

# **APPENDIX XI**

## **PETROLEUM INDUSTRY COST ANALYSIS**



9 December, 1996

Mr Stewart McDonald  
Project Manager, Petrol Volatility Project  
Vic EPA Vehicle Testing Station  
PO Box 182  
Altona  
Vic. 3018

Dear Stewart,

**re Costs of gasoline volatility reduction**

Our members have estimated the costs associated with reducing the volatility (RVP) of gasoline from all Australian refineries by 5 and 10 kPa. The estimates have been made on the basis of a reduction for two months (say February, March) but with allowance for extensions to this time period.

The costs are somewhat different for each refiner, with one refiner being able to manage the reduction by increased operating costs and short term storage. Should the period be significantly extended, however, this would not be feasible. All of the other refineries would require some capital investment, mostly of the order of \$5 million per company, with one exception. One refinery would need to install a butamer plant to remove C4s from the pool in order to achieve the 10kPa reduction. The industry costs (Australian \$) are as follows:

	Capex, \$M		Opex, \$M/y	
	-5 kPa	-10 kPa	-5 kPa	-10 kPa
<b>Industry cost</b>	13	255	7.1	15.9

All companies deliver gasoline according to an industry-agreed FVI specification which is adjusted monthly in each marketing region according to an extensive statistical analysis of the weather records for marker locations within those regions. The purpose of the FVI specification is to ensure vehicle driveability in the expected extreme weather conditions. Economics dictate that gasoline is blended to the maximum of the specification. The current specifications are given in the table below (for all grades of gasoline):

h:\docs\hse\airqual\petrol volatility\volatility 5 and 10 reduction.doc

Australian Institute of Petroleum Ltd ACN 005 152 581  
500 Collins Street, Melbourne, Vic 3000 Tel: 61 3 9614 1466 Fax: 61 3 9614 1416

**FVI specifications:**

<b>Location</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
NSW	98	100	102	107	114	120	120	117	110	105	102	98
Vic	95	96	102	110	119	124	125	121	116	109	104	99
SA	89	91	97	104	114	119	119	114	109	100	95	91
Tas	106	106	112	117	124	127	127	125	121	114	114	110
S Qld	98	100	104	108	113	116	116	112	108	104	100	98
Glads/N Qld	96	98	102	105	108	110	108	106	103	98	96	96
Perth/Kalgoorlie	93	95	100	107	112	118	119	118	114	108	102	97
Bun/Alb/Esp	100	100	108	116	120	122	122	120	118	110	106	100
Pt Hed/NWA	90	92	94	96	104	108	104	100	94	88	88	88
Geraldton/Carn	92	94	98	106	112	118	114	112	108	100	94	92
Darwin/Alice	90	94	98	102	102	102	100	98	96	92	90	90

The formula for FVI is:

$$FVI = RVP \text{ (kPa)} + 0.7 * E70$$

where E70 is the volume % evaporated at 70 °C by ASTM D86. The distillation characteristics will vary from refinery to refinery so an exact overall mathematical relationship does not exist. I have estimated the current RVP from the average of the distillation properties for 1995 which showed that E70 was about 13%vol in summer and about 21% vol in winter.

**Approximate current RVP:**

<b>Location</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
NSW	89	91	93	92	99	105	105	102	101	96	93	89
Vic	86	87	93	95	104	109	110	106	107	100	95	90
SA	80	82	88	89	99	104	104	99	100	91	86	82
Tas	97	97	103	102	109	112	112	110	112	105	105	101
S Qld	89	91	95	93	98	101	101	97	99	95	91	89
Glads/N Qld	87	89	93	96	99	101	99	97	94	89	87	87
Perth/Kalgoorlie	84	86	91	92	97	103	104	103	105	99	93	88
Bun/Alb/Esp	91	91	99	101	105	107	107	105	109	101	97	91
Pt Hed/NWA	81	83	85	87	95	99	95	91	85	79	79	79
Geraldton/Carn	83	85	89	97	103	109	105	103	99	91	85	83
Darwin/Alice	81	85	89	93	93	93	91	89	87	83	81	81

Implementation time for 5 and 10 kPa volatility reduction will vary. For the company which needs to change operating conditions it will depend on the ability to adjust supply scheduling and product offtake in order to make sufficient ullage available for the summer period. This could be achieved within six months. The smaller capital investments could be done in a 1-2 year timeframe. A butamer plant is a major investment and would require about 4 years for the planning, design, construction, commissioning process and would probably need to be timed to coincide with a

scheduled statutory shutdown. For any scale of investment of course, a mechanism to achieve a reasonable rate of return is the first hurdle to be overcome.

If you have any queries on the above data please do not hesitate to contact me.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Barry Challenger', with a long horizontal flourish extending to the right.

Barry Challenger  
Manager Engineering, Health, Safety & Environment