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**FUEL EFFICIENCY &
GREENHOUSE GAS REDUCTION
STUDY AT
OSBORNE MINES**

July, 2000

Prepared by:

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ACN 063 561 151

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EXECUTIVE SUMMARY

The FTC Combustion Catalysts manufactured and marketed by Fuel Technology Pty Ltd have proven in laboratory and field trials to reduce fuel consumption in the range 3% to 8% under comparable load conditions and to also substantially reduce carbon emissions.

Following positive tests conducted at Placer (Granny Smith) Power Station, and discussions with Osborne Mines personal, it was agreed that a fuel efficiency and greenhouse gas reduction emission study should be conducted at the power generation plant on three Wartsila 12V 32E engines. The trial to employ the engineering standard procedure "Specific Fuel Consumption" (SFC).

The net efficiency gain (reduction in fuel consumption) measured at Osborne Mines power facility was **1.8% to 3.3%** with **3.3%** efficiency being more representative in daily operations. The efficiency gain measured by the Specific Fuel Consumption test translates to an annual reduction in CO₂ emissions of 1432 tonnes.

INTRODUCTION

Baseline (untreated) fuel efficiency tests were conducted on three Wartsila 12V 32E alternator sets, Nos 1, 2, and 3 during the week commencing 7th June, 2000 employing the SFC test procedure.

Fuel Technology Pty Ltd supplied, on loan, an air operated FTC catalyst metering system which was calibrated and commissioned following completion of the baseline tests. This unit injected catalyst into the fuel supply at time of fuel transfer from bulk storage tank to power station day tank.

Treated tests were conducted during the week commencing 29th June, 2000.

Due to the large power supply swings created by the operation of the winder, tests were conducted on each of the three Gensets at their most efficient Test load of 3.8 Mw. As this is not truly representative of normal daily operations, Genset No; 1 was also tested at the normal operating range where load fluctuates between 1.8 Mw and 3 Mw.

TEST METHODS

The Specific Fuel Consumption (SFC) test procedure employed in this efficiency study measures the absolute amount of fuel consumed against work performed by the engine over time at a constant load. From this raw data the engine's efficiency can be calculated.

This evaluation of FTC involves a series of back to back untreated (baseline) and treated fuel tests conducted approximately three weeks apart.

A pair of calibrated MacNaught M-10 flow transducers were used to measure fuel supplied to the engine and also fuel returning from the engine from which the net volume of fuel consumed over a ten-minute time interval can be calculated.

The flow transducers are fitted with thermocouple probes which enable measurement of fuel temperature at each transducer.

From the fuel temperature the density at that temperature is calculated. A sample of fuel was taken for laboratory analysis and the density determined at 15°C. Copies of the laboratory reports are included in the *Appendix*.

Volumetric fuel flows are corrected for density and temperature and reported in mass (kg) of fuel.

The kWh's of power produced were recorded from individual generator power supply instrumentation.

Engine operating parameters were also monitored as an indicator of changing efficiency trends.

TEST RESULTS

1. Fuel Efficiency

A summary of the fuel efficiency results achieved in this test program are detailed in the tables 1 & 2.

TABLE 1
Specific Fuel Consumption Test Results
Fixed Load 3.8Mw

Unit No.	Baseline 7/6/00 Kg/kWh	Treated 29/6/00 Kg/kWh	Variation
1	0.2066	0.2016	-2.4%
2	0.2058	0.2019	-1.9%
3	0.2061	0.2025	-1.8%
AVERAGE	0.2062	0.2020	-2.1%

TABLE 2
Variable Load 1.8-3Mw

Unit No.	Baseline 7/6/00 Kg/kWh	Treated 29/6/00 Kg/kWh	Variation
1	0.2174	0.2101	-3.3%
AVERAGE			-3.3%

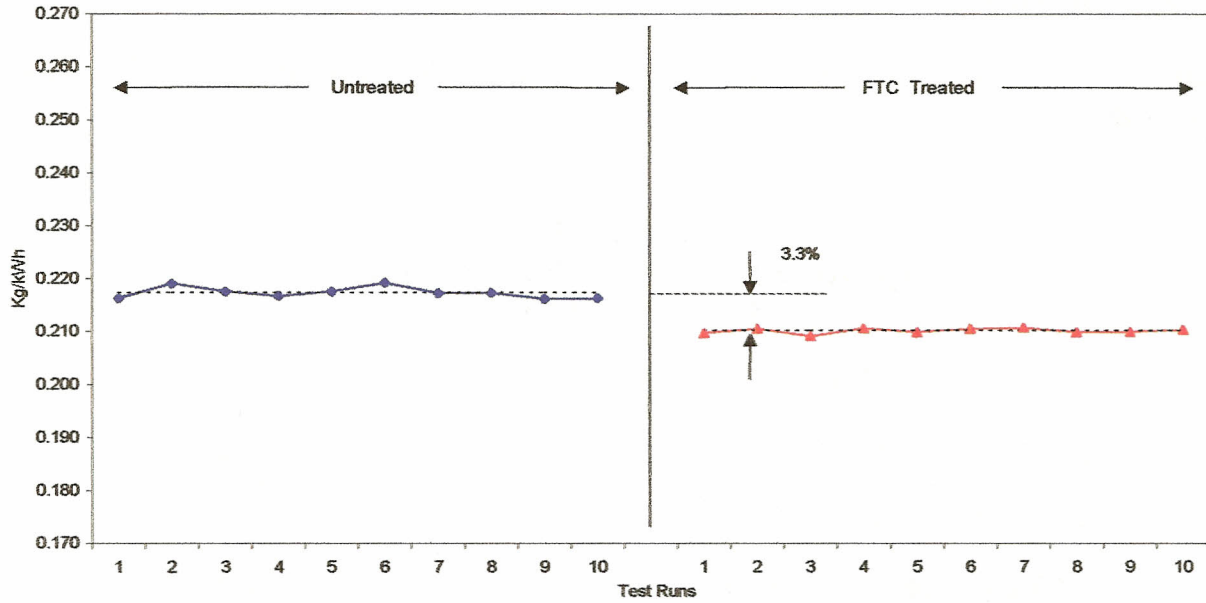
The average efficiency gain of 2.1% recorded at engine test mode of 3.8 Mw is in line with tests conducted over the past twenty years where engines are in good condition and running at their most efficient mode. The 3.3% efficiency gain measured at normal variable load of 1.8 - 3Mw is more representative of benefits achievable by the introduction of FTC combustion catalyst at Osborne Mines operations.

The computer printouts of the results are contained in the *Appendix* as are the raw data sheets

Graphical representation of tests follow.

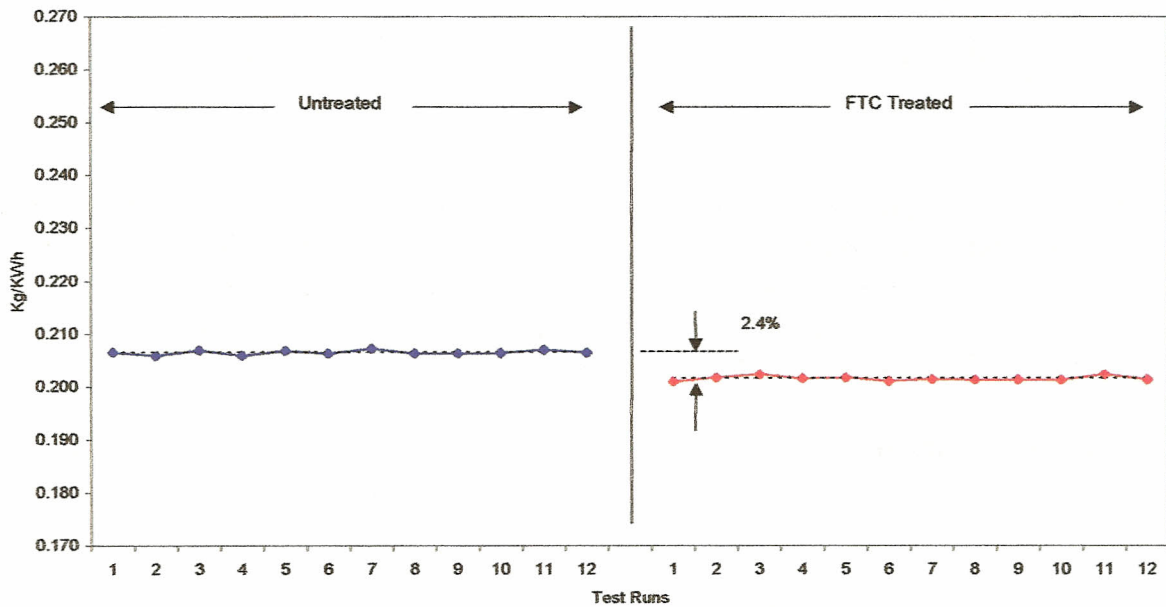
GRAPH NO. 1

Osborne Mines Power Station
Genset # 1 1.8 - 3 Mw



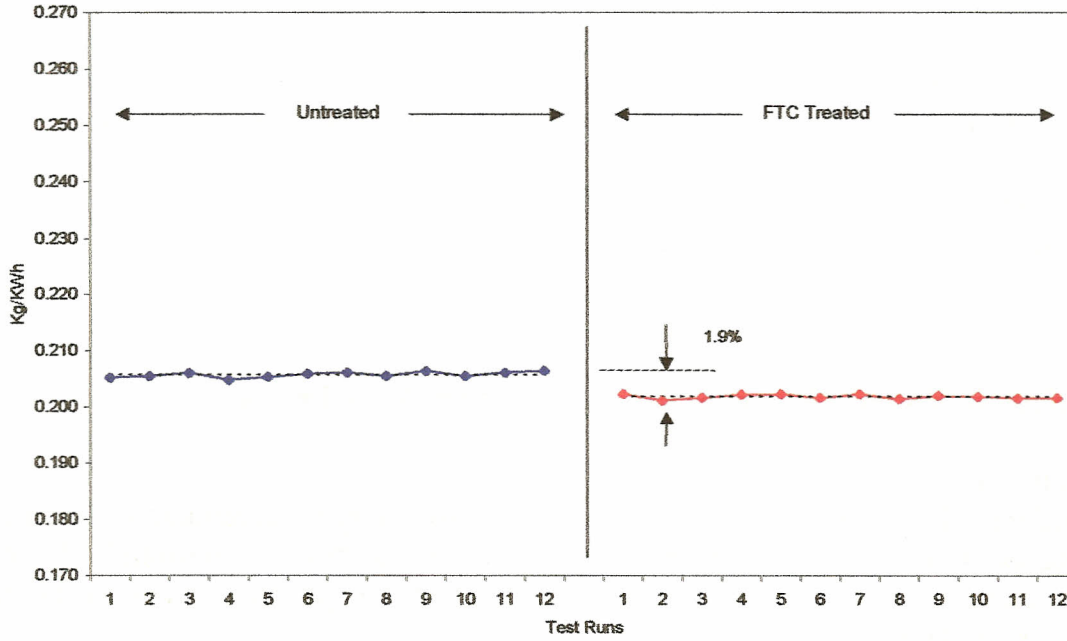
GRAPH NO. 2

Osborne Mines Power Station
Genset # 1 3.8 Mw



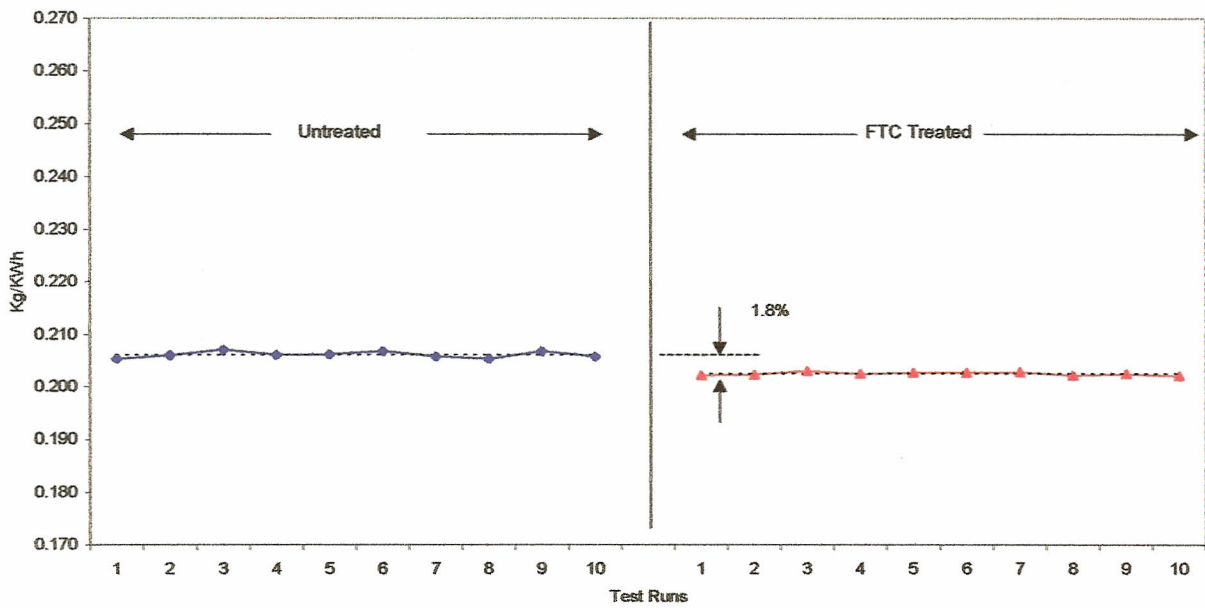
GRAPH NO. 3

Osborne Mines Power Station
Genset # 2 3.8 Mw



GRAPH NO. 4

Osborne Mines Power Station
Genset # 3 3.8 Mw



2. Greenhouse Gas Reduction

A gross reduction of 3.3% of the current estimated annual fuel consumption of 15,000 KL translates to a 1,432 tonnes per annum reduction in CO₂ emissions based on the formula outlined in Worksheet 1 of the "Electricity Supply Business Greenhouse Change Workbook". Our estimate is based on the following calculations:-

$$\begin{aligned} & (15000 \text{ KL} \times 38.6 \times 74.9) \div 1000 = 43,367 \text{ tonnes CO}_2 \text{ per annum} \\ - 3.3\% & (14505 \text{ KL} \times 38.6 \times 74.9) \div 1000 = 41,935 \text{ tonnes CO}_2 \text{ per annum} \end{aligned}$$

$$\begin{aligned} & \text{CO}_2 \text{ reduction by application FTC-3} \\ & 43,367 - 41,935 = 1,432 \text{ tonnes} \end{aligned}$$

3. FTC's Effect on Engine Operating Parameters and Wear Profiles

FTC's action is twofold:

1. To produce a faster and cleaner fuel burn, where by a larger percentage of the fuel injected is burnt in the combustion chamber, reducing "tail-end burning" of fuel out the exhaust. For the same fuel used, more power is produced. Turbocharger speeds and charge air pressures also increase.
2. To oxidise carbon (ie decarbonise combustion and exhaust spaces). This includes removal of cylinder glaze and top ring carbon, which are the two main causes of poor oil control, compression loss and blowby of combustion contaminants into the crankcase oil.

These combined actions are very significant from an engine maintenance and wear profile view point. By producing less combustion soot (and of reduced particle size) and providing a more efficient, cleaner seal against blowby, the rate of abrasive wear to all lubricated parts is reduced.

Oil Analysis

A significant reduction in Fe and Cu wear profiles following FTC treatment of fuel was indicated by laboratory oil analysis (Hastings Deering lab, Brisbane). To a lesser extent, Al and Pb were also reduced. Refer Table 3

TABLE 3
Wear Metal Profiles (ppm)
(untreated / treated)

Wear Metal	Genset # 1	Genset # 2	Genset # 3
Cu	2 / <1	2 / <1	2 / <1
Fe	7 / 5	7 / 4	7 / 5
Al	1 / 1	1 / <1	1 / <1
Pb	2 / 1	<1 / <1	<1 / <1

Engine Operating Parameters

At fully open fuel rack settings, engines consistently exhibited higher power output, faster turbocharger speeds and higher charge air pressures providing “visual” confirmation of the more efficient operation of all three engines. Refer Table 4

TABLE 4
Gensets Tests on Fully Open Fuel Rack

Genset Parameters	Genset 1		Genset 2		Genset 3	
	Untreated	FTC treated	Untreated	FTC treated	Untreated	FTC treated
Fuel Rack Position	39.5	39.5	40	40	40	40
Av Kw output	3855	3952.5	3809	3885.5	3778.2	3838.8
Av Turbo RPM Right	23150	23280	23120	23320	23240	23390
Av Turbo RPM Left	23540	23690	23240	23430	23410	23480
Charge Air (bar)	2.2	2.3				

CONCLUSION

These carefully controlled engineering standard test procedures conducted on Wartsila 12V 32E generator sets Nos 1, 2, and 3 provide clear evidence of reduced fuel consumption in the range **3.3%** .

A fuel efficiency gain of 3.3% as measured by the Specific Fuel Consumption test method if applied to the total fuel currently consumed by the power generation plant will result in a 1,432 tonnes per annum reduction in CO₂ emissions.

Additional to the fuel economy benefits measured and a reduction in greenhouse gas emissions, a significant reduction over time in engine maintenance costs will be realised following the introduction of FTC Combustion Catalyst. These savings are achieved by lower soot levels in lubricating oil produced by a more complete combustion of the fuel, therefore reducing wear rates and resulting in less carbon build up in combustion areas. FTC also acts as an effective biocide.

Appendix "A"

Specific Fuel Consumption Printouts

Appendix "B"

Laboratory Reports

GEOTECH

SPECTROTECH DIVISION

41-45 Furnace Road, Welshpool, Western Australia. 6106
 Locked Bag 27, Cannington, Western Australia. 6967
 Email: geotech@geotechnical-services.com.au

**GEOTECHNICAL
SERVICES PTY LTD**

Telephone: (08) 9458 8877
 Facsimile: (08) 9458 8857
 ACN 050 643 194



Quality
Endorsed
Company
ISO 9002 Lic 10661
Sedona Australia

16 June 2000

Fuel Technology Pty Ltd
 P.O. Box 1271
 Fremantle W.A. 6959

Attention: Noel Millin
 Your Order No: 2078
 Our Ref. No: 0006-32

REPORT ON FUEL SAMPLE**Introduction:**

A sample of diesel fuel (dated 8/6/00) from Osborne Mines was received on 15 June 2000 for testing as requested.

Method of Analysis/Testing:

Digital density meter (ASTM D4052-96) for density at 20° C

Results:

	15° C	20° C
Density (kg/L)	0.8408	0.8373
Specific gravity	0.8416	0.8388

Comments:

The density at 15° C was obtained by reference to Petroleum Measurement Tables - Volume Correction Factors, Volume VII, Table 53A (ASTM D1250-80). The specific gravities are relative to the densities of water at 15° C and 20° C respectively.

GEOTECHNICAL SERVICES

Mark Gloyn
Senior Chemist

Simon van Bruchem
Chemist

GEOTECH**GEOTECHNICAL
SERVICES PTY LTD****SPECTROTECH DIVISION**

41-45 Furnace Road, Welshpool, Western Australia. 6106
 Locked Bag 27, Cannington, Western Australia. 6987
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 Facsimile: (08) 9458 8857
 ACN 050 543 194



Quality
 Endorsed
 Company
 ISO 9002 Lic 10531
 Standard Australia

ABN 58 050 543 194

7 July 2000

Fuel Technology Pty Ltd
 P.O. Box 1271
 Fremantle W.A. 6959

Attention: **Bob Platt**
 Your Order No: **2085**
 Our Ref. No: **0007-15**

REPORT ON SAMPLE OF DIESEL FUEL**Introduction:**

A sample of fuel marked 29-6-00 was received on 6 July 2000 for density testing.

Method of Analysis/Testing:

Digital density meter (ASTM D4052-96) for density at 20° C

Results:

	15° C	20° C
Density (kg/L)	0.8415	0.8380
Specific gravity	0.8423	0.8395

Comments:

The density at 15° C was obtained by reference to Petroleum Measurement Tables - Volume Correction Factors, Volume VII, Table 53A (ASTM D1250-80). The specific gravities are relative to the densities of water at 15° C and 20° C respectively.

GEOTECHNICAL SERVICES

Max Offer
Operations Manager

Simon van Bruchem
Chemist

Ref. 0007-15 Page 1 of 1

Test results apply to the sample/s as received, unless stated otherwise. This report should only be reproduced in full.

FROM : HASTINGS DEERING SOS LAB

PHONE NO. : 07 33659201

Jul. 06 2000 03:06PM P1

ATTN: - BRID

10/3

From - BEN@SOS

Hastings Deering



BRISBANE
Kerry Road, Archerfield, Qld. 4108
P.O. Box 46, Archerfield, Qld. 4108
Telephone: (07) 3365 9239
Facsimile: (07) 3365 9233

- CAIRNS
- GOVE
- EMERALD
- MACKAY
- MOUNT ISA
- ROOKHAMPTON
- TOOWOOMBA
- TOWNSVILLE
- DARWIN
- ALICE SPRINGS

Hastings Deering (Australia) Ltd. - A.C.N. 054 094 847

PLACER PACIFIC OSBORNE MINE
ATT: ROBERT PERKINS
GPO BOX 5170
TOWNSVILLE
QLD 4810

Shop Job Number
Shop Segment Number
Unit Number **GENSET**
Location **MT ISA**
Make **MISCELLANEOUS**
Model **12V32E**
Serial Number **60531P7BARZ1004**
Compartment **engine-gen set**
Oil Brand/Type **SELL UNKNOWN/OIL**
Was Oil Changed?

Interpreted By: B Bentley Analysis Authorised By: G Corrin
Do you want results electronically? *Ph. 33659391*

Label Number
Lab Control Number **00146042**
Current Sample Evaluation **4**

CURRENT					EVAL:	A	Hours on oil NOT supplied with the sample. Wear Levels in the 5 Micron Range appear OK. All other Test Results appear Acceptable. Infrared Tests Will Provide More Information. Please advise Make & Grade of oil with next sample. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM	HRS/KM ON OIL			
30-06-00	05-07-00		0				

PREVIOUS #1					EVAL:	A	Hours on oil NOT supplied with the sample. Wear Levels in the 5 Micron Range appear OK. All other Test Results appear Acceptable. Infrared Tests Will Provide More Information. Please advise Make & Grade of oil with next sample. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM	HRS/KM ON OIL			
05-05-00	17-06-00		5134				

PREVIOUS #2					EVAL:	A	All Test Results appear to be Normal. Continue sampling at the Recommended Interval.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM	HRS/KM ON OIL			
13-07-95	21-07-95	390	1112	1112			

PREVIOUS #3					EVAL:	A	Wear Levels in the 5 Micron Range appear OK. No NEW OIL found in Sample. Continue sampling at the Recommended Interval.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM	HRS/KM ON OIL			
10-07-93	14-07-93		825	825			

DATE TAKEN	ELEMENT CONCENTRATION IN PPM (WEIGHT/WEIGHT)													FLUID CONDITION/CONTAMINANTS CONCENTRATION IN % ALLOWABLE						
	Cu	Fe	Cr	Pb	Al	Si	Sn	Ni	Na	K	Ca	Mg	Zn	P	W	F	PQ	VSC	DEP	
300600	<1	5	<1	1	1	3	<1	<1	6	3	4012	26	404	368	<0.1	<2.0		0	141	OK
156925	2	5	0	1	2	3	1	1	7	7	114	25	407	361	<0.1	<2.0		0	141	OK
186725	2	5	0	1	2	3	1	1	7	7	114	25	407	361	<0.1	<2.0		0	141	OK

- Cu - Copper
- Fe - Iron
- Cr - Chromium
- Pb - Lead
- Al - Aluminium
- Si - Silicon
- Sn - Tin
- Ni - Nickel
- Na - Sodium
- K - Potassium
- Ca - Calcium
- Mg - Magnesium
- Zn - Zinc
- P - Phosphorus
- W - % Water
- F - % Fuel Dilution
- PQ - PQ Index
- VSC - Viscosity
- DEP - Visible Deposits

SEE REVERSE SIDE FOR DISCLAIMER

OVERALL SAMPLE EVALUATION:

"A" - normal wear is occurring; no action required.
"B" - increased wear is occurring; corrective action may be required.

"C" - abnormal wear is occurring; corrective action is required.
"X" - extreme or critical wear is occurring; immediate corrective action is required.

FROM : HASTINGS DEERING SOS LAB

PHONE NO. : 07 33659201

JUL 06 2000 03:08PM P2

Lot 3

Hastings Deering



BRISBANE
Kerry Road, Archerfield, Qld. 4108
P.O. Box 48, Archerfield, Qld. 4108
Telephone: (07) 3365 9229
Facsimile: (07) 3365 9228

- CAIRNS
- GOVE
- EMERALD
- MACKAY
- MOUNT ISA
- ROOKHAMPTON
- TOOWOOMBA
- TOWNSVILLE
- DARWIN
- ALICE SPRINGS

Hastings Deering (Australia) Ltd. - A.C.N. 054 094 647

Shop Job Number
Shop Segment Number

Unit Number

Location

Make

Model

Serial Number

Compartment

Oil Brand/Type

Was Oil Changed?

GENSET2

MT ISA

MISCELLANEOUS

12V32E

0515V2

engine-gen set

SHELL UNKNOWN/OIL

N

PLACER PACIFIC OSBORNE MINE
ATT: ROBERT PERKINS
GPO BOX 5170
TOWNSVILLE
QLD 4810

Label Number

Lab Control Number 00145438

Interpreted By: B Bentley Analysis Authorised By: G Corrin
Do you want results electronically? *Ph. 33659391*

Current Sample Evaluation

A

CURRENT		EVAL:	A	Hours on oil NOT supplied with the sample. No NEW OIL found in Sample Bottle for I.R. Test. Wear Levels in the 5 Micron Range appear OK. I.R. Analysis Needed for more detail on Eng Oil. Please supply New Oil for Infrared Test. Please supply Make & Grade of oil with next sample. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM ON OIL	
30-06-00	04-07-00		0	
PREVIOUS #1		EVAL:	A	Hours on oil NOT supplied with the sample. No NEW OIL found in Sample Bottle for I.R. Test. Wear Levels in the 5 Micron Range appear OK. I.R. Analysis Needed for more detail on Eng Oil. Please supply New Oil for Infrared Test. Please supply Make & Grade of oil with next sample. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HRS/KM ON OIL	
08-06-00	17-04-00		3412	

DATE TAKEN	ELEMENT CONCENTRATION IN PPM (WEIGHT/WEIGHT)															FLUID CONDITION/CONTAMINANTS CONCENTRATION IN % ALLOWABLE			
	CU	FE	CR	PB	AL	SI	SN	NI	NA	K	CA	MG	ZN	P	W	F	PO	VSC	DEP
300600	<1	4	<1	<1	<1	4	<1	<1	8	3	4158	22	414	388	<0.1	<2.0	0	140	OK
080600	2	7	<1	<1	7	8	<1	<1	8	100	26	420	395	<0.1	<2.0	0	140	OK	

- Cu - Copper
- Fe - Iron
- Cr - Chromium
- Pb - Lead
- Al - Aluminium
- Si - Silicon
- Sn - Tin
- Ni - Nickel
- Na - Sodium
- K - Potassium
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SEE REVERSE SIDE FOR DISCLAIMER

OVERALL SAMPLE EVALUATION:

"A" - normal wear is occurring; no action required.

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FROM : HASTINGS DEERING SOS LAB

PHONE NO. : 07 33659201

JUL. 06 2000 03:09PM P3

30/3

Hastings Deering



BRISBANE

Kerry Road, Archerfield, Qld. 4108
P.O. Box 48, Archerfield, Qld. 4108
Telephone: (07) 3489 9229
Facsimile: (07) 3495 9228

- CAIRNS
- ROCKHAMPTON
- GOVE
- TOOWOOMBA
- EMERALD
- TOWNSVILLE
- MACKAY
- DARWIN
- MOUNT ISA
- ALICE SPRING

Hastings Deering (Australia) Ltd. - A.C.N. 064 084 847

PLACER PACIFIC OSBORNE MINE
ATT: ROBERT PERKINS
GPO BOX 5170
TOWNSVILLE
QLD 4810

Shop Job Number
Shop Segment Number
Unit Number
Location
Make
Model
Serial Number
Compartment
Oil Brand/Type
Was Oil Changed?

GENSET

MT ISA
MISCELLANEOUS
12V32E

QSEWS

engine gen set

SHELL/15W40

N

Label Number
Lab Control Number
Current Sample Evaluation

Interpreted By: B Bentley Analysis Authorised By: G Corrin
Do you want results electronically? *Ph. 33659391*

CURRENT		EVAL:	A	Hours on oil NOT supplied with the sample. No NEW OIL Found in Sample Bottle for I.R. Test. All other Test Results appear Acceptable. To allow for more accurate interpretations please supply new oil for I.R. Test. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HR8/KM	HR8/KM ON OIL
30-06-00	04-07-00		0	

PREVIOUS #1		EVAL:	A	Hours on oil NOT supplied with the sample. No NEW OIL Found in Sample Bottle for I.R. Test. All other Test Results appear Acceptable. To allow for more accurate interpretations please supply new oil for I.R. Test. Resample at 250 hours.
DATE TAKEN	DATE REC'D	OIL ADDED	METER HR8/KM	HR8/KM ON OIL
08-06-00	17-06-00		22005	

DATE TAKEN	ELEMENT CONCENTRATION IN PPM (WEIGHT/WEIGHT)														FLUID CONDITION/CONTAMINANTS CONCENTRATION IN % ALLOWABLE				
	Cu	Fe	Cr	Pb	Al	Si	Sn	Ni	Na	K	Ca	Mg	Zn	P	W	P	PQ	VSC	DEP
300600	<1	5	<1	<1	<1	5	<1	<1	8	3	4116	20	414	381	<0.1	<2.0	0	140	OK
080600	2	7	<1	<1	1	4	21	1	7	2076	25	473	386	10.1	12.0	0	140	OK	

- Cu - Copper
- Fe - Iron
- Cr - Chromium
- Pb - Lead
- Al - Aluminium
- Si - Silicon
- Sn - Tin
- Ni - Nickel
- Na - Sodium
- K - Potassium
- Ca - Calcium
- Mg - Magnesium
- Zn - Zinc
- P - Phosphorus
- W - % Water
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Appendix "C"

Specific Fuel Consumption Data Sheets

SHARING LOAD - WINDER OPERATING.

SPECIFIC FUEL CONSUMPTION GENSET TRIAL



Customer: OSBORNE MINE
 Genset No: 1
 Date: 1.8 MW - 3 MW

Make & Model: WARTSILA 12V 32E
 Engine Hrs: 31341
 Date: Untreated/Treated: 8-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load %	Volts	Amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS
								In	Out			In	Out	
1	1140		7820494											ENG FURSOR TURBO
	1150	10	7820887	393	66	4.8	301	462.27	364.45	97.82	0.2490	22.6	35.4	747 17320 17180
2	1150		7820910											
	1200	10	7821290	380	66	4.7	302	462.11	366.37	95.74	0.2519	22.6	35.2	747 19180 19010
3	1204		7821418											
	1214	10	7821798	380	66	4.8	301	461.44	366.20	95.24	0.2506	23.7	36.0	746 18780 1890
4	1214		7821812											
	1224	10	7822194	382	66	4.7	301	461.11	365.76	95.35	0.2496	23.1	35.4	746 18240 18540
5	1225		7822213											
	1235	10	7822599	386	66	4.8	303	462.99	366.26	96.73	0.2506	23.8	36.3	745 18570 18650
6	1240		7822778											
	1250	10	7823151	373	66	4.7	303	460.61	366.48	94.13	0.2523	24.0	36.4	747 17110 17290
7	1251		7823172											
	1301	10	7823560	388	66	4.7	305	459.88	362.69	97.19	0.2505	24.3	36.9	749 19350 19180
8	1302		7823659											
	1312	10	7824060	401	66	4.7	304	459.88	359.17	100.71	0.2511	25.0	37.7	747 19110 19410
9	1313		7824095											
	1323	10	7824499	404	66	4.7	304	459.72	358.79	100.93	0.2498	25.2	37.9	746 17750 18000
10	1325		7824609											
	1335	10	7825014	405	66	4.7	304	459.55	358.24	101.31	0.2501	25.3	37.9	749 18550 18790
				3892							975.15			
											0.2505			

PHASE A.A 5.1.0



GENSET FUEL CONSUMPTION DATA LOG SHEET

Customer: OSBORNE
 Location: _____
 Baseline/Treated: _____
 Unit No. #1
 Load RANGE 2-3 MW ± FLUCTUATING BASE LOAD

Equipment Make & Model WARTSILA 12V32E
 Ambient Temp °C Start 17.3
 Ambient Temp °C Finish ~~18.7~~ 19.7
 Fuel Density _____
 Fuel Density corrected @ 15°C _____

Amb
°C
1
18.6
2
18.5
3
4
18.9
5
6
9.4
7
9.5
8
8.3
9
10

TIME	T	FUEL METER READINGS litres		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		IN	OUT		IN	OUT	IN	OUT	IN	OUT		
11:40												
	10	462.27	364.45		22.6	35.4						
	10	462.11	366.37		22.6	35.2						
	10	461.44	366.20		23.7	36.0						
	10	461.11	365.76		23.1	35.4						
	10	462.99	366.26		23.8	36.3			(+2 seconds?)			
	10	460.61	366.48		24.0	36.4						
	10	459.88	362.69		24.3	36.9						
	10	459.88	359.17		25.0	37.7						
	10	459.72	358.79		25.2	37.9						
	10	459.55	358.24		25.3	37.9						



SPECIFIC FUEL CONSUMPTION GENSET TRIAL

Customer: OSBORNE MINE
 Genset No: 1
 Load: 3.8 MW (3777-3886)
 Date: 3-8-00

Make & Model: WARTSILA 12V 32E
 Engine Hrs: 31335.6
 Date: Untreated/Treated: 8-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

Run No	Time Start	Period Mins	kWh Meter	kWh	Average Load kWh	Volts PAR	Average RPM	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS				
								In	Out			In	Out					
1	7:59		7,808,597															
	8:09	10	7,809,238	641	67°	4.6	300	476.83	323.13	153.7	0.2398	19.5	35.6	749	23150	23530		
2	8:10		7,809,276															
	8:20	10	7,809,919	643	67	4.6	301	476.66	322.46	153.7	0.2390	19.5	35.6	749	23150	23540		
3	8:20		7,809,949															
	8:30	10 ⁺³⁰	7,810,620	671	67	4.7	302	500.94	339.78	161.16	0.2402	19.6	35.8	746	23160	23550		
4	8:31		7,810,683															
	8:42	10	7,811,325	642	67	4.7	302	476.38	322.91	153.47	0.2390	19.7	36.0	746	23170	23550		
5	8:43		7,811,361															
	8:53	10	7,812,000	639	67	4.6	303	476.38	322.91	153.47	0.2401	19.9	36.1	746	23150	23530		
6	8:53		7,812,041															
	9:03	10	7,812,682	641	67	4.7	302	476.05	322.47	153.58	0.2396	20	36.2	747	23170	23560		
7	9:04		7,812,719															
	9:14	10	7,813,357	638	67	4.7	303	476.16	322.58	153.58	0.2407	20.3	36.4	747	23160	23560		
8	9:14		7,813,389															
	9:24	10	7,814,030	641	67	4.7	303	475.94	322.30	153.64	0.2397	20.4	36.5	747	23140	23540		
9	9:25		7,814,064															
	9:35	10	7,814,703	639	67	4.7	304	475.22	322.52	153.20	0.2397	20.5	36.6	746	23150	23560		
10	9:35		7,814,737															
	9:45	10	7,815,375	638	67	4.7	304	475.38	322.41	152.97	0.2397	20.6	36.8	746	23160	23540		
11	9:46		7,815,411															
	9:56	10	7,816,049	638	67	4.7	304	475.33	321.86	153.47	0.2405	20.8	36.9	747	23140	23560		
12	9:56		7,816,079															
	10:06	10	7,816,718	639	67	4.7	304	475.33	321.97	153.36	0.2400	20.8	37	749	23140	23560		
				7710														
										1849.3								
										0.2398								



FUEL TECHNOLOGY PTY LTD

① 366 2406 ②
① 353 394 ③

① 23170 320
② 23530 310

Oil Temp
5.2
(4.6)

Charge Air
2.4
(2.2)

RACE 39.5

GENSET FUEL CONSUMPTION DATA LOG SHEET

Oil Temp 67°C

31340 hrs
8/6/00

Customer: OSBORNE
Location: _____
Baseline/Engine: _____
Unit No. 1
Load 3.8 MW

Equipment Make & Model: WARTSILA 32 VE
Ambient Temp °C Start: 9.6
Ambient Temp °C Finish: 14.9
Fuel Density: _____
Fuel Density corrected @ 15°C: _____

TIME	T	FUEL METER READINGS		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		litres IN	OUT		IN	OUT	IN	OUT	IN	OUT	IN	OUT
8:00												
1	10	476.83	323.13		19.5	35.6						
2	10	476.66	322.96		19.5	35.6						
3	10:30	500.94	339.78		19.6	35.8						
4	10	476.38	322.91		19.7	36.0						
5	10	476.38	322.91		19.9	36.1						
6	10	476.05	322.47		20.0	36.2						
7	10	476.16	322.58		20.3	36.4						
8	10	475.94	322.30		20.4	36.5						
9	10	475.72	322.52		20.5	36.6						
10	10	475.38	322.41		20.6	36.8						
11	10	475.33	321.86		20.8	36.9						
12	10	475.33	321.97		20.8	37.0						



SPECIFIC FUEL CONSUMPTION GENSET TRIAL

Customer: OSBORNE MARK

Make & Model WARTSILA 12V 32E

GenSet No: 2

Engine Hrs 2412 8

LOAD 3.8 MW

Date: Untreated/Exhaust 7-6-00

LUBE OIL TEMP
PRESSURE

EXHAUST STACK TEMP

Fuel Sample	Density	Temp Dec C
Corrected		15

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load kW	Volts BAR	amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS			
								In	Out			In	Out				
1	1410		4312134														
	1420	10	4312,770	636	65°C	4.7	285°C	455.27	303.29	151.98	0.2389	21.5	37.7	755			
2	1425		4312,994														
	1435	10	4313,630	636	65°C	4.8	284°C	454.44	302.30	152.14	0.2392	21.7	38	753			
3	1437		4313,676														
	1447	10	4314,311	635	65°C	4.8	284°C	455.22	302.85	152.37	0.2399	21.8	38	753	23120	23270	
4	1448		4314,364														
	1458	10	4315,001	637	65°C	4.8	285°C	454.33	302.30	152.03	0.2386	21.9	38.1	751	23120	23260	
5	1459		4315,041														
	1509	10	4315,676	635	65°C	4.7	286°C	453.99	302.14	151.85	0.2391	22.3	38.6	755	23140	23250	
6	1510		4315,718														
	1520	10	4316,353	635	65°C	4.8	287°C	454.94	302.69	152.25	0.2397	22.1	38.6	754	23130	23260	
7	1520		4316,391														
	1530	10	4317,025	634	65°C	4.8	288°C	454.83	302.58	152.25	0.2401	22.5	38.8	751	23150	23270	
8	1530		4317,063														
	1540	10	4317,699	636	65°C	4.7	288°C	454.83	302.52	152.31	0.2395	22.5	38.9	752	23130	23290	
9	1541		4317,733														
	1551	10	4318,367	634	65°C	4.7	288°C	454.77	302.56	152.41	0.2404	22.5	39.0	751	23110	23280	
10	1555		4318,603														
	1605	10	4319,239	633	65°C	4.8	288°C	455.05	302.74	152.31	0.2406	22.6	39	751	23110	23280	
11	1605		4319,275														
	1615	10	4319,909	634	65°C	4.8	287°C	454.66	302.41	152.25	0.2401	22.6	39.1	753	23100	23220	
12	1616		4319,951														
	1626	10	4320,584	633	65°C	4.8	286°C	454.66	302.38	152.28	0.2405	22.6	39	752	23100	23210	
				7,618							1,826.43						
											0.2397						



FUEL TECHNOLOGY PTY LTD

① 343 - 387 ②
③ 352 - 392

③ PACIK 40mm

TURBO SPEED
23150 306°C
23270 303°C

Oil Press
5.3 bar

Charge Air
(bar)
2.25
(ENR R)

GENSET FUEL CONSUMPTION DATA LOG SHEET

ENR HRS
24,117 hrs

Customer: OSBORNE
Location: _____
Baseline/Trained: _____
Unit No. 6/6/00
Load 2
3.8 MW

Equipment Make & Model _____
Ambient Temp °C Start 16.6
Ambient Temp °C Finish 16.1
Fuel Density _____
Fuel Density corrected @ 15°C _____

TIME	T	FUEL METER READINGS		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		IN	OUT		IN	OUT	IN	OUT	IN	OUT		
14:24:30												
14:29:30	10	455.27	303.29		21.5	37.7						
14:29	10	454.44	302.30		21.7	38.0						
14:38	10	455.22	302.85		21.8	38.1						
	10	454.33	302.30		21.9	38.1						
15:09	10	453.99	302.14		22.3	38.6						
	10	454.94	302.69		22.1	38.6						
	10	454.83	302.58		22.5	38.8						
	10	454.83	302.52		22.5	38.9						
	10	454.77	302.36		22.5	39.0						
	10	455.05	302.74		22.6	39.0						
	10	454.66	302.41		22.6	39.1						
	10	454.66	302.30		22.6	39.0						

14:38

15:10

2.25



SPECIFIC FUEL CONSUMPTION GENSET TRIAL

Customer: OSBORNE MINE
 Genset No: 3
 LOAD 3.8 MW (3731-3820)
 Date: 7-6-00

Make & Model WARTSILA 12V 32E
 Engine Hrs 22005 3
 Date: Untreated/Treated 7-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

LUBRICANT LUBRICANT OIL PRESSURE
 EXHAUST STACK TEMP

Run No	Time Start	Period Mins	kWh Meter	kWh	Average Load kW	Volts BAR	Amps °C	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS		
								In	Out			In	Out			
1	1748		5023080											749	23220	23450
	1758	10	5023709	629	67°C	4.7	297	449.27	298.79	150.48	0.2392	23.3	37.9	749	23220	23450
2	1758		5023741													
	1808	10	5024372	631	67°C	4.7	298	441.27	289.78	151.49	0.2401	23.4	40.4	749	23250	23430
3	1809		5024401													
	1819	10	5025030	629	68°C	4.7	298	442.11	290.32	151.79	0.2413	23.4	40.5	751	23270	23420
4	1820		5025070													
	1830	10	5025699	629	68°C	4.7	298	441.83	290.76	151.07	0.2402	23.4	40.5	749	23250	23420
5	1830		5025730													
	1840	10	5026359	629	68°C	4.7	298	441.49	290.38	151.11	0.2402	23.5	40.7	749	23220	23390
6	1841		5026384													
	1851	10	5027012	628	68°C	4.7	298	441.38	290.05	151.33	0.2409	23.5	40.6	749	23230	23390
7	1852		5027054													
	1902	10	5027685	631	68°C	4.7	298	441.55	290.27	151.28	0.2397	23.5	40.7	749	23240	23390
8	1902		5027716													
	1912	10	5028347	631	68°C	4.7	298	441.49	290.54	150.95	0.2392	23.5	40.7	750	23250	23400
9	1913		5028376													
	1923	10	5029005	629	68°C	4.7	298	441.55	290.05	151.5	0.2408	23.5	40.7	749	23260	23390
10	1923		5029034													
	1933	10	5029665	631	68°C	4.7	298	441.49	290.16	151.33	0.2399	23.5	40.7	749	23250	23390
					629.7											
										1512.33						
											0.2402					



FUEL TECHNOLOGY PTY LTD

Rack 40

23250

306 °C

5.2

2.35

23420

313

low

GENSET FUEL CONSUMPTION DATA LOG SHEET

Rpm 755

Exit hrs
22009 hrs.

Customer:

Location

Baseline/Erased

Unit No.

Load

6/6/00

3
3.8 MW

Equipment Make & Model

Ambient Temp °C Start

Ambient Temp °C Finish

Fuel Density

Fuel Density corrected @ 15°C

WARTSILAA 12V32E

15.4

3975 KW

TIME	T	FUEL METER READINGS litres		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		IN	OUT		IN	OUT	IN	OUT	IN	OUT	IN	OUT
17:50												
1	10	449.27	298.79		23.3	39.9						
2	10	441.27	289.78		23.4	40.4						
3	10	442.11	290.32		23.5	40.5						
4	10	441.83	290.76		23.4	40.5						
5	10	441.49	290.38		23.5	40.7						
6	10	441.38	290.05		23.5	40.6						
7	10	441.55	290.27		23.5	40.7						
8	10	441.49	290.54		23.5	40.7						
9	10	441.55	290.05		23.5	40.7						
10	10	441.49	290.16		23.5	40.7						
11												
12												

13.8
13.7



SPECIFIC FUEL CONSUMPTION, GENSET TRIAL

CHARGE AIR 24

Customer: OSBORNE MINES
 Genset No: 1
 Date: LOAD 1.8 - 3 MW

Make & Model: WAGSILA 12 V 32 E
 Engine Hrs: 31863.3
 Date: Untreated/Treated 30-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

LUBE OIL TEMP
 LUBE OIL PRESSURE
 EXHAUST STACK TEMP

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load kWh	Voter	Amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS
								In	Out			In	Out	
1	1105		9007856											ENG T400A T400C
	1115	10	9008300	444	66	4.7	294	468.11	361.20	106.91	0.2408	20.0	33.7	747 18880 19040
2	1116		9008343											
	1126	10	9008769	426	66	4.7	295	467.16	364.28	102.88	0.2415	19.8	33.2	747 20320 20450
3	1127		9008800											
	1137	10	9009239	439	66	4.7	295	467.44	362.03	105.41	0.2401	20.2	34.0	747 18390 18670
4	1138		9009282											
	1148	10	9009699	417	65	4.7	297	466.27	365.54	100.73	0.2415	20.7	34.1	747 19480 19680
5	1157		9010036											
	1207	10	9010459	423	66	4.7	296	466.61	364.50	102.11	0.2414	21.4	34.3	750 16960 17260
6	1207		9010495											
	1217	10	9010907	412	66	4.7	296	465.72	366.09	99.63	0.2418	21.3	34.1	747 18320 18400
7	1218		9010940											
	1228	10	9011354	414	66	4.7	297	465.22	364.94	100.28	0.2422	21.8	34.8	748 18430 18730
8	1229		9011384											
	1239	10	9011800	416	66	4.7	297	464.99	364.56	100.43	0.2414	22.1	34.9	748 18600 18920
9	1240		9011837											
	1250	10	9012254	417	66	4.7	297	465.22	364.45	100.77	0.2417	22.3	35.0	746 18600 18800
10	1251		9012295											
	1301	10	9012726	431	66	4.7	297	466.22	361.81	104.41	0.2422	22.5	35.7	750 19780 20170
				4239						1023.56	0.2415			
												3.69		



GENSET FUEL CONSUMPTION DATA LOG SHEET

Customer: OSBORNE
Location:
Base/Sec/Treated:
Unit No. 1
Load: FLUCTUATING

Equipment Make & Model:
Ambient Temp °C Start: 15.3
Ambient Temp °C Finish: 17.3
Fuel Density:
Fuel Density corrected @ 15°C:

16.0
16.3
17.0
16.7
17.3
17.3

Table with columns: TIME, T, FUEL METER READINGS (litres), LITRES CONSUMED, FUEL TEMP (°C), FUEL DENSITY at observed temp. °C, FUEL METER Readings Corrected Kg, FUEL CONSUMED Kg. Rows include data points from 11:08 to 12:52.

1
2
3
4
5
6
7
8
9
10



SPECIFIC FUEL CONSUMPTION GENSET TRIAL

Customer: OSBORNE MINES
 Genset No: 1
 Date: LOAD 3 8 M W

Make & Model: WARTSILA 12U32 E
 Engine Hrs: 31860.3
 Date: Untreated/Treated 30-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

Large Oil Pressure 24 Amps
 Large Oil Pressure 24 Amps

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load -kW	Volts BAR	Amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS				
								In	Out			In	Out					
1	0816		8997,456															
	0826	10	8998,118	662	67	4.6	296	483.05	329.17	153.88	0.2324	17.1	33.4	746	23260	23680		
2	0827		8998,181															
	0837	10	8998,840	659	67	4.5	297	482.33	328.57	153.76	0.2333	17.0	33.3	745	23270	23700		
3	0838		8998,899															
	0848	10	8999,555	656	67	4.5	297	482.05	328.51	153.54	0.2340	17.2	33.4	744	23280	23690		
4	0849		8999,610															
	0859	10	9000,270	660	67	4.5	297	481.61	327.74	153.87	0.2331	17.2	33.6	747	23280	23680		
5	0900		9000,325															
	0910	10	9000,984	659	66	4.6	297	481.55	327.74	153.81	0.2333	17.5	33.9	744	23260	23680		
6	0911		9001,046															
	0921	10	9001,706	660	67	4.6	297	481.44	327.91	153.53	0.2326	17.7	34.1	744	23310	23690		
7	0921		9001,765															
	0931	10	9002,424	659	66	4.6	298	481.16	327.63	153.53	0.2329	17.6	34.1	746	23290	23700		
8	0932		9002,477															
	0942	10	9003,136	659	66	4.6	299	480.88	327.41	153.47	0.2328	17.9	34.4	745	23290	23690		
9	0943		9003,184															
	0953	10	9003,843	659	66	4.6	299	481.44	327.91	153.53	0.2329	18.0	34.4	747	23280	23680		
10	0954		9003,895															
	1004	10	9004,553	658	66	4.6	299	481.27	327.96	153.31	0.2329	18.7	34.7	745	23260	23690		
11	1005		9004,612															
	1015	10	9005,269	657	66	4.6	299	481.66	327.73	153.93	0.2342	18.5	34.9	748	23310	23720		
12	1015		9005,389															
	1025	10	9006,046	657	66	4.6	299	480.55	327.14	153.41	0.2335	19.4	35.4	747	23320	23680		
				7905							1.84357	0.2332						
													-2.75	7.0				



FUEL TECHNOLOGY PTY LTD

Eng.
Hrs 3,861

GENSET FUEL CONSUMPTION DATA LOG SHEET

Customer: OSBORNE
Location: _____
Baseline/Treated: _____
Unit No. 1
Load 3.8 MW

Equipment Make & Model WARTSILA 12V32C
Ambient Temp °C Start 8.0
Ambient Temp °C Finish 14.0
Fuel Density _____
Fuel Density corrected @ 15°C _____

°C
9:11
a
12.7
11.3
12.7
13.2

TIME	T	FUEL METER READINGS litres		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg		
		IN	OUT		IN	OUT	IN	OUT	IN	OUT	IN	OUT	
8:17	10				17.1	32.4			483.05	329.17			1
8:29	10				17.0	33.3			482.33	328.57			2
	10				17.2	33.4			482.05	328.51			3
	10				17.2	33.6			481.61	327.74			4
	10				17.5	33.9			481.55	327.74			5
	10				17.7	34.1			481.44	327.91			6
9:23	10				17.6	34.1			481.16	327.63			7
9:34	10				17.9	34.4			480.88	327.44			8
	10				18.0	34.4			481.44	327.91			9
9:55	10				18.3	34.7			481.27	327.96			10
	10				18.5	34.9			481.66	327.73			11
	10				19.4	35.4			480.55	327.14			12

(Late stop by 1-2 dec)



SPECIFIC FUEL CONSUMPTION GENSET TRIAL

Customer: OSBORNE MINES

Make & Model

WARTSILA 12V 32E

Genset No: 2

Engine Hrs

24601.3

LOAD Date: 3.8 MW

Date: Unrated/Treated

29-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

LUBE OIL TEMP
LUBE OIL PRESSURE
EXHAUST STACK TEMP

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load %	Water BAR	Amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS				
								In	Out			In	Out					
1	1105		5386,171		65													
	1115	10	5386,821	650	65	4.6	288	461.33	308.40	152.93	0.2352	21.6	37.8	752	73320	23400		
	1118		5387,021															
	1128	10	5387,671															
2	1209		5390,298															
	1219	10	5390,950	652	65	4.6	289	459.55	306.81	152.74	0.2342	23	39.4	749	23310	23450		
3	1220		5391,024															
	1230	10	5391,674	650	65	4.6	289	458.49	305.76	152.73	0.2349	23.3	39.5	749	23330	23480		
4	1234		5391,885															
	1244	10	5392,532	647	65	4.6	290	457.11	304.61	152.50	0.2357	23.6	39.8	749	23340	23480		
5	1244		5392,579															
	1254	10	5393,226	647	65	4.6	290	457.16	304.56	152.60	0.2358	23.6	39.8	749	23340	23450		
6	1255		5393,276															
	1305	10	5393,923	647	65	4.6	290	456.16	304.12	152.04	0.2350	23.7	39.9	749	23320	23430		
7	1306		5393,959															
	1316	10	5394,604	645	65	4.6	290	456.44	304.34	152.10	0.2358	24.2	40.6	748	23310	23420		
8	1316		5394,662															
	1326	10	5395,309	647	65	4.6	290	456.44	304.49	151.99	0.2349	24.4	40.6	749	23320	23420		
9	1327		5395,351															
	1337	10	5395,997	646	65	4.6	290	455.88	303.73	152.15	0.2355	24.3	40.7	749	23330	23420		
10	1338		5396,038															
	1348	10	5396,684	646	65	4.6	290	456.27	304.17	152.10	0.2354	24.4	40.6	748	23320	23420		
11	1349		5396,733															
	1359	10	5397,380	647	65	4.6	290	455.94	303.90	152.04	0.2350	24.4	40.7	749	23320	23400		
12	1400		5397,426															
	1410	10	5398,073	647	65	4.6	290	455.72	303.62	152.10	0.2351	24.4	40.7	749	23310	23410		



29 JUNE 00
FUEL TECHNOLOGY PTY LTD

11112

Charge 114 2.0 - 2.1 Dec

Full Rank.
(MAX FUEL FLOW)

GENSET FUEL CONSUMPTION DATA LOG SHEET

24602 hrs

Customer: OSBORNE
Location: _____
Baseline/Treated: _____
Unit No. 2
Load 3.8 MW

Equipment Make & Model WÄRTSILÄ 12V32E
Ambient Temp °C Start 16.5°C
Ambient Temp °C Finish 17.4°C
Fuel Density _____
Fuel Density corrected @ 15°C _____

°C
17.9
17.9
17.8
17.8
17.7
17.4

TIME	T	FUEL METER READINGS litres		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		IN	OUT		IN	OUT	IN	OUT	IN	OUT	IN	OUT
17:05					21.6	37.3			461.33	308.40		
	10				21.9	38.2			460.05	86.97	??	
11:37					22.4	38.8			459.55	86.59		
12:10	10				23.0	39.4			459.55	306.81		
12:32	10				23.3	39.5			458.49	305.76		
12:35	10				23.5	39.8			457.11	304.61		
12:45	10				23.6	39.8			457.16	304.56		
12:57	10				23.7	39.9			456.16	304.12		
13:08	10				24.2	40.6			456.44	304.34		
	10				24.4	40.6			456.44	304.45		
13:29	10				24.3	40.7			455.88	303.73		
13:40	10				24.4	40.6			456.27	304.17		
13:50	10				24.4	40.7			455.94	303.90		
					24.4	40.7			455.72	303.62		

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SPECIFIC FUEL CONSUMPTION GENSET TRIAL

CHARTER HIN 02

15.1

Customer: BOSORWE MINES
 Genset No: 3
 Date: LOAD 3 8 MW

Make & Model: WARTSILA 12 V 32 E
 Engine Hrs: 22405.5
 Date: 29-6-00

Fuel Sample	Density	Temp Dec C
Corrected		15

LUBE OIL TEMP
 LUBE OIL PRESSURE
 EXHAUST STACK TEMP

Run No	Time Start	Period Mins	kWh Meter	kWh	Avg Load kW	Volts BAR	Amps	Fuel (L)		L Consumed	Fuel (L) Per kWh	Fuel Temp (C)		RPM COMMENTS				
								In	Out			In	Out					
1	1619		5942335															
	1629	10	5942976	641	67	4.7	298	443.88	292.74	151.14	0.2358	25.4	42.3	748	23390	23510		
2	1630		5943023															
	1640	10	5943663	640	67	4.7	297	443.83	292.85	150.98	0.2359	25.4	42.5	748	23400	23500		
3	1640		5943712															
	1650	10	5944352	640	67	4.7	298	443.66	292.19	151.47	0.2366	25.4	42.5	751	23390	23490		
4	1651		5944390															
	1701	10	5945028	638	67	4.7	297	443.94	293.40	150.54	0.2359	25.4	42.6	753	23390	23470		
5	1702		5945068															
	1712	10	5945708	640	67	4.7	297	443.49	292.30	151.19	0.2362	25.4	42.6	749	23390	23480		
6	1712		5945757															
	1722	10	5946397	640	67	4.7	298	443.77	292.52	151.25	0.2363	25.3	42.5	747	23380	23480		
7	1723		5946444															
	1733	10	5947083	639	67	4.7	298	444.22	293.13	151.09	0.2364	25.4	42.5	748	23380	23470		
8	1734		5947129															
	1744	10	5947769	640	67	4.7	299	443.99	293.13	150.86	0.2357	25.3	42.5	748	23410	23490		
9	1745		5947824															
	1755	10	5948464	640	67	4.7	297	443.61	292.58	151.03	0.2359	25.2	42.4	749	23380	23480		
10	1756		5948517															
	1806	10	5949157	640	67	4.7	298	443.27	292.47	150.80	0.2356	25.3	42.4	753	23390	23450		
										1510.75	0.2361							
											0.2362							
											-1.7%							



GENSET FUEL CONSUMPTION DATA LOG SHEET

Customer: OSBORNE
 Location _____
 Base/Use/Treated _____
 Unit No. 3
 Load 3.8mw

Equipment Make & Model WARTSILA 12V32C
 Ambient Temp °C Start 17.2°C
 Ambient Temp °C Finish 15.1
 Fuel Density _____
 Fuel Density corrected @ 15°C _____

TIME	T	FUEL METER READINGS		LITRES CONSUMED	FUEL TEMP °C		FUEL DENSITY at observed temp. °C		FUEL METER Readings Corrected Kg		FUEL CONSUMED Kg	
		IN	OUT		IN	OUT	IN	OUT	IN	OUT	IN	OUT
16:20	10				25.4	42.3			443.88	292.74		
					25.4	42.5			443.83	292.85		
					25.4	42.5			443.66	292.19		
16:53					25.4	42.6			443.94	293.40		
					25.4	42.6			443.49	292.30		
					25.3	42.5			443.77	292.52		
					25.4	42.5			444.22	293.13		
15:8					25.3	42.5			443.99	293.13		
15:5					25.2	42.4			443.61	292.58		
15:3					25.3	42.4			443.27	292.47		

Ambient

°C

16.7

16.3

15.8

15.5

15.3

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