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Kennedy School of Government **HKS167**
Case Program CR15-99-1484.0

SAGASCO Holdings Limited

In the summer of 1993, Australia's Trade Practices Commission was considering whether or not to permanently enjoin Santos Limited from acquiring SAGASCO Holdings Limited. This merger was potentially of enormous significance since Santos was the largest and SAGASCO the third largest on-shore natural gas producer in Australia. SAGASCO, which was fighting the takeover, argued that the merger would significantly reduce competition in the natural gas market. Santos countered that the gas industry was highly concentrated already and had always been disciplined by intense competition from other fuels.

Australia's Natural Gas Industry

The process of producing natural gas and delivering it to the final customer involves four stages that are often provided by different firms:

1. Exploration and development of on-shore or off-shore gas fields.
2. Processing the raw gas to remove gas liquids, water, carbon dioxide and other impurities so that it can be transmitted by pipeline.
3. Transmission by long-distance pipeline to the area where the gas will be consumed.
4. Distribution of the gas to individual customers.

Santos was primarily a natural gas producer. It owned interests in fields that served four of Australia's six sates and territories: South Australia, New South Wales, Queensland, and Northern Territory. SAGASCO was a holding company that owned the distribution company serving South Australia but also

This case was written by Professor Jose A. Gomez-Ibanez with the assistance of Professors F.M. Scherer and Joseph P. Kalt and with the financial support of the Inter-American Development Bank. Unless otherwise noted, the data in the exhibits are from Joseph P. Kalt, Analysis of Competition Issues Raised by the Proposed Acquisition of SAGASCO Holdings Limited by Santos Limited, statement before the Trade Practices Commission, August 10, 1993. The case does not purport to provide an accurate description of the positions of the various parties involved in this merger dispute. It is intended for classroom use only. (0898)

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owned interests in some of the same production fields as Santos. Only two of Australia's six states were not affected by the merger: Victoria, which lies between South Australia and New South Wales, but was served by a separate gas basin and not connected to its neighbors by pipeline; and Western Australia, which is on the other side of the continent and also physically isolated (see Exhibit 1).

Most of the key companies involved in the dispute were private, the main exceptions being the pipeline companies. The raw gas producers had long been primarily private, and they usually owned the processing plants. Several of the key distribution companies had been recently sold to the private sector—the State of South Australia had sold SAGASCO the year before, for example. There was talk of selling the pipeline companies as well, although that probably would not be done for many years.

The volume of gas produced or consumed is commonly measured by the number of joules of energy it contains. Prices at the wholesale level are often quoted in terms of gigajoules, which is one billion (10^9) joules and abbreviated as GJ. The production and capacity of gas fields or basins are often quoted in petajoules, or PJ, which is a million GJ (or 10^{15} joules) .

Gas Basins, Pipelines and Processing Plants. Most of Australia's gas came from seven large basins. The basins and the firms that had an interest in the production of their fields are listed in Exhibits 2 and 3.

Santos and/or SAGASCO owned interests in three of the basins that served four states and territories:

Cooper. The most important was the Cooper basin, which was in the interior and straddled the states of South Australia, Queensland and New South Wales. The Cooper basin was connected to two major markets by two pipelines:

- Moomba-Adeliaide, which supplied South Australia with up to 95 PJ of gas per year, and
- Moomba-Sydney, which supplied New South Wales with up to 118 PJ of gas per year

The basin was dominated by two major production units:

- the South Australian Cooper Basin (SACB) unit, which had been in operation since 1969, and
- the South West Queensland Cooper Basin (SWQCB) unit, which was about to begin assuming some of the load for South Australia in 1994, although there were independents as well.

Surat-Bowen. The Surat basin, including Bowen, was located in the interior of Queensland and provided it with about 40 PJ per year. Two pipelines connected the basin to Queensland markets:

- Roma-Brisbane, which supplied two retail gas distribution companies, and
- Wallumbala-Gladstone, which mainly supplied a large aluminum company, Queensland Alumina, Ltd.

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***Amadeus*.** The Amadeus basin was located in the interior of the Northern Territory, supplying that state with 12 to 15 PJ per year. It was connected to the Darwin market by the Amadeus-Darwin pipeline.

Two other basins were currently in commercial production. The Gippsland basin lay off the shore of Victoria and supplied all of its gas to that state. The North West Shelf was a gigantic basin 300 to 400 kilometers off the shore of the state of Western Australia; it served export markets as well as the state. Export gas was liquified, an expensive process, and then shipped by special tankers to Japan.

Two additional basins were not in commercial production yet. Otway was off the coast of South Australia while Bonaparte Gulf was off the coast of the Northern Territory. Santos and SAGASCO both had interests in Bonaparte Gulf .

Four of the five pipelines serving the Cooper, Surat, and Amadeus basins were still state-owned: PASA (Pipelines Authority of South Australia) served Moomba-Adeliade, TPA (The Pipeline Authority) served Moomba-Sydney, NT Gas served Amadeus-Darwin, and a Queensland State company owned the small pipeline that served Gladstone. A distribution company owned the pipeline that served Brisbane (Exhibit 4). The pipeline companies charged tolls for carrying the gas that were based on their costs. The state governments had the authority to regulate pipeline tariffs but in most cases that issue was moot because the pipelines were publicly owned.[1]

Each basin had at least one processing plant that cleaned the raw gas for transport and use. The Cooper basin was served by an enormous $800 million plant at Moomba. It was owned by the SACB production unit, but also served the SWQCB unit and independent producers in the basin as well. The plant had a capacity of 220 PJ per year, but had been operating at only about 170 PJ per year because the field's customers were not taking all the gas they contractually could.

Gas producers might sign wholesale contracts with a pipeline company, a distribution company, or individual major customers, depending on the state. The wholesale contracts were generally 10 or more years long, with prices indexed wholly or partially to some measure of inflation. The contracts would set both minimum and maximum volumes. For example, PASA, the pipeline serving South Australia had recently signed 10 year contracts to take up to 65 PJ per year from SACB and 30 PJ per year from SWQCB, with an 85 percent "take or pay" requirement. Similarly, AGL, the distribution company in New South Wales, had a contract with SACB to buy up to 118 PJ per year through the year 2006, with an 80 percent "take or pay" requirement.

***Distribution Companies and End Users*.** Natural gas was used by domestic households for heating, hot water and cooking, by some electricity companies as fuel, by industry for process heat, and by commercial businesses for heating and other uses. The domestic customers and small industrial and

1 In the only state where the pipeline was privately owned (New South Wales) it was owned by the distribution company (AGL) which was already regulated. One state did not have leagal authority to regulate pipeline tolls (Victoria), but it had a publicly owned pipeline. Australian Gas Association, *Gas Supply and Demand Study*, third report to participants, Canabera, July 1992, p. 46.

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commercial users were served by distribution companies, while the electricity companies and the very largest industrial customers could contract directly with the gas producers or pipelines in many states. The largest industrial customers often had confidential negotiated rates which could be very low, especially if their service was interruptible (i.e., could be cut off in periods of peak demand).

The pattern of gas use varied from state to state, as shown in Exhibits 5 and 6. In South Australia, for example, about half of the gas was used for electricity generation by the local electric company, ETSA, and the other half retailed by the SAGASCO-owned distribution company, called The Gas Company. Approximately 40 percent of The Gas Company's sales were to domestic and small commercial or industrial customers and 60 percent to large industrial customers. The pipeline company, PASA, could compete with The Gas Company to serve the largest industrial customers, but PASA's last industrial contract had expired in 1992. PASA bought gas wholesale from the field producers on behalf of ETSA and The Gas Company, and could not sign a contract for their gas without their permission. ETSA also had separate side wholesale contracts with field producers—in 1992, for example, it had signed a special ten-year contract for up to 9 PJ per year on an interruptable basis at 25 percent off the normal price.

New South Wales, by contrast, didn't use gas for electricity generation because it had abundant, cheap coal and mine-mouth power plants. New South Wales was Australia's industrial heartland, however, and industry consumed two-thirds of the state's gas. Eighteen large manufacturers alone accounted for half of gas usage in the state. The distribution company, AGL, sold all the gas retail and contracted directly with the gas producers .

Queensland also had inexpensive local coal for electricity generation, and so 94 percent of the gas was sold to industry. One of the two pipelines was essentially dedicated to an aluminum company and the second served two distribution companies, Queensland Gas Company and Allgas, that sold all the gas in the Brisbane area .

In the Northern Territory, there was no coal, and virtually all the gas was used for electricity generation by the state-owned power company, PAWA.

Santos

Santos was a South Australian company formed in the 1950s to search for oil in the Cooper basin area. As with many such searches, Santos discovered gas instead. Santos played a major role in developing the basin and in organizing first the SACB and later the SWQCB production units. In both SACB and SWQCB, production was carried out through joint ventures of multiple producers under Unit Agreements that specified the rights and obligations of members concerning the rates of development of the field, field operations, and processing. Under the terms of the Unit Agreements, most matters were decided by a 63 percent majority vote, subject to the requirement that at least two members voted favorably. Separate affiliates of a parent company were treated as separate voting parties for these purposes. Santos was still

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headed by its founder, John Bonython, who was a respected and influential leader of the South Australian business community.

The Trade Practices Commission.

The Trade Practices Commission was established in 1974 as Australia's competition agency. It had broad powers under the Trade Practices Act to investigate and stop anti-competitive practices. With respect to mergers, section 50 of the act said that a corporation or a person could not acquire shares in another corporation or person: .

> … if the acquisition would have the effect, or be likely to have the effect, of substantially lessening competition in a market.

The act went on to define the circumstances in which this might occur:

> Without limiting matters that may be taken into account … in determining whether the acquisition would have the effect, or be likely to have the effect, of substantially lessening competition in a market, the following matters must be taken into account:
>
> (a) The actual and potential level of import competition in a market;
>
> (b) The height of barriers to entry to the market;
>
> (c) The level of concentration in the market;
>
> (d) The degree of countervailing power in the market;
>
> (e) The likelihood that the acquisition would result in the acquirer being able to significantly increase prices or profit margins;
>
> (f) The extent to which substitutes are available in the market or are likely to be available in the market;
>
> (g) The dynamic characteristics of the market, including growth, innovation and product differentiation;
>
> (h) The likelihood that the acquisition would result in the removal from the market of a vigorous and effective competitor;
>
> (i) The nature and extent of vertical integration in the market.

The Trade Practices Commission held hearings on its proposed orders, and interested parties were invited to submit written and oral testimony. The Commission had issued a temporary injunction preventing the Santos-SAGASCO merger and was proposing to make the injunction permanent. Both Santos and

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SAGASCO filed briefs, as had various gas consumers, state governments, and other interested parties. One of the few agencies that did not participate was the new office created by the government of South Australia to regulate SAGASCO's distribution company.

The Issues Before the Commission

Concentration in the Wholesale Gas Market. The issue brought up most often by merger opponents was that it would substantially lessen competition among wholesale gas producers. How much competition might be reduced depended in part on two factors. The first was whether new pipelines would be built or new basins brought on line. At the time, each state was served by only a single basin: South Australia and New South Wales by Cooper, Queensland by Surat, and Northern Territories by Amadeus. Thus competition seemed to be limited to the companies in the relevant basin. But there were several possibilities for new connections or basins:

- PASA had been discussing for several years (with permission from ETSA and SAGASCO) the possibility of building a new pipeline between the Amadeus basin and South Australia to supply 30 PJ per year. There were two possible routes: to Moomba, connecting there with PASA's pipeline to Adelaide; or direct to Adelaide. The first route was much shorter and would connect Amadeus to New South Wales as well, but it would pass through the SACB unit's processing facility at Moomba.
- The government of Queensland, concerned that the Surat basin was small and its reserves declining, had been discussing the possibility of building a pipeline to the Cooper basin. Santos had a 78 percent interest in an existing gas-rated petroleum pipeline that connected the Cooper area with Queensland and was considering the possibility of converting that line to gas use.
- In New South Wales AGL, the pipeline operator and distribution company, was considering the possibility of building a pipeline to connect its system to that of the state of Victoria. The gap (between Albury and Wagga Wagga) was only 100 kilometers, by far the shortest of any of the pipelines under consideration, and would provide access to the Gippsland basin.
- The Otway basin might eventually be developed to serve South Australia.
- The Bonaparte Gulf basin might be developed to provide an additional source for the Northern Territories.

The new off-shore basins were a remote possibility for the immediate future. Off-shore fields are usually worth developing only if potential demand is fairly high. Bonaparte Gulf was not considered feasible unless developed for 35 PJ per year, for example, which would not be possible unless a large aluminum plant at Gove converted to gas. Even when volumes were large, off-shore gas was generally more expensive than on-shore gas. In 1992, for example, gas brought ashore from the North West Shelf cost about 25 percent more than gas at the wellheads in the Cooper or Bowen basins.[2] The Australian Gas Association (AGA) thought

2 In 1992, North West Shelf gas was $2.65 per GJ f.o.b. at Whitehall Bay. Compare with well-head prices in Exhibit 5.

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that eventually it would be economical to build a pipeline to bring North West Shelf gas 2,600 kilometers across Australia to South Australia, New South Wales and Queensland. But that would be only in 20 or 30 years at the earliest, after Cooper and other local basins were nearly depleted so that the costs of on-shore gas extraction had risen significantly.

New pipeline connections within the region were more likely, but they would not be cheap either. It might be difficult to acquire the right-of-way if the pipelines had to cross through aboriginal lands, national parks, or other sensitive areas. Assuming no right-of-way problems, the cost per GJ transported of building and operating a pipeline varied considerably. Costs per GJ increased roughly proportionately with distance transported but declined with gas volumes or scale. Pipelines exhibited economies of scale because the capital cost of installation was not very sensitive to the diameter of the pipeline while the capacity of the pipeline was proportional to the diameter raised to the 2.5 power.[3] Exhibit 7 shows AGA cost estimates for three pipelines similar to those that were being considered. Exhibit 8 illustrates the effects of scale on costs for one of the three pipelines and for the huge 2,600 kilometer pipeline that the AGA thinks might eventually be needed.

The second issue affecting competition was whether SAGASCO would be allowed to proceed with its acquisition of Magallen Petroleum. SAGASCO had made a tender offer for Magallen's shares before Santos had made its offer for SAGASCO. Magellan owned a 47 percent share of the Amadeus basin, however, which, combined with Santos 43 percent share would put the combined company in control of 90 percent of that basin (Exhibit 3).

Opponents of the merger had submitted to the Trade Practices Commission calculations of how much concentration in the wholesale gas market would increase under various assumptions about whether new pipelines would be built and whether SAGASCO would be allowed to acquire Magellan (Exhibits 9 and 10). Concentration was measured in three different ways commonly used in competitive analysis: the market share of the largest supplier, the market share of the largest four suppliers (often called the C4 index), and the Herfindhal Index (usually abbreviated HHI). The HHI is constructed as the sum of the squares of the market shares of each supplier. The maximum value is 10,000 (one firm with a 100 percent market share), and the minimum zero. An industry with 100 equal size suppliers would have an HHI of 100, for example, one with 10 equal size suppliers would have an HHI of 1,000, one with 4 equal suppliers an HHI of 2,500, and one with 3 equal suppliers an HHI of 3,333. Although there was no firm standard, many anti-trust economists became concerned about the possibility of collusion among firms when an industry had an HHI of above 2,000 or a merger increased the HHI by 1,000 points.

Vertical Foreclosure. Another set of issues raised by opponents was that this was not just a horizontal merger (between firms at the same stage of gas production) but a vertical merger as well (between firms with operations at different stages of production). One possibility was a problem called vertical foreclosure: that other upstream companies might be denied access or sales to downstream customers or facilities. Other production companies might lose the opportunity of selling gas to SAGASCO's distribution

3 Australian Gas Association, *Gas Supply and Demand*, p. 42.

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company, for example, or might be dependent on the Moomba processing facility that the merged companies would control.

Inter-Fuel and Locational Competition. Proponents of the merger acknowledged that it would increase the concentration of suppliers in some gas basins, but countered that the suppliers were highly concentrated even before the merger. More important, they argued, concentration in wholesale gas supply simply didn't matter that much, and the concern with it reflected a fundamental misunderstanding of the gas market. There was tremendous competition at the retail level from other locations and, particularly, from other fuels. Thus, even though the ownership of gas supplies had been highly concentrated for a long time, wholesale gas suppliers could not raise prices for fear of losing sales to alternative fuels or plants at other locations.

The Trade Practices Commission had received a great deal of information on the issues of inter-fuel and locational competition. In certain uses and in certain states, inter-fuel competition seemed plausible. Coal was cheap in New South Wales and Queensland, for example, and was a competitive substitute for gas in many uses such as electricity generation and steel making. Even in South Australia, where no local coal was available, the electricity authority adjusted its purchases among gas, oil, and buying electricity off the grid from year to year depending upon which was cheaper (Exhibit 11). Oil was also a substitute in many other manufacturing processes, as well as for home heating and hot water. Proponents acknowledged that there were a few rare industries, like the manufacture of nitrate fertilizers, which were important in New South Wales and which could use no substitute for gas in their manufacturing processes. But even nitrate fertilizer producers faced competition from other types of fertilizers and from fertilizer imported from plants in other states.

Opponents of the merger stressed the limits of inter-fuel and locational competition. Fuel switching required that plants convert boilers and other machinery, which was expensive and time-consuming, or that they maintain costly dual fuel capability. Similarly, importing electricity from other states was not always an option. The electricity system in the Northern Territory was not connected to the grids in other states, for example, and the transmission lines connecting South Australia, Victoria, New South Wales, and Queensland all had quite limited capacity, since they were designed more for emergencies than for the routine transfer of enormous quantities of power.

The Commission had quantitative data that seemed to bear on these issues, but each side stressed different numbers and interpretations. Merger opponents argued that the prices of various fuels should move closely together over time if inter-fuel substitution was strong. If coal or oil prices fell, for example, gas prices would have to fall as well, or gas companies would lose customers. Some economists argued that if two commodities effectively competed with one another, their price movements should be correlated with one another at the level of 0.8 or 0.9.[4] An analysis of price movements between 1974 and 1991 showed, however,

4 G.J. Stigler and R.A. Sherwin, "The Extent of the Market" *Journal of Law and Economics*, 27 (1985), pp. 555-585.

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that gas prices charged different types of customers were not always highly correlated (Exhibit 10), and that the correlation between gas prices and prices of other fuels was even lower (Exhibits 11 and 12) .

Merger proponents argued that the more persuasive evidence was the long-run price elasticity of gas demand. If there was lots of substitution from other fuels or locations, the demand for gas should be fairly sensitive to price. The usual measure used is the price elasticity of demand, which is defined as the percentage change in quantity demanded in response to a 1 percent increase in price. A government study cited by the Australian Gas Association (Exhibit 13) showed that the long-run elasticity of demand was close to -1. This would mean that raising gas prices would not increase the gas producers revenues, since every 1 percent increase in price would be offset by a 1 percent reduction in gas purchases. Moreover, proponents cited some studies of specific industries in which the long-run price elasticities of gas demand were -1.2 to -1.6, so that gas price increases would actually reduce revenues.[5] .

The Trade Practices Commission was left with the task of trying to interpret the evidence in order to decide whether the merger would "substantially lessen" competition in the relevant market.

Suggested Discussion Questions.

(1) Is the proposed merger likely significantly to reduce competition among gas producers? As part of your argument, please evaluate the significance of.

(a) the increase in the concentration of ownership of gas supplies in selected basins,

(b) the potential for inter-fuel and locational competition, and

(c) the possibility of vertical foreclosure.

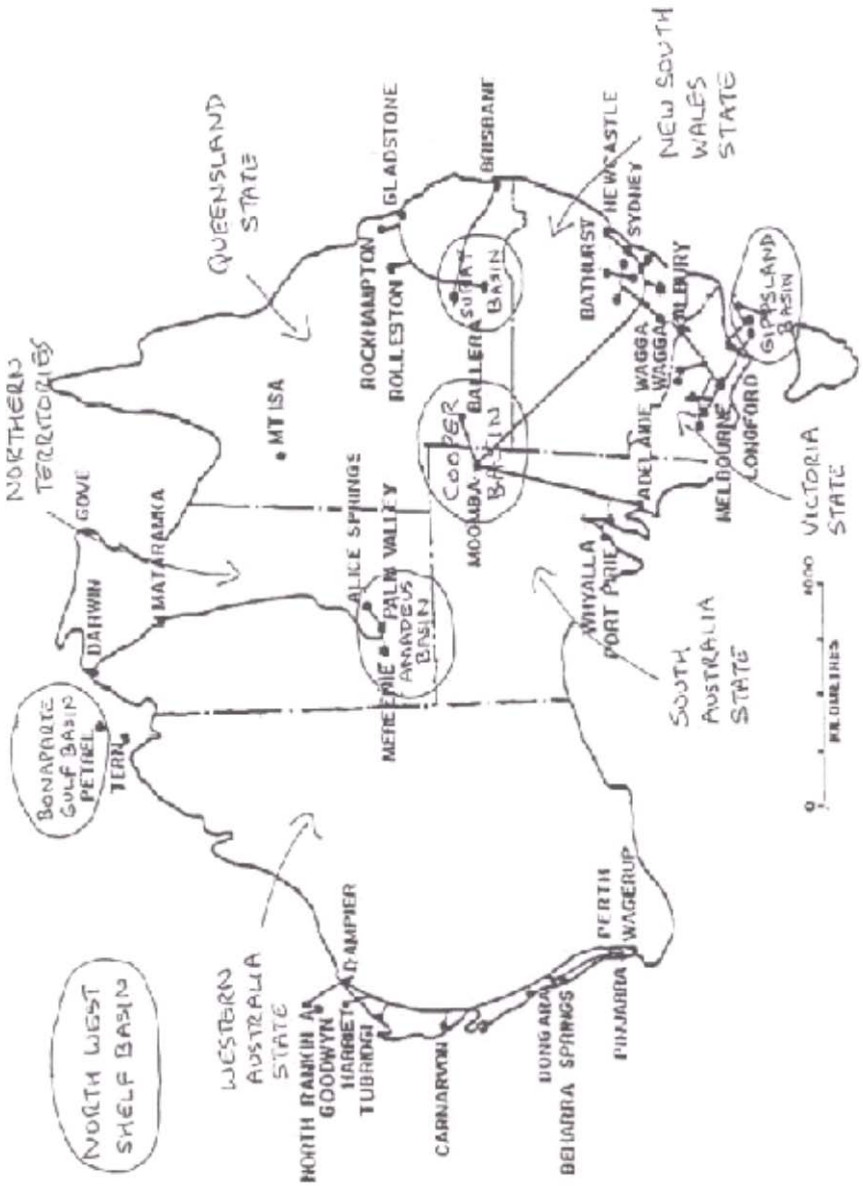
(2) Should the regulator of SAGASCO have participated in the debate over the merger? If so, why?

5 One study estimated that the price elasticity of industrial demand for natural gas in Australia was -1.45, for example; M. Turnovsky, M. Folie, and A. Ulph, "Factor Substitution in Australian Manufacturing with Emphasis on Energy Inputs", *The Economic Record* (March 1982), pp. 61-72.

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Exhibit 1:
Map of Australia with Principal Pipelines



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Exhibit 2:

Major Natural Gas Fields in Australia

Basin	Estimated recoverable reserves in 1992 (PJ)	Forecast reserves in 1995 Total (PJ)	Uncommitted (PJ)	In commercial production.?	Currently physically able to supply	Nearby and might also supply
Cooper						
SACB	2,510	1890	450	Yes	SA, NSW	QLD
SWQCB	1,194	1340	1100	Yes	SA, NSW	QLD
Amadeus	1,074	850	650	Yes	NT	SA
Surat-Bowen						
Surat	114	125	125	Yes	QLD	
Bowen	170	n.a.	n.a.	Yes	QLD	
Gippsland	6,900	5265	2800	Yes	VIC	NSW
North West Shelf	41,666	n.a.	n.a.	Yes	VIC	
Otway (off-shore)	70	300	300	No		SA?, VIC?
Bonaparte Gulf	1,800	2400	2400	No		NT?

Notes: N.a. means not available.
A question mark means the prospect of future supply is highly speculative.
Excludes data on minor fields such as Murta (estimated 1992 reserves of 73 PJ), Patchawara South west (estimated reserves of 35 PJ), and Kannook (which is an on-shore part of Otway, with estimated reserves of 27 PJ).

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Exhibit 3:

Interests by Companies in Selected Wholesale Gas Sources

Company	SACB	SWQCB	Amadeus	Surat	Gipps-land	Otway	Bona-parte
Santos Group	55%	57%	43%	27%			57%
SAGASCO	16%	17%	1%				3%
Ampolex		1%		4%			
AUSPET							
Australian Hydrocarb.		1%					
Basin Oil NW	1%						
BHP Petroleum					50%	90%	
Bridge Oil	1%			29%		10%	
Claremont		1%					
Crusader Resources	8%			8%			
Cultus Petroleum				+0%			2%
Dehli Petroleum*	20%	23%					
Esso*					50%		
Gas & Fuel of Vic.			7%				9%
Kntpec			1%				
Magellan Petroleum			47%				
Minora Resources				2%			
Mosaic				+0%			
Oil Co. Of Australia		+0%		13%			9%
Petroz				17%			6%
Other				+0%			15%

Note: Dehli Petroleum is owned by Esso.

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Exhibit 4:

Pipelines, Pipeline Operators, Distributors, and Other Major Customers in Selected States of Southern and Eastern Australia, 1992

	South Australia	New South Wales	Queensland (Brisbane)	Queensland (Gladstone)	Northern Territory
Pipelines	Moomba-Adeliade	Moomba-Sydney	Roma-Brisbane	Wallumbila-Gladstone	Amadeus-Darwin
Pipeline operator	PASA (Pipeline Authority of South Austrailia)	AGL (Australian Gas Light Company)	TPA (The Pipeline Authority)	State owned	NT Gas or AGL (34)
Distributor	The Gas Company (a SAGASCO subsidiary)	AGL (Australian Gas Light Company)	Queensland Gas Company and Allgas	None	None
Other major customers	ETSA (Electricity Trust of South Australia)	Manufacturing industries		Queensland Alumina Ltd.	PAWA (Power and Water Authority of Northern Territory) for electricity gen.

Exhibit 5:
Wholesale Contracts and Buyers in Selected States of Southern and Eastern Australia, 1992

State	South Australia	New South Wales	Queensland (Brisbane)	Queensland (Gladstone)	Northern Territory
Major fields	SACB & SWQCB*	SCAB & SWQCB	Surat Basin	Dennis Trough	Amadeus
Major wholesale contract	Up to 95 PJ per year	Up to 118 PJ per year	Up to 40 PJ per year (includes Dennis Trough)		12 to 14 PJ per year
Expiration date	1994	2006	n.a.	n.a.	n.a.
Wholesale gas buyer	PASA with approval of the Gas Company and ETSA	AGL (Australian Gas Light Company)	Queensland Gas Company and Allgas	Queensland Aluminum Ltd.	PAWA
Wholesale gas prices (1992, $/GJ after processing)	$2.16 (indexed to 95% of CPI)	n.a.	n.a.	n.a.	$2.09-2.37 for Amadeus Palm Valley; $1.89 for Amadeus Mereenie
Pipeline tolls ($/GJ)	$0.25	$0.54	$0.95	n.a.	n.a.

* As of January 1, 1994, 65 PJ/yr will be supplied from SACB and 30 PJ/yr. from SWQB under a ten-year contract that expires in 2003. Also 2 PJ/yr are supplied to the Mt. Gambier area of South Australia from the Katonook field.
N.a. means not available

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Exhibit 6:

Natural Gas Consumption by Sector, 1991

	South Australia		New South Wales		Queensland		Northern Territory	
	PJ	Percent	PJ	Percent	PJ	Percent	PJ	Percent
Electricity generation	36.6	53	0.0	0	0.0	0	12.2	94
Industrial	24.2	34	65.7	74	30.7	94	0.8	6
Commercial	2.8	4	10.9	12	0.7	2	0	0
Domestic	6.6	9	11.6	13	1.4	4	0	0
Totals	72.2		88.2		32.8		13.0	

Exhibit 7:

AGA Estimates of Costs per GJ Transported for Three New Gas Pipelines

Basin to state	Route	Year opened	Length (km)	Internal diameter (mm)	Predicted average load factor	Highest annual flow (PJ)	Average cost per GJ transported
Cooper to Queensland	Jackson-Wallumbella	1996	700	450	0.90	69	0.69
Amadeus to South Australia	Palm Valley to Peterborough (near Adelaide)	1999	1270	550	0.75	85	1.36
Gippsland to New South Wales	Melbourne to Young	2000	560	650	0.75	125	0.35

Notes: the Gippsland to New South Wales pipeline is an entirely new pipeline for the entire distance. A 100 kilometer pipeline from Albury to Wagga Wagga would also serve to connect the Victoria and New South Wales systems, but would have less capacity.
The load factor of the pipeline to Queensland is higher because its customers are assumed to be mainly industrial and would have interruptable contracts.
Source: Australian Gas Association, *Gas Supply and Demand Study*, third report to participants, Canaberra, July 1992, pp. 52, 57 and 60

Exhibit 8:

AGA Estimates of Economies of Scale for Two Pipelines

Basin to state	Route	Year opened	Length (km)	Internal diameter (mm)	Predicted average load factor	Highest annual flow (PJ)	Average cost per GJ transported
Cooper to Queensland	Jackson to Wallumbella	1996	700	600	0.90	129	0.54
		1996	700	450	0.90	69	0.69
North West Shelf to Southern and Eastern Australia	North West to Moomba	2018	2,600	1400 (12 compressers)	0.90	1260	1.14
		2018	2,600	1300 (11 compressers)	0.90	1000	1.22
		2018	2,600	1200 (14 compressers)	0.90	880	1.29

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Source: Australian Gas Association, *Gas Supply and Demand Study*, third report to participants, Canaberra, July 1992, pp. 41, 52, 57 and 60.

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Exhibit 9:
Market Shares of Largest and Largest Four Gas Producers
Under Various Scenarios

State Supplying basins and scenario	Magellan acquired?	Share of largest firm Post merger	 Change from no merger	Share of largest four Post merger	 Change from no merger
South Australia					
Actual (Cooper)	No	73%	+16%	98%	+1%
Cooper plus Amadeus through Adeliade	Yes	77%	+24%	98%	+2%
Cooper plus Amadeus through Moomba	Yes	72%	+16%	98%	+1%
Cooper plus Amadeus through Moomba	No	66%	+13%	96%	+3%
Cooper plus Amadeus through Adelaide and Otay	Yes	53%	+16%	96%	+4%
New South Wales					
Actual (Cooper)		73%	+16%	98%	+1%
Cooper plus Gippsland		28%	+6%	98%	+6%
Cooper plus Amadeus through Moomba		72%	+16%	98%	+1%
Cooper plus Gippsland and Amadeus through Moomba		33%	+7%	97%	+7%
Queensland (Brisbane)					
Actual (Surat)		27%	+0%	85%	+8%
Surat plus Cooper		79%	+15%	96%	+2%
Northern Territory					
Actual (Amadeus)	No	44%	+1%	100%	+1%
Amadeus	Yes	92%	+48%	100%	+0%
Amadeus plus Bonaparte	Yes	65%	+11%	94%	+7%

Note: Estimates based on uncommitted reserves in the year 2005.

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Exhibit 10:

Herfindhal Index (HHI) for Gas Producers Under Various Scenarios

State Supplying basins and scenario	Magellan acquired?	Pre merger HHI	Change in HHI	Post merger HHI
South Australia				
Actual (Cooper)	No	3943	1831	5775
Cooper plus Amadeus through Adeliade	Yes	3705	2516	6221
Cooper plus Amadeus through Moomba	Yes	3883	1805	5688
Cooper plus Amadeus through Moomba	No	3430	1363	4793
Cooper plus Amadeus through Adelaide and Otay	Yes	2553	1176	3730
New South Wales				
Actual (Cooper)		3943	1831	5775
Cooper plus Gippsland		2456	279	2738
Cooper plus Amadeus through Moomba		3883	1805	5688
Cooper plus Gippsland and Amadeus through Moomba		2292	371	2663
Queensland (Brisbane)				
Actual (Surat)		2070	0	2070
Surat plus Cooper		3667	1667	5334
Northern Territory				
Actual (Amadeus)	No	4170	85	4255
Amadeus	Yes	4264	4179	8443
Amadeus plus Bonaparte	No	3368	1215	4583

Note: Estimates based on uncommitted reserves in the year 2005.

Exhibit 11:

Electricity Trust of South Australia (ETSA) Production by Fuel Type

	1990	1991	1992
Gas	52%	36%	45%
Coal	41%	39%	40%
Purchased electricity	6%	24%	14%
Total production	9,474	9,444	9,489

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Exhibit 12:

Correlation Among Gas Prices for Various Classes of Customers, 1974-1991

	South Australia	New South Wales	Queensland
Industrial v. commercial	0.35	0.54	0.66
Commercial v. domestic	0.27	0.89	0.84
Domestic v. industrial	0.45	0.53	0.66

Note: Correlation is the first difference of the logarithm of price

Exhibit 13:

Correlation Among Gas Prices and Prices of Other Fuels, 1974-1991

	South Australia	New South Wales	Queensland
Industrial gas v.			
Heavy fuel oil	0.22	0.41	
Industrial diesel oil	0.48	0.20	
Coal	0.09	0.55	
Industrial electricity	0.68	0.40	
Commercial gas v.			
Commercial electricity	0.27	0.22	0.73
Domestic gas v.			
Domestic electricity	0.57	0.27	0.59
Gas for electricity generation			
	n.a.	n.a.	n.a.

Note: Correlation is the first difference of the logarithm of price

Exhibit 14:

Correlation Among Wholesale Gas Prices and Prices of Other Fuels, 1974-1991

	South Australia	New South Wales
Wholesale gas v.		
Heavy fuel oil	0.28	0.23
Industrial diesel oil	0.34	0.12
Coal	0.61	0.10
Industrial electricity	0.58	0.10

Note: Correlation is the first difference of the logarithm of price

Exhibit 15:

Estimates of the Price Elasticity of Demand for Natural Gas in Australia

	Short run	Long run
Industrial	-0.37	-0.82
Residential	-0.27	-0.79
Commercial	-0.37	-0.82

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