids System			1000	OFFWRDBN	230	90	0	50	1439	1809	2809	10%	1100	81.0	89.1	1.2	1.3	
	Telecomms System			1500	OFFCOMCON	300	375	0	75	2363	3113	4613	10%	1650	100.0	165.0	6.5	10.7	
	DCS/PSS			1100	OFFCOMCON	220	275	0	55	1733	2283	3383	10%	1210	700.0	847.0	6.5	7.9	
	Hydraulic Package Unit			1000	OFFCOMCON	200	250	0	50	1575	2075	3075	10%	1100	40.0	44.0	6.5	7.2	
	Day Room			10000	OFFACCOMM	70	500	50	500	1112	2232	12232	10%	11000		0.0			Costs included in Bulks
	Equipment room			10000	OFFACCOMM	70	500	50	500	1112	2232	12232	10%	11000		0.0			Costs included in Bulks
	Helideck			80000	OFFMODSP	0	0	0	0	8000	8000	88000	10%	88000		0.0			Costs included in Bulks
	Workover Equipment			200000	OFFDRLLG	1400	1000	1000	1000	51100	55500	55500	10%	220000		0.0			To generate bulks weight
	Pipelines			5000	OFFGENERAL	500	450	2000	500	8873	12323	17323	10%	5500		0.0			Costs included in Bulks

259450	33232	64345	131120	21374	588088	838190		285755	7776.9	231.8
259.45	838160	838.159887								
TOTAL MODULE WEIGHT (KGS): 1312610										
TOTAL MODULE WEIGHT (TONNES): 1313										
Commissioning Materials & Spares 1.5% of Equipment Costs 116.7										
Capital Spares - 5% of Equipment Costs 388.8										
Total Equipment Cost 8282.3 232										

Bulks Cost Estimate						
	Weight	Procurement Allowance	Fabrication Allowance	Proc. Cost US\$,000/7	Fab. Cost US\$,000/7	
Electrical	33232	15%	10%	15.0	12.0	573.3
Instrument	64345	15%	10%	35.0	6.0	2589.9
Piping	153620	15%	10%	16.3	10.0	2879.8
Other	21374	15%	10%	25.0	10.0	614.5
Structural	778088	15%	10%	0.75	4.5	671.1
	1050660					7328.4

Total Equipment + Bulks 15610.7 6871.6

Onshore Commissioning @ 10 man-hour/ & US\$40/hr 525.0

Loadout 5 man-hour/ & US\$40/hr 262.5

Total Fabrication 7659.2

Offshore Hook-up and Commissioning

Total Cost incl HSV 35 manhours/ @ US\$90/hr = 4134.7



Calc. No. 7903-CAL-021	Page No. 1 of 1
By: Alan Sia <i>Sia</i>	Revision: A
Checked By: B. Smith <i>BS</i>	Date: 23-Mar-99
File Location: K:\WU040709\CO\ST\PLTOFF\K.XLS\cost	



Worley Limited

JACKET COST ESTIMATE

Main	Item	MTO type	Net Qty	unit	Qty Allow	Cut & Waste	Proc Qty	Unit Cost US\$	Proc. Cost US\$/unit	Cons Qty	unit cost US\$/Unit	rolling cost US\$/t	Fab Cost US\$	Notes
Primary	Legs, rolled tubular > 914 mm OD	P1	280.3	tonne	1.1	1.1	315	750	236,250	288	800	270.00	308,020	Material cost estimated from....
Primary	Frames and Bracing API pipe > 914mm OD	P1	15.2	tonne	1.1	1.1	18	750	13,500	17	1,220	630.00	31,450	
Primary	Frames and Bracing API pipe <= 914mm OD	T1	381.3	tonne	1.1	1.1	461	740	341,140	419	1,220	-	511,180	
Primary	Frames and Bracing Nodes: Rolled tubular <= 914mm OD	P1(Z)	26.8	tonne	1.1	1.1	32	800	25,600	29	1,220	630.00	53,650	
Primary	Legs nodes - rolled tubular	P1(Z)	175	tonne	1.1	1.1	212	800	169,600	193	880	250.00	218,090	
	Skirt pile sleeve		49.3											
	Skirt pile sleeve		22											
	Riser stubs		5											
	Conductor Guides		12.7	tonne	1.1	1.1	15	735	11,025	14	2,970		41,580	
	primary jacket weight		947.55											
Calsons	API pipe	T2	15.3	tonne	1.2	1.1	20	740	14,800	18	800		14,400	
Mud Mats	Plates	P2	30.3	tonne	1.1	1.1	37	735	27,195	33	2,760		91,080	
Mud Mats	Knee braces API pipes <= 914mm OD	T2	11.5	tonne	1.2	1.1	15	740	11,100	14	1,220		17,080	
Mud Mats	Rollled shapes	S2	42.2	tonne	1.2	1.1	56	600	33,800	51	2,760		140,760	
Boatlanding	10,12,18 inch API pipes	T2	28.2	tonne	1.2	1.1	37	740	27,380	34	6,500		221,000	
Anodes	108 pcs @ 382 kg nett weight each	-	41.2	tonnes	1.1	1.1	50	2,511	125,550	45	1,160		52,200	
Grout lines	API pipe	T2	3	tonne	1.2	1.1	4	740	2,960	4	7,200		28,800	
Flooding Lines	API pipe	T2	4	tonne	1.2	1.1	5	740	3,700	5	7,200		36,000	
Risers	API pipe (1 no. 6 inch riser)	T1	6.5	tonne	1.1	1.05	8		0	7	780	250.00	7,210	
W'way Platform	Bollard service platform, Sea Deck Walkway (API pipes)	T2	20.8	tonne	1.1	1.1	25	740	18,500	23	6,500		149,500	
Gratings	Webframe 45mm x 5		1.98	tonne	1.15	1.05	2		0	2	6,500		13,000	
Handrails	API pipe	T2	1.5	tonne	1.15	1.05	2	740	1,480	2	6,500		13,000	
Grout Packers	4 nos. Oil States Grout packers	-	4	number	1	1	4	10,000	40,000	4	1,500		6,000	
	Jacket appurtenances		206.48											
Rigging Platform	Rollled shapes	S2	4	tonne	1.2	1.1	5	600	3,000	5	6,500		32,500	
Padeyes	50mm Plates	P1(Z)	5	tonne	1.1	1.1	6	800	4,800	6	4,500		27,000	
Spreader Bar	Upending Spreader Bar 610mm OD API pipes	T1	6	tonne	1.15	1.05	7	740	5,180	7	1,220		8,540	
Spreader Bar	Padeyes for Spreader Bar	P1(Z)	1.5	tonne	1.1	1.1	2	800	1,600	2	4,500		9,000	
	Installation Aids		16.5											
Piles	primary pile 1800mm OD	P1	213	tonne	1.06	1.1	248	750	186,000	226	5,460		1,233,960	
	insert piles 1400mm OD	P1	336	tonne	1.06	1.1	392	750	294,000	356	560	250.00	288,360	
	Centralizer, grout ducts, stinger duct/guide etc	T2	32	tonne	1.06	1.1	37	740	27,380	34	580	250.00	27,540	
	pile weights		581											
	etc)		1170.5											
	Total unfactored weight		1751.5				2,015			1,836				
									\$ 1,625,340.00				\$ 3,578,900	
													\$ 4,294,680.00	
														total jacket cost :
														\$ 367,200.00 \$ 5,204,240.00
Conductors (30TJ/day & 45TJ/d)	2 No. 660dia x 25.7 x 120m lg	T1	95.4	tonne	1.2	1.1	126	1,000	126,000					
Conductors (60TJ/day)	3 No. 660dia x 25.7 x 120m lg	T1	143.1	tonne	1.2	1.1	189	1,000	189,000					

645102



Offshore Pipeline Cost Estimate

Yolla Development Scenario 2 - Platform(30.2 & 45.3 TJ/d)



Project Title	Yolla Study	Calc No	7903-CAL-022
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
		Page	1 of 2

File Location K:\WL\08407903\COST\PLTOFFPL.XLS\pipeline 60

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in	FL		B	9 April 1999	in <i>AD</i>	FL <i>BB</i>	

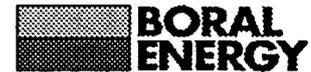
DN300 118 km 2 phase export line to Port Latt;
API Grade X65 seamless ANSI class 900 Wall thickness 11.1 mm
FBE coated 1-inch high density concrete weight coating

	Description	Unit	AS/Unit	Quantity	AS
1	Line Pipe				
1.1	DN300 2 Phase Export Line CS wt = 11.1 X65 SMLS	m	95	121540	11,546,300
1.2	Transportation of coated line pipe to barge	tonne	150	19945	2,991,678
	Subtotal				14,537,978
2	Riser Pipe				
2.1	DN300 2 Phase Export Riser CS wt = 11.1 X65 SMLS	m	95	120	11,400
	Subtotal				11,400
3	Connectors				
3.1	DN300 Flange connector ANSI Class 900	ea	1000	2	2,000
	Subtotal				2,000
4	Coatings				
4.1	Anti-corrosion coating	sq-m	15	123655	1,854,831
4.2	Concrete weight coating	cub-m	800	3340	2,671,659
4.3	Field joint coating	ea	80	9963	797,040
4.4	Splash zone coating	ea	2500	1	2,500
	Subtotal				5,326,029
5	Cathodic Protection				
5.1	Aluminium Anodes	tonne	3500	104	364,219
5.2	Installation of anodes to line pipe	ea	125	997	124,625
	Subtotal				488,844
	TOTAL				20,366,252



Offshore Pipeline Cost Estimate

Yolla Development Scenario 2 - Platform (60.4 TJ/day)



Project Title	Yolla Study	Calc No	7903-CAL-022
Client	Boral Energy Resources Limited	Project No	084/07903
Calculation Title	CAPEX	Phase / CTR	000
File Location	K:\WL\08407903\COST\PLTOFFPLXLS\pipeline 60		
		Page	2 of 2

REVISION	DATE	BY	CHECKED	APPROVED	REVISION	DATE	BY	CHECKED	APPROVED
A	19 March 1999	in	FL		B	9 April 1999	in <i>W</i>	FL <i>ppg</i>	

DN350 118 km 2 phase export line to Port Latt:
 API Grade X65 seamless ANSI class 900 Wall thickness 11.1 mm
 FBE coated 1-inch high density concrete weight coating

	Description	Unit	AS/Unit	Quantity	AS
1	Line Pipe				
1.1	DN350 2 Phase Export Line CS wt = 11.1 X65 SMLS	m	105	121540	12,761,700
1.2	Transportation of coated line pipe to barge	tonne	150	20969	3,145,314
	Subtotal				15,907,014
2	Riser Pipe				
2.1	DN350 2 Phase Export Riser CS wt = 11.1 X65 SMLS	m	120	120	14,400
	Subtotal				14,400
3	Connectors				
3.1	DN350 Flange connector ANSI Class 900	ea	1500	2	3,000
	Subtotal				3,000
4	Coatings				
4.1	Anti-corrosion coating	sq-m	15	135778	2,036,677
4.2	Concrete weight coating	cub-m	800	3633	2,906,484
4.3	Field joint coating	ea	90	9963	896,670
4.4	Splash zone coating	ea	2500	1	2,500
	Subtotal				5,842,330
5	Cathodic Protection				
5.1	Aluminium Anodes	tonne	3500	115	401,143
5.2	Installation of anodes to line pipe	ea	125	997	124,625
	Subtotal				525,768
	TOTAL				22,292,513

BORAL ENERGY Yolla Field Development Scenario 2- Platform Installation Cost Summary				Calculation No.: 7903-CAL-023 By : Brian Smith <i>BS</i> Checked By : Ian Neill <i>IN</i> File Location : K:\WL108407903\COST\PLTOFFIC.XLS\SUMMARY	Sheet No.: 1 of 3 Revision : A Date : 15-Mar-99
DESCRIPTION	COST USD	VESSEL(S) ASSUMED FOR COSTING			
INSTALLATION OF JACKET, DECK & FLARE					
OIC Management/Engineering/Procurement	2,981,803				
Transport Structures to Site	5,249,201	Tugs & Cargo Barges			
Install Structures	18,226,136	Derrick Vessel DLB30			
Sub-Total	26,457,141				
INSTALLATION & TRENCHING OF PIPELINE					
OIC Management/Engineering/Procurement	365,000				
Installation of Pipeline	23,239,659	Derrick Vessel DLB30			
Trenching of Pipeline	4,535,000				
Sub-Total	28,139,659				
ESTIMATED COST OF INFIELD FACILITIES INSTALLATION	\$54,596,799				

BORAL ENERGY		BORAL ENERGY		Calculation No.: 7903-CAL-023	Sheet No.: 2 of 3
Yolla Field Development				By: Brian Smith <i>BS</i>	Revision: A
Scenario 2- Platform				Checked By: <i>NO</i>	Date: 15-Mar-99
Platform Installation Cost Estimate				File Location: K:\WL\08407903\COST\PLTOFFIC.XLS\WHP JACKET,DECK & FLARE	
	Unit	No. Off	Unit Rate US\$	Cost US\$	
OIC Management/Engineering/Procurement					
Project Management	hrs	2,000	100	200,000	
Engineering	hrs	3,000	90	270,000	
Fabrication & Procurement - from breakdown in Data Base	LS	1	2,511,803	2,511,803	
			Subtotal	2,981,803	
Total Cost of OIC Management/Engineering/Procurement				2,981,803	
Transport Structures & Temporary Works to Site					
Transportation					
Grillages & Seafastening - Jacket/Piles/Deck	LS	1	151,800	151,800	
Mob/Demob Transport Barge [400'] Spread at Singapore	LS	1	79,100	79,100	
Tow Transport Barge Singapore Area-Fabrication Site(Adelaide)	days	35	29,900	1,046,500	
Load Out & Seafasten Jacket, Piles & Deck	days	7	27,200	190,400	
Tow Transport Barge Fabrication Site-Site	days	4	29,900	119,600	
Barge at Site	days	25	27,200	668,757	
Tow Barge Site-Singapore	days	33	29,900	986,700	
Clean Up Barge	days	2	7,000	14,000	
	days	106	Subtotal	3,256,857	
Workdeck Transportation					
<i>Workdeck Barge Towed to and from Site by Derrick Vessel AHT/Supply Vessel [7,000-8,000 bhp]</i>					
Grillages & Seafastening - Workdecks/Drilling Caisson/etc	LS	1	23,100	23,100	
Mob/Demob Workdeck Barge [300'] at Singapore	LS	1	21,000	21,000	
Load Out & S/F Workdecks/Drilling Caisson/etc [Singapore Area]	days	5	4,200	21,000	
Tow Workdeck Barge Singapore Area-Site & Put On Sea Anchor	days	33	27,100	894,300	
AHT Installs 2 no. Field Moorings & puts W'deck Barge on Moorings	days	1	27,100	27,100	
Workdeck Barge at Site	days	20	4,200	83,944	
Tow Workdeck Barge Site-Singapore [in tandem with Pile Barge]	days	33	27,100	894,300	
Harbour Tugs for Demob	LS	1	15,000	15,000	
Offload Workdecks, etc and Clean Up Barge	days	3	4,200	12,600	
	days	96	Subtotal	1,992,344	
Total Cost of Transportation				5,249,201	
Install Structures					
Mobilise/Demobilise Derrick Vessel Spread					
Rig Up and Mob/Demob Derrick Vessel Spread Singapore-Site	LS	1	11,377,200	11,377,200	
			Subtotal	11,377,200	
Platform Installation					
Derrick Vessel Site Setup/Seabed Survey	days	1	275,000	275,000	
Lift and Install Jacket	days	1	275,000	275,000	
Install Primary Piles [4 no.]	days	3	275,000	825,000	
Install Temporary Access on Jacket	days	0.5	275,000	137,500	
Install Insert Piles [4 no.]	days	8.1	275,000	2,218,333	
De-Rig Workdeck & Backload to Workdeck Barge	days	0.5	275,000	137,500	
Jacket Leg Cutoffs/Prepare for Deck Installation	days	1.5	275,000	412,500	
Lift and Install Deck	days	0.5	275,000	137,500	
Lift and Install Flare Boom	days	0.5	275,000	137,500	
Weld Out Legs/Adjust Boat Landing/Install Stairway to Landing	days	2	275,000	550,000	
30% Weather Downtime	days	5.6	275,000	1,531,750	
	days	24.1	Subtotal	6,637,583	
Helicopters					
Helicopter Costs Allocated to this Part of the Work			Subtotal	211,353	
Total Cost of Installation				18,226,136	
ESTIMATED COST FOR TRANSPORTATION & INSTALLATION OF SUBSTRUCTURE, DECK AND FLARE			US\$	26,457,141	

BORAL ENERGY			Calculation No.:	7903-CAL-023	Sheet No.:	2 of 3	
Yolla Field Development			By :	Brian Smith	Revision :	A	
Scenario 2- Platform			Checked By :		Date :	15-Mar-99	
Platform Installation Cost Estimate			File Location :	K:\W\108407903\COST\PLTOFFIC.XLS\WHP JACKET,DECK & FLARE			
<u>BARGE DURATIONS AT OFFSHORE SITE</u>							
Jacket & Deck Barge							
Standby on Arrival at Offshore Site		5.0					
Install WHP Jacket & Deck		15.1					
30% Weather Downtime		4.5					
Duration at Offshore Site		24.6			days		
Workdeck Barge							
Standby on Arrival at Offshore Site		3.0					
Installation of WHP Insert Piles and Deck		13.1					
30% Weather Downtime on Above Activities		3.9					
Duration at Offshore Site		20.0			days		
<u>JACKET INSERT PILE INSTALLATION ACTIVITIES</u>							
Assume 4-leg Workdeck, with hydraulic, air and water lines pre-installed on workdeck and on bridge and quick-connectable at both ends of bridge. Stairway between seadeck and workdeck.							
		Durations [hours]					
		Subtotal	Critical Path [Cumulative]				
Pile #1							
Preparations							
Transfer Rigging Personnel to Jacket	1					Crane	
Lift Workdeck from Barge & Install On Jacket	2						
Lift & Install Drilling Caisson in Pile Slot #1	2						
Install Bridge between Derrick Vessel & Jacket EL(+)-7.10m	1						
Install Access from Bridge to Workdeck/Install Drill Rig on Caisson	2						
Hook Up Service Lines at Bridge & to Drill Rig & Test	4	12		12			
Drilling							
Lift BHA & Install in Drill Rig Slips	1						
Run Drill String to Mudline	2						
Drill Hole to 85m [4.5m/hour 1.0 hour cleaning hole]	20						
Trip Out Drill String	3						
Run Caliper Survey	2						
Disconnect & Remove Drill Rig to Derrick Vessel	3						
Release, Lift & Remove Drilling Caisson to Pile #2 Slot	2	33		45			
Insert Pile Installation							
Lift and Run Insert Pile in Hole using ILT	3						
Rig Grout Stinger and Deploy into Insert Pile	3						
Grout Insert Pile [theoretical 73m3/460bbbls]	4						
Gout Cure	6						
Tag Grout	1	17					
PILE #2							
Preparations							
Re-route drilling service lines to Pile #2 Slot [partial C/Path activity]	1						
Lift & Install Drill Rig on Caisson	1						
Hook Up Service Lines to Drill Rig & Test	3	5		50			
Drilling							
Insert Pile Installation		33		83			
		17					
Pile #3							
Preparations							
Drilling		5		88			
Insert Pile Installation		33		121			
		17					

BORAL ENERGY Yolla Field Development Scenario 2- Platform Platform Installation Cost Estimate	 		Calculation No.: 7903-CAL-023	Sheet No.: 2 of 3	
			By: Brian Smith	Revision: A	
			Checked By: <i>[Signature]</i>	Date: 15-Mar-99	
			File Location: K:\WL\08407903\COST\PLTOFFIC.XLS\WHP JACKET,DECK & FLARE		
Pile #4					
Preparations			5	126	
Drilling [remove Drilling Caisson to Workdeck Barge]			33	159	
Insert Pile Installation			17	176	
Base Critical Path Time to Install 4 Insert Piles				176	hours
Add 10% Contingency Duration				18	
Total Critical Path Time to Install 4 Insert Piles				194	hours
				8.1	days

BORAL ENERGY Yolla Field Development Scenario 2- Platform Pipeline Installation Cost Estimate			Calculation No.: 7903-CAL-023	Sheet No.: 3 of 3
			By: Brian Smith <i>BS</i>	Revision: A
			Checked By: Ian Neill <i>IN</i>	Date: 15-Mar-99
			File Location: K:\W\108407903\COST\PLTOFFIC.XLS\PIPELINE	
	Unit	No. Off	Unit Rate US\$	Cost US\$
OIC Management/Engineering/Procurement				
OIC - Pipelines Installation				
Project Management	hrs	700	100	70,000
Engineering	hrs	1,500	90	135,000
Fabrication & Procurement - from breakdown in Data Base	LS	1	160,000	160,000
			Subtotal	365,000
Total Cost of OIC Management/Engineering/Procurement			Subtotal	365,000
Pipeline Installation				
Tie In at Shore Crossing	days	2	275,000	550,000
Lay Pipeline @ 2000m/day	days	59	275,000	16,225,000
Tie In at Jacket	days	2	275,000	550,000
30% Weather Downtime	days	18.9	275,000	5,197,500
		81.9	Subtotal	22,522,500
Helicopters				
Helicopter Costs Allocated to this Part of the Work			Subtotal	717,159
Total Cost Install Pipeline				23,239,659
Pipeline Stabilisation				
Mobilise/Demobilise Stabilisation Spread				
Mob/Demob Stabilisation Vessel Spread Singapore-Site	LS	1	2,000,000	2,000,000
			Subtotal	2,000,000
Trenching/Additional Stabilisation 10.0km @ 500m day	days	20	65,000	1,300,000
Span rectification	days	10	65,000	650,000
30% Weather Downtime	days	9.0	65,000	585,000
		39	Subtotal	2,535,000
Total Cost For Trenching Pipeline				4,535,000
ESTIMATED COST FOR INSTALLATION & TRENCHING OF PIPELINE				28,139,659

BORAL ENERGY
Yolla Field Development



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Worley

Scenario 2: Platform - Base Case
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Electrical Power kW	Duty kW	Unit Size (m) L x W x H or T/T x ID	Weight per Unit(tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost \$5,000/r	Procurement Cost \$5,000	Comments
							Dry	Operating	Total					
Inlet and Gas Conditioning														
V-2002	1	100	Pig Receiver			4.4 x 0.4	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater	965		4.9 x 0.4	2.4	2.6		10%	2.64	25.0	66.0	
E-2121	1	100	Dry Gas/Gas Cooler	620		3.7 x 0.89	10.5	10.7		10%	11.55	15.0	173.3	
V-2101 A/B	1	100	Slug catcher			10.0 x 2.0	41	57		10%	45.1	15.6	703.6	Horizontal
Cold Separation														
V-2122	1	100	Low Temperature Separator			2.5 x 0.8	2.9	3.3		10%	3.19	8.2	26.2	Vertical
Sales Gas														
U-2131	1	100	Sales Gas Metering			12 x 8 x 2	18.5			10%	20.35	25.0	508.8	
Condensate/Water Separation														
V-2201	1	100	Condensate Flash Vessel			3.1 x 0.77	1.0	1.4		10%	1.1	8.2	9.0	
Condensate Stabilisation														
C-2201A/B	2	100	Flash Gas Compressor	55.0		3 x 2 x 1	2.5			10%	5.5	175.0	962.5	
E-2201A/B	2	100	Flash Gas Cooler		52	1.2 x 1.3 x 4	1.6			10%	3.52	60.0	211.2	Fin fan cooler
C-2202A/B	2	100	Condensate Vapour Compressor	130		6 x 4 x 2	5.0			10%	11	175.0	1925.0	
E2202A/B	2	100	Condensate Vapour Cooler		210	2.4 x 3.0 x 4	3.0			10%	6.6	22.5	148.5	
E-222A/B	2	100	Condensate Trim Cooler		500	1.8 x 2.7 x 4.0	3.0			10%	6.6	22.5	148.5	
U-2211	1	100	Condensate Stabiliser Package		795	4.0 x 2.0 x 4.0	4.0			10%	4.4	38.2	159.3	
Condensate Storage														
P-2231A/B	2	100	Condensate Loadout Pump	12.5		1.0 x 0.5 x 0.5	0.25			10%	0.55	60.0	33.0	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank			15.0 X 25.0	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas														
E-2301A/B	2	100	HP Fuel Gas Heater	30		4 x 0.8	1.5			10%	3.3	24.5	80.9	
E-2303	1	100	Heating Gas Cooler	2	65	1.8 x 1 x 4	2.0			10%	2.2	24.5	53.9	
F-2301	1	100	Fuel Gas Filter/Coalescer			2 x 0.8	1.0			10%	1.1	24.5	27.0	
V-2301	1	100	Heating Gas KO Drum			4.3 x 1.1	4.0			10%	4.4	7.5	33.0	
Instrument / Service Air														
U-2601	1	100	Instrument Air Package	50.0		8 x 4 x 3	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package														
U-2603	1	100	Gas Stenchant Package	1		6 x 3 x 4				10%	0		10.0	
Hot Oil System														
H-2621A/B	2	100	Hot Oil Furnace		3000	4 x 2 x 8	25.0			10%	55	14.5	797.5	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	10		1.5 x 0.6 x 0.6	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel			3.0 x 1.5	2.0			10%	2.2	7.5	16.5	
E-2621	1	100	Hot Oil Dump Cooler	3	2000	4.4 x 2.7 x 4.0	6.2			10%	6.82	7.5	51.2	
Drains														
P-2701 A/B	2	100	Closed Drain Pumps	2.5		1.0 x 0.5 x 0.5	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	2.5		0.5 x 0.5 x 3.0	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	2.5		1.0 x 0.5 x 0.5	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit			4.0 x 2.0 x 3.0				10%	0			
T-2702	1	100	Slops Tank			4.0 x 4.0	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	25		4.0 x 2.0	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY
Yolla Field Development



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Worley

Scenario 2: Platform - Base Case
 Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Electrical Power kW	Duty kW	Unit Size (m) L x W x H or T/T x ID	Weight per Unit (tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost \$5,000's	Procurement Cost \$5,000	Comments
							Dry	Operating	Total					
Relief and Blowdown														
P-2802A/B	2	100	LP Flare Drum Pumps	5		1 x 0.6 x 0.6	0.2			10%	0.44	60.0	26.4	
V-2801	1	100	HP Flare KO Drum			4 x 2.5	36.6			10%	40.26	7.5	302.0	
V-2802	1	100	LP Flare KO Drum			4 x 1.5	22.9			10%	25.19	7.5	188.9	
U-2801	1	100	LP/HP Flare Tip			14.5 x 5.5 x 12	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment														
P-2901A/B	2	100	Water Recovery Pump	10.0		0.5 x 0.5 x 2	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System			2 x 2 x 2								Flow Diverter System
A-2902	1	100	Triple Interceptor			3 x 9 x 2								In Ground
A-2903	1	100	Primary Holding Pond			35 x 35 x 3								Pond
A-2904	1	100	Artificial Wetlands			40 x 57 x 0.3								Pond
A-2905	1	100	Water Collection Pond			30 x 30 x 4								Pond
Produced Water Handling														
A-2911	1	100	Aeration Pond			25 x 25 x 3								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	15.0		0.7 x 0.7 x 2	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	2.0		1.5 x 0.5 x 0.5	0.2			10%	0.44	25.0	11.0	Electric submersible pumps
P-2902 A/B	2	100	Holding Pond Pumps				0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water														
P-2921	1	100	Fire Water Pump	110		2 x 0.6 x 0.6	2.0			10%	2.2	35.0	77.0	Centrifugal
P-2922	1	100	Diesel Fire Water Pump		110	3 x 1.2 x 2	2.5			10%	2.75	25.0	68.8	Centrifugal
P-2923 A/B	2	100	Utility Water Pumps	7.5		1.2 x 0.5 x 0.5	0.3			10%	0.68	25.0	16.5	Centrifugal
T-2921	1	100	Water Storage Tank			6 x 20	56.0			10%	61.6	5.0	308.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank			2 x 1.2	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2931	1	100	Potable Water Tank			3 x 4	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	1		1 x 0.5 x 0.5	0.1			10%	0.22	22.0	4.8	Centrifugal
Power Generation														
BC-2801	1	100	24 V DC System	2.5		3 x 1 x 2.5	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel			1.5 x 1 x 2.5								incl. In Generator
G-2801	1	100	415V Diesel Generator	850		6 x 1.5 x 2.5	9.0			10%	9.9		600.0	UGS Budget Quote for 1 MW
T-2801	1	100	Generator Diesel Storage Tank			2 x 1.2	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers			3 x 3 x 3	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	24 V UPS	21		4 x 1.0 x 2.5	3.0			10%	3.3	25.0	82.5	
Instruments														
	1	100	Control System	30									750.0	UGS Budget Quote from Honeywell

1440.7 Sub Total 15760.7

Bulk Materials		
Electrical	8% of Equipment Cost	1260.9
Instruments	10.5% of Equipment Cost	1654.9
Piping - Material	21% of Equipment Cost	3309.7
Piping - Valves	9% of Equipment Cost	1418.5
Structural	1% of Equipment Cost	157.6
Sub-Total		7801.5

23562.2

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BORAL ENERGY
Yolla Field Development



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By: B Smith *BS* Date: 15/3/99
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Worley

Scenario 2: Platform - 30.2 TJ/day
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Weight per Unit (tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost AS,000/t	Procurement Cost AS,000	Comments
				Dry	Operating	Total					
Inlet and Gas Conditioning											
V-2002	1	100	Pig Receiver	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater	1.9	2.6		10%	2.09	25.0	52.3	
E-2121	1	100	Dry Gas/Gas Cooler	8.2	10.7		10%	9.02	15.0	135.3	
V-2101 A/B	1	100	Slug catcher	32	57		10%	35.2	15.6	549.1	Horizontal
Cold Separation											
V-2122	1	100	Low Temperature Separator	2.3	3.3		10%	2.53	8.2	20.7	Vertical
Sales Gas											
U-2131	1	100	Sales Gas Metering	18.5			10%	20.35	25.0	508.8	
Condensate/Water Separation											
V-2201	1	100	Condensate Flash Vessel	0.8	1.4		10%	0.88	8.2	7.2	Horizontal
Condensate Stabilisation											
C-2201A/B	2	100	Flash Gas Compressor	2.0			10%	4.4	175.0	770.0	
E-2201A/B	2	100	Flash Gas Cooler	1.2			10%	2.64	60.0	158.4	Fin fan cooler
C-2202A/B	2	100	Condensate Vapour Compressor	3.9			10%	8.58	175.0	1501.5	
E2202A/B	2	100	Condensate Vapour Cooler	2.3			10%	5.06	22.5	113.9	
E-222A/B	2	100	Condensate Trim Cooler	2.3			10%	5.06	22.5	113.9	
U-2211	1	100	Condensate Stabiliser Package	3.1			10%	3.41	38.2	123.4	
Condensate Storage											
P-2231A/B	2	100	Condensate Loadout Pump	0.3			10%	0.66	60.0	39.6	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas											
E-2301A/B	2	100	HP Fuel Gas Heater	1.5			10%	3.3	24.5	80.9	
E-2303	1	100	Heating Gas Cooler	2.0			10%	2.2	24.5	53.9	
F-2301	1	100	Fuel Gas Filter/Colescer	1.0			10%	1.1	24.5	27.0	
V-2301	1	100	Heating Gas KO Drum	4.0			10%	4.4	7.5	33.0	
Instrument / Service Air											
U-2601	1	100	Instrument Air Package	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package											
U-2603	1	100	Gas Stenchant Package				10%	0		10.0	
Hot Oil System											
H-2621A/B	2	100	Hot Oil Furnace	25.0			10%	55	14.5	797.5	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel	2.0			10%	2.2	7.5	16.5	
E-2621	1	100	Hot Oil Dump Cooler	6.2			10%	6.82	7.5	51.2	
Drains											
P-2701 A/B	2	100	Closed Drain Pumps	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit				10%	0			
T-2702	1	100	Slops Tank	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY
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Worley

Scenario 2: Platform - 30.2 TJ/day

Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Weight per Unit (tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost AS,000/1	Procurement Cost AS,000	Comments
				Dry	Operating	Total					
Relief and Blowdown											
P-2802A/B	2	100	LP Flare Drum Pumps	0.2			10%	0.44	60.0	26.4	
V-2801	1	100	HP Flare KO Drum	28.5			10%	31.35	7.5	235.1	
V-2802	1	100	LP Flare KO Drum	17.9			10%	19.69	7.5	147.7	
U-2801	1	100	LP/HP Flare Tip	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment											
P-2901A/B	2	100	Water Recovery Pump	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System								Flow Diverter System
A-2902	1	100	Triple Interceptor								In Ground
A-2903	1	100	Primary Holding Pond								Pond
A-2904	1	100	Artificial Wetlands								Pond
A-2905	1	100	Water Collection Pond								Pond
Produced Water Handling											
A-2911	1	100	Aeration Pond								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	0.2			10%	0.44	25.0	11.0	Electric submersible pumps
P-2902 A/B	2	100	Holding Pond Pumps	0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water											
P-2921	1	100	Fire Water Pump	2.0			10%	2.2	35.0	77.0	Centrifugal
P-2922	1	100	Diesel Fire Water Pump	2.5			10%	2.75	25.0	68.8	Centrifugal
P-2923 A/B	2	100	Utility Water Pumps	0.3			10%	0.66	25.0	16.5	Centrifugal
T-2921	1	100	Water Storage Tank	56.0			10%	61.6	5.0	308.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2931	1	100	Potable Water Tank	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	0.1			10%	0.22	22.0	4.8	Centrifugal
Power Generation											
BC-2801	1	100	24 V DC System	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel								Incl. In Generator
G-2801	1	100	415V Diesel Generator	10.0			10%	11		600.0	UGS Budget Quote for 1 MW
T-2801	1	100	Generator Diesel Storage Tank	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	24 V UPS	3.0			10%	3.3	25.0	82.5	
Instruments											
	1	100	Control System							750.0	UGS Budget Quote from Honeywell

1405.1 Sub Total 14671.9

Bulk Materials		
Electrical	8% of Equipment Cost	1173.8
Instruments	10.5% of Equipment Cost	1540.8
Piping-Material	21% of Equipment Cost	3081.1
Piping - Valves	9% of Equipment Cost	1320.5
Structural	1% of Equipment Cost	146.7
Sub-Total		7262.9

21934.5

645113



Scenario 2: Platform - 60.4 TJ/day
Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Weight per Unit(tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost AS,000/1	Procurement Cost AS,000	Comments
				Dry	Operating	Total					
Inlet and Gas Conditioning											
V-2002	1	100	Pig Receiver	2.0			10%	2.2	15.6	34.3	
E-2111	1	100	Feed Stream Heater	2.832	2.6		10%	3.1152	25.0	77.9	
E-2121	1	100	Dry Gas/Gas Cooler	12.39	10.7		10%	13.629	15.0	204.4	
V-2101 A/B	1	100	Slug catcher	48.38	57		10%	53.218	15.6	830.2	Horizontal
Cold Separation											
V-2122	1	100	Low Temperature Separator	3.4	3.3		10%	3.7642	8.2	30.9	Vertical
Sales Gas											
U-2131	1	100	Sales Gas Metering	18.5			10%	20.35	25.0	508.8	
Condensate/Water Separation											
V-2201	1	100	Condensate Flash Vessel	1.2	1.4		10%	1.298	8.2	10.6	Horizontal
Condensate Stabilisation											
C-2201A/B	2	100	Flash Gas Compressor	2.5			10%	5.5	175.0	962.5	
E-2201A/B	2	100	Flash Gas Cooler	1.9			10%	4.1536	60.0	249.2	Fin fan cooler
C-2202A/B	2	100	Condensate Vapour Compressor	5.9			10%	12.98	175.0	2271.5	
E2202A/B	2	100	Condensate Vapour Cooler	3.5			10%	7.788	22.5	175.2	
E-222A/B	2	100	Condensate Trim Cooler	3.5			10%	7.7	22.5	173.3	
U-2211	1	100	Condensate Stabiliser Package	4.7			10%	5.192	36.2	188.0	
Condensate Storage											
P-2231A/B	2	100	Condensate Loadout Pump	0.25			10%	0.55	60.0	33.0	
T-2231 A/B/C/D/E/F/G/H	8	12.5	Condensate Storage Tank	120		960.0	10%	1056	6.0	6336.0	
Fuel Gas											
E-2301A/B	2	100	HP Fuel Gas Heater	1.5			10%	3.3	24.5	80.9	
E-2303	1	100	Heating Gas Cooler	2.0			10%	2.2	24.5	53.9	
F-2301	1	100	Fuel Gas Filter/Coalescer	1.0			10%	1.1	24.5	27.0	
V-2301	1	100	Heating Gas KO Drum	4.0			10%	4.4	7.5	33.0	
Instrument / Service Air											
U-2601	1	100	Instrument Air Package	9.8			10%	10.78	24.5	264.1	
Stenchant Injection Package											
U-2603	1	100	Gas Stenchant Package				10%	0		10.0	
Hot Oil System											
H-2621A/B	2	100	Hot Oil Furnace	25.0			10%	55	14.5	797.5	
P-2621A/B/C	3	50	Hot Oil Circulation Pump	0.5			10%	1.65	25.0	41.3	
V-2621	1	100	Hot Oil Surge Vessel	2.0			10%	2.2	7.5	16.5	
E-2621	1	100	Hot Oil Dump Cooler	6.2			10%	6.82	7.5	51.2	
Drains											
P-2701 A/B	2	100	Closed Drain Pumps	0.1			10%	0.22	125.0	27.5	
P-2703A/B	2	100	Open Drain Pumps (HAZ)	0.1			10%	0.22	125.0	27.5	
P-2704A/B	2	100	Condensate Transfer Pumps	0.1			10%	0.22	125.0	27.5	
T-2701	1	100	Open Drain Pit				10%	0			
T-2702	1	100	Slops Tank	1.9			10%	2.09	7.5	15.7	
V-2701	1	100	Closed Drain Vessel	3.1			10%	3.41	7.5	25.6	

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BORAL ENERGY
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 By: B Smith Date: 15/3/99
 Checked: S Kennedy
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Worley

Scenario 2: Platform - 60.4 TJJ/day
 Onshore Gas Plant Equipment Cost Estimate

Equipment No	Number off	Capacity	Description	Weight per Unit (tonnes)			Design Allowance	Factored Total Weight (Tonnes)	Proc. Cost A\$5,000	Procurement Cost A\$5,000	Comments
				Dry	Operating	Total					
Relief and Blowdown											
P-2802A/B	2	100	LP Flare Drum Pumps	0.2			10%	0.44	60.0	28.4	
V-2801	1	100	HP Flare KO Drum	43.2			10%	47.5068	7.5	356.3	
V-2802	1	100	LP Flare KO Drum	27.0			10%	29.7242	7.5	222.9	
U-2801	1	100	LP/HP Flare Tip	2.5			10%	2.75	55.0	151.3	
Run-off Water Treatment											
P-2901A/B	2	100	Water Recovery Pump	0.2			10%	0.44	25.0	11.0	Electric Submersible Pump
A-2901	1	100	First Flush System								Flow Diverter System
A-2902	1	100	Triple Interceptor								In Ground
A-2903	1	100	Primary Holding Pond								Pond
A-2904	1	100	Artificial Wetlands								Pond
A-2905	1	100	Water Collection Pond								Pond
Produced Water Handling											
A-2911	1	100	Aeration Pond								Channelled Pond
M-2911A/B/C/D	4	50	Aerators	0.5			10%	2.2	25.0	55.0	Electric driven aerator
P-2912A/B	2	100	Produced Water Discharge Pump	0.2			10%	0.44	25.0	11.0	Electric submersible pumps
P-2902 A/B	2	100	Holding Pond Pumps	0.2			10%	0.44	25.0	11.0	
Utility Water & Fire Water											
P-2921	1	100	Fire Water Pump	2.0			10%	2.2	35.0	77.0	Centrifugal
P-2922	1	100	Diesel Fire Water Pump	2.5			10%	2.75	25.0	68.8	Centrifugal
P-2923 A/B	2	100	Utility Water Pumps	0.3			10%	0.66	25.0	16.5	Centrifugal
T-2921	1	100	Water Storage Tank	56.0			10%	61.6	5.0	306.0	Vertical Tank
T-2951	1	100	Fire Pump Diesel Tank	2.0			10%	2.2	5.0	11.0	Elevated Horizontal Tank
T-2931	1	100	Potable Water Tank	2.8			10%	3.08	5.0	15.4	Vertical Tank
P-2931A/B	2	100	Potable Water pumps	0.1			10%	0.22	22.0	4.8	Centrifugal
Power Generation											
BC-2801	1	100	24 V DC System	2.5			10%	2.75	25.0	68.8	
CP-2801	1	100	Diesel Engine Generator Control Panel								Incl. In Generator
G-2801	1	100	415V Diesel Generator	10.0			10%	11		600.0	UGS Budget Quote for 1 MW
T-2801	1	100	Generator Diesel Storage Tank	0.4			10%	0.44	5.5	2.4	Elevated Horizontal Tank
TF-2801	1	100	11/0.4 kV Transformers	5.0			10%	5.5	10.0	55.0	
UPS-2801	1	100	24 V UPS	3.0			10%	3.3	25.0	82.5	
Instruments											
	1	100	Control System							750.0	UGS Budget Quote from Honeywell

1470.7 Sub Total 16489.7

Bulk Materials		
Electrical	8% of Equipment Cost	1319.2
Instruments	10.5% of Equipment Cost	1731.4
Piping - Material	21% of Equipment Cost	3462.8
Piping - Valves	9% of Equipment Cost	1484.1
Structural	1% of Equipment Cost	164.9
Sub-Total		8162.4

24652.2

BORAL Energy Resources Ltd

Yolla Field Development

Scenario 2: WH Platform - Base Case

**Worley**

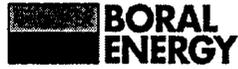
Calc : 7903-CAL-025	Sheet 1 of 4
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Onshore Construction Cost Summary

Activity	Description	Cost A\$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$2,813,282
	Sub-Total	\$3,073,282
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$13,004,923
	Site Restoration	\$100,000
Sub-Total	\$18,459,703	
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
Sub-Total	\$322,075	
TOTAL	\$21,855,060	

Yolla Field Development

1. Fabrication



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost A\$	Unit	Total Cost A\$	Remarks
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1	\$260,000	
			<u>Sub-Total</u>	<u>\$260,000</u>	
PIPING	Fabricate Spool Pieces	\$2,813,282	1	\$2,813,282	
			<u>Sub-Total</u>	<u>\$2,813,282</u>	
			TOTAL	\$3,073,282	(Fabrication)

645117

2. Construction



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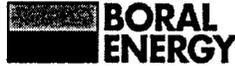
Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waarre Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
	Waarre Road Underpass	\$0	-	item	\$0	
				Sub-Total	\$732,380	

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
CAMP SET-UP						
Mobilisation of Camp						
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation Based on Using site septic system Based on camp being at construction site
	Perimeter Fence	\$40	600	m	\$24,000	
	Hardstand	\$50,000	1	item	\$50,000	
	Plumbing	\$30,000	1	item	\$30,000	
	Electrical Reticulation	\$30,000	1	item	\$30,000	
	Septic System	\$20,000	1	item	\$20,000	
	Power Supply to Site	\$0	1	item	\$0	
	Water	\$20,000	1	item	\$20,000	
	Telephone Connections	\$10,000	1	item	\$10,000	
	Supply Camp (80 man) includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's	\$1,000,000	1	item	\$1,000,000	
	Transportation					
	Craneage and Dogman	\$2,000	12	days	\$24,000	
	Paths and Plinths	\$50,000	1	item	\$50,000	
	Covered Areas	\$50,000	1	item	\$50,000	
				Sub-Total	\$1,320,000	

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
CAMP RUNNING COSTS						
Camp Running Cost	Electricity	\$700	60	wks	\$42,000	\$35 per man per day, approx. 20,000man days
	Potable Water	\$200	60	wks	\$12,000	
	Septic Disposal	\$200	60	wks	\$12,000	
	Catering	\$35	20000	m-days	\$700,000	
				Sub-Total	\$766,000	

645120

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		AS			AS	
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost AS		Unit	Total Cost AS	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		AS			AS	
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
	Buildings					
	Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analyser Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
	Site Civil Work					
	Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	8400	hrs	\$672,000	6 man-hours/tonne for approx. 1400t

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 45TJ/d

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
Piping	Installation of Piping					
	- Permanent facilities	\$5,910,256	1	item	\$5,910,256	
E & I	Installation of Field Elect.					
	Install Utility	\$350,000	1	item	\$350,000	
	Generator	\$50,000	1	item	\$50,000	
	Main Switchboards	\$10,000	1	item	\$10,000	
	Distribution Boards	\$20,000	1	item	\$20,000	
	Variable Frequency Drives	\$15,000	1	item	\$15,000	
	Motor Control Equipment	\$50,000	1	item	\$50,000	
	General Area Lighting	\$70,000	1	item	\$70,000	
	Process Area Lighting	\$50,000	1	item	\$50,000	
	Cable & Assoc.	\$620,000	1	item	\$620,000	
	Cathodic Protection System	\$20,000	1	item	\$20,000	
	UPS	\$20,000	1	item	\$20,000	
	24 Vdc System	\$40,000	1	item	\$40,000	
	Telephone Facilities	\$40,000	1	item	\$40,000	
	Site Radio	\$15,000	1	item	\$15,000	
	Installation of Field Instr.					
	- Permanent facilities	\$1,075,667	1	item	\$1,075,667	
	- Permanent facilities-Cabling	\$95,000	1	item	\$95,000	
				Sub-Total	\$13,004,923	
SITE RESTORATION						
	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$18,459,703	

645125

Yolla Field Development

3. Commissioning



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Worley

Scenario 2: WH Platform - 45TJ/d

Personnel	Description	Rate A\$	Manhours (hours)	Total Cost A\$	Remarks
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @ \$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @ 1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	

BORAL Energy Resources Ltd
Yolla Field Development
 Scenario 2: WH Platform - 30.2 TJ/day



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Onshore Construction Cost Summary

Activity	Description	Cost A\$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$2,618,937
	Sub-Total	\$2,878,937
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$12,522,326
	Site Restoration	\$100,000
Sub-Total	\$17,977,106	
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
Sub-Total	\$322,075	
TOTAL		\$21,178,118

Yolla Field Development

1. Fabrication



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Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost	Unit	Total Cost	Remarks
		\$		\$	
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1	\$260,000	
			<u>Sub-Total</u>	<u>\$260,000</u>	
PIPING	Fabricate Spool Pieces	\$2,618,937	1	\$2,618,937	
			<u>Sub-Total</u>	<u>\$2,618,937</u>	
			TOTAL	\$2,878,937	(Fabrication)

645128

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost AS		Unit	Total Cost AS	Remarks
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waarre Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
	Waare Road Underpass	\$0	-	item	\$0	
				Sub-Total	\$732,380	

Yolla Field Development

2. Construction



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Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
CAMP SET-UP						
Mobilisation of Camp						
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation Based on Using site septic system Based on camp being at construction site
	Perimeter Fence	\$40	600	m	\$24,000	
	Hardstand	\$50,000	1	item	\$50,000	
	Plumbing	\$30,000	1	item	\$30,000	
	Electrical Reticulation	\$30,000	1	item	\$30,000	
	Septic System	\$20,000	1	item	\$20,000	
	Power Supply to Site	\$0	1	item	\$0	
	Water	\$20,000	1	item	\$20,000	
	Telephone Connections	\$10,000	1	item	\$10,000	
	Supply Camp (80 man) includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's Transportation Craneage and Dogman	\$1,000,000	1	item	\$1,000,000	
	Paths and Plinths	\$2,000	12	days	\$24,000	
	Covered Areas	\$50,000	1	item	\$50,000	
		\$50,000	1	item	\$50,000	
				Sub-Total	\$1,320,000	

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Yolla Field Development

2. Construction



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Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
CAMP RUNNING COSTS						
Camp Running Cost						
	Electricity	\$700	60	wks	\$42,000	\$35 per man per day, approx. 20,000man days
	Potable Water	\$200	60	wks	\$12,000	
	Septic Disposal	\$200	60	wks	\$12,000	
	Catering	\$35	20000	m-days	\$700,000	
				Sub-Total	\$766,000	

2. Construction



Calc : 7903-CAL-026	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL\08407903\COST\PLTONS30.XLS]2. Construction	



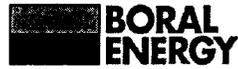
Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		A\$			A\$	
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

Yolla Field Development

2. Construction



Calc : 7903-CAL-026	Sheet 3 of 4
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Checked By : Ian Neill <i>IN</i>	Date : 13-Apr-99
File Location : K:\WLI08407903\COST\PLTONS30.XLS\2. Construction	



Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	Item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (Including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

Yolla Field Development

2. Construction



Calc : 7903-CAL-026	Sheet 3 of 4
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Checked By : Ian Neill	Date : 13-Apr-99
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Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost		Unit	Total Cost	Remarks
		AS			AS	
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
Buildings	Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analyser Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
Site Civil Work	Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	8400	hrs	\$672,000	6 man -hours/tonne for approx. 1400t

Yolla Field Development

2. Construction



Calc : 7903-CAL-026	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 13-Apr-99
File Location : K:\WL08407903\COST\PLTONS30.XLS\2. Construction	



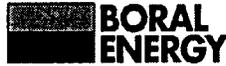
Worley

Scenario 2: WH Platform - 30.2 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
Piping	Installation of Piping - Permanent facilities	\$5,501,968	1	item	\$5,501,968	
E & I	Installation of Field Elect.					
	Install Utility	\$350,000	1	item	\$350,000	
	Generator	\$50,000	1	item	\$50,000	
	Main Switchboards	\$10,000	1	item	\$10,000	
	Distribution Boards	\$20,000	1	item	\$20,000	
	Variable Frequency Drives	\$15,000	1	item	\$15,000	
	Motor Control Equipment	\$50,000	1	item	\$50,000	
	General Area Lighting	\$70,000	1	item	\$70,000	
	Process Area Lighting	\$50,000	1	item	\$50,000	
	Cable & Assoc.	\$620,000	1	item	\$620,000	
	Cathodic Protection System	\$20,000	1	item	\$20,000	
	UPS	\$20,000	1	item	\$20,000	
	24 Vdc System	\$40,000	1	item	\$40,000	
	Telephone Facilities	\$40,000	1	item	\$40,000	
	Site Radio	\$15,000	1	item	\$15,000	
	Installation of Field Instr.					
	- Permanent facilities	\$1,001,358	1	item	\$1,001,358	
	- Permanent facilities-Cabling	\$95,000	1	item	\$95,000	
				Sub-Total	\$12,522,326	
SITE RESTORATION	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$17,977,106	

Yolla Field Development

3. Commissioning



Calc : 7903-CAL-026	Sheet 4 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 13-Apr-99
File Location : K:\WL\08407903\COST\PLTONS30.XLS\3. Commissioning	



Worley

Scenario 2: WH Platform - 30.2 TJ/day

Personnel	Description	Rate A\$	Manhours (hours)	Total Cost A\$	Remarks
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @ \$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @ 1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	

BORAL Energy Resources Ltd
Yolla Field Development
 Scenario 2: WH Platform - 60.4 TJ/day



Worley



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File Location : K:\WL\08407903\COST\PLTONS60.XLS\Summary	

Onshore Construction Cost Summary

Activity	Description	Cost A\$
1. Fabrication	Structural Steelwork	\$260,000
	Piping	\$2,943,419
	Sub-Total	\$3,203,419
2. Construction	Site Establishment	\$732,380
	Camp Set-up	\$1,320,000
	Camp Running Costs	\$766,000
	Site Offices and Storage Compounds	\$826,600
	Site Personnel	\$1,086,800
	Additional On-site Factors	\$500,000
	Equipment	\$123,000
	Sub-Contractors	\$13,328,079
	Site Restoration	\$100,000
Sub-Total	\$18,782,859	
3. Commissioning	Planning & Preparation	\$88,000
	Execution	\$216,000
	Travel & Accommodation	\$18,075
Sub-Total	\$322,075	
TOTAL		\$22,308,354

Yolla Field Development

1. Fabrication



Calc : 7903-CAL-027	Sheet 2 of 4
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Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL\08407903\COST\PLTONS60.XLS\1. Fabrication	



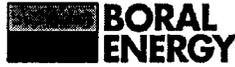
Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost	Unit	Total Cost	Remarks
		A\$		A\$	
STRUCTURAL STEELWORK	Equipment Steelwork	\$260,000	1	\$260,000	
			<u>Sub-Total</u>	\$260,000	
PIPING	Fabricate Spool Pieces	\$2,943,419	1	\$2,943,419	
			<u>Sub-Total</u>	\$2,943,419	
			TOTAL	\$3,203,419	(Fabrication)

Yolla Field Development

2. Construction



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File Location : K:\WL\08407903\COST\PLTONS60.XLS\2. Construction	



Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SITE ESTABLISHMENT						
Initial	Construction Security Fencing	\$40	1500	m	\$60,000	Perimeter fence around construction site 12m x 3m, 66 wks Single units, 66 wks (2 units @ \$40 each)
	Security Gatehouse	\$100	66	wks	\$6,600	
	Site toilets (temporary)	\$80	66	wks	\$5,280	
	Fabricate Project Sign	\$500	1	item	\$500	
Civil Works	Remove Topsoil and Stockpile	\$3	22000	m ²	\$66,000	Excavation of 300mm thk layer, stockpiled on site 150mm thk crushed rock, grading, rolling, compac. 300mm thk crushed rock
	Cap Site with Crushed Rock	\$12	22000	m ³	\$264,000	
	Initial Road Construction	\$20	6000	m ³	\$120,000	
	Drainage Management	\$50,000	1	item	\$50,000	
Electrical & Communications Supply	Re-arrange Local Lines	\$50,000	1	item	\$50,000	Based on power supply up and running
	Generator Sets (Initial)	\$0	13	wks	\$0	
	Site Reticulation	\$100,000	1	item	\$100,000	
	Phone Lines (2off, Initial)	\$10,000	1	item	\$10,000	
Road Works	Waarre Road Upgrade	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
	Waarre Road Underpass	\$0	-	item	\$0	Cost to be supplied by Shire of Corangamite
Sub-Total					\$732,380	

Yolla Field Development

2. Construction



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File Location : K:\WL08407903\COST\PLTON560.XLS]2. Construction	



Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks	
CAMP SET-UP							
Mobilisation of Camp							
	Site grading	\$4	3000	m ²	\$12,000	Camp size 150m x 100 m, 200mm excavation	
	Perimeter Fence	\$40	600	m	\$24,000		
	Hardstand	\$50,000	1	item	\$50,000		
	Plumbing	\$30,000	1	item	\$30,000		
	Electrical Reticulation	\$30,000	1	item	\$30,000		
	Septic System	\$20,000	1	item	\$20,000		Based on Using site septic system
	Power Supply to Site	\$0	1	item	\$0		Based on camp being at construction site
	Water	\$20,000	1	item	\$20,000		
	Telephone Connections	\$10,000	1	item	\$10,000		
	Supply Camp (80 man) includes, Sleeping/Ablutions, Mess, Wet Canteen, Office, A/C's	\$1,000,000	1	item	\$1,000,000	UGS Quotation from AUSCO for 96 man camp (\$1.126M)	
	Transportation Craneage and Dogman	\$2,000	12	days	\$24,000		
	Paths and Plinths	\$50,000	1	item	\$50,000		
	Covered Areas	\$50,000	1	item	\$50,000		
				Sub-Total	\$1,320,000		

2. Construction



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By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL\08407903\COST\PLTONS80.XLS\2. Construction	



Worley

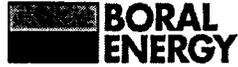
Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SITE OFFICES AND STORAGE COMPOUNDS						
	Offices	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Office furniture	\$25,000	1	item	\$25,000	
	Crib Huts	\$600	66	wks	\$39,600	6 units, 12m x 3m (\$100 each)
	Change rooms	\$400	66	wks	\$26,400	4 units, 12m x 3m (\$100 each)
	Security Fencing	\$40	200	m	\$8,000	
	Warehouse (15 x 30)	\$90,000	1	item	\$90,000	
	Establishment of Services					
	Mob/Demob Offices, Ablutions, etc	\$3,000	20	item	\$60,000	\$3,000 includes mob and demob of units
	Septic Installation	\$50,000	1	item	\$50,000	
	Ablution Blocks	\$300	66	wks	\$19,800	6 units, 30 man unit (\$30 each)
	Raw Water	\$20,000	1	item	\$20,000	
	Potable Water, Establish	\$50,000	1	item	\$50,000	
	Potable Water, running	\$200	66	wks	\$13,200	
	Waste Water Disposal	\$20,000	1	item	\$20,000	
	Reticulation of Electrical Supply	\$50,000	1	item	\$50,000	
	Power Supply, running	\$500	66	wks	\$33,000	
	Telecommunications	\$1,000	66	wks	\$66,000	running costs for worley phones only
	Vehicle Leasing and Running	\$6,000	15	mths	\$90,000	site vehicles (6 vehicles @ \$1000/mth/vehicle)
	Personal Protective Equipment	\$500	60	item	\$30,000	
	First Aid Station	\$30,000	1	item	\$30,000	includes ATCO hut
	Miscellaneous Expenses	\$1,000	66	wks	\$66,000	
				Sub-Total	\$826,600	

645143

Yolla Field Development

2. Construction



Calc : 7903-CAL-027	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL\08407903\COST\PLTONS60.XLS\2. Construction	



Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
ADDITIONAL ON-SITE FACTORS						
Cost of Site Agreement	Union costs	\$2.50	200000	hrs	\$500,000	\$2.50 /man / hr prices)
			Sub-Total		\$500,000	
EQUIPMENT						
	Cranes	\$60,000	1	item	\$60,000	purchase
	Forklift	\$500	66	wks	\$33,000	
	Tanker (including driver)	\$1,500	20	wks	\$30,000	
			Sub-Total		\$123,000	

2. Construction



Calc : 7903-CAL-027	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL08407903\COST\PLTONS80.XLS]2. Construction	



Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
SUBCONTRACTORS						
Civil & Earth Works						
	Site Preparation	\$260,000	1	item	\$260,000	
	Equipment Foundations	\$600,000	1	item	\$600,000	
	Pipe Track	\$1,280,000	1	item	\$1,280,000	
	Miscellaneous Concrete	\$150,000	1	item	\$150,000	
	Buildings Control/Switch gear room	\$1,000	200	m2	\$200,000	
	Compressor Building	\$750	200	m2	\$150,000	
	Emergency Response Shed	\$500	30	m2	\$15,000	
	Analyser Shed	\$500	30	m2	\$15,000	
	Chemical Store	\$500	30	m2	\$15,000	
	Workshop	\$500	40	m2	\$20,000	
	Gatehouse	\$500	20	m2	\$10,000	
	Site Civil Work Permanent Perimeter Fence	\$40	1000	m	\$40,000	
	Permanent Sealed Roads	\$400	340	m	\$136,000	
	Permanent Unsealed Roads	\$300	270	m	\$81,000	
	Drainage	\$100,000	1	item	\$100,000	
	Site Services	\$100,000	1	item	\$100,000	
Ponds and Wetlands						
	Ponds and wetlands	\$400,000	1	item	\$400,000	
	'Wilson's' dam	\$50,000	1	item	\$50,000	
Structural						
	Equipment Steelwork	\$260,000	1	item	\$260,000	
Mechanical						
	Installation of Equipment	\$80	8400	hrs	\$672,000	6 man -hours/tonne for approx. 1400t

2. Construction



Calc : 7903-CAL-027	Sheet 3 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
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Worley

Scenario 2: WH Platform - 60.4 TJ/day

Activity	Description	Unit Cost A\$		Unit	Total Cost A\$	Remarks
Piping	Installation of Piping - Permanent facilities	\$6,183,654	1	item	\$6,183,654	
E & I	Installation of Field Elect.					
	Install Utility	\$350,000	1	item	\$350,000	
	Generator	\$50,000	1	item	\$50,000	
	Main Switchboards	\$10,000	1	item	\$10,000	
	Distribution Boards	\$20,000	1	item	\$20,000	
	Variable Frequency Drives	\$15,000	1	item	\$15,000	
	Motor Control Equipment	\$50,000	1	item	\$50,000	
	General Area Lighting	\$70,000	1	item	\$70,000	
	Process Area Lighting	\$50,000	1	item	\$50,000	
	Cable & Assoc.	\$620,000	1	item	\$620,000	
	Cathodic Protection System	\$20,000	1	item	\$20,000	
	UPS	\$20,000	1	item	\$20,000	
	24 Vdc System	\$40,000	1	item	\$40,000	
	Telephone Facilities	\$40,000	1	item	\$40,000	
	Site Radio	\$15,000	1	item	\$15,000	
	Installation of Field Instr.					
	- Permanent facilities	\$1,125,425	1	item	\$1,125,425	
	- Permanent facilities-Cabling	\$95,000	1	item	\$95,000	
				Sub-Total	\$13,328,079	
SITE RESTORATION	General tidy-up	\$100,000	1		\$100,000	
				Sub-Total	\$100,000	
				TOTAL	\$18,782,859	

Yolla Field Development

3. Commissioning



Calc : 7903-CAL-027	Sheet 4 of 4
By : Brian Smith <i>BS</i>	Revision : A
Checked By : Ian Neill <i>IN</i>	Date : 23-Mar-99
File Location : K:\WL\08407903\COST\PLTONS60.XLS\3. Commissioning	



Worley

Scenario 2: WH Platform - 60.4 TJ/day

Personnel	Description	Rate	Manhours	Total Cost	Remarks
		A\$	(hours)	A\$	
PREPARATION/PLANNING					
	Commissioning Leader	\$90	200	\$18,000	40 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Mechanical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Electrical Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Installation Engineer	\$80	200	\$16,000	40 hrs/week for 5 weeks
	Clerk	\$30	200	\$6,000	40 hrs/week for 5 weeks
	Sub-Total		1200	\$88,000	
EXECUTION					
	Commissioning Leader	\$90	300	\$27,000	60 hrs/week for 5 weeks
	Facilities Engineer (Process)	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Mechanical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Electrical Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Installation Engineer	\$80	300	\$24,000	60 hrs/week for 5 weeks
	Clerk	\$30	300	\$9,000	60 hrs/week for 5 weeks
	Mechanical Crew				
	Leading Hand	\$55	300	\$16,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Fitter	\$45	300	\$13,500	60 hrs/week for 5 weeks
	Technical Assistant	\$40	300	\$12,000	60 hrs/week for 5 weeks
	Instrument and Electrical Crew				
	Leading Hand/Electrical Technical Assistant	\$55	300	\$16,500	50 hrs/week for 5 weeks
	Instrument Technical Assistant	\$40	300	\$12,000	50 hrs/week for 5 weeks
	Sub-Total		3600	\$216,000	
OTHER					
	Accommodation	\$80	210	\$16,800	6 people for 5 weeks @ \$80/night
	Travel	\$85	15	\$1,275	3 cars x 5 weeks @ 1 return trip/week
				\$18,075	
	TOTAL		4,800	\$322,075	



Operational Cost Estimate
 Yolla Development Scenario 2 - Platform
 Base Case - 45.3 TJ/day



Job Number	084 / 07903	Calc. No.	7903-CAL-028
Prepared by	L.Neill	Rev	B
Checked by	B. Smith	Date	9-Apr-99
K:\WL\08407903\COST\PLATOPEX.XLS\base case			

Capex

Current estimate	345,592 AUDk
Offshore	276,103
Onshore	69,488

Day staff

Human resources

Shift length	12 h
All supervisors are working supervisors	
Offshore	Nil regular, neither daily visits or living offshore!
Onshore - weekday	8 *staff
	2 contractor
Onshore - weeknight and all weekend	2 *staff

Supvr	1
Oper	2
Elec	1
Mech	1
Rot Eq	0
PIM	0
Labour	1
Engr	0
Admin	1
Whouse	1
	8

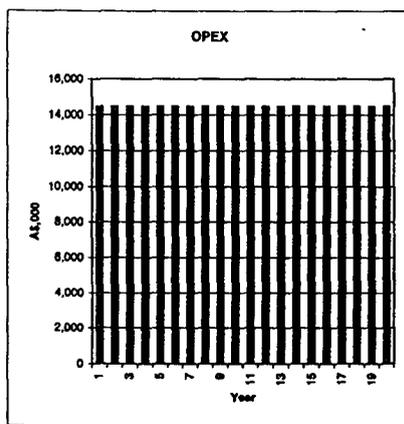
Nights, weekend days	
Supvr	1
Oper	1
	2

Main components of opex	Status	AUDk
Reservoir studies and well intervention	A\$3M per year (Boral)	3,000
Internal pipeline survey - intelligent pigging	A\$1M every 5 years	200
Pipeline external inspns offshore	Once every 2 years @ A\$250k	125
Communications links		80
Helicopter when needed	Say 24 flights per year @ 2h @ 2200/h	106
Supply boat when needed	Allow per year	150
Standby boat when needed	Allow per year, possibly reqd for well ops, wireline etc	100
Fishing damage	No allowance here	
Glycol	A\$2/L, 10,000 L/yr	20
Stenchant	Allow	5
Diesel fuel - onsh use	Allow	20
Personnel vehicle lease	Half of capital cost - 2 vehicles @ avg 40k	40
Major overhauls - rotating equip	Allow	300
Warehousing - degradation of stocks	1.5% of capex * 10% per year	518
Parts usage	1% of capex per year	3,456
Insurance - assets offsh		1,933
Insurance - assets onsh		278
Insurance - wells	2wells	15
Insurance - public risk	Allow	250
Meter proving	Allow	25
Personnel - day 12h	10	700
Personnel - night/weekend 12h	4	360
Contract labour full time	2	140
Contract services - maintenance etc	Allow	300
Laboratory services	Allow equiv of one chemist and equip charge - approx	75
Engineering services	Allow	250
Corporate overhead	Allow equiv of one fulltime senior person/director incl oh	150
Subtotal		12,596
Contingency	15%	1,889
TOTAL		14,485

Opex relative weighting

This table shows how opex varies year by year as operation changes

Year	Base	Due to cost		Net effect	Opex by year A\$K
		Due to complexity	cutting/decline		
1	1.00	0.000	0.000	1.00	14,485
2	1.00	1.00	1.00	1.00	14,485
3	1.00	1.00	1.00	1.00	14,485
4	1.00	1.00	1.00	1.00	14,485
5	1.00	1.00	1.00	1.00	14,485
6	1.00	1.00	1.00	1.00	14,485
7	1.00	1.00	1.00	1.00	14,485
8	1.00	1.00	1.00	1.00	14,485
9	1.00	1.00	1.00	1.00	14,485
10	1.00	1.00	1.00	1.00	14,485
11	1.00	1.00	1.00	1.00	14,485
12	1.00	1.00	1.00	1.00	14,485
13	1.00	1.00	1.00	1.00	14,485
14	1.00	1.00	1.00	1.00	14,485
15	1.00	1.00	1.00	1.00	14,485
16	1.00	1.00	1.00	1.00	14,485
17	1.00	1.00	1.00	1.00	14,485
18	1.00	1.00	1.00	1.00	14,485
19	1.00	1.00	1.00	1.00	14,485
20	1.00	1.00	1.00	1.00	14,485



Reality check

Opex as percentage of capex	
Should be in range of 3-5%	
Capex	345,592
Check As percentage of base opex value	4.19%



Operational Cost Estimate
Yolla Development Scenario 2 - Platform
Low Flow Case - 30.2 TJ/day



Job Number	084 / 07903	Calc. No.	7903-CAL-028
Prepared by	L.Neill	Rev	B
Checked by	B. Smith	Date	9-Apr-99
K:\WL\08407903\COST\PLATOPEX.XLS base case			

Capex

Current estimate	336,386 AUDk
Offshore	270,424
Onshore	65,962

Day staff

Human resources

Shift length	12 h
All supervisors are working supervisors	
Offshore	Nil regular, neither daily visits or living offshore
Onshore - weekday	8 "staff"
	2 contractor
Onshore - weeknight and all weekend	2 "staff"

Nights, weekend days	
Supvr	1
Oper	1
	2

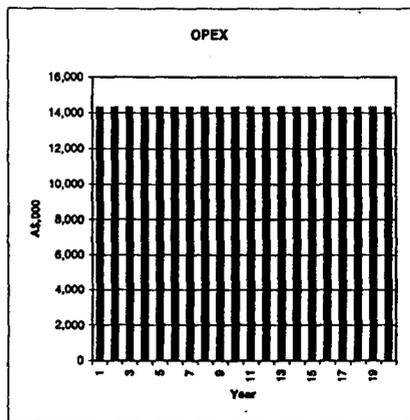
Supvr	1
Oper	2
Elec	1
Mech	1
Rot Eq	0
PIM	0
Labour	1
Engr	0
Admin	1
Whouse	1
	8

Main components of opex	Status	AUDk
Reservoir studies and well intervention	A\$3M per year (Boral)	3,000
Internal pipeline survey - intelligent pigging	A\$1M every 5 years	200
Pipeline external inspns offshore	Once every 2 years @ A\$250k	125
Communications links		80
Helicopter when needed	Say 24 flights per year @ 2h @ 2200/h	106
Supply boat when needed	Allow per year	150
Standby boat when needed	Allow per year, possibly reqd for well ops, wireline etc	100
Fishing damage	No allowance here	
Glycol	A\$2/L, 10,000 L/yr	20
Stenchant	Allow	5
Diesel fuel - onsh use	Allow	20
Personnel vehicle lease	Half of capital cost - 2 vehicles @ avg 40k	40
Major overhauls - rotating equip	Allow	300
Warehousing - degradation of stocks	1.5% of capex * 10% per year	505
Parts usage	1% of capex per year	3,364
Insurance - assets offsh		1,893
Insurance - assets onsh		264
Insurance - wells	2wells	15
Insurance - public risk	Allow	250
Meter proving	Allow	25
Personnel - day 12h	10	700
Personnel - night/weekend 12h	4	360
Contract labour full time	2	140
Contract services - maintenance etc	Allow	300
Laboratory services	Allow equiv of one chemist and equip charge - approx	75
Engineering services	Allow	250
Corporate overhead	Allow equiv of one fulltime senior person/director incl oh	150
Subtotal		12,436
Contingency	15%	1,865
TOTAL		14,301

Opex relative weighting

This table shows how opex varies year by year as operation changes

Year	Base	Due to complexity	Due to cost cutting/decline	Net effect	Opex by year A\$k
1	1.00	0.000	0.000	1.00	14,301
2	1.00	1.00	1.00	1.00	14,301
3	1.00	1.00	1.00	1.00	14,301
4	1.00	1.00	1.00	1.00	14,301
5	1.00	1.00	1.00	1.00	14,301
6	1.00	1.00	1.00	1.00	14,301
7	1.00	1.00	1.00	1.00	14,301
8	1.00	1.00	1.00	1.00	14,301
9	1.00	1.00	1.00	1.00	14,301
10	1.00	1.00	1.00	1.00	14,301
11	1.00	1.00	1.00	1.00	14,301
12	1.00	1.00	1.00	1.00	14,301
13	1.00	1.00	1.00	1.00	14,301
14	1.00	1.00	1.00	1.00	14,301
15	1.00	1.00	1.00	1.00	14,301
16	1.00	1.00	1.00	1.00	14,301
17	1.00	1.00	1.00	1.00	14,301
18	1.00	1.00	1.00	1.00	14,301
19	1.00	1.00	1.00	1.00	14,301
20	1.00	1.00	1.00	1.00	14,301



Reality check

Opex as percentage of capex	
Should be in range of 3-5%	
Capex	336,386
Check As percentage of base opex value	4.25%



Operational Cost Estimate
 Yolla Development Scenario 2 - Platform
 High Flow Case - 60.4 TJ/day



Job Number	084 / 07903	Calc. No.	7903-CAL-028
Prepared by	L.Neill	Rev	B
Checked by	B. Smith	Date	9-Apr-99
K:\W\08407903\COST\PLATOPEX.XLS\base case			

Capex

Current estimate	372,818 AUDk
Offshore	300,968
Onshore	71,850

Day staff

Human resources

Shift length	12 h
All supervisors are working supervisors	Nil regular, neither daily visits or living offshore
Offshore	8 "staff"
Onshore - weekday	2 contractor
Onshore - weeknight and all weekend	2 "staff"

Nights, weekend days	
Supvr	1
Oper	1
	2

Supvr	1
Oper	2
Elec	1
Mech	1
Rot Eq	0
PIM	0
Labour	1
Engr	0
Admin	1
Whouse	1
	8

Main components of opex	Status	AUDk
Reservoir studies and well intervention	A\$3M per year (Boral)	3,000
Internal pipeline survey - intelligent pigging	A\$1M every 5 years	200
Pipeline external Inspns offshore	Once every 2 years @ A\$250k	125
Communications links		80
Helicopter when needed	Say 24 flights per year @ 2h @ 2200/h	106
Supply boat when needed	Allow per year	150
Standby boat when needed	Allow per year, possibly reqd for well ops, wireline etc	100
Fishing damage	No allowance here	
Glycol	A\$2/L, 10,000 L/yr	20
Stenchant	Allow	5
Diesel fuel - onsh use	Allow	20
Personnel vehicle lease	Half of capital cost - 2 vehicles @ avg 40k	40
Major overhauls - rotating equip	Allow	300
Warehousing - degradation of stocks	1.5% of capex * 10% per year	559
Parts usage	1% of capex per year	3,728
Insurance - assets offsh		2,107
Insurance - assets onsh		287
Insurance - wells	2wells	15
Insurance - public risk	Allow	250
Meter proving	Allow	25
Personnel - day 12h	10	700
Personnel - night/weekend 12h	4	360
Contract labour full time	2	140
Contract services - maintenance etc	Allow	300
Laboratory services	Allow equiv of one chemist and equip charge - approx	75
Engineering services	Allow	250
Corporate overhead	Allow equiv of one fulltime senior person/director incl oh	150
Subtotal		13,092
Contingency	15%	1,964
TOTAL		15,056

Opex relative weighting

This table shows how opex varies year by year as operation changes

Year	Base	Due to complexity	Due to cutting/decline	Net effect	Opex by year A\$K
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5	1.00	1.00	1.00	1.00	15,056
6	1.00	1.00	1.00	1.00	15,056
7	1.00	1.00	1.00	1.00	15,056
8	1.00	1.00	1.00	1.00	15,056
9	1.00	1.00	1.00	1.00	15,056
10	1.00	1.00	1.00	1.00	15,056
11	1.00	1.00	1.00	1.00	15,056
12	1.00	1.00	1.00	1.00	15,056
13	1.00	1.00	1.00	1.00	15,056
14	1.00	1.00	1.00	1.00	15,056
15	1.00	1.00	1.00	1.00	15,056
16	1.00	1.00	1.00	1.00	15,056
17	1.00	1.00	1.00	1.00	15,056
18	1.00	1.00	1.00	1.00	15,056
19	1.00	1.00	1.00	1.00	15,056
20	1.00	1.00	1.00	1.00	15,056

Reality check

Opex as percentage of capex	
Should be in range of 3-5%	
Capex	372,818
Check As percentage of base opex value	4.04%



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT D

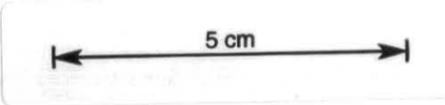
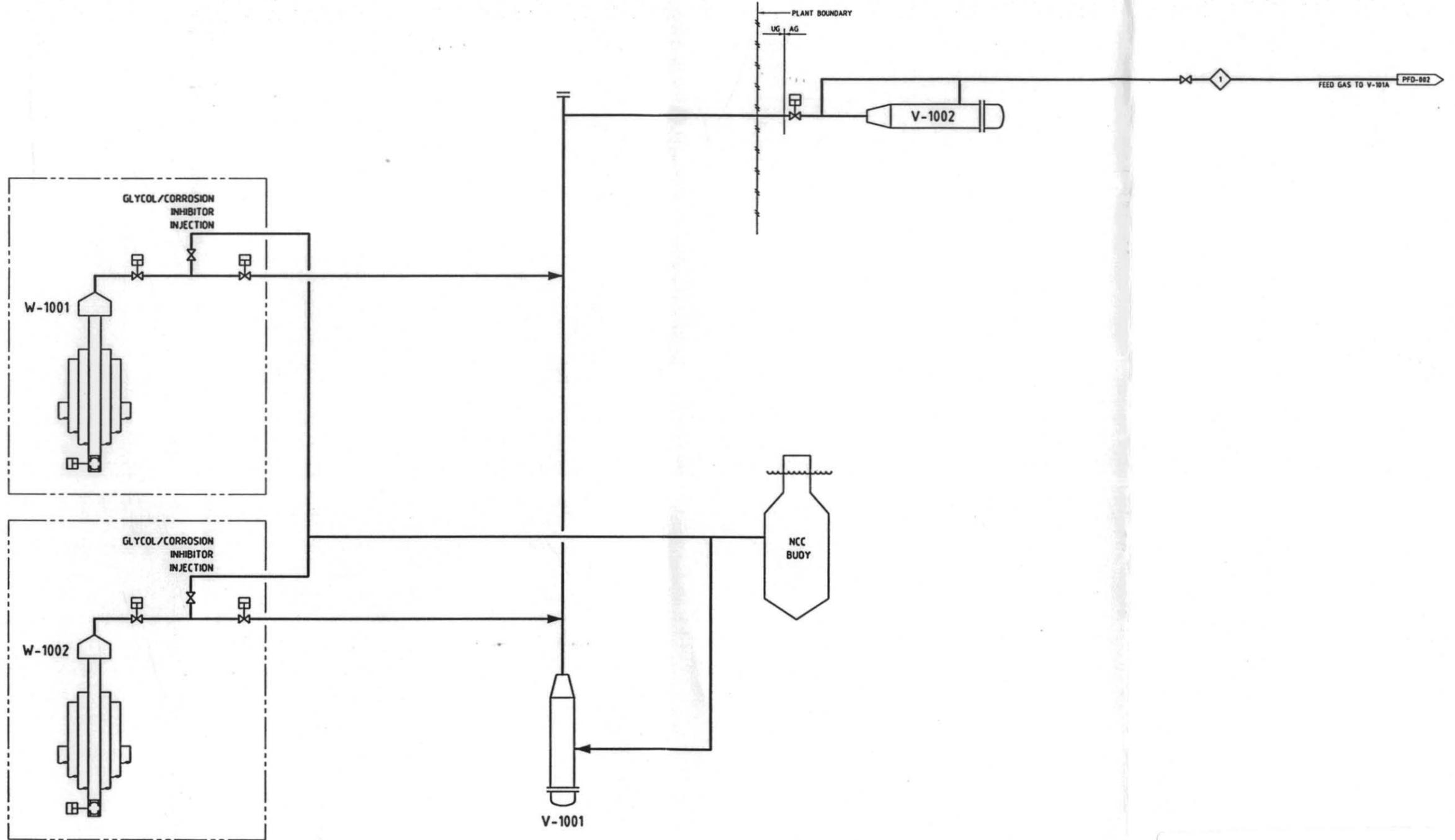
Process Flow Diagrams

(6 Pages)

W-003/4
SUBSEA WELLHEADS

V-1001
PIG LAUNCHER

V-1002
PIG RECEIVER



6 ECA

22-03



PREPARED BY
KAW
903/04
PFD-00

NO.	DATE	REVISION	PROJ. NO.	DRAWN	CHEK	ENL.	PRJ. ENL.	PRJ. ENL. SIGN.
A	3/99	ISSUED FOR REPORT	0848793	DAK				

DRAWN	DAK	DATE	3/99
CHECKED		DATE	
ENGINEER		DATE	
CLIENT ENG.		DATE	

YOLLA SCOPING STUDY
OPTION 1 - NCC BUOY
PFD
SCALE: NTS
DRAWING: PFD-001
REV: A

E-2111
FEED GAS
HEATER

V-2101
SLUG
CATCHER

F-2111A/B
INLET GAS
FILTER

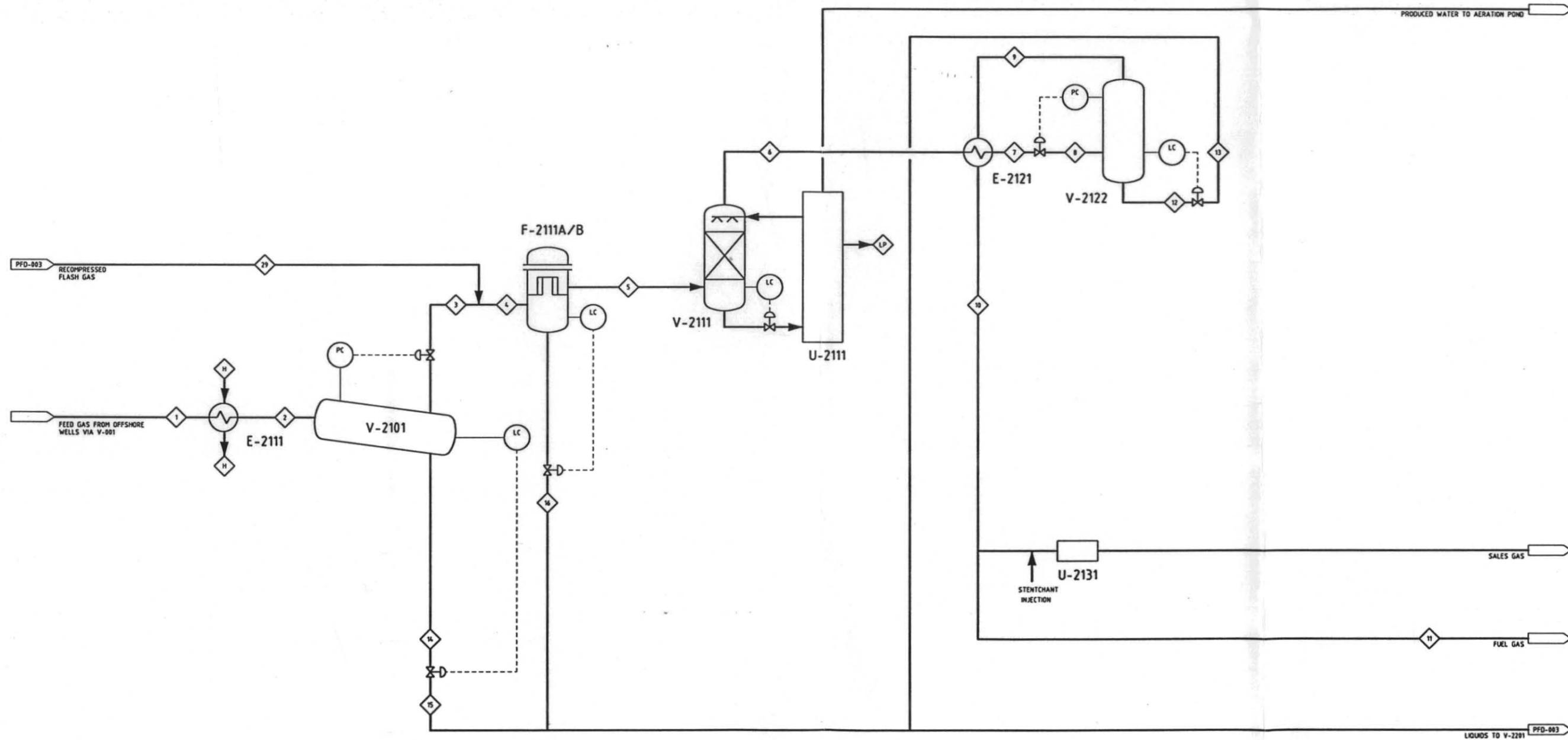
V-2111
TEG
CONTACTOR

U-2111
TEG REGENERATION
UNIT

E-2121
DRY GAS/
GAS COOLER

U-2131
SALES GAS METERING

V-2122
LOW TEMPERATURE
SEPARATOR

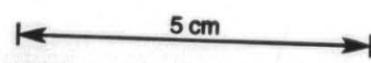


PRODUCED WATER TO AERATION POND

SALES GAS

FUEL GAS

LIQUIDS TO V-2201 PFD-003

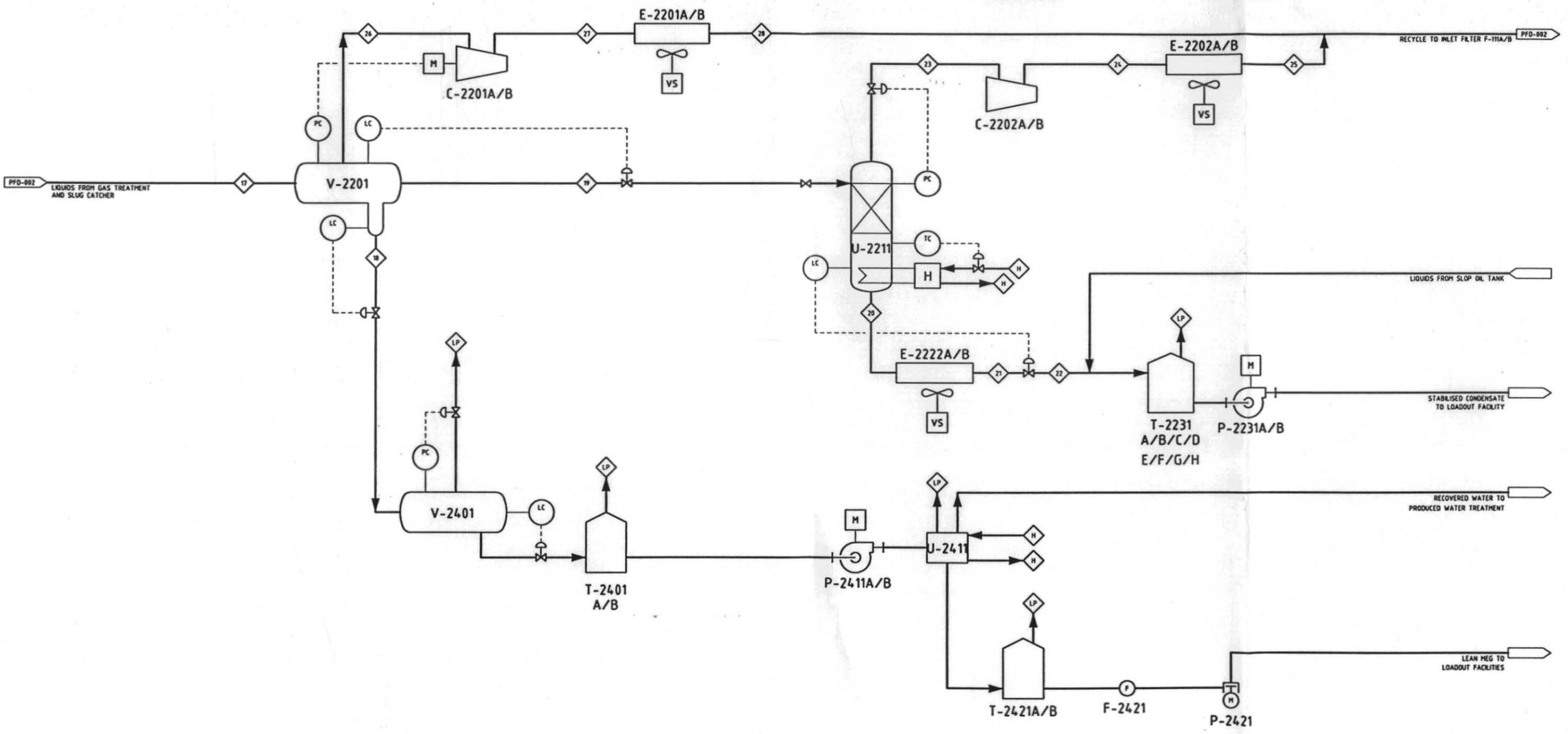


10-00
 00300
 K/M
 22-03

PREPARED BY 		YOLLA SCOPING STUDY OPTION 1 - NCC BUOY PFD														
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V-2201 INLET LIQUID SEPARATOR V-2401 RICH MEG DEGASSER T-2401A/B RICH MEG BUFFER TANK U-2211 CONDENSATE STABILISER PACKAGE E-222A/B CONDENSATE TRIM COOLER U-2411 MEG REGENERATION PACKAGE T-2231A/B/C/D/E/F/G/H CONDENSATE STORAGE TANK P-2231A/B CONDENSATE LOADOUT PUMP P-421A LEAN MEG PUMP

C-2201A/B FLASH GAS COMPRESSOR E-2201A/B FLASH GAS COOLER P-2411A/B RICH MEG TRANSFER PUMP T-2421 LEAN MEG STORAGE TANK C-2202A/B COND. VAPOUR COMPRESSOR P-2421 LEAN MEG INJECTION FILTER E-2202A/B COND. VAPOUR COOLER



5 cm

		YOLLA SCOPING STUDY OPTION 1 - NCC BUOY PFD														
PREPARED BY (CAD) A1 08407903	REFERENCE NO. PFD-003-B	DRAWING NO.	REFERENCE DRAWINGS	NO.	DATE	REVISION	PROJ. NO. 08407903	DRAWN DAK	CHECKED ENL	PERM. INT. PRLNG. SOL.	DATE 3/99	ISSUED FOR REPORT	DATE 3/99	SCALE NTS	SHEET NO. PFD-003	REV A

E-1110
WELLSTREAM
COOLER

V-1110
THREE PHASE
SEPARATOR

V-1111
TEG
CONTACTOR

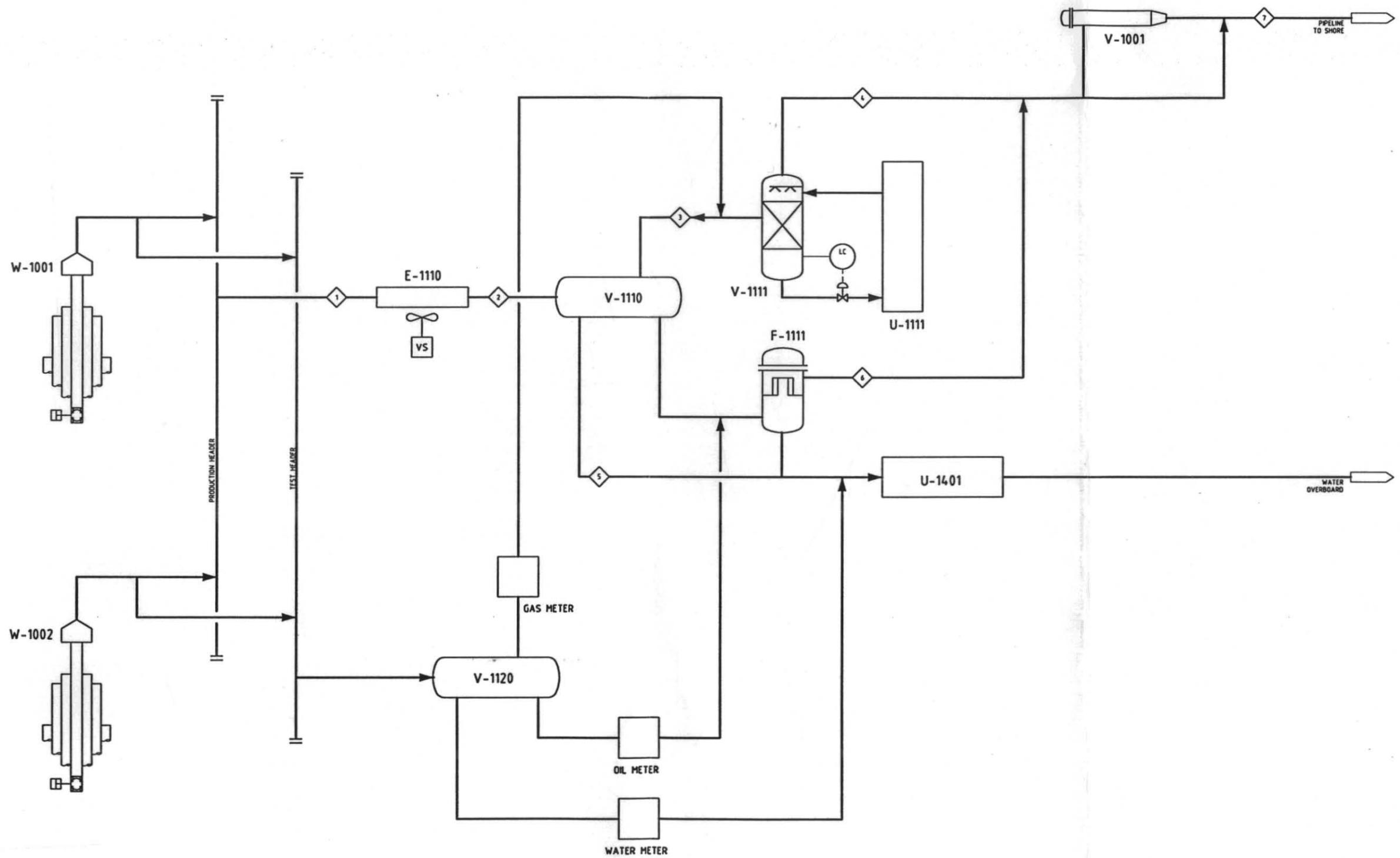
V-1111
TEG
REGENERATOR

F-1111
FILTER
COALESCER

V-1001
PIG
LAUNCHER

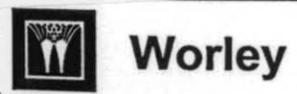
U-1401
PRODUCED
WATER TREATMENT

V-1120
TEST
SEPARATOR



12-04
S ECA
K3V
103304
PFD-001

5 cm



PREPARED BY																				
DATE																				
NO.																				
DATE																				
REVISION																				
PROJ. NO.	08407903	DRAWN	DAK	CHKD	ENL	FILED	INT.	FILED	SOCL											

DRAWN	DAK	DATE	3/99
CHECKED		DATE	
ENGINEER		DATE	
CLIENT ENG.		DATE	

YOLLA SCOPING STUDY
OPTION 2 - OFFSHORE PLATFORM
PFD
SCALE: NTS
DRAWING NO: PFD-004
REV: B

V-1002
PIG
RECEIVER

E-2111
FEED GAS
HEATER

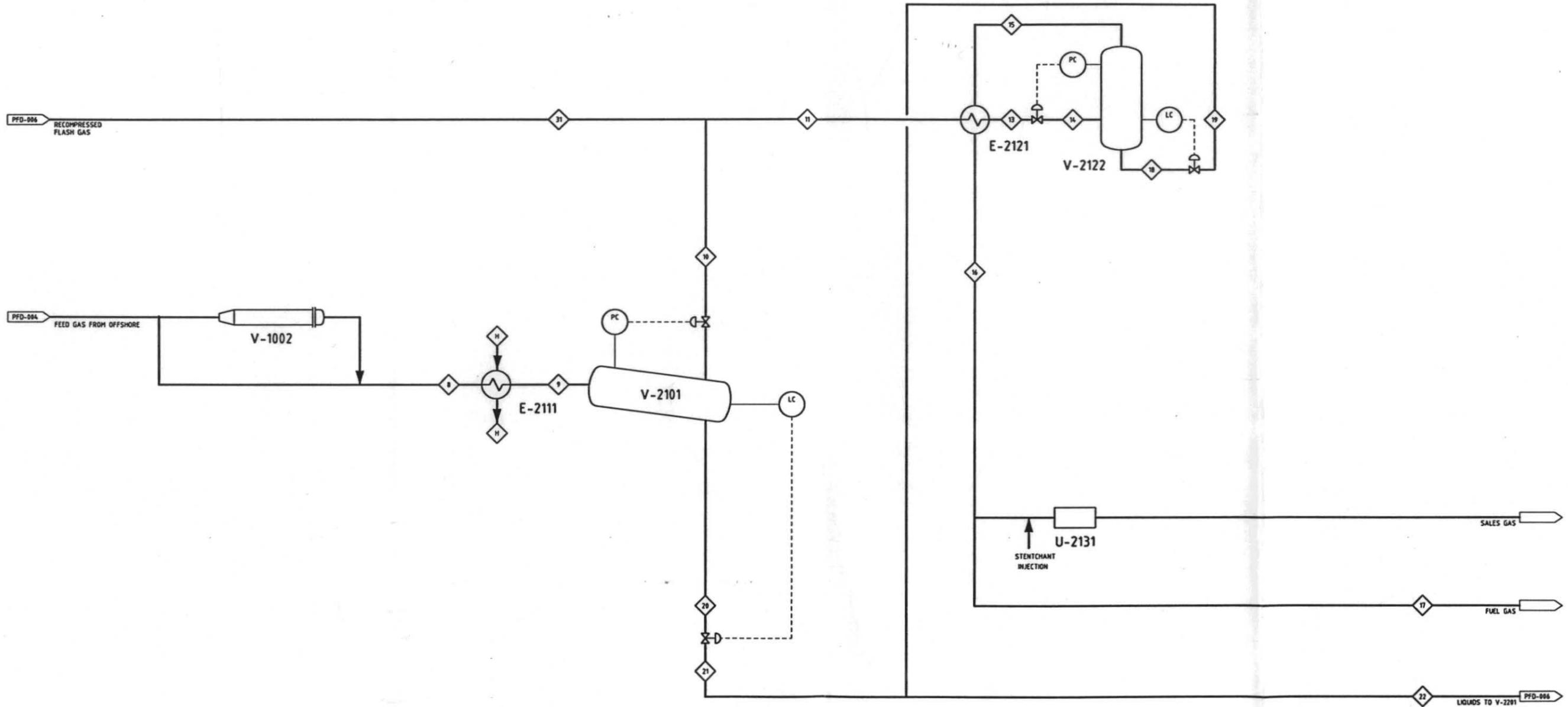
V-2101
SLUG
CATCHER

V-2111
TEG
CONTACTOR

E-2121
DRY GAS/
GAS COOLER

U-2131
SALES GAS METERING

V-2122
LOW TEMPERATURE
SEPARATOR



5 cm

PFD-00
 903/01
 K-33
 17 ECJ

PREPARED BY 		YOLLA SCOPING STUDY OPTION 2 - OFFSHORE STUDY PLATFORM PFD									
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V-2201
CONDENSATE FLASH
VESSEL

C-2201A/B
FLASH GAS
COMPRESSOR

E-2201A/B
FLASH GAS
COOLER

U-2211
CONDENSATE STABILISER
PACKAGE

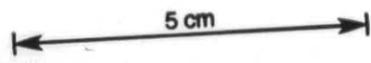
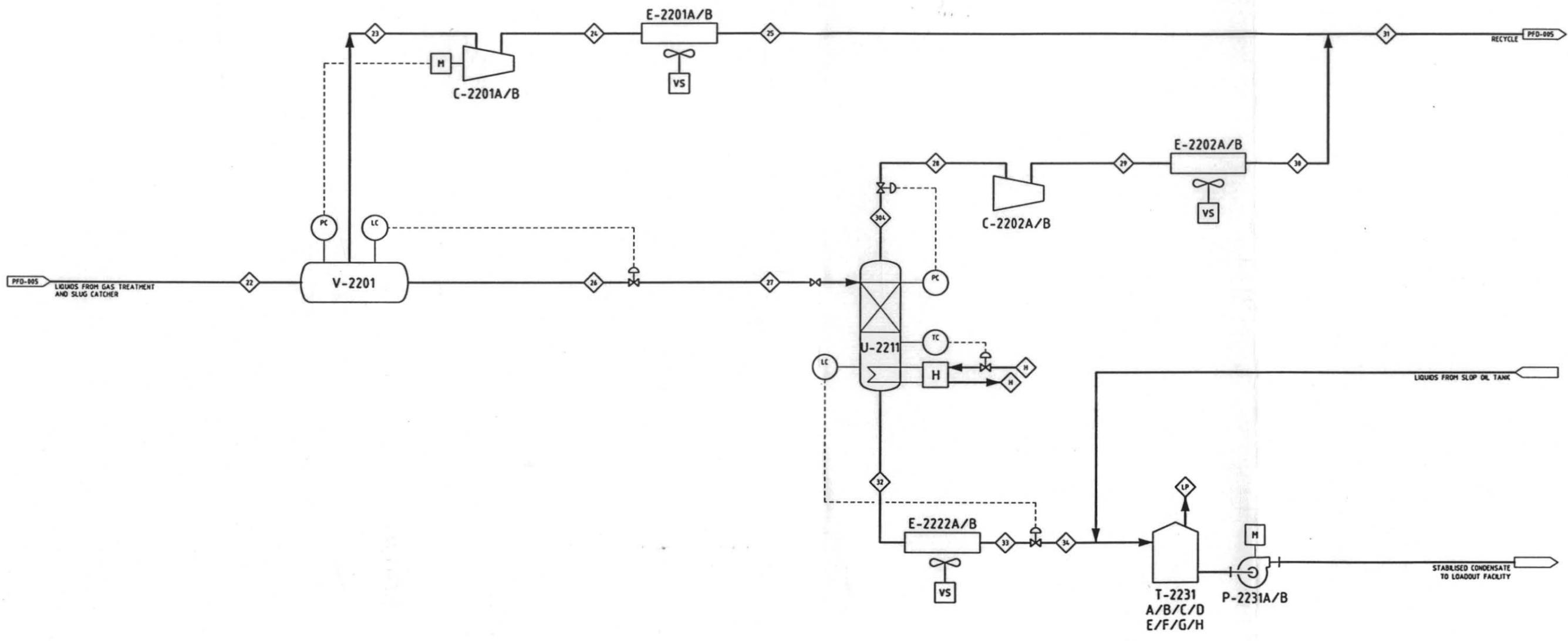
E-2222A/B
CONDENSATE TRIM
COOLER

T-2231A/B/C/D/E/F/G//H
CONDENSATE STORAGE TANK

P-2231A/B
CONDENSATE LOADOUT PUMP

C-2202A/B
COND. VAPOUR
COMPRESSOR

E-2202A/B
COND. VAPOUR
COOLER



PREPARED BY 											YOLLA SCOPING STUDY OPTION 2 - OFFSHORE PLATFORM PFD	
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**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT E

Heat and Material Balances

(4 Pages)



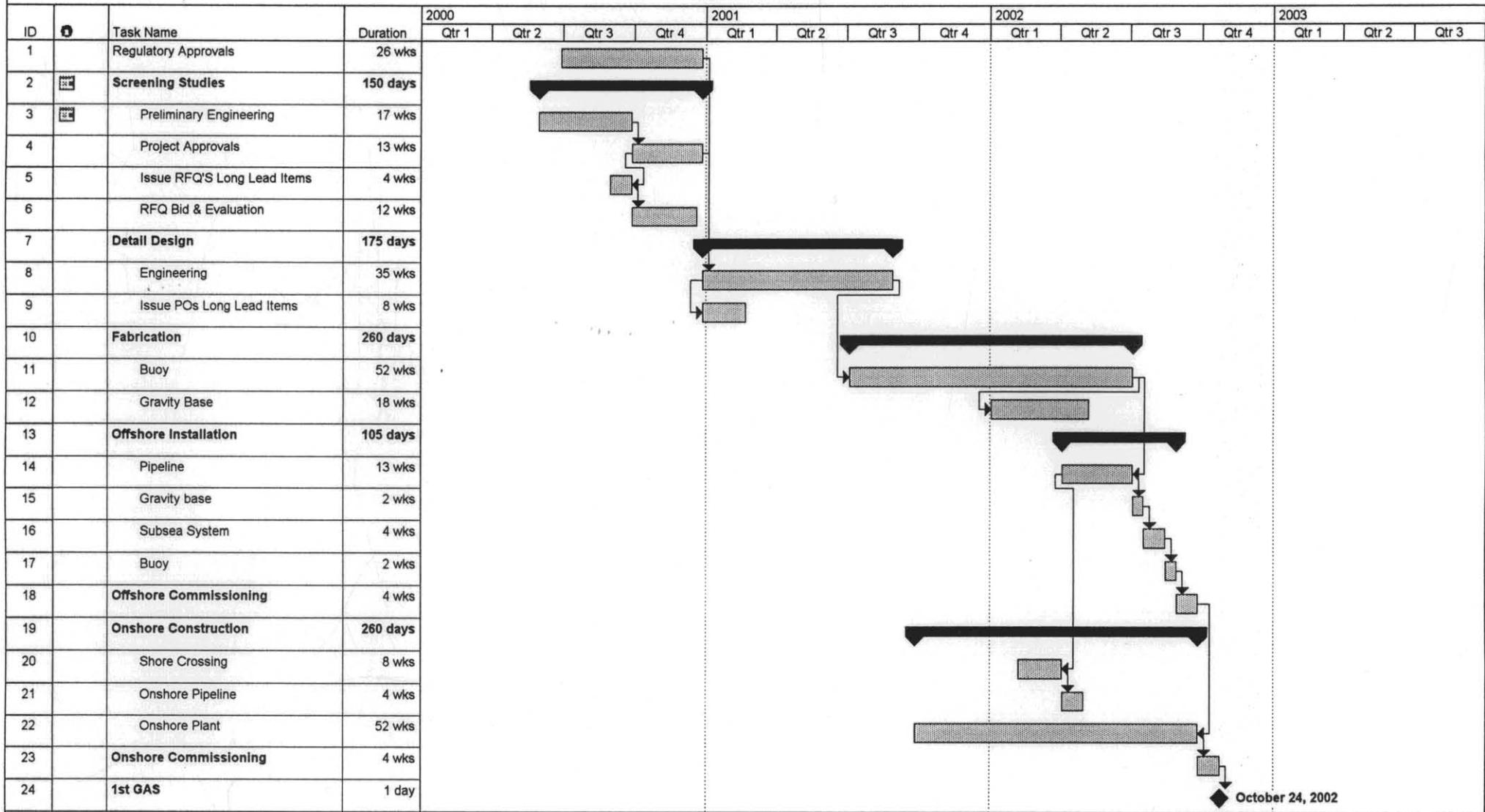
**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT F

Schedules

(2 Pages)

Boral Energy Resources Ltd
Yolla Field Development



October 24, 2002

Yolla Scoping Study
Scenario 1- NCC Buoy

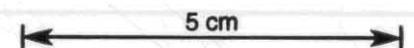
Task



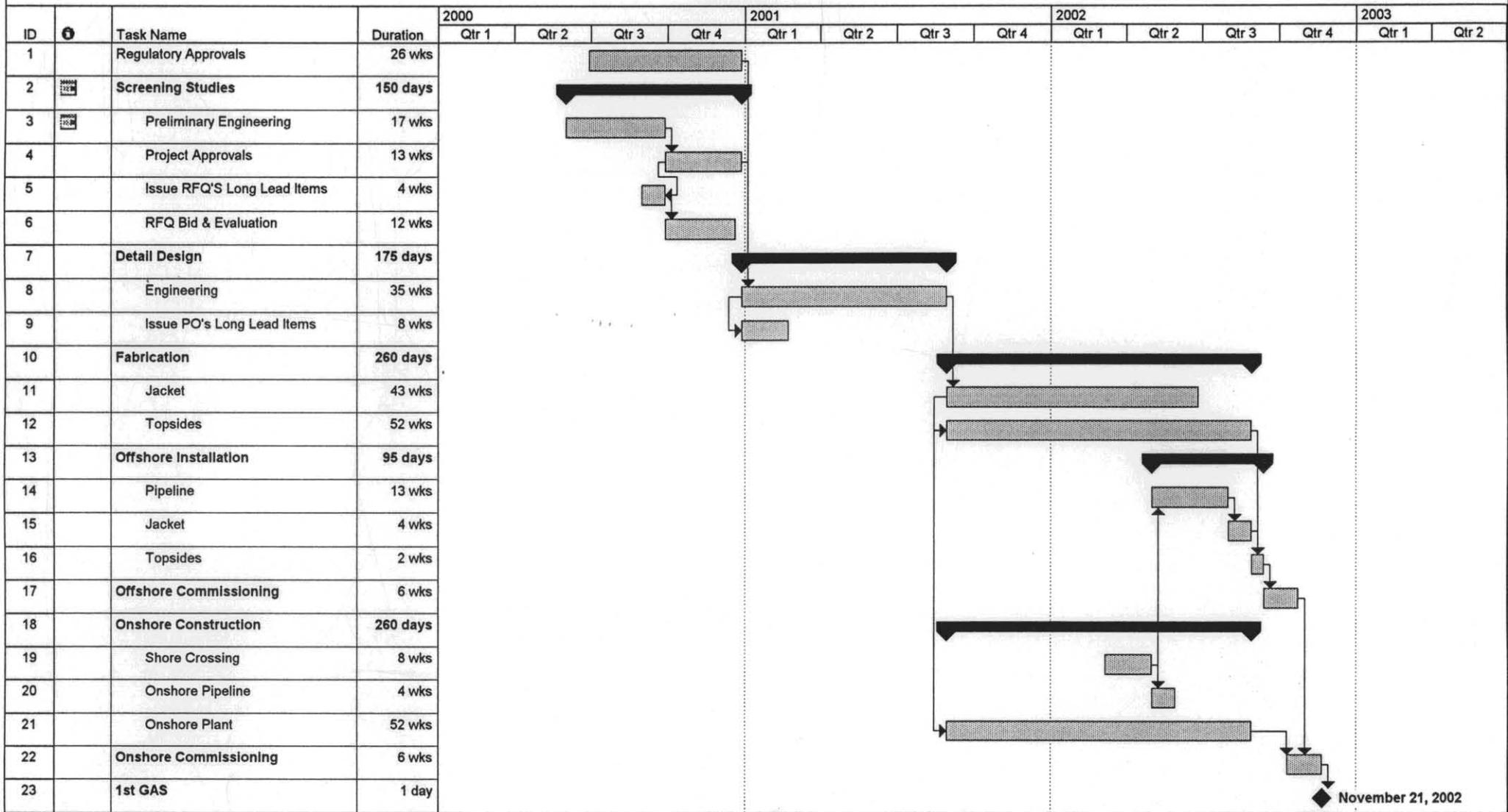
Milestone



Summary



Boral Energy Resources Ltd
Yolla Field Development



Yolla Scoping Study
Scenario 2 - Wellhead Platform

Task



Milestone



Summary



5 cm



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT G

Yolla Reservoir Fluid Composition and Product Specifications

(2 Pages)



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

Yolla Reservoir Fluid Composition

Initial gas composition in Yolla "2900m" gas zone (zone 1B).

To be used for facilities and process design studies.

<u>Compound</u>	<u>Mole Percent</u>
Hydrogen Sulphide	Assume 8 ppm
Carbon Dioxide	18.86
Nitrogen	0.20
Methane	63.87
Ethane	7.64
Propane	3.75
i-Butane	0.65
n-Butane	1.04
i-Pentane	0.38
n-Pentane	0.39
Hexanes	0.54
Heptanes	0.74
Octanes	0.55
Nonanes	0.34
Decanes	0.21
Undecanes plus	0.84
TOTAL	100.00

Molecular weight of heptanes plus: 137
Density of heptanes plus: 0.793



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

Indicative Product Specification

1. Stabilised Condensate:

Reid Vapor Pressure:	12 psia max at 100 degrees F.
BS&W:	1% (vol) max.
Assumed storage:	350,000 bbls

2. Industrial Quality Sales Gas:

Water Dew Point	112mg/m3 (max)
HC Dew Point	2 degrees C
CO2 content:	Not removed
Total sulphur:	115 mg/m3 (max)
H2S content:	11.5 mg/m3 (max)
Free Oxygen:	0.2% (max)
Gross Heating Value:	36-42 MJ/m3
Wobbe Index:	46-51 MJ/m3
Supply Temperature:	71 degrees C (max)
Supply Pressure:	600 psig

No separate LPG product is envisaged. LPG will need to remain in the sales stream to achieve HV and Wobbe spec. To be confirmed by process calculations.



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

ATTACHMENT H

Document Register

(2 Pages)



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

Scenario 1 - NCC Buoy

Calculation No.	File Name	Description	No. of Pages
7903-CAL-001	Nccoffeq.xls	NCC Buoy Equipment Cost Estimate	1
7903-CAL-002	Nccoffby.xls	NCC Buoy Procurement & Fabrication Cost Estimate	6
7903-CAL-003	Nccsubeq.xls	Subsea Equipment Cost Estimate	3
7903-CAL-004	Nccoffpl.xls	Pipeline Cost Estimate	2
7903-CAL-005	Nccoffic.xls	Offshore Installation Cost Estimate	3
7903-CAL-006	Ncconseq.xls	Onshore Gas Plant Equipment Cost Estimate	6
7903-CAL-007	Ncconsop.xls	Onshore Gas Plant Construction Cost Estimate-45.3 TJ/d	11
7903-CAL-008	Nccons30.xls	Onshore Gas Plant Construction Cost Estimate-30.2 TJ/d	11
7903-CAL-009	Nccons60.xls	Onshore Gas Plant Construction Cost Estimate-60.4 TJ/d	11
7903-CAL-010	Nccfut.xls	Future Wells Cost Estimate	2
7903-CAL-011	Ncc_opex.xls	Opex Estimate	3
7903-CAL-012	Nccsum.xls	NCC Buoy Cost Estimate Summary	3
HMB-001	HMB(NCC).xls	Heat & Material Balance NCC Buoy and Onshore Gas Plant	2
Drawing No.	File Name	Description	No. of Pages
PFD-001 Rev. A	PFD-001A.dwg	NCC Buoy PFD	1
PFD-002 Rev. A	PFD-002A.dwg	NCC Buoy PFD	1
PFD-003 Rev. A	PFD-003A.dwg	NCC Buoy PFD	1
SKS001-A	SKS001.dwg	NCC Buoy, Subsea Production Schematic	1
n/a	SCEN1.mpp	NCC Buoy Development Schedule	1



**BORAL ENERGY RESOURCES LIMITED - YOLLA DEVELOPMENT
SCOPING STUDY**

Scenario 2 – Wellhead Platform

Calculation No.	File Name	Description	No. of Pages
7903-CAL-020	Pltoffeq.xls	Platform Topsides Weight & Cost Estimate	7
7903-CAL-021	Pltoffjk.xls	Platform Jacket Weight & Cost Estimate	1
7903-CAL-022	Pltoffpl.xls	Pipelines Cost Estimate	2
7903-CAL-023	Pltoffic.xls	Offshore Installation Cost Estimate	5
7903-CAL-024	Pltonseq.xls	Onshore Gas Plant Equipment Cost Estimate	6
7903-CAL-025	Pltonsop.xls	Onshore Gas Plant Construction Cost Estimate-45.3 TJ/d	11
7903-CAL-026	Pltons30.xls	Onshore Gas Plant Construction Cost Estimate-30.2 TJ/d	11
7903-CAL-027	Pltons60.xls	Onshore Gas Plant Construction Cost Estimate-60.4 TJ/d	11
7903-CAL-028	Platopex.xls	Opex Estimate	3
7903-CAL-029	Platum.xls	WH Platform Cost Estimate Summary	3
HMB-002	HMB(PLT).xls	Heat & Material Balance WH Platform and Onshore Gas Plant	2
Drawing No.	File Name	Description	No. of Pages
PFD-004 Rev. A	PFD-004A.dwg	Offshore Platform PFD	1
PFD-005 Rev. A	PFD-005A.dwg	Offshore Platform PFD	1
PFD-006 Rev. A	PFD-006A.dwg	Offshore Platform PFD	1
SKS002-A	SKS002.dwg	Offshore Platform, Minimum Processing Offshore	1
n/a	SCEN2.mpp	Offshore Platform Development Schedule	1