GOLDFIELDS GAS PIPELINE

ACCESS ARRANGEMENT INFORMATION

Submitted to the
Independent Gas Pipelines Access Regulator
Western Australia

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GOLDFIELDS GAS PIPELINE
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1 INTRODUCTION

1.1 Purpose of Document

This Access Arrangement Information document, prepared by Goldfields Gas Transmission Pty. Ltd. ACN 004 273 241 of 35 Ventnor Avenue, West Perth, Western Australia (GGT) for the Goldfields Gas Pipeline, has been written to satisfy the requirements of the Gas Pipelines Access (Western Australia) Act 1998 (the Act) which incorporates the National Third Party Access Code for Natural Gas Pipeline Systems (the Code) which in turn requires the provision of information pertinent to the Access Arrangement for the Goldfields Gas Pipeline.

GGT is the Service Provider for the purposes of this Access Arrangement.

1.2 Confidential Information

This Access Arrangement presents some information in aggregated form. This has been done out of necessity to observe contractual confidences, and protect the legitimate business interests of existing Users, prospective new Users, and GGT. Such aggregated presentation is identified and permitted under section 2.8 of the Code.

1.3 Nomenclature

This Access Arrangement Information document makes use of terminology used in the Goldfields Gas Pipeline Access Arrangement and in the Code. In particular, meanings from a number of definitions from documents comprising this Access Arrangement and section 10.8 of the Code are assumed.

2 COMPLIANCE WITH CODE

The intent of this Access Arrangement Information document is to provide information which permits understanding of the Access Arrangement for the Goldfields Gas Pipeline.

Section 2.5 of the Code states that an Access Arrangement

> ... must include at least the elements described in sections 3.1 to 3.20 ...

of the Code.

Section 2.6 of the Code requires that the Access Arrangement Information must provide information to Users and Prospective Users of the Goldfields Gas Pipeline so that they can

> ... understand the derivation of the elements in the proposed Access Arrangement ...

and are able to

> ... form an opinion as to the compliance of the Access Arrangement with the provisions of the Code.

Appendix A addresses the issue of compliance of the Access Arrangement with the requirements of the Code. Table 1 provides a cross reference between the requirements of sections 3.1 to 3.20 of the Code inclusive, and the Goldfields Gas Pipeline Access Arrangement. A cross reference linking the contents of this Access Arrangement Information document and the information disclosure requirements listed in Attachment A of the Code appears in Table 2.

3 OVERVIEW: GOLDFIELDS GAS PIPELINE

3.1 Overview of Tariffs

Prior to presenting a brief history of the Goldfields Gas Pipeline and identifying and discussing the factors which make it unique amongst pipelines in Australia, it is instructive to first present an overview of the past, present, and potential future tariffs.

3.1.1 Historical Tariffs

The Goldfields Gas Pipeline was developed as a result of the Goldfields Gas Transmission Joint Venture (GGTJV) being selected by the State Government on a competitive basis to progress the project and subsequently conclude a State Agreement.

A benchmark tariff was developed for the Goldfields Gas Pipeline before it was constructed. This tariff is presented below for reference purposes.

Goldfields Gas Pipeline: Initial Benchmark Tariff (16 to 20 years)

Toll component	$ 0.243512 / GJ
Reservation component	$ 0.001685 / (GJ * km)
Throughput component	$ 0.000634 / (GJ * km)

where tariffs were indexed with CPI, and the reference CPI was 120.2

To encourage early third party use of the pipeline, an 'open season' which provided for a 7.5 percent discount for five years to foundation third party pipeline users, was conducted. No third party users took advantage of the offer.

In March 1998, GGT voluntarily reduced the benchmark tariff to approximately 85 percent of its original value.

In early 1999, GGT voluntarily reduced the benchmark tariff to approximately 75 percent of its original value in two steps. The first step, effective on 1 July 1999, reduced the benchmark tariff to approximately 80 percent of its original value. The second step becomes effective at the end of 1999.

3.1.2 Tariffs Today

On 1 January 2000, the benchmark tariff is scheduled to reduce to approximately 75 percent of its original value. This means that third party tariffs have reduced by fully one quarter in the space of three years.

The January 2000 tariffs are shown below for purposes of comparison.

Goldfields Gas Pipeline: Benchmark Tariff (16 to 20 years) as at 1 January 2000

Toll component	$ 0.224494 / GJ
Reservation component	$ 0.001297 / (GJ * km)
Throughput component	$ 0.000412 / (GJ * km)

where tariffs are indexed with CPI, and the reference CPI is 120.2

The reduction of third party transport tariffs for the Goldfields Gas Pipeline over its short life has been substantial. This action indicates that GGT is dedicated to promoting the use of the Goldfields Gas Pipeline.

GGT offered an Economic Development Tariff which was available to be taken up during September and October 1999, and was applicable to new loads in the East Pilbara and Goldfields regions. This tariff was offered to encourage third party load growth for the Goldfields Gas Pipeline, and is discussed further below.

3.1.3 Economic Development Tariff

In September 1999, GGT announced the offer of an Economic Development Tariff (EDT). The EDT was intended to further promote third party use of the Goldfields Gas Pipeline by offering tariffs lower than those scheduled for introduction on 1 January 2000.

The EDT offer closed on 31 October 1999, prior to the submission of this Access Arrangement.

The EDT was available on a non discriminatory basis to new resource development projects. Such projects may have been 'greenfields' in nature, expansions of existing operations, or fuel conversions. Subject to receiving sufficient commitment of new loads, GGT was to expand pipeline capacity and provide relevant and applicable transport services to the new projects. In order for a project to pre-qualify

for services under the EDT umbrella, that project was to be scheduled for commissioning no later than December 2003.

The nature and conditions of the services provided under the EDT and the dollar values of the Economic Development Tariff components were intended to be fully negotiable, but with the understanding that the EDT would reduce gas transport costs. Such reduction would result from throughput increases facilitated by the installation of additional pipeline compression.

The process for establishing a specific service under the EDT regime was to be iterative, with pre-qualified proponents of new projects submitting to GGT expressions of interest by the closing date. GGT was then to collate the requests received and determine the nature of the pipeline capacity expansion required to meet those requests. A specific tariff proposal for each customer was then to be developed and offered on a consistent and non-discriminatory basis.

Transport contracts offered under the EDT regime were to be Negotiated Services in the context of the Goldfields Gas Pipeline Access Arrangement, and not Reference Services. Both the terms and conditions and tariffs for EDT services were to be established through negotiations between the potential third party pipeline user and GGT, so that each potential user would receive a service tailored and optimised to its needs.

New loads which commenced under the EDT offer were to be included in the pipeline throughput assumptions made for the determination of the Reference Service tariff for the Access Arrangement period commencing in 2005.

During September and October 1999, GGT received a number of enquiries regarding the EDT. However, no firm commitments to future gas transport arose from the Economic Development Tariff offer. This lack of commitment indicates that gas transport markets in the East Pilbara and Goldfields are comparatively price inelastic, and that there is little prospect for load growth during the Access Arrangement period.

3.1.4 Reference Service Tariff

This Access Arrangement defines a Reference Service and associated tariff for the Goldfields Gas Pipeline. This service is intended to be a 'standard' service which may be utilised by any third party without negotiation, subject to the availability of pipeline capacity.

The Reference Service tariff proposed in this Access Arrangement is equal to the tariff currently scheduled for introduction on 1 January 2000.

Posted Tariff: Applicable 1 January 2000

and

Proposed Reference Service Tariff

Tariff	Toll $/GJ	Capacity Reservation $/GJ km	Throughput $/GJ km
1 - 5 Year Contract	0.269392	0.001556	0.000494
6 - 10 Year Contract	0.246943	0.001427	0.000453
11 -15 Year Contract	0.235718	0.001362	0.000433
16 - 20 Year Contract	0.224494	0.001297	0.000412

where tariffs are indexed with CPI, and the reference CPI is 120.2

The methodology used to determine this tariff is described in detail in subsequent sections of this document.

The Reference Service is offered as a requirement under the Code. The choice between utilisation of the Reference Service or the development, in concert with GGT, of Negotiated Services to suit specific requirements rests with third party pipeline users.

3.2 Historical Overview

During 1992, a number of companies independently undertook studies investigating the feasibility of constructing a natural gas pipeline to supply the Goldfields region of Western Australia. They did this with the objective of providing a cheaper source of energy to mining operations in the region. Electrical power had been supplied to the Kalgoorlie and Kambalda areas by the State Energy Commission of Western Australia ("SECWA", now Western Power Corporation), while remote sites such as Mount Keith and Leinster were supplied by local, company owned, diesel power stations. A number of pipeline options were considered, including links from the Dampier to Bunbury Natural Gas Pipeline (DBNGP), to supply gas from fields in the Carnarvon Basin to mining and related operations in the Goldfields.

In April 1993, the Western Australian State Government separately called for expressions of interest for the construction of a natural gas pipeline from the Pilbara to the Goldfields.

WMC, Normandy and BHP formed a Joint Venture (the GGTJV) to pursue the project. Given the spread of each Joint Venturer's interests along the pipeline route, the percentage interests in the GGTJV were determined on the basis of volume of gas to be transported and distance to be covered.

The final composition of the Joint Venture, based on load forecasts of the time, was:

WMC	62.664 percent
Normandy	25.493 percent
BHP	11.843 percent

The Western Australian State Government received expressions of interest from a number of parties regarding the development of the new pipeline. Following a competitive selection process which took into account factors including proposed tariff arrangements and tariff levels, the GGTJV was selected as the preferred proponent of the new pipeline. The State Government and the GGTJV Participants subsequently negotiated the Goldfields Gas Pipeline Agreement (the State Agreement), which was signed in March 1994.

Goldfields Gas Transmission Pty. Ltd. was appointed to act as pipeline manager on behalf of the Joint Venture in May 1993. A tender for the provision of pipeline operations and maintenance services was called and a contract subsequently awarded to AGL Pipelines (WA) Pty. Ltd.

The State Agreement imposed a number of obligations on the GGTJV, including:

- field and office studies related to pipeline construction and operations,
- the gaining of pipeline route approval,
- development of third party access arrangements and tariffs in compliance with agreed principles,
- active encouragement of third party transport customers,

The GGTJV was granted a pipeline licence (WA: PL 24) on 27 January 1995 to design, construct, and operate a pipeline of approximately 1380 kilometres in length to transport natural gas from DBNGP Compressor Station One at Yarraloola to Kalgoorlie, via the East Pilbara and North East Goldfields regions of Western Australia.

Construction progressed rapidly, with particular attention being paid to the minimisation of impact on the environment during construction and the environmental restoration of the pipeline route following construction.

Commissioning of the pipeline was done progressively, from north to south. Gas was first delivered to Newman in June 1996, Mount Keith and Leinster in August 1996, and Kalgoorlie and Kambalda in September 1996. The pipeline was officially opened by the Premier, the Hon. Richard Court, on 4 October 1996.

In 1994, GGT offered an 'open season' for foundation third party pipeline users. This open season provided for a discount of 7.5 percent on transport tariffs for a period of five years.

At that time, no third party took advantage of this initial incentive to use the Goldfields Gas Pipeline.

In 1997, four third party users took capacity on the Goldfields Gas Pipeline. These were Plutonic Operations (at Plutonic), Wiluna Gold (at Wiluna), AWI for Great Central Mines (at Jundee), and AlintaGas (for the distribution system in Kalgoorlie). These were followed in 1998 by Anaconda Operations (at Murrin Murrin), and AWI for Centaur Mining (at Cawse).

These third party loads, combined with the GGTJV loads, lifted the utilisation of Goldfields Gas Pipeline capacity to its present (fully committed) level.

In March 1998, tariffs on the Goldfields Gas Pipeline were voluntarily reduced to approximately 85 percent of their original value. In July 1999, a further voluntary tariff reduction saw tariffs fall to approximately 80 percent of their original value. In January 2000, tariffs are scheduled to voluntarily fall again to approximately 75 percent of their original value.

In December 1998, WMC completed the sale of its share in the Goldfields Gas Pipeline to Southern Cross Pipelines Australia Pty. Ltd. In January 1999, Pilbara Energy (i.e. BHP) sold its interest in the Goldfields Gas Pipeline to Duke Energy International. In March 1999, Normandy Pipelines sold its interest in the Goldfields Gas Pipeline to Southern Cross Pipelines (NPL) Pty. Ltd. Ownership of the Southern Cross companies comprises CMS (45 percent), AGL (45 percent), and TransAlta (10 percent).

GGT Pty. Ltd. remains as pipeline manager under the new ownership. CMS is the commercial services provider to GGT, and AGL remains as pipeline operator. These services are provided on a commercial basis under formal contracts.

3.3 What Makes the Goldfields Gas Pipeline Significantly Different?

The Goldfields Gas Pipeline stands apart from other natural gas transmission pipelines in Australia. The reasons for this are presented below.

3.3.1 Regulatory Environment

The Goldfields Gas Pipeline was constructed and is operated under the terms and conditions of the Goldfields Gas Pipeline Agreement Act 1994 (the State Agreement). The State Agreement is administered by the Department of Resources Development (Western Australia).

Past and present Goldfields Gas Pipeline tariffs have been determined and have received government approval in accordance with the tariff setting principles in the State Agreement.

Under the State Agreement the GGTJV was required to construct a pipeline which was larger in size and hence greater in cost than what was required to satisfy the needs of the individual Participant companies. This meant that the GGTJV faced from the outset the commercial risk associated with the uncertainty surrounding the development of a third party gas transport market. Further, the GGTJV determined initial and subsequent third party tariffs on a 'levelised' basis in order to yield tariffs which remained constant in real (i.e. inflation adjusted) terms. This methodology reduced tariff levels in the early years of the project, and hence promoted the use of the pipeline. This tariff reduction in the early years of the project resulted in capital recovery being displaced to later years of the project. This deferment of capital recovery imposes further risk upon the GGTJV.

The State Agreement recognises the "legitimate business interests" of the pipeline owners. Such recognition is appropriate given that the State Government did not underwrite the project in any way.

The State Government's objectives for regional development in the East Pilbara and Goldfields regions would not have been realised without the GGTJV base load and the commitment of capital by the GGTJV to the construction of the pipeline.

The Goldfields Gas Pipeline is a 'covered pipeline' under Gas Pipelines Access (WA) Act 1998 (the Act)

The State Agreement foresaw the introduction of "uniform laws" (i.e. the Act) covering third party access to natural gas pipelines. Complementary recognition of the State Agreement appears in the Act. Under the State Agreement, the Act does not apply to the foundation load. However, as described below, GGT has taken a conservative approach regarding tariff determination for the purposes of this Access

Arrangement and has included all pipeline throughput in the tariff setting calculations.

The Goldfields Gas Pipeline has operated under a commercial regulatory environment for all its life. This sets it apart from other Australian pipelines.

3.3.2 Development Resulting from Competitive Processes

The Goldfields Gas Pipeline as it exists today is a product of commercial and competitive forces and processes. The development of the initial benchmark tariff for the Goldfields Gas Pipeline followed a process which functionally complied with the requirements of the Code regarding tariff setting through competitive tender.

In 1993, the GGTJV was one of several proponents seeking to progress the development of the Goldfields Gas Pipeline.

The State Government used a competitive process to select the GGTJV ahead of other project proponents. Selection was based on reasoned and comprehensive criteria which included assessment of third party tariffs.

At the time the State Government was considering the competing project proposals, the Code had not been written. However, the selection process followed by the Government embodied the spirit and intent of the requirements of section 3 of the Code regarding determination of tariffs for Reference Services through a competitive tender process. Recognition of Code requirements was possible because of the concurrent involvement of senior government officials in the development of the Code. Thus, the initial tariffs for the pipeline may be considered to have been developed through a competitive tender process which closely paralleled that specified in the Code.

Queensland followed a similar path. That state has given recognition to pipeline tariffs developed under conditions of competitive tender which have proceeded in parallel with the Code (for the same reasons as above), and has derogated coverage of the relevant pipelines.

It is therefore appropriate to consider current Goldfields Gas Pipeline tariffs in the same vein, and view the tariff determination process at hand as a cross check on tariffs which already comply with the spirit and intent of the Code.

3.3.3 Explicit Recognition of Third Party Access

Access to the Goldfields Gas Pipeline by third parties was explicitly recognised at the time the GGTJV and the State Government negotiated the State Agreement. The concepts that the GGTJV actively seek third party users and that pipeline capacity be set at time of design to accommodate the needs of third party users are fundamental to the State Agreement.

The initial development of tariffs for the Goldfields Gas Pipeline was done under clearly defined and prescriptive tariff setting principles agreed under the State Agreement which specifically promote third party access and protect the interests of third party users. The process by which initial tariffs were developed was overseen by the Department of Resources Development, which approved the tariffs finally promulgated.

Subsequent tariffs (including those which apply at the time of initial submission of this Access Arrangement) have also been developed under the tariff setting principles set down in the State Agreement.

Thus, the ability of third parties to access to the Goldfields Gas Pipeline has been present from the time of the pipeline's inception.

3.3.4 History of Tariff Reduction

The Goldfields Gas Pipeline has a history of substantial tariff reduction over its short life.

The benchmark tariff was reduced voluntarily to 85 percent of its original value in March 1998.

In July 1999, the same tariff was reduced voluntarily to 80 percent of its original value.

On 1 January 2000, the benchmark tariff is voluntarily scheduled to reduce to 75 percent of its original value.

It is therefore apparent that the Goldfields Gas Pipeline has, in its short life, delivered substantial cost savings to its users, and that GGT has aggressively promoted the use of the pipeline.

3.3.5 Direct Fuel On Fuel Competition

The original driver which lead the GGTJV Participants to consider the construction of the Goldfields Gas Pipeline was the economic advantage derived from displacing diesel with gas as the primary fuel used for electric power generation.

At the time of writing, over 90 percent of all gas transported by the Goldfields Gas Pipeline is ultimately used as fuel for gas turbines which provide motive power for electricity generation.

Gas turbines readily consume diesel as an alternate fuel to natural gas. For many machines, transferring fuel supply from gas to diesel is accomplished by the operation of a single switch on the turbine's control panel. For those machines originally configured to operate only on natural gas, conversion to dual fuel capability is both simple and relatively inexpensive. Further, burners at the Kalgoorlie smelter (which consume some of the minority portion of the gas transported by the Goldfields Gas Pipeline which is not consumed in gas turbines) are equipped for dual fuel operation.

Inevitably, the Goldfields Gas Pipeline faces ongoing direct competition from the fuel it displaced.

3.3.6 Competition From Other Pipelines

The recent construction of the Mid West Pipeline has provided a potential alternate gas supply to areas west of Leinster. These areas could formerly have been regarded as comprising part of the 'catchment area' of the Goldfields Gas Pipeline.

A report of a potential new pipeline from Geraldton to Mount Margaret appeared on page 59 of 'The West Australian' newspaper of Saturday 3 July 1999. This report presents the potential new pipeline as a direct competitor to the Goldfields Gas Pipeline.

A pipeline connecting a supply of gas (i.e. the Dampier to Bunbury Natural Gas Pipeline at Geraldton) with a region serviced by the downstream end of the Goldfields Gas Pipeline (i.e. the environs of Mount Margaret) would, if constructed, constitute a second and more formidable direct competitor to the Goldfields Gas Pipeline.

While the actual construction of a potential new pipeline from Geraldton to the Goldfields is not yet certain, the news report nevertheless indicates that such a pipeline is a distinct possibility.

It is therefore evident that part of the gas transport market in which the Goldfields Gas Pipeline operates is characterised by pipeline on pipeline competition.

This fact of current and potential future competition is fundamental to consideration of the market structure faced by the Goldfields Gas Pipeline. It cannot be considered as an absolute monopoly.

If a Geraldton to Goldfields pipeline were to eventuate, the Goldfields Gas Pipeline would be unique amongst transmission pipelines in Australia in that it would face two direct competitors for the provision of gas transport services.

Consequently, the application of considerations which apply to monopolies should be tempered to recognise the present real and potential future competition which the Goldfields Gas Pipeline faces.

3.3.7 Dependence on the Mining Industry

The Goldfields Gas Pipeline delivers gas to 11 industrial end user locations and the Kalgoorlie domestic gas distribution system. Of the industrial user locations, all 11 are mine sites or mineral processing plants. Consumption by mining related activity accounts for over 99 percent of the gas transported by the Goldfields Gas Pipeline.

Thus, it is apparent that the Goldfields Gas Pipeline, as the supplier of one of the input factors of production to mining related activity, is almost solely dependent on that mining activity for its continued viability.

It has been widely reported that proposed changes to taxation law regarding depreciation will adversely impact the mining industry. These taxation changes are likely to have an adverse effect on the economics of new extractive primary industry developments in the Pilbara and Goldfields, and the Carnarvon Basin. Given this, growth prospects for the Goldfields Gas Pipeline are gloomy, and current transport markets are likely to shrink as transport contracts expire. This is in direct contrast to gas transport markets elsewhere in the country.

Because of the nature of the gas demand it supplies, the Goldfields Gas Pipeline faces commercial risks which are substantially greater than those faced by pipelines supplying mature, diversified end user markets with substantially greater numbers of gas consumers.

This greater business risk means that precedents set in the application of Open Access regulation to other pipeline systems are not applicable to the Goldfields Gas Pipeline. It simply can not be considered in the terms which are applicable to transmission pipelines such as the DBNGP which supply major population centres. Further, comparison with distribution systems such as AlintaGas, which have mass

markets whose growth are essentially linked to population growth, is not only unwarranted but potentially misleading.

3.3.8 Competition in International Commodity Markets

The mining projects which almost exclusively constitute the Goldfields Gas Pipeline's load face competition in international commodity markets. The continued survival of mining operations in the Pilbara and particularly the Goldfields is dependent on both the mining industry structure in Australia and the cost structures of competing mines elsewhere in the world. Such cost structures are a function of many variables, including reserves, ore grade, and proximity to energy supplies.

Transmission pipelines such as the DBNGP which supply diversified markets in major population centres are to a large extent shielded from the influences of direct international competition in specific metals markets.

The Goldfields Gas Pipeline has no such protection. This fact further contributes to the its business risk being higher than most other Australian pipelines.

3.3.9 Lack of Long Term Transport Contracts

At present, one third of the Goldfields Gas Pipeline's transport contracts will expire within five years.

All current contractual commitment to the use of the Goldfields Gas pipeline ends in the year 2016.

This means that the second half of the pipeline's assigned economic life is currently uncontracted.

Despite the offer of the Economic Development Tariff, GGT has yet to secure any firm commitment to new transport loads.

Thus, it is clear that the business future for the Goldfields Gas Pipeline is uncertain.

Lack of long term (i.e. 20 year plus) contracts combined with the volatility of the mining industry means that the business risk faced by the Goldfields Gas Pipeline is far greater than that faced by other transmission pipelines in Australia.

In assuming a pipeline life expectancy of 40 years for the purposes of determining the Reference Service tariff (discussed further below), GGT is assuming significant risk. If current transport contracts are not extended or new transport opportunities

do not arise, GGT is in danger of not recovering its initial investment, let alone receive a return. The lack of firm interest in the Economic Development Tariff indicates that there is a low probability of future load growth in the near term.

It is therefore clear that the long term survival of the Goldfields Gas Pipeline is critically dependent on sustaining gas transport business after current contracts expire, and that the risk of failure to secure such new contracts places the pipeline in a different business risk category to the majority of other transmission pipelines in Australia. Thus, the risk premium assigned to 'safe' pipelines such as Longford to Dandenong and Dampier to Bunbury is simply inappropriate for the Goldfields Gas Pipeline.

3.4 Impact of Significant Differences

3.4.1 Overview

The circumstances which apply to the Goldfields Gas Pipeline are unique to any gas transmission pipeline in Australia. In summary, the combination of:

1) demand risk,
2) limited life,
3) existing and potential future direct competition,
4) a history of substantial tariff reduction, and
5) development under competitive conditions

yields an operating environment for the Goldfields Gas Pipeline which differs substantially and materially from any other in the country.

These points are discussed below.

3.4.2 Demand Risk

Natural gas pipelines connect producers of natural gas to consumers of natural gas. Thus, the continued operation of such pipelines is dependent on supplies of gas being available, and the existence of demand for that gas.

Western Australia is blessed with over three quarters of the nation's known gas reserves. A large proportion of these reserves are located in the Carnarvon Basin, which encompasses the north west shelf region.

Overall gas demand in Western Australia is projected to grow in the future. This growth is projected on the basis of population growth and the establishment of new industry.

However, the specific circumstances surrounding gas pipelines (and distribution systems) in Western Australia vary widely.

The Goldfields Gas Pipeline receives its gas supply from fields in the north west shelf region. Thus, in general terms, its supply risk is low. However, over 99 percent of demand for gas transported by the Goldfields Gas Pipeline is by mining or mining related activities.

These mining activities are confined to extraction of iron, gold and nickel. Thus, there is little diversity in the markets served.

Metals prices are known for their instability. This is because metals in their basic form are fungible commodities. This results in price competition (as distinct from competition on other bases such as product differentiation and concentration on niche markets) defining the operation of the markets for metals. Therefore, the mining activities supplied by the Goldfields Gas Pipeline, and hence the pipeline itself, face markets which are uncompromising in selecting the low cost producers. In particular, the nickel mines served by the Goldfields Gas Pipeline compete on the basis of ore type and extraction technology. The newer lateritic ore mining operations such as Murrin Murrin and Cawse have the potential to establish themselves as low cost producers. If this eventuates, these laterite mines and similar operations elsewhere in the world may displace older, higher cost mines operating in the Goldfields and currently supplied by the Goldfields Gas Pipeline. Such economic 'natural selection' would have dire consequences for the Goldfields Gas Pipeline.

Mining constitutes the exploitation of non-renewable resources. Thus, the demand for gas for mining operations declines with the depletion of the reserves being mined.

Industrial and technological developments will inevitably change business as we know it today. Thus, the future demand for metals mined in the Pilbara and Goldfields regions is uncertain. For example, a collapse of the gold industry would have a direct and serious negative impact on the viability of the Goldfields Gas Pipeline, as would a continuation or further downturn of the nickel industry.

In summary, depletion of mineral reserves and fluctuations in levels of mining activity mean that the life of the Goldfields Gas Pipeline is limited, and that demand during this short life is uncertain.

Thus, it may be seen that the Goldfields Gas Pipeline faces substantial demand risk. This places the Goldfields Gas Pipeline in a situation which is different from most other gas transmission pipelines and all distribution systems in Australia.

3.4.3 Limited Life

The physical life of well maintained high pressure natural gas transmission pipelines may be as long as 70 years.

However, the economic life of such assets is dictated by supply and demand conditions.

The Goldfields Gas Pipeline does not hold any contracts whose remaining life are in excess of 20 years. Further, it is unlikely that GGT will, in the near future, secure any gas transport contracts which will be of extended duration. The general uncertainty surrounding metals prices combined with the negative impact which will flow from changes to taxation rules regarding asset depreciation means that miners are likely to confine investment decisions to shorter rather than longer time horizons.

Further, it is problematical that the Goldfields Gas Pipeline will secure any significant new loads in the more distant future. The depressed state of the mining industry, competition between miners, and competition from other pipelines is likely to result in the Goldfields Gas Pipeline being restricted to its current contracts.

This is in direct contrast to pipelines such as the Dampier to Perth Natural Gas Pipeline, which will, in all probability, secure new transport contracts in the future to service its growing end user market.

3.4.4 Direct Competitors

The Goldfields Gas Pipeline faces direct fuel on fuel competition from the diesel it displaced. Unlike consumers which take their gas supply from distribution systems, fuel switching costs for the miners supplied by the Goldfields Gas Pipeline are either zero or extremely low.

The Goldfields Gas Pipeline also faces both actual and potential competition from other pipelines.

Thus, it is evident that the competitive environment in which the Goldfields Gas Pipeline operates is unique in Australia. It currently competes with one pipeline for a part of its 'catchment area', and faces the very real possibility of a more significant

bypass from a second pipeline. In a realistic future scenario, the Goldfields Gas Pipeline could face more direct competitors than any other pipeline in the country.

3.4.5 Tariffs and Tariff Reduction

The Goldfields Gas Pipeline was developed specifically as an open access pipeline from its inception.

Third party tariffs were set before the pipeline was constructed. This meant that the GGTJV bore, and continues to bear, all facets of the pipeline's (unusually high) commercial risk. The State Government catered for the assumption of this risk by the GGTJV by explicitly recognising in the State Agreement the "interests of the Joint Venturers". Part of this recognition took the form of an agreed project rate of return which exceeded that proposed for the purposes of determination of the Reference Service tariff.

It is well accepted that risk and return are positively correlated. Thus, given the high risks associated with the Goldfields Gas Pipeline, it is reasonable to expect that tariffs should remain at the levels set at the commencement of the project so that returns commensurate with the risk faced could be realised.

However, GGT has voluntarily reduced tariffs by approximately 25 percent in three years. Such reduction constitutes powerful promotion of the pipeline to third parties.

This reduction indicates that the owners of the Goldfields Gas Pipeline have accepted lower third party transport revenues for a pipeline whose risks have remained essentially unchanged.

The impact of continued fuel on fuel competition, the threat of pipeline on pipeline competition, and the concerted efforts of the GGTJV to increase pipeline throughput have, in concert, lead to tariff substantial reductions over a short space of time.

Thus, the 'conventional wisdom' regarding Open Access tariffs which has been applied to other pipelines and distribution systems in Australia simply does not apply. The desire to see prices reduce as a consequence of the application of conditions of synthetic competition has been realised through the operation of actual, and not artificially manufactured, market forces.

3.4.6 Competitive Development

The Goldfields Gas Pipeline is not, and has never been, a government owned asset. It was developed solely by the private sector using solely private sector capital. At

time of construction, addition pipeline capacity, installed at additional cost, was accommodated at government behest to meet a potential future market which was not underwritten in any way. These factors differentiate the Goldfields Gas Pipeline from the majority of gas infrastructure in Australia.

The Goldfields Gas Pipeline was developed through a competitive tender process conducted by the State Government. This process embodied the spirit and intent of the Code's provision for the development of pipeline tariffs through competitive tender.

Current tariffs are substantially less than those originally developed and accepted.

The GGTJV assumed, and continues to assume, all of the risk associated with the construction and operation of the pipeline. As identified above, this risk is substantially greater than that facing the vast majority of gas transmission pipelines in Australia.

Therefore, the current tariff determination process should be viewed as a cross check on a tariff which is currently accepted as being appropriate.

4 CAPITAL COSTS

Goldfields Gas Transmission Pty. Ltd. is a sole purpose company with responsibility for the operation of the Goldfields Gas Pipeline (WA: PL 24). The costs identified below relate solely to that asset.

4.1 Asset Base

4.1.1 Code Requirements

The Code intends (section 8 Introduction) that tariffs for Reference Services should be designed to provide the Service Provider with:

> ... the opportunity to earn a stream of revenue that recovers the costs of delivering the Reference Service over the expected life of the assets used in delivering that Service, to replicate the outcome of a competitive market, and to be efficient in level and structure.

The Code states (section 8.4) that capital costs should be included in the determination of Total Revenue. Section 8.10 of the Code provides a list of methodologies and factors to be considered when establishing the Initial Capital Base for existing pipelines. These include:

- depreciated actual cost,
- depreciated optimised replacement cost,
- other well recognised asset valuation methodologies,
- the economically efficient utilisation of gas resources,
- comparison with cost structures of competing pipelines,
- asset purchase prices.

Section 8.11 of the Code states that the Initial Capital Base:

> ... normally should not fall outside the range of values determined for [Depreciated Actual Cost] and [Depreciated Optimised Replacement Cost].

4.1.2 Asset Valuation Methodology

It is a matter of public record that the Goldfields Gas Pipeline was constructed for approximately $ 456 million in money of the day during construction.

It is also a matter of public record that WMC Resources recently sold its share in the Goldfields Gas Pipeline for approximately $ 402 million.

It is a matter of further public record that Normandy Pipelines recently sold its share in the Goldfields Gas Pipeline for approximately $ 147 million.

Pilbara Energy (i.e. BHP) has also recently sold its share in the Goldfields Gas Pipeline. However, this asset was bundled with other assets offered for sale at the same time. Therefore, a discrete value for the Pilbara Energy share of the Goldfields Gas Pipeline is not readily available to GGT.

On the basis that the sale price of the Pilbara Energy share of the Goldfields Gas Pipeline was proportionately comparable to the prices of the WMC Resources and Normandy Pipelines shares, the recent (1999) sale price of the Goldfields Gas Pipeline was of the order of $ 624 million.

Therefore, the 'original cost' of the Goldfields Gas Pipeline could be viewed as being either approximately $ 456 million (i.e. the construction cost for the original owners) or approximately $ 624 million (i.e. the sale price to the current owners).

The Code is prescriptive regarding the value ascribed to the Initial Capital Base used for tariff determination. As identified above, the Code states (section 8.11) that the Initial Capital Base should "normally" fall within the range of Depreciated Actual Cost (DAC) and Depreciated Optimised Replacement Cost (DORC).

"Actual capital cost" faced by the owners of the Goldfields Gas Pipeline is the asset's 1999 purchase price.

Thus, it is appropriate to use a value of $ 624 million as one bound for the value of Initial Capital Base for the Goldfields Gas Pipeline, as this represents the DAC of the pipeline.

DORC represents the other bound for the value of Initial Capital Base.

DORC is widely perceived (by both Service Providers and Regulators) as being an appropriate asset valuation method for the purposes of determination of tariffs for Reference Services.

GGT has adopted a Depreciated Optimised Replacement Cost methodology as the basis for the determination of the Initial Capital Base for the Goldfields Gas Pipeline. As expanded in the discussion below, GGT identifies the actual historical cost of construction of the Goldfields Gas Pipeline (adjusted for foreign exchange rate variations and inflation) as providing the basis for the estimation of the Optimised Replacement Cost.

As identified below, the value for DORC for the Goldfields Gas Pipeline is significantly less than the value for DAC. Thus, the Initial Capital Base used for the determination of the Reference Service tariff is at the lower end of the range specified as being normally applicable in the Code. This assumption is consistent with the conservative overall approach taken in this Access Arrangement.

The components of the DORC methodology employed are presented below.

4.1.3 Goldfields Gas Pipeline Replacement Cost

4.1.3.1 Optimum Pipeline Size

The Goldfields Gas Pipeline Agreement Act 1994 states (clause 9(5), in part) that:

> Unless otherwise agreed by the Minister, the initial development of the Pipeline shall be such that its size is the greater of -
>
> (a) a diameter of 400 mm from the commencement of the Pipeline through to Newman thence 350 mm through to Kalgoorlie; and
>
> (b) such diameter or diameters as are required so that the initial operating capacity of the Pipeline is sufficient to provide for all Initial Committed Capacity

The pipeline was subsequently constructed to the sizes specified in sub clause (a).

The Goldfields Gas Pipeline is currently running at capacity.

Thus, it is apparent that the 'optimum' size for the purposes of DORC for the existing Goldfields Gas Pipeline is its present size, DN 400 mm (NPS 16 inch) for the section from Yarraloola to Newman, and DN 350 mm (NPS 14 inch) for the section Newman to Kalgoorlie, because the 'as built' sizes are the minimum prescribed under the State Agreement and provide capacity which just meets current load.

4.1.3.2 Optimum Pipeline Replacement Cost

It is a matter of public record that the Goldfields Gas Pipeline was constructed for approximately $ 456 million.

Reconciliation of the final construction cost will be completed in the financial year 1999/2000, as negotiations regarding compensation payments associated with the pipeline's construction were concluded in the second quarter 1999.

It is likely that final reconciliation will indicate that the total pipeline construction cost, in historical terms, is $ 456.6 million in dollars of the day.

There have been various efforts made over time to quantify 'typical' Australian pipeline construction costs. Pipeline unit construction costs (i.e. dollars per unit of diameter per unit of length) have been identified in various publications and presentations by Philip Venton (e.g. Venton 1996). Venton's figures have been widely quoted by the industry and in the industry literature, and may be regarded as constituting industry rules of thumb.

The length weighted average pipeline unit construction cost identified by Venton (1996) is approximately $ 25,800 per inch kilometre in 1995 Australian dollars.

The length weighted average unit construction cost for the Goldfields Gas Pipeline is approximately $22,400 per inch kilometre. This cost includes a significant sales tax burden which did not apply to many other pipelines.

It may therefore be seen that the actual unit construction cost of the Goldfields Gas Pipeline compares favourably, at 87 percent, with industry average. It also compares very favourably, at approximately 50 percent, with the unit construction cost of the Dampier to Bunbury Natural Gas Pipeline, the other long distance gas transmission pipeline in Western Australia. However, this latter comparison must be tempered by the consideration that the Dampier to Bunbury Natural Gas Pipeline is substantially greater in diameter than the Goldfields Gas Pipeline (DN 650 mm versus DN 400 mm and DN 350 mm) and incorporated more compressor stations at time of construction.

The Goldfields Gas Pipeline was constructed in accordance with industry best practice. In the short interval between construction of the Goldfields Gas Pipeline and the present day, there have been no technological or other breakthroughs which have significantly reduced pipeline construction costs. Therefore, it is reasonable to assume that historical construction cost, adjusted to account for foreign exchange rate variations, interest incurred during construction, and inflation, is a reasonable guide to current day construction cost.

In order that a current day estimate of pipeline construction cost may be derived from the historical construction cost, the three factors mentioned above are considered in turn.

The first adjustment factor identified above is variations in exchange rate. For the calendar year 1996, the US dollar to Australian dollar exchange rate averaged 0.7846. For the first 9 months of 1999, the same exchange rate averaged 0.6436.

On this basis, items purchased in US dollars in 1999 would cost approximately 22 percent more in Australian dollars in 1999 than in 1996 after foreign exchange variation is taken into account.

A small portion of the material and equipment purchased during the construction of the Goldfields Gas Pipeline was sourced from overseas. On the basis that the US dollar / Australian dollar exchange rate provides a reasonable proxy for exchange rate variations relevant to the construction of the pipeline, and that foreign exchange adjustment is applicable to approximately A$ 60 million of the historical construction cost, the historical cost requires an upward adjustment of approximately 13.0 million Australian dollars.

The second adjustment factor identified above is interest charges incurred during construction. Interest charges calculated at the prevailing Weighted Average Cost of Capital (see below) total approximately 26.7 million dollars.

The third adjustment factor to be considered is movements in the Australian Consumer Price Index. The 1996 June quarter index (all groups, 8 capital cities) is 119.8. The corresponding index for June 1999 is 122.3. Application of this movement in prices to the foreign exchange adjusted historical construction cost gives a present day construction cost for the Goldfields Gas Pipeline of 506.7 million dollars.

On the basis that the historical construction cost, adjusted for variations in the foreign exchange rate and Consumer Price Index, is a reasonable estimate of current construction cost, and that the optimum size of the pipeline is its present size, the Optimised Replacement Cost for the purposes of tariff determination for the Goldfields Gas Pipeline is 506.7 million dollars.

4.1.3.3 Other Capital Assets

Capital assets not included in the optimum pipeline replacement cost identified above include:

- emergency response equipment,
- office fit out and furniture,
- miscellaneous plant and equipment,
- offtake facilities

The total of these and related items of capital equipment is estimated at $ 3.8 million.

4.2 Asset Depreciation

The issue of asset depreciation for the Goldfields Gas Pipeline (or any other pipeline) is a complex one.

When considering depreciation, consideration must be given to the anticipated physical life and economic lives of the assets in question. In order that owners may recover the capital input to a project such as the Goldfields Gas Pipeline, it is necessary to match capital recovery with anticipated actual operational life, where operational life is the shorter of physical and economic life.

It is also appropriate to make simplifying assumptions regarding depreciation as it affects the determination of the Reference Service tariff. Such simplification is consistent with assumptions made by other gas transmission and distribution system operators in Australia in the determination of tariffs for their Reference Services.

Operational asset life and simplifying assumptions made for the purposes of determining the value of the Initial Capital Base are discussed below.

4.2.1 Asset Life

4.2.1.1 Physical Asset Life

A natural gas transmission pipeline system is comprised of a large number of individual components. Some of these have different lives. As an extreme example, the physical life of well maintained buried pipe may be 70 years, while the economic life of a personal computer may be less than 5 years.

Typical physical asset lives are:

ASSET TYPE	ASSET LIFE (Years)
Buried transmission pipeline and laterals	70
Compressor and meter station pipework	50
Compression and metering equipment	30
Other fixed plant and equipment	30
Vehicles and other mobile plant and equipment	10
SCADA and field communications equipment	10

4.2.1.2 Regulatory Life

The State Agreement provides for the granting of an initial pipeline licence of 21 years followed by one renewal, also for 21 years. Thus, the 'regulatory' horizon for the Goldfields Gas Pipeline envisaged under the State Agreement is 42 years from the time of project physical commencement (i.e. early 1995).

However, pipeline design and construction took just under two years. During this time, no revenue was derived from the transport of natural gas. Therefore, the maximum regulatory operating life of the Goldfields Gas Pipeline which is provided for under the State Agreement is 40 years (i.e. 1997 to 2036 inclusive).

4.2.1.3 Economic Life

The economic life of the pipeline is a function of the mining and related activities which underpin the transport services it provides. The transport contract currently in force with the longest certain term expires in 2016. Given the volatility of the mining industry, no certainty may be attached to contracts extending beyond that point.

Therefore, it is evident that the second half of the Goldfields Gas Pipeline's 'regulatory' operating life (i.e. the years spanning 2017 to 2036 inclusive) may not be considered to be part of the pipeline's foreseeable economic life.

Therefore, it is necessary to employ an asset depreciation methodology which recognises both the regulatory life of the Goldfields Gas Pipeline and the uncertainty associated with pipeline throughput in the latter half of the project's life.

In line with the conservative approach generally taken in the tariff determination process at hand, an economic life equal to the regulatory life of 40 years has been assumed for the Goldfields Gas Pipeline.

4.2.1.4 Asset Classification

It is not practical to determine the life of every item of plant and equipment on the Goldfields Gas Pipeline for the purposes of determining the Reference Service tariff. Therefore, it is necessary to aggregate asset types into a manageable number of classifications. In order to simplify depreciation calculations, it is appropriate to apply an average life to cover all assets. This assumption is inherently conservative, as many short lived assets are amortised over periods which far exceed their useful lives.

4.2.2 Depreciation Methodology

Depreciation may be applied using a variety of methods. In Australia, declining balance, straight line, and units of production approaches are common.

The declining balance method is attractive to Service Providers, because it allocates the majority of depreciation and hence capital recovery to the early years of the project. As such, the declining balance method could be applicable to a risky project such as the Goldfields Gas Pipeline which does not offer any certainty of capital recovery in the later years of the project. However, use of this method does not yield truly levelised tariffs.

Straight line depreciation is widely used. However, an implicit but critical assumption embodied in this method is that revenue, and hence the opportunity to recover capital, is evenly distributed over the life of the asset. In many cases, this assumption is reasonable. However, this assumption certainly does not apply to the Goldfields Gas Pipeline. If project risk is given due recognition, the considerable majority of revenue should be obtained during the life of existing transport contracts. Consequently, the depreciation methodology used should allow for the majority of capital recovery to be realised during this period. Thus, straight line depreciation is not the most applicable method for the Goldfields Gas Pipeline.

Units of production is an appropriate depreciation methodology for the Goldfields Gas Pipeline. This methodology matches the profile of capital recovery to the profile of revenue received. As such, it overcomes the difficulties associated with straight line depreciation, yet facilitates the objective of determining a levelised tariff.

Units of production depreciation has therefore been used for the purposes of tariff determination. The projected future pipeline throughput profile used for determining the units of production appears in Appendix C. This profile assumes that GGT will be successful in securing significant new loads beyond existing contracts.

4.3 Future Capital Expenditure

Future capital expenditure on the Goldfields Gas Pipeline is projected on the basis that there will be no expansion of pipeline capacity during the Access Arrangement period.

Minor capital expenditure is required during the life of any pipeline. This capital expenditure covers replacement of miscellaneous capital equipment and enhancements of peripheral and utility systems and equipment.

The Goldfields Gas Pipeline faces present real and potential future competition from other pipelines and suppliers of alternate fuels. Thus, the data presented is, of necessity, in aggregated form.

For the Goldfields Gas Pipeline, projected future capital expenditure for remedial and other work is as follows:

YEAR	2000	2001	2002	2003	2004
Future capital expenditure $ thousands	1454	1173	1200	1223	1247

4.4 Working Capital

Working capital for a natural gas transmission pipeline has two major components. First, financial reserves are required to fund the day to day operations of the pipeline. Second, an initial pipeline linepack inventory is required to fill the pipeline with natural gas at the commencement of operations.

For the Goldfields Gas Pipeline, summation of these components yields a working capital of $ 2.6 million.

4.5 Initial Capital Base

The value for the Optimised Replacement Cost for the Goldfields Gas Pipeline has been determined as the sum of:

- the optimised replacement cost of the main line,
- other capital assets,

- working capital.

On the basis of the discussion above, the value of the Optimised Replacement Cost for the Goldfields Gas Pipeline is $ 506.7 million.

The asset value used for determination of the tariff for the Reference Service is comprised in large part by the depreciated value of this Optimised Replacement Cost.

Applying units of production depreciation (using the actual and projected load profile shown in Appendix C) to the Optimised Replacement Cost of $ 506.7 million yields a Depreciated Optimised Replacement Cost of $ 446.6 million.

Applying units of production depreciation to the other capital assets, valued at $ 3.8 million yields a depreciated value of $ 3.4 million. It should be noted that this is a conservative assumption, as many of the individual capital items in this category have useful lives which are substantially shorter than that assumed.

This yields the Initial Capital Base for the Goldfields Gas Pipeline as follows:

Depreciated Optimised Replacement Cost ($ million)	446.6
Depreciated Other Capital ($ million)	3.4
Working Capital ($ million)	2.6
Initial Capital Base ($ million)	452.6

5 OPERATING, MAINTENANCE, MARKETING AND OVERHEAD COSTS

Goldfields Gas Transmission Pty. Ltd. is a sole purpose company with responsibility for the operation of the Goldfields Gas Pipeline (WA: PL 24). The costs identified below relate solely to that asset.

5.1 Operating and Maintenance Costs

Operating and Maintenance costs for the Goldfields Gas Pipeline may be divided into two major categories: 'Pipeline Operating and Maintenance Costs' and 'Management Costs'.

Pipeline Operating and Maintenance Costs are those incurred in the operation and maintenance of the Goldfields Gas Pipeline and associated facilities. They include direct operations, operations support, engineering support, Right of Way management, and direct administration and management.

Management Costs are those incurred in the high level management of the Goldfields Gas Pipeline and the provision of commercial and contractual support to direct operations. Management Costs include management fees, legal, public relations, regulatory related activities, and communications leases.

The Goldfields Gas Pipeline faces real and potential competition from other pipelines and the suppliers of alternate fuels. Thus, the data presented is, of necessity, in aggregated form.

Projected Operating and Maintenance costs for the Goldfields Gas Pipeline are as follows:

YEAR	2000	2001	2002	2003	2004
Pipeline Operating & Maint. Cost $ thousands	6635	6937	7133	7386	7781
Management Cost $ thousands	4669	4315	4169	4200	4931
Total operating & maintenance $ thousands	11304	11252	11302	11586	12712

Note: Management Cost includes:
communications lease and maintenance
pipeline operations management charge
commercial operations management charge

Used Gas (the sum of compressor fuel and unaccounted for gas), and linepack adjustments constitute a further operating expense consideration.

Compressor fuel for all pipeline transport services is managed by GGT. Fuel costs are proportioned across all pipeline users and charged to them periodically as an item which is separate from transport tariff. Therefore, fuel costs are not included in tariff determination.

Unaccounted for gas (UAFG) is similarly proportioned across all pipeline users. Such proportioning may result in a debit or a credit to pipeline users, depending on the arithmetic sign of the UAFG inventory. UAFG costs are not included in tariff determination.

Linepack adjustments necessitated by pipeline users incurring gas imbalances over time may be achieved by either trading or swaps between users, or by the purchase or sale of gas by the pipeline operator. It is anticipated that the vast majority of linepack adjustments will be accommodated by swaps or trading between users. Therefore, operating expenses associated with linepack adjustments are assumed to be zero.

5.2 Marketing and Overhead Costs

Marketing and Overhead costs are included in the Operating and Maintenance costs presented above. However, for clarity, Marketing and Overhead costs are identified specifically below. They include (but are not limited to):

- salaries and related on costs,
- legal,
- marketing,
- public relations,
- commercial and operations management fees,
- regulatory,
- project evaluation.

The Goldfields Gas Pipeline faces real and potential competition from other pipelines and the suppliers of alternate fuels. Thus, the data presented is, of necessity, in aggregated form.

Projected marketing and overhead costs for the Goldfields Gas Pipeline are as follows:

YEAR	2000	2001	2002	2003	2004
*** Marketing & Overhead Cost $ thousands	4669	4315	4169	4200	4931

***** *included in Operating and Maintenance Costs shown above***

Note: Management Cost includes:
communications lease and maintenance
pipeline operations management charge
commercial operations management charge

6 PIPELINE SYSTEM

6.1 Pipeline System Description

The Goldfields Gas Pipeline extends from Yarraloola, in the Pilbara region of Western Australia, to Kalgoorlie, in the southern Goldfields region. The function of the pipeline is to transport pipeline quality natural gas safely, reliably, and efficiently from producers in the Carnarvon Basin to a variety of end users in the East Pilbara and Goldfields.

The pipeline system comprises:

- DN 400 mm and DN 350 mm main pipeline sections,
- the DN 200 mm lateral to Newman,
- compressor stations on the pipeline,
- custody transfer meter stations at the Yarraloola inlet,
- a head office in West Perth
- a Gas Control centre in West Perth,
- maintenance bases and regional offices in Karratha, Newman, Leinster, and Kalgoorlie,
- a backup Gas Control centre in Kalgoorlie,
- a Supervisory Control and Data Acquisition (SCADA) system,
- a satellite data communications system,
- a satellite telephone system,
- a field operations radio communications system,
- operations, maintenance, commercial, quality, safety, and environmental management systems.

Input to the pipeline is currently made at Yarraloola, near Compressor Station One on the Dampier to Bunbury Natural Gas Pipeline.

Gas is currently being delivered to third party take off points which then transport gas to end users at:

- Newman;
- Plutonic;
- Jundee;
- Wiluna;
- Mount Keith;
- Leinster;
- Murrin Murrin;
- Cawse;
- Parkeston;

- Kalgoorlie North (to domestic distribution);
- Kalgoorlie South;
- Kambalda (via third party lateral from Kalgoorlie South).

A map showing the Goldfields Gas Pipeline appears in Attachment No. 1 Pipeline Maps.

Key Goldfields Gas Pipeline system characteristics and parameters include:

Commissioned	June to October 1996
Pipeline licence WA - PL 24	expires 27 January 2016
Pipeline length	1378 kilometres
Pipeline diameter: Yarraloola to Newman	DN 400 mm (16 inch)
Pipeline diameter: Newman to Kalgoorlie	DN 350 mm (14 inch)
Maximum Allowed Operating Pressure	10.2 MPa
Pipe grade	X70
Corrosion mitigation	trilaminate pipe coating; impressed current cathodic protection
Compressor station sites	2
Installed compression	4 x 1290 kW
Compressors	reciprocating, gas engine driven
Active inlet custody transfer meter stations	1
Active sales outlet custody transfer meter stations	11
Main Line Valves	11
Scraper (pig) launch and/or receive facilities	8
Maintenance bases	4
Pipeline control	remote via SCADA
Right of Way identification	marker signs; at least one visible at any ROW location

6.2 Capacity and Volume Assumptions

6.2.1 Goldfields Gas Pipeline Capacity

6.2.1.1 Mandated Capacity Requirements

The State Agreement requires that the Goldfields Gas Pipeline be constructed with sufficient capacity to at least accommodate the capacity allocated to the GGTJV Participants plus the capacity for third party users. The State Agreement also requires that pipeline capacity can be increased by at least 50 percent above initial capacity through the addition of compression.

6.2.1.2 Goldfields Gas Pipeline Operational Capacity

The current firm capacity of the Goldfields Gas Pipeline is between 85 TJ/d and 95 TJ/d for load profiles similar to that projected. This range of values of capacity will change if loads are redistributed between pipeline outlet points. A range, rather than a single deterministic value, is appropriate to characterise pipeline capacity because pipeline outlet points are distributed over 860 kilometres, or approximately 60 percent, of the pipeline's length. This geographic dispersion of load results in pipeline hydraulic behaviour being very sensitive to load distribution.

The Goldfields Gas Pipeline is currently operating essentially at capacity. Therefore, no new significant loads (under either the Reference Service or Negotiated Services) can be accommodated without expanding the capacity of the pipeline.

6.2.2 Goldfields Gas Pipeline Throughput Projections

The Goldfields Gas Pipeline currently transports gas on behalf of its owners and five third party users.

For the purposes of this Access Arrangement, future pipeline throughput is assumed to comprise the continuation of all existing transport contracts. No load growth is anticipated during the Access Arrangement period. This assumption is made on the basis of the depressed state of the mining industry and the lack of firm response to the Economic Development Tariff initiative.

During the period of the Access Arrangement, several transport contracts are scheduled to terminate. It has been assumed that these contracts will not be renewed.

For the purposes of tariff determination, an average load factor of 0.72 is assumed. This corresponds to the pipeline's actual operating load factor (i.e. the quotient of average daily throughput and maximum daily throughput) for the 12 month period ending 30 September 1999. This operational value is numerically higher than the contractual load factor (i.e. the quotient of average daily throughput and pipeline reservation) for the same period. As such, the load factor used constitutes a conservative assumption for the purposes of determining the Reference Service tariff.

Existing Goldfields Gas Pipeline gas transport contracts are subject to commercial confidentiality. Further, the pipeline faces competition from both other pipelines and suppliers of alternate fuels, and end users face substantial competition in their own markets. Therefore, in order to protect the interests of pipeline users and GGT it is necessary that future throughput projections be presented in aggregated form.

On an aggregated basis, the Goldfields Gas Pipeline projected future throughput for the duration of the proposed Access Arrangement is as follows:

YEAR	2000	2001	2002	2003	2004
Projected pipeline throughput TJ / d	71	71	74	72	69

Appendix B shows daily pipeline throughput and daily pressures at the Yarraloola pipeline inlet gate station for the 12 month period ending 30 September 1999.

For the Goldfields Gas Pipeline, pipeline inlet parameters are a more meaningful indication of pipeline operation than 'city gate' values (as specified in Attachment A of the Code). This is because the Goldfields Gas Pipeline currently has a single inlet (at Yarraloola), but has delivery points distributed over approximately 860 pipeline kilometres or 62 percent of pipeline length. Deliveries at Kalgoorlie (the city at the end of the pipeline) represent only a fraction of total pipeline throughput. This characteristic of geographically distributed load is in contrast to many other pipelines (such as the Dampier to Bunbury Natural Gas Pipeline, the Moomba to Adelaide pipeline, etc.), which deliver the majority of their throughput at the downstream extremity of the pipeline.

7 ACCESS AND PRICING PRINCIPLES

7.1 Pipeline Access

7.1.1 Access Philosophy

The Goldfields Gas Pipeline was developed specifically as an open access pipeline. Its sole business is the safe, reliable and efficient transport of natural gas for both its owners and third party users.

The State Agreement makes specific and detailed provision for third party access. Under that Agreement, initial pipeline sizing was required to meet the needs of both the owners of the pipeline and foundation third party users. Tariffs for third parties using the Goldfields Gas Pipeline were posted at the beginning of the pipeline's operation. These were developed in accordance with tariff setting principles agreed between the GGTJV and the State Government. These principles were developed to explicitly protect the interests of third party users.

The Goldfields Gas Pipeline is, in practical terms, solely dependent on a comparatively small number of mining operations in the Goldfields region of Western Australia for its gas transport business. Over 99 percent of the current throughput of the pipeline is consumed by mining and mining related activities. This is in contrast to other transmission pipelines in Australia which serve markets which are substantially more mature and diversified, and whose users face comparatively high fuel switching costs.

The survival of the Goldfields Gas Pipeline is dependent on sustaining gas transport after current contracts expire. At present, contractual commitment to the use of the Goldfields Gas pipeline ends in the year 2016. This means that the second half of the pipeline's assigned economic life is currently uncontracted. Therefore, new business is critical to the operation of the Goldfields Gas Pipeline in the long term.

Future gas transport business can only be gained through a truly open access philosophy.

7.1.2 Nature of Services Offered

Since the commencement of transportation services through the Goldfields Gas Pipeline, the only service which has been sought by current users of the pipeline has been a firm, forward haul service. The Reference Service offered under this Access Arrangement reflects this universal user preference.

However, GGT recognises the opportunity and potential need to provide Negotiated Services in addition to the Reference Service described in this Access Arrangement. By offering such individually tailored services, GGT will ensure that pipeline users' needs may be accommodated to the fullest extent practical. Provision of such services is further tangible indication that the Goldfields Gas Pipeline is customer focussed, is encouraging the use of the pipeline, and is actively seeking access by third parties wishing to transport natural gas.

The flexibility facilitated by Negotiated Services will ensure that existing and prospective new pipeline users can negotiate gas transport services which best meet their needs.

7.2 Evaluation of Acceptable Tariff Determination Methods

Because of the more global view the NPV / IRR approach offers, the elimination of year to year price shocks, the minimisation of tariffs during early project life, and prior use in previous tariff determinations, an NPV tariff determination methodology has been adopted for the purposes of determining the Reference Service tariff for the Goldfields Gas Pipeline. This choice is discussed in some detail below.

7.2.1 Available Methodologies

The Code specifies (sections 8.1, 8.4) that one of three methodologies:

a) Cost of Service (CoS)

b) Net Present Value (NPV)

c) Internal Rate of Return (IRR)

may be used to determine a Total Revenue which:

- in the case of the CoS methodology, "is set to recover costs ... on the basis of a return (Rate of Return)" (section 8 Introduction: Principles for determining the total revenue),

- in the case of the NPV methodology, yields an NPV equal to zero using an "acceptable discount rate" (ibid), and

- in the case of the IRR methodology, provides an "acceptable IRR" (ibid).

The Code also intends (section 8 General Principles) that:

"other methodologies that can be translated into one of these forms are acceptable".

The NPV and IRR methodologies may be considered to be variants of a common theme, given that the IRR is, by definition, the discount rate which results in the NPV of a given cashflow to be equal to zero.

7.2.2 Evaluation

The Cost of Service methodology considers total revenue and the tariff required to achieve it over a period of one year. Tariffs are then adjusted according to various formulae.

In contrast, the NPV / IRR methodology considers revenues and costs over the full life of the Access Arrangement. This approach yields 'levelised' tariffs. Leveling of tariffs is achieved by considering non routine expenditures (such as major equipment overhauls) within the context of the complete Access Arrangement period. Such costs are thus 'averaged' over a number of years in a manner which is more closely aligned with accepted fluctuations in actual income and expenditure, and not directly linked to assumptions of annual amortisation which are (of necessity) inherent in the Cost of Service approach.

The original tariff determination for the Goldfields Gas Pipeline, performed in accordance with the requirements of the State Agreement, employed an NPV approach.

Levelised tariffs offer both simplicity and predictability for pipeline users. Under this methodology, a user of pipeline services is presented with a tariff path over time which is known in real (i.e. CPI adjusted) terms.

A levelised tariff determination methodology also yields tariffs which are lower in the early years of pipeline operation. This makes this methodology attractive to pipeline users. However, from the pipeline operator's point of view, low tariffs and associated low revenues in the early years of operation increase project risk.

7.3 Cost Allocation and Tariff Determination Methodology

7.3.1 Code Intention

The tariff for the Goldfields Gas Pipeline Reference Service is set in accordance with the principles set out in section 8 of the Code.

The Code is prescriptive with regard to the general methodology which is to be employed to determine tariffs for Reference Services. Therefore, it is appropriate to consider the intent, as well as the specific requirements, of the Code.

Its general tariff setting principles may be summarised through the use of selected excerpts from the Code.

The Code intends (section 8 Introduction: General Principles) that:

> The overarching requirement is that when Reference Tariffs are determined and reviewed, they should be based on the efficient cost (or anticipated efficient cost) of providing the Reference Services.

It continues:

> Reference Tariffs [shall] be designed [to] provide the Service Provider with the ability to earn greater profits (or less profits) than anticipated between reviews if it outperforms (or underperforms against) the benchmarks that were adopted in setting the Reference Tariffs.

The Code further intends (ibid) that Reference Tariff Policy:

> ... should be designed to achieve a number of objectives, including providing the Service Provider with the opportunity to earn a stream of revenue that recovers the cost of delivering the Reference Service over the expected life of the assets used in delivering that Service, to replicate the outcome of a competitive market, and to be efficient in level and structure.

To facilitate these aims (ibid):

> ... the Reference Tariff Principles are designed to provide a high degree of flexibility so that the Reference Tariff Policy can be designed to meet the specific needs of each pipeline system.

7.3.2 Cost Allocation

The Goldfields Gas Pipeline offers gas transport services on a non discriminatory basis. Further, tariffs are determined on the basis of all pipeline users, including the owners, being ascribed the same tariff. Therefore, the basic cost allocation philosophy adopted for the Goldfields Gas Pipeline is that costs are distributed reasonably over all gas transport services and all users.

Costs allocated to the Goldfields Gas Pipeline for the purposes of determination of the Reference Service tariff relate solely to that asset.

The NPV tariff setting approach used yields a 'levelised' tariff. The impacts of significant non routine expenditures, such as compressor overhauls, are spread over the duration of the Access Arrangement, thus eliminating price shocks. Further, the adoption of a longer time horizon for tariff setting ensures that future activities are anticipated and planned prudently.

7.3.3 Tariff Determination Methodology

This section provides a high level overview of the methodology and assumptions used to determine the tariff for the Reference Service in order to orient the reader. Prior and subsequent sections deal with each of the key aspects of the tariff determination process in more detail.

The tariff for the Reference Service has been determined according to the following procedure:

1) Determine the Optimised Replacement Cost (ORC) of the Goldfields Gas Pipeline.

2) Depreciate the ORC to yield the Depreciated Optimised Replacement Cost (DORC).

3) Add depreciated 'other capital costs' and working capital to DORC to yield the Initial Capital Base.

4) Establish projected pipeline throughput for the duration of the Access Arrangement.

5) Determine the Weighted Average Cost of Capital (WACC) applicable to the Goldfields Gas Pipeline.

6) Construct a discounted cash flow model for the Access Arrangement period using throughput projections, proposed tariff structures, and capital and

operating costs. This permits calculation of the NPV of that cash flow at a discount rate equal to the WACC.

7) Determine the Reference Service tariff which generates revenues which yield an NPV equal to zero at a discount rate equal to the WACC.

For the purposes of determining the Reference Service tariff, a common value of tariff is ascribed to all pipeline users, including the owners of the pipeline. This assumption ensures that all pipeline users contribute to the ongoing operation of the Goldfields Gas Pipeline on a proportionately equal basis, and that a fair and reasonable tariff is determined.

This assumption is conservative, because the State Agreement specifically excludes foundation loads from consideration under the Code, and the Act specifically recognises this provision.

7.4 NPV Discount Rate: WACC

GGT has undertaken the calculation of the regulated rate of return for tariff determination using a widely accepted approach. This approach can be referred to as a determination of a Long Term Real Pre Tax Weighted Average Cost of Capital ("LT RPT WACC").

This approach has been applied in several access determinations nationwide, has received academic support, is supported by significant empirical research, and is consistent with the provisions of the Code.

Section 8.31 of the Code states that WACC should be calculated with regard to "standard industry [financial] structures for a going concern and best practice". GGT has applied component values for the rate of return calculation that reflect standard industry practice and financial structures.

Section 8.31 of the Code also states that the Capital Asset Pricing Model (CAPM) provides a suitable means of calculating WACC. An accepted approach for determining a WACC as a regulatory rate of return has been to use the CAPM to derive a post tax return on equity, which is then calculated with debt information to determine a nominal post tax WACC. The nominal post tax WACC value is converted to a real pre tax WACC value by the market practice transformation method.

The following sections of this chapter outline the approach used by GGT and explains the selection of values for the parameters of the CAPM and WACC equations used.

7.4.1 The WACC Calculation in Context

Before considering the specific aspects of calculation of the Weighted Average Cost of Capital appropriate to the Goldfields Gas Pipeline, it is appropriate to first consider WACC in a wider context.

The most important issue associated with the calculation of WACC for the Goldfields Gas Pipeline is the final value obtained, and its contextual relevance.

7.4.1.1 Input Variables and Results of Calculations

There has been much controversy in the recent past during the submission and decision processes for Access Arrangements for other Australian natural gas infrastructure assets as to what constitute 'appropriate' values for input variables to the WACC calculation, and the extent to which the calculated value of WACC is 'appropriate'. The Draft and Final Decisions in Victoria and the Draft Decision for the Central West Pipeline have been notable in this regard.

Such controversy arises from two sources.

The first arises from the uncertainty surrounding the value of each input variable. For example, in the recent Victorian Access Arrangement submissions, the appropriate values for most (if not all) of the input variables to the WACC calculation attracted considerable debate.

The second arises from the perception of the 'GIGO' (garbage in, garbage out) principle applying to the WACC calculation itself. Because there are a comparatively large number of input variables to the WACC calculation, the effect on the output of the calculation resulting from the cumulative variations of each input variable can be large. For example, if the values defining the low ends of the "plausible ranges" for each input variable as proposed by the ORG and the ACCC in the recent Victorian decisions are submitted to the WACC calculation, the resulting WACC is substantially different to that obtained by using the values defining the high ends of the plausible ranges. Therefore, caution must be exercised when selecting variable values to ensure that the overall view of the WACC calculation taken is not unduly optimistic or pessimistic.

As identified above, the determination of WACC using the Capital Asset Pricing Model involves the assignment of values to a comparatively large number of input variables.

These input variables may be segregated into two broad classes.

First, there are input variables which are generally applicable to all pipeline operators in the industry. The tax rate, the risk free rate, and the behaviour of the stock market as a whole in terms of its performance with respect to the risk free rate are all applicable to all pipeline operators. They are dictated by prevailing economic and statutory conditions.

Second, there are input variables whose values are specific to each pipeline operator. The capital structure of the firm, the pipeline operator's risk profile with respect to the market as a whole and the associated cost of equity and debt, and the ability of shareholders to benefit from dividend imputation are all variables which are particular to the individual pipeline operator. They are dictated by the particular circumstances applying to the specific company in question.

Recent Final Decisions in Victorian contain references to the circumstances prevailing in Victoria, and how these were considered in the context of the cases at hand. In particular, the ORG stated that their decision related specifically to the established Victorian gas distribution businesses:

> ... having regard to their particular market circumstances and risk characteristics. It should not be regarded as a precedent to be applied to other regulated infrastructure assets ...

The ACCC likewise stated:

> ... the rate of return and other features of the ACCC's decision relate solely to the established Victorian gas transmission pipelines. It should not be regarded as a precedent to be applied to other pipeline assets or assets in other industries, which have their own risk profile.

Thus, considerable caution must be exercised if consideration is to be given to the use of the Victorian decisions as any sort of explicit or implicit benchmarks for other Access Arrangements. It is not appropriate to blindly apply any firm specific variable values from the Victorian Access Arrangements to firms operating in different states in different business environments and industry structures.

The Draft Decision for the Central West Pipeline is notable for the controversy it has generated over its mandating a pre-tax real value of WACC which is lower than that delivered in the Victorian decisions. At the time of writing of this document, there has been insufficient time available to fully analyse the arguments put forward by the various stakeholders justifying or refuting this value. However, on a heuristic basis, this value of allowed rate of return is not commensurate with the risks faced by that pipeline. This point was made forcefully by potential future pipeline *users* at a recent public forum held to discuss the Central West Pipeline Draft Decision.

This leads to a wider consideration of methodological issues.

7.4.1.2 Methodological Issues

The views of William Sharpe, who, with Lintner first proposed the Capital Asset Pricing Model, are illuminating. He offers the following comments (Sharpe 1985: 148) on the Capital Asset Pricing Model:

> Every investor is assumed to have the same information and to analyze and process it in the same way. Everyone thus agrees about the future prospects for securities. Moreover, investors are assumed to be concerned *only* [italics in original] with risk and return. Since risk and return relate present price to future prospects, every investor in such a never-never land agrees with every other regarding all ingredients required for portfolio analysis. And, since everyone knows all the relevant aspects of portfolio analysis, all will process the available information in the same way .... What would happen in such a world? First, everyone would analyze the situation and determine a set of efficient risky portfolios, but *everyone would obtain the same set* [italics in original] ....

While these comments are directed specifically at the CAPM, they are generally applicable to the bulk of the finance theory applied in the current Australian regulatory environment. The point made by Sharpe is hopefully self evident.

The number of conflicting views put forward during the public consultation processes associated with the Victorian decisions indicate that there is no one 'correct' method for the determination of Weighted Average Cost of Capital. This is exemplified by the divergence of views between prominent academics on a number of key issues. It indicates that some of the best minds in the country do not agree on any sort of unique approach to the multi-variate, multi-faceted problem of determining WACC, and that there is no single widely accepted view regarding its solution. For example, many observers have proposed that arguments over nominal to real transformation methods constitute 'cherry picking' on the part of regulators in order to reduce rates of return.

Thus, care must be exercised when considering the Goldfields Gas Pipeline in the context of recent eastern states regulatory decisions. Some decisions by the ORG and the ACCC regarding appropriate values for variables applicable to all pipeline operators may be taken as a guide for use in other contexts, but should not be utilised solely on the basis of precedent. Market wide parameter values are extremely fluid. For example, the assignment of a value to the risk free rate is critically dependent on the time horizon assumed. Further, selection of the Market Risk Premium is widely perceived by a number of informed observers to be highly subjective.

Decisions by the ORG and ACCC regarding appropriate values for pipeline specific variables such as beta and debt premium are simply not applicable to the Goldfields Gas Pipeline. This pipeline is unique, and should be treated as such. Attempts to assign 'industry standard' parameter values to specific projects necessarily requires acceptance of inherent cross subsidy between pipelines with different risk profiles in the averaging process. Such cross subsidy directly contravenes the intent of the Code.

Thus, it is not possible to conclude that previous regulatory decisions provide indisputable precedent. Decisions regarding the firm specific variables discussed below should be seen as situation specific. It is not appropriate to blindly apply values for the cost of debt, capital structure, dividend imputation factor, and cost of equity identified as acceptable in other regulatory decisions to the Goldfields Gas Pipeline. To do so implies that the circumstances applicable to the Goldfields Gas Pipeline are the same as those applying to the gas system elsewhere in Australia. Even cursory consideration of these indicates that such is not the case.

The Goldfields Gas Pipeline was initially developed on the basis of a rate of return which is higher than the WACC determined in this document. This initial rate of return reflected the result of a competitive selection process by the State Government. It also was agreed and ratified by the Department of Resources Development, which was responsible for the administration of the State Agreement. Further, the rate of return used in a subsequent tariff redetermination was higher than the WACC obtained below.

The value of WACC determined in this document constitutes a conservative assumption for the purposes of determination of the Reference Service tariff. However, as discussed below, the Reference Service tariff proposed for the Goldfields Gas Pipeline is lower than that resulting from the calculations described in this document. The Reference Service tariff is also consistent with tariffs currently approved by State Government. On this basis, the value of WACC calculated below should be seen as conservative.

7.4.1.3 Consequences of Regulatory WACC Determinations

A final issue worthy of consideration is the effects of regulators mandating values of WACC which are either too low or too high.

If a regulator accepts a WACC value which is higher than appropriate, the Service Provider stands to make some incremental gain. However, such gain is not guaranteed. If the Service Provider experiences adverse circumstances, actual returns will be dictated by those circumstances and not by any allowed rate of return. Revenues are ultimately determined by market forces.

If a regulator mandates a value of WACC which is too low, this decision will act as a disincentive to investment.

Unfortunately, the decisions of investors to place their funds with other opportunities are not visible in the short term, because the frequency of occurrence of new infrastructure project approvals is low compared to other forms of investment decisions such as share purchases on the stock exchange. Therefore, it may be some time before the wider economic impact of regulatory decisions are seen or felt.

This time lag could in turn lead to significant adverse impact on the state and national economy. By the time the effects of shortcomings in the state's and the nation's infrastructure are felt, economic disadvantage has already been suffered. Further, the long lead times associated with major infrastructure developments mean that economic disadvantage will continue long after the problem is recognised. This 'dragging out' effect is compounded by the fact that economic disadvantage arising from a regulatory decision will be locked in for the life of that regulatory period. Typical lives of Access Arrangements are five years.

On balance, the wider consequences of a low WACC are worse than the wider consequences of a high WACC. Therefore, if regulators are to err, it should be towards the decision which does not compromise the long term viability of the natural gas transport industry.

7.4.2 The Capital Asset Pricing Model

The classical Capital Asset Pricing Model uses the following formula to estimate the after tax cost of equity:

$$k_e = \left(r_f + \left(r_m \times \beta\right)\right)$$

where:

k_e	=	after tax cost of equity
r_f	=	the nominal risk free rate
r_m	=	the Australian market risk premium (of equities over the risk free rate)
β(beta)	=	the systematic risk of equity

7.4.3 Cost of Equity

The nominal after tax cost of equity is determined using the Capital Asset Pricing Model as described above, with reference to the risk free rate of return, the beta value of the firm's equity, and the market risk premium.

7.4.3.1 Risk Free Rate

The risk free rate is represented by a government bond or similar riskless financial instrument with term equal to the pipeline project life. In practice, such financial instruments do not exist, as the assumed regulatory life of the GGT is 40 years. The risk free rate proxy which is most applicable is the ten year bond rate. This bond, while not matching the life of most regulated assets, has the longest term and is the most liquid, and therefore is an appropriate proxy reflecting current market conditions.

Australian Regulators have in the recent past used short run interest rates for the purposes of tariff determination. On this basis, GGT has used 6.7 percent nominal as the applicable value for the risk free rate. This value reflects the 10 year bond rate prevailing immediately after the Reserve Bank of Australia decision of 3 November 1999 on interests rates.

7.4.3.2 Beta Value

Betas can be calculated when data is available on the historical returns of an individual stock. This historical data is then compared to a representative sample of the market through an empirical calculation which indicates the historical returns volatility of one company compared to the market portfolio. Beta indicates the variability of returns for a single stock compared to the averaged return from all stocks, usually considered in the form of an index, e.g. the All Ordinaries index, or other, wider, indices. Company betas may be grouped into industry categories which provide a representative sample of industry members relative to the market portfolio.

When selecting an appropriate beta for an unlisted stock, the use of appropriate proxy betas is necessary.

As such selection requires specialised expertise, GGT has obtained assistance from the Macquarie Bank to perform this task.

Beta has meaning only in the context of market wide risks. A beta value demonstrates the proportionate change in one stock's returns compared to changes

in the market's return. By definition, the calculation of beta is based on changes in the stock's return with respect to the return from the entire market, rather than any one segment of the market.

Changes in the market's return result from global, rather than industry specific, variables that impact the market in its entirety.

As such, specific events that impact a company or group of assets, can not be identified (and therefore reflected) by the beta value.

Assets that are not listed on the stock exchange do not have available data from which to calculate a value for beta.

The most important process in selecting a proxy beta value when empirical data is not available is the identification of the appropriate listed asset(s) against which to benchmark the unlisted asset. There is no defined standard that has emerged as being the correct method for selecting an appropriate proxy beta. Therefore, selection of an appropriate asset is a subjective process, which may attract much controversy.

In recent regulatory decisions, betas have been derived from an analysis of the characteristics of the individual assets being assessed, combined with reference to a set of precedents from previous regulatory decisions.

If unwarranted reliance is placed on precedent, one runs the risk that regulated assets are arbitrarily aggregated into a single "industry class". If this is done, the assumption is made that all regulated assets share similar exposure to market wide, or systematic risks. As discussed above, the risks facing the Goldfields Gas Pipeline and other gas infrastructure assets such as distribution systems in major population centres are substantially different. Further, the use of 'industry standard' risk measures necessarily implies that cross subsidy between assets of different risk profiles is acceptable.

The most significant attributes that enable logical comparison between assets are the factors that cause volatility in returns. Separation or distinction on this basis of risk is the most relevant approach to selecting an appropriate beta. For example, a clear distinction can be made between a typical utility and a gold mine on the basis of the markets in which they operate (i.e. low volatility and large, stable and captive customer base versus high volatility and competitive customer base respectively), the type and nature of costs they incur (e.g. fuel compared to labour, fixed and variable, etc.). These factors will best reflect future movements in returns relative to the market portfolio.

In considering the GGT, selection of the appropriate asset is a difficult task. The GGT is unique in a number of ways. There is no similar asset either in Australia or overseas that could form a basis for comparison, and there is no identifiable asset

class that reflects the same market risks on an indisputable basis. The GGT stands alone as a gas infrastructure asset, and should not be considered to have the same risk exposure as a transmission pipeline which serves diverse and mature markets.

The GGT is essentially dedicated to supplying the mining industry in a specific geographic area. It supplies energy to a small number of resource projects. Future returns volatility is influenced by the tenure of these contracts and the expected changes in demand for gas over time in the Goldfields region. This volatility excludes the impact of the regulatory uncertainty on tariff levels. For the Goldfields Gas Pipeline, exposure to market risks is greater than those of a typical gas distribution network due to the number of customers, the customer demand profile, and customer fuel switching costs. These facts are inescapable.

Demand for gas is influenced by the ongoing viability of its customers' operations relative to global competitors. To an extent, the risks of these operators are passed through to be risks that the GGT faces.

As such it is appropriate to consider the betas of the customers of the GGT. This approach is useful, but should be used for general reference rather than to select a specific beta proxy value. This is because all of the mining companies which take gas from the Goldfields Gas Pipeline, with the exception of Anaconda Nickel, have operations which extend beyond the assets which demand gas from the GGT. This element of diversity in customers' operations suggests that such company betas understate the risks associated with the specific operations supplied by the Goldfields Gas Pipeline.

Nevertheless, it is instructive to consider beta values of relevant companies. The betas of these companies, weighted to reflect their relative importance as components of GGT demand, are displayed below.

	Raw Equity Beta1	Re-levered Equity Beta2	Approx % of GGT Demand	Weighted Raw Equity Beta	Weighted Re-levered Equity Beta
Western Mining	1.77	2.08	43%	0.7644	0.9001
Anaconda Nickel	0.97	0.97	11%	0.1049	0.1051
Normandy Mining	1.66	2.01	22%	0.3615	0.4375
Centaur Mining	2.45	2.15	5%	0.1213	0.1064
Great Central Mines	2.18	2.16	1%	0.0179	0.0177
Duke (JV Partner)	0.45	0.52	16%	0.0725	0.0841
	Weighted Average Equity Beta			**1.4425**	**1.6509**

1 Source: Australian Graduate School of Management, Risk Measurement Service: June 1999
2 Many commentators suggest that raw equity betas should be unlevered and then re-levered to reflect the target capital structure of the asset being assessed

As identified above, taking an asset class approach is problematical. This consideration also applies to applying company betas to characterise the risk associated with operations served by the Goldfields Gas Pipeline. As identified above, most of the relevant companies have a number of different operations. This diversity of operation has the effect of diversifying risk. It is sound financial practice for companies to diversify operations in this way to lessen of risk. Identifying an appropriate asset class and then applying a beta from companies holding those assets is very subjective and as such should be complemented by a wider consideration of risk.

Macquarie's view is that the best means for selecting an appropriate beta is to consider an range of assets which includes some infrastructure, but is weighted toward resource-based stocks. This approach best translates the risks faced by the GGT, and yields results for beta which are higher than past utility regulation precedents which have used betas in the range of 0.65 to 1.2 for gas infrastructure assets which are substantially less risky than the Goldfields Gas Pipeline.

Macquarie (which worked on setting of the initial tariffs for the Goldfields Gas Pipeline) had, prior to construction of the pipeline, calculated a value of beta using twenty year data for a number of mining companies (weighted in proportion to mining output), resulting in a beta of 1.3282.

However, the Australian Graduate School of Management (AGSM), a leading Australian body responsible for producing beta information, recommends the use of four year data in calculating beta as this time period best captures the volatility of the stock relative to the market, without incorporating fluctuations caused by longer term changes in, or evolution of, the business.

A recalculation of a proxy beta utilising the same weighting principles and employing data in the four year period up to and including June 1999 results in a 48 month weighted average beta of 1.543.

On the basis of the weighted average re-levered equity beta of 1.65 for the resource-based asset group and the four year weighted industry beta of 1.543 described above, a beta for the Goldfields Gas Pipeline which is higher than the beta values in the range 0.65 to 1.2 applied to low risk regulated infrastructure assets in the recent past is applicable.

The data above indicates that a wide range of equity beta could be applicable to GGT.

This range could extend from as low as 1.0, based on prior regulatory decisions, to as high as 1.65, based on the above analysis. Given the small sample of resource companies evaluated (although representative of GGT's customer base), Macquarie

3 Source: Australian Graduate School of Management, Risk Measurement Service: June 1999

is of the view that the industry average beta of 1.54 may be the best indicator of the upper end of the range, forming a representative range of beta from 1.0 to 1.54. The single point within this range which would represent the best estimate of beta for GGT is ultimately a subjective decision.

Recognising that the other assumptions made for the purposes of determining the Reference Service tariff have been consistently conservative, GGT views it appropriate to adopt a value for beta which properly reflects the risks faced by the Goldfields Gas Pipeline. On this basis, a beta value of 1.4 is used for the purposes of determining the Reference Service tariff.

7.4.3.3 Market Risk Premium

The Market Risk Premium (MRP) is the difference between market return and risk free return (i.e. the r_m term in CAPM equation). It is a dynamic parameter, fluctuating as a result of variations in both market return and interest rates. This MRP, when applied in the CAPM above, is a forward looking estimate, which is based on long term historical data.

GGT believes, on the basis of external professional advice, that a market risk premium of 6.5 percent currently has wide acceptance in the Australian finance industry, and is supported by empirical research undertaken by Hathaway.

Some studies indicate that a lower range of values for MRP is applicable. They conclude this by citing the more stable inflationary period now prevailing and the effect of the imputation system in lowering market risk premiums. Other commentators believe the observed market risk premium of the past decade is still the most accurate long term forecast[4]. A study by Officer (1989) shows that the MRP for the period 1882 to 1987 was 7.94 percent. The same study showed that ten year measures of MRP over the 105 years ranged from 0.36 percent to 11.87 percent. This observed volatility of the MRP implies that taking a short term view may not be useful in trying to predict the market return for the next regulatory period. In this regard, Hathaway has suggested in a recent report that a long term market risk premium of 6.6 percent is appropriate. This conclusion has intuitive appeal (based on the range of MRP reported by Officer) as well as analytical justification.

The market risk premium is potentially the most inaccurate variable applied in CAPM. Empirical research has shown that its value fluctuates significantly over the short to medium term. Therefore it is prudent to take a long term average of historical values to be applied in a forward looking model such as the CAPM. On this basis, GGT has used a value of 6.5 percent for the Australian market risk premium in its calculations.

4 Hathaway, Neville 1999 *Market Risk Premia*, 15 September

7.4.4 WACC Formula

The input variables used to develop the Nominal Post-Tax WACC under the CAPM framework with an imputation taxation system are summarised below.

$$WACC = k_e \frac{(1-t_c)}{1-t_c(1-\gamma)} \times \frac{E}{V} + k_d\left(1-t_c\right)\frac{D}{V}$$

Where

k_e	=	after tax cost of equity
k_d	=	nominal pre tax debt rate
t_c	=	corporate tax rate
D	=	market value of interest bearing debt
E	=	the market value of equity
V	=	the market value of the entity (V = D + E)
γ	=	franking credit utilisation

7.4.5 Cost Of Debt

The cost of debt is a function of the perceived risk to the lender and the prevailing level of interest rates in the financial community.

An approach to assigning a value to the cost of debt which is commonly employed in Australia considers the premium above the risk free rate that a borrower will pay to finance a project such as a pipeline.

Empirical evidence supports a cost of debt margin of between 200 basis points and 250 basis points. This range has been chosen after consultation with financial institutions. The range is comprised of the following margins:

- 25 basis points for the typical margin between the 10 year Commonwealth Government bond rate and a “bank” rate against which credit margins would be levied;
- 150 basis points to 200 basis points for the credit margin on debt funding the Pipeline given the risks discussed above; and

- 25 basis points margin for swap costs.

GGT has confirmed the validity of these margins after observing indicative evidence of financing costs in recent transactions undertaken in Australia that share similar characteristics to the financing of infrastructure like the GGT. This is consistent with the approach to the cost of debt margin as proposed by the ACCC. [from Statement Of Principles For The Regulation Of Transmission Revenues - Draft May 27 1999 p. 82]

> The Commission will set the cost of debt relevant to the type of business assuming it maintains the financial structure implied by the financial accounts. Financial indicator analysis will provide a check on the credit rating likely to apply to the TNSP. The likely interest rates and form of financing will be assessed in consultation with relevant institutions investing in the financial markets. For the purpose of developing revenues or assessing the cost of capital, the effective cost of debt will be expressed as a debt margin augmenting the risk free rate.

Taking the mid point of the credit margin, the total debt margin is 225 basis points.

This is a conservative value. A recent report in a national newspaper stated that the debt margin for one particular tranche of debt taken by the owners of a recently privatised power station in Victoria is 4 percent.

7.4.6 Capital Structure

A debt to equity ratio of 50 : 50 is used as a typical value for the determination of the WACC for the Goldfields Gas Pipeline.

The capital structure of GGT's parent companies provides a guide to what may constitute an applicable value for the purposes of calculating WACC.

The CMS Energy Corporation 1998 Annual Report shows its prevailing debt to equity ratio as 52 : 48. AGL's 1999 Annual Report indicates a debt to equity ratio of 46 : 54 for that company. The June 1999 quarterly report for TransAlta reveals it has a debt to equity ratio of 52 : 48. Data from Duke's internet website gives it a debt to equity ratio of 40 : 60.

Data from CSI Data Inc. (cited by Gray (1998: 12)) shows an average gearing ratio of 49 percent for 19 natural gas utilities in the USA. However, consideration of this data must be tempered by the fact that these utilities operate in markets which are considerably different from those in Australia.

A substantial proportion of the assets held by CMS, AGL, TransAlta, and Duke comprise comparatively 'safe' distribution utilities. The Goldfields Gas Pipeline does not fall into this class of lower risk asset. It represents a significantly riskier investment to its owners. As gearing levels as accepted by lenders are generally inversely proportional to risk, it is appropriate to assume that an actual gearing level for a stand alone Goldfields Gas Pipeline project would be lower than those for its owners. Nevertheless, a capital structure consistent with that of its owners is used.

7.4.7 Tax Rate

The Australian company tax rate of 36 percent, prevailing in the second quarter of 1999, is applicable to the determination of the GGT's current WACC.

7.4.8 Dividend Imputation (Gamma) Factor

The availability of tax imputation credits requires a modification to the standard CAPM and WACC formulae to reflect the return to shareholders of tax credits associated with their share dividends. Thus, gamma (γ) is included in the WACC calculation to represent the proportion of franking credits which can, on average, be used by shareholders of the company to offset tax payable on other income. The higher the gamma, the lower will be the required return to equity holders and therefore the lower the estimated WACC. Consequently, gamma becomes a significant parameter.

GGT has used a gamma value of 30 percent for the determination of the Reference Service tariff for the Goldfields Gas Pipeline. This value is the mid point of a realistic range of 20 to 40 per cent for gamma. The ACCC's *Final Decision* regarding Victorian gas transmission and the recent *Draft Regulatory Principles* note that the analysis of imputation credits is a controversial issue and there is considerable debate as to the value which should be ascribed. Ultimately, an appropriate choice of gamma is a matter of judgement, as a deterministic calculation is impossible because it requires access to confidential Australian Taxation Office data. GGT's applied range is consistent with a number of regulatory decisions. GGT has, in accordance with the ACCC's approach, not argued the fact that the foreign status of some of the GGT's owners means that imputation credits are not valued.

The large impact of gamma on the WACC outcome is a significant issue in the overall returns to equity to the owners of the GGT. Any overestimation of the value of gamma, in the presence of ranging empirical evidence would have significant consequences for the GGT owners.

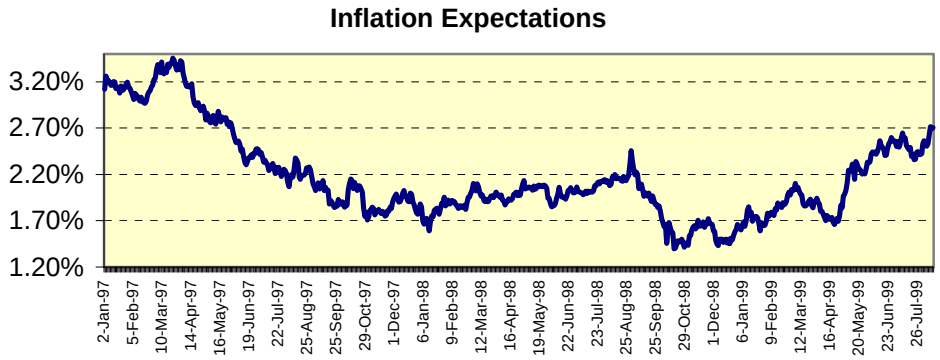
7.4.9 Inflation Rate

The ACCC in its proposed statement S6.11[5] states that:

> "The forecast inflation rate will be deduced from the difference in the nominal bond rate and indexed inflation indexed bond rates, and will be deduced for the term corresponding to the duration of the regulatory period. Alternatively, official inflation forecasts may be used."

The market's inflationary expectations may be derived from the difference between the index linked bond rate and the 10 year bond futures rate.

This expected value of inflation for the medium term past is presented in the chart below[6]:



The Reserve Bank of Australia sets the inflation target, implements monetary policy and is the most dominant influence on Australia's future inflation rate. The RBA's current long term target for inflation is between 2.0 percent and 3.0 percent.

It may be seen that the Reserve Bank target is consistent with market expectations.

For the purposes of determination of the Reference Service tariff for the Goldfields Gas Pipeline, a CPI rate of 2.5 percent, the mid point of the realistic range of 2 percent to 3 percent, has been applied.

5 Draft Statement of Principles for the Regulation of Transmission Revenues, 27 May 1999
6 Source: Break-even Inflation Rate CIB 2010 vs. CGL 9/09. Bloomberg 13 August

7.4.10 Nominal to Real Transformation

When applying the regulatory rate of return as a real pre tax WACC, the nominal post tax WACC value derived by the traditional LT RPT WACC approach is required to be converted by adjusting for taxation and inflation.

The Market Practice transform is generally used in industry (hence its name). It is also well understood by practitioners.

Hence, the Market Practice transformation method has been used in the determination of the Reference Service tariff for the Goldfields Gas Pipeline.

Formulae for the Market Practice transformation are displayed below:

Post-tax nominal WACC

$$W = r_e [(1-t)/(1-t(1-\gamma))].E/V + r_d (1-t).D/V$$

Market Practice Transformation

Pre-tax nominal WACC

$$W_t = r_e /(1-t(1-\gamma)).E/V + r_d .D/V$$

Pre-tax real WACC

$$W_{tr} = (1+W_t)/(1+f)-1$$

7.4.11 Calculation: Weighted Average Cost of Capital

The values of the variables used in the WACC calculation, and the value of WACC used to determine the Reference Service tariff for the Goldfields Gas Pipeline are displayed in the table below:

PARAMETER	PARAMETER VALUE
Inflation Rate	2.5%
Gearing Assumptions	
Debt	50%
Equity	50%
Cost of Debt	
Debt Margin	2.25%
Nominal Cost of Debt	8.95%
Cost of Equity	
Nominal Risk Free Rate	6.7%
Australian Market Risk Premium	6.5%
Beta (equity)	1.4
Dividend Imputation Factor	
Value of Franking Credits	30%
Taxation	
Company Tax Rate	36%
WACC	
Real Pre Tax WACC	**12.2%**

It may be seen that the applicable value for the real before tax Weighted Average Cost of Capital for the Goldfields Gas Pipeline for the purpose of determining the Reference Service tariff is 12.2 percent.

7.5 Tariff Determination

7.5.1 Introduction

This sub-section on tariff determination is comprised of two parts. The first describes the structure of the Reference Service tariff. The second describes the methodology employed to determine the tariff for the Reference Service.

7.5.2 Reference Service Tariff Structure

The Reference Service tariff is comprised of four components:

- a toll component (expressed in dollars per gigajoule),
- a reservation component (expressed in dollars per gigajoule kilometre),
- a throughput component (expressed in dollars per gigajoule kilometre), and
- an annual account management charge (in dollars).

These components, when combined, constitute the basis for charges for the provision of the Reference Service.

The toll charge associated with the toll component of the Reference Service tariff is the product of the capacity which is reserved by the User in the Goldfields Gas Pipeline and the toll component of the Reference Service tariff.

The reservation charge associated with the reservation component of the Reference Service tariff is the product of the capacity which is reserved by the User, the distance the gas is transported in the Goldfields Gas Pipeline, and the reservation component of the Reference Service tariff.

The throughput charge associated with the reservation component of the Reference Service tariff is the product of the actual quantity of gas which is transported for the User, the distance the gas is transported, and the throughput component of the Reference Service tariff.

This tariff structure is identical to that which was developed under the State Agreement and which has applied for the life of the Goldfields Gas Pipeline.

The tariff structure described above was initially adopted in recognition of the fact that:

- all pipelines face fixed costs and variable costs,
- capital servicing costs dominate (as is the case for all pipelines),
- Goldfields Gas Pipeline outlet points are distributed over a very long distance (i.e. approximately 860 kilometres, or nearly two thirds of pipeline length) and pipeline capacity is a function of the location of each outlet point and its load.

7.5.3 Tariff Determination Methodology

7.5.3.1 NPV Approach

A Net Present Value (NPV) approach has been adopted for the determination of the Reference Service tariff for the Goldfields Gas Pipeline. This approach has been favoured over a Cost of Service approach because an NPV methodology considers revenues and costs over the full life of the Access Arrangement, providing a smooth and predictable tariff path.

Further, an NPV methodology has been used in the past for the purposes of tariff determination.

The NPV approach yields 'levelised' tariffs. Leveling of tariffs is achieved by considering non routine expenditures within the context of the complete Access Arrangement period. Such costs are thus 'averaged' over several years in a manner which is more closely aligned with actual income and expenditure compared to assumptions of amortisation which are (of necessity) inherent in the Cost of Service approach.

Levelised tariffs offer both simplicity and predictability for pipeline users. Under this methodology, a user of pipeline services is presented with a tariff path over time which is known in real (i.e. CPI adjusted) terms. Further, in the early years of pipeline operation tariffs are lower than those determined under a traditional Cost of Service approach. This feature is attractive to many pipeline users.

7.5.3.2 Tariff Calculation Model Structure

The NPV Reference Service tariff calculation model employed conforms closely to the methods of project evaluation described in standard university finance texts. Peirson et al (1985) and Van Horne et al (1985) have been used as references.

The tariff calculation model considers the operation of the Goldfields Gas Pipeline to be a 'project' (in the academic sense) for the life of the Access Arrangement.

The project is initially nominally 'purchased' for the Initial Capital Base value at the beginning of the Access Arrangement period. This 'purchase' constitutes the initial outward cash flow.

The 'project' is then operated for the duration of the Access Arrangement, with revenues from the provision of transportation services comprising the annual inward

cash flow to the project, and future capital and operating expenses comprising the annual outward cash flows.

The project is then nominally 'sold' for the depreciated value of the Initial Capital Base minus working capital plus the depreciated capital expenditure during the life of the 'project'.

Net cash flow on a before tax and before interest basis is computed as the difference between revenues and expenditures. This cash flow is then discounted and summed to yield the project Net Present Value (NPV). The Reference Service tariff is determined to yield an NPV of zero at a discount rate equal to the Weighted Average Cost of Capital.

This process yields a Reference Service tariff which facilitates the recovery of costs associated with the provision of the Reference Service.

7.5.3.3 Taxation Assumptions

The Reference Service tariff determination for the Goldfields Gas Pipeline considers earnings before interest and tax.

Such a 'before tax' tariff determination approach is consistent with methods used in other Access Arrangements already submitted in Australia.

This approach has been employed with the objective of avoiding the manifold problems associated with the determination of a representative taxation impost.

7.5.3.4 Pipeline Utilisation Assumptions

For the purposes of determining the tariff for the Reference Service, the load projection presented in a preceding section has been used. This is reproduced for convenience below.

YEAR	2000	2001	2002	2003	2004
Projected pipeline throughput TJ / d	71	71	74	72	69

A load factor of 0.72 (where load factor is defined as average throughput divided by maximum throughput) has been assumed for the purposes of Reference Service

tariff determination. This corresponds to the pipeline's actual operating load factor (i.e. the quotient of average daily throughput and maximum daily throughput) for the 12 month period ending 30 September 1999. This operational value is numerically higher than the contractual load factor (i.e. the quotient of average daily throughput and pipeline reservation) for the same period, and as such constitutes a conservative assumption for the purposes of determining the Reference Service tariff.

7.5.3.5 Tariff Calculation Model: Gas Transport Revenues

Foundation users of the Goldfields Gas Pipeline received a tariff discount of 7.5 percent for the first five years of pipeline operation. However, for the purposes of Reference Service tariff determination, is has been assumed that all Goldfields Gas Pipeline users are ascribed the same tariff. This is a conservative assumption.

In other words, for the purposes of Reference Service tariff determination the owners are assumed to receive revenues which would be generated by the application of the Reference Service tariff to their use of the pipeline.

This uniform tariff assumption ensures that tariffs are determined on the basis of equal treatment of all users of the Goldfields Gas Pipeline.

7.5.3.6 Tariff Calculation Model: Expenditures

Expenditures for the purposes of calculating the Reference Service tariff comprise all the estimated future capital expenditures and operating expenditures for the Goldfields Gas Pipeline during the Access Arrangement period.

Projected expenditures for the Goldfields Gas Pipeline over the life of the Access Arrangement have been discussed in a preceding section. These are reproduced for convenience in summary form below.

YEAR	2000	2001	2002	2003	2004
Expenditure: future capital $ thousands	1454	1173	1200	1223	1247
Expenditure: operating costs $ thousands	11304	11252	11302	11586	12712

7.5.3.7 Tariff Calculation Model: Asset Value and Depreciation

For the purposes of determination of the Reference Service tariff, the asset value at the beginning of the Access Arrangement period is taken to be the depreciated value of the cost to fully replace the Goldfields Gas Pipeline.

Application of units of production depreciation to the Optimised Replacement Cost value from the time of construction to the present day yields the Depreciated Optimised Replacement Cost (DORC).

Based on the discussion of asset value in a preceding section, an ORC value of $ 506.7 million is used.

This yields a value of $ 446.6 million for DORC.

The depreciated value of other capital assets is identified to be $ 3.4 million in a preceding section. Further, the value of working capital is identified as being $ 2.6 million.

The Initial Capital Base (ICB) is then set at the value of DORC plus the depreciated value other capital assets plus the value of working capital. As identified in the discussion in a preceding section, an ICB value of $ 452.6 million is obtained.

Addition of future capital expenditure to the ICB and application of units of production depreciation, and subtraction of working capital, yields the asset residual value at the end of the Access Arrangement period.

7.5.3.8 Tariff Calculation Model: Discount Rate

The real before tax Weighted Average Cost of Capital previously determined is used as the discount factor for the base case NPV calculation to determine the Reference Service tariff. The WACC value used is 12.2 percent.

7.5.3.9 Consumer Price Index

To facilitate determination of the Reference Service tariff, the assumptions for inflation made for the determination of Weighted Average Cost of Capital (i.e. 2.5 percent) is employed.

7.5.3.10 Calculation of the Reference Service Tariff

To determine the Reference Service tariff, the values identified above are submitted to a simple discounted cash flow model, whose structure is described above. Tariff is set to yield a Net Present Value of zero.

The following table presents a summary of the discounted cash flow analysis.

GOLDFIELDS GAS PIPELINE:
REFERENCE SERVICE TARIFF DETERMINATION
DISCOUNTED CASH FLOW ANALYSIS

year	1999	2000	2001	2002	2003	2004
reservation (TJ/d)	0	98.2	98.2	102.2	100.5	95.9
average throughput (TJ/d)	0	70.7	70.7	73.6	72.3	69.0
average transport distance (km)	0	1091	1093	1104	1117	1134
toll revenue ($ MOD)	0	10.3	10.5	11.2	11.3	11.1
reservation revenue ($ MOD)	0	64.8	66.4	71.5	72.9	72.6
throughput revenue ($ MOD)	0	14.8	15.2	16.4	16.7	16.6
average fixed charges ($ million MOD)	0	0.02	0.02	0.02	0.02	0.01
annual revenue ($ million MOD)	0	90.0	92.1	99.1	100.9	100.3
capital base initial & residual ($ million MOD)	452.6	0	0	0	0	-352.1
capital expenditure ($ million MOD)	0	1.5	1.2	1.2	1.2	1.2
operating expenditure ($ million MOD)	0	11.3	11.3	11.3	11.6	12.7
net cash flow ($ million MOD)	-452.6	77.2	79.7	86.6	88.1	438.5
discount factor (WACC)	1.000	1.122	1.259	1.412	1.585	1.778
discounted cash flow ($ million MOD)	-452.6	68.8	63.3	61.3	55.6	246.6
discounted cash flow ($ million real)	-452.6	67.1	60.2	57.0	50.4	217.9

It is apparent that the sum of the discounted real cash flows (i.e. their Net Present Value @ WACC) is equal to zero.

The Reference Service tariff required to obtain an NPV @ WACC of zero in the calculations above is approximately 22 percent higher than the Goldfields Gas Pipeline benchmark tariff scheduled for introduction on 1 January 2000.

GGT is committed to encouraging third parties to use the Goldfields Gas Pipeline. To provide such encouragement, it is appropriate to offer a Reference Service tariff which continues to extend to pipeline users the substantial savings in gas transport costs realised through the series of voluntary tariff reductions over the last three years.

Therefore, in order to maintain continuity with the tariff schedules as currently posted, the Reference Service tariff is set to equal to the tariff currently (November 1999) scheduled for introduction on 1 January 2000, namely:

GOLDFIELDS GAS PIPELINE TARIFF SCHEDULE

Posted Tariff: Applicable 1 January 2000

and

Proposed Reference Service Tariff

Tariff	Toll $/GJ	Capacity Reservation $/GJ km	Throughput $/GJ km
1 - 5 Year Contract	0.269392	0.001556	0.000494
6 - 10 Year Contract	0.246943	0.001427	0.000453
11 -15 Year Contract	0.235718	0.001362	0.000433
16 - 20 Year Contract	0.224494	0.001297	0.000412

where tariffs are indexed with CPI, and the reference CPI is 120.2

7.6 Incentive Structures

The approach taken in the determination of the tariff for the Reference Service is based on a "price path" philosophy (Code section 8.3(a)), whereby tariffs are set in advance for the entire Access Arrangement period on the basis of anticipated revenues and costs.

These revenues and costs constitute a benchmark of performance for the Goldfields Gas Pipeline. If GGT is able to reduce costs, through improvements in operating efficiency, it stands to generate returns above those predicted at the time of determination of tariffs. Conversely, if GGT incurs costs which are greater than those predicted, returns will be lower.

Thus, incentives are inherent in the "price path" approach, particularly given the assumptions made regarding revenues generated from currently unused pipeline capacity.

8 KEY PERFORMANCE INDICATORS

8.1 Australian Benchmarks

The acquisition of meaningful benchmark data which might serve as Key Performance Indicators (KPIs) for the Goldfields Gas Pipeline has proved to be a very difficult task.

As part of a recent search for potential sources of KPI information , a request for information was sent to 16 key industry, government, and regulatory organisations. None returned data other than that which has been quoted in Access Arrangements already submitted in other Australian states. Comments from representatives of several of these organisations (including both government agencies and industry associations) indicated that comprehensive, current, appropriately organised, public domain benchmark data for the Australian transmission pipeline industry does not exist.

Therefore, it may be concluded that there is no well established and accepted public domain benchmark data appropriate to the current exercise.

However, coarse comparisons of capital and operating costs on a unit basis have been made in other Access Arrangements. It is illuminating to consider these.

The Access Arrangement Information recently submitted by NT Gas Pty. Limited for the Amadeus Basin to Darwin Pipeline contains a comparison of Australian pipeline operating costs. Data from section 6.4.1.2 of this document is reproduced below.

Company	**Pipeline**	**Unit Operating Cost $ million per 1000 km** (source: NT Gas)
NT Gas	Amadeus Basin to Darwin	3.9
AGLP	Central West	2.8
Epic Energy	Moomba to Adelaide	7.3
EAPL	Moomba to Sydney	6.1
CMS Energy	Parmelia	9.3
TPA (1998)	Victorian Transmission	11.0 to 16.0
TPA (1995 / 96)	Victorian Transmission	9.9
AlintaGas	Dampier to Bunbury	13.6
Pipeline Authority	Moomba to Sydney	10.4
PASA	Moomba to Adelaide	10.1
GGT	***Goldfields***	***7.9***

The unit operating cost for the Goldfields Gas Pipeline lies in the mid range of those listed, and is approximately 60 percent of the unit operating cost for the Dampier to Bunbury Natural Gas Pipeline. This gives a superficial indication that the operating cost for the Goldfields Gas Pipeline compares favourably with unit operating costs for other long distance pipelines.

However, further examination of the data above reveals that there is a 5 to 1 (approximately) spread in unit operating costs over the pipelines considered.

Notwithstanding possible arguments over the relative efficiency of various Australian pipelines under various ownerships over time, it is difficult to see how a meaningful benchmark for pipeline operating costs may be derived from the data above.

As identified above, unit construction costs for long distance pipelines in Western Australia differ by a factor of approximately two to one. While this divergence is not as extreme as the divergence in unit operating costs identified above, it is nevertheless substantial.

On this basis, no further attempt is made to compare KPIs of other pipelines with those for the Goldfields Gas Pipeline.

8.2 Key Performance Indicators in a Competitive Environment

The Goldfields Gas Pipeline currently delivers natural gas to the East Pilbara and Goldfields regions of Western Australia. However, the Goldfields Gas Pipeline is not a monopoly energy supply to those regions.

On one hand, the Goldfields Gas Pipeline faces competition from diesel as an alternate fuel. The original justification for the construction of the Goldfields Gas Pipeline was to displace diesel as fuel for electric power generation. The gas turbines which consume over 90 percent of the gas transported in the Goldfields Gas Pipeline will readily accept diesel as an alternate fuel. It is reasonable to assume that the owners of these gas turbines would revert to the use of diesel if it were in their economic interest to do so, and that developers of new projects will use the most cost effective fuel available. Thus, it is apparent that the delivered price of diesel constitutes the ceiling for the delivered price of gas to the principal consumers supplied by the Goldfields Gas Pipeline.

The Goldfields Gas Pipeline faces current and potential future competition from other pipelines. The Mid West Pipeline represents a potential but tangible alternate means of gas transport to areas west of Leinster and Leonora. The proposed Geraldton to Mount Margaret pipeline would, if constructed, result in a third potential supplier of gas transport services to the region. If such competition eventuates, it will create the most competitive gas transmission market in the country.

Unlike many other pipelines in Australia, the Goldfields Gas Pipeline does not currently hold long term transport contracts. Thus, in order for it to survive in the long term, the Goldfields Gas Pipeline must successfully compete against both existing and potential new pipelines and alternate fuels, and retain as its customers viable mining operations. This last consideration is critical. Virtually all of the Goldfields Gas Pipeline's load supplies mining operations which compete in world markets. Thus, the pipeline faces competitive pressures which are greater than virtually all other Australian pipelines.

These circumstances mean that the Goldfields Gas Pipeline faces a business environment which is substantially different from that which applies to the majority of Australian pipelines. It is also a different environment to that assumed by the Code. Therefore, it is not appropriate to evaluate the Goldfields Gas Pipeline against criteria which are applicable to pipelines which serve major population centres and their diversified markets. Ultimately, the Goldfields Gas Pipeline will stand or fall on its ability to compete for energy transport under conditions of business risk which are greater than those facing virtually all other natural gas pipelines in Australia.

APPENDIX A

CROSS REFERENCE:
INFORMATION DISCLOSURE TO INTERESTED PARTIES

TABLE 1

CODE COMPLIANCE and QUICK REFERENCE GUIDE: GOLDFIELDS GAS PIPELINE ACCESS ARRANGEMENT

Code Section 3 Reference	***Comment***	***Access Arrangement Reference*** *
3.1 Services	The Goldfields Gas Pipeline embraces Open Access principles, offers a widely demanded Reference Service, and provides for other services which can be specifically tailored to meet individual Users' needs.	**AA section 4**
3.2 sought after Services	The Goldfields Gas Pipeline offers a widely demanded Reference Service, which closely mirrors existing transport services offered.	**AA section 4**
3.3 Tariffs	A Tariff is provided for the Reference Service.	**GT&C Sixth Schedule**
3.4 compliance with section 8 of the Code	An exposition of tariff determination principles and methodology is provided in this Access Arrangement Information document.	**AAI section 7; AA section 5**
3.5 principles used	The Reference Service tariff is determined in accordance with the Reference Tariff Policy for the Goldfields Gas Pipeline, and section 8 of the Code.	**AA section 5**
3.6 Terms and Conditions	The General Terms and Conditions address the Reference Service offered and provide for flexibility and negotiation to satisfy individual Users' requirements	**entire GT&C; AA section 8**
3.7 Capacity Management	The Goldfields Gas Pipeline is a Contract Carriage pipeline as defined in the Code.	**AA section 11**
3.8 market carriage	The Goldfields Gas Pipeline is not a Market Carriage pipeline.	**not applicable**
3.9 Trading	Users may readily trade capacity.	**AA section 9; GT&C section 20**
3.10 assignment, change of Receipt & Delivery points	Bare Transfers and Consent Transfers as stipulated under the Code are provided for; Users may negotiate changes to Receipt and Delivery Points.	**AA section 9; GT&C section 20**
3.11 examples	Changes in Receipt Points and Delivery Points may be negotiated.	**AA section 9; GT&C section 20**

* Note: AA designates the Access Arrangement document
GT&C designates the General Terms and Conditions of the Access Arrangement
AAI designates this Access Arrangement Information document.

CODE COMPLIANCE and QUICK REFERENCE GUIDE (continued): GOLDFIELDS GAS PIPELINE ACCESS ARRANGEMENT

Code Section 3 Reference	***Comment***	***Access Arrangement Reference*** *
3.12 Queuing	Queuing for capacity is on the basis of fair and equitable treatment among Prospective Users.	**AA section 7**
3.13 policy content	Queuing is on a first come first served basis .	**AA section 7**
3.14 other matters	The Queuing Policy is designed to accommodate a wide variety of circumstances.	**AA section 7**
3.15 compliance	GGT will comply with its Queuing Policy.	**AA section 7**
3.16 Extensions / Expansions	Extensions and Expansions covered by the Code with the Regulator's consent will be subject to the Access Arrangement; Users who have not made capital contributions to Extensions / Expansions may be subject for surcharges as provided for in section 8 of the Code.	**AA section 10; GT&C section 6**
3.17 Review and Expiry	The Revisions Submissions Date is 4 years 6 months from the Effective Date; the Revisions Commencement Date is 5 years from the Effective Date.	**AA section 3**
3.18 duration more than 5 years	Access Arrangement is for 5 years.	**AA section 3**
3.19 duration more than 5 years	Access Arrangement is for 5 years.	**AA section 3**
3.20 Pipelines not Covered	The Goldfields Gas Pipeline is a Covered Pipeline.	**not applicable**

* Note: AA designates the Access Arrangement document
GT&C designates the General Terms and Conditions of the Access Arrangement
AAI designates this Access Arrangement Information document.

TABLE 2

COMPLIANCE TABLE
GOLDFIELDS GAS PIPELINE ACCESS ARRANGEMENT INFORMATION

NATIONAL THIRD PARTY ACCESS CODE FOR NATURAL GAS PIPELINE SYSTEMS REQUIRED INFORMATION per ATTACHMENT A	ACCESS ARRANGEMENT INFORMATION REFERENCE
Category 1 Access and Pricing	
tariff determination methodology	7.2, 7.3, 7.4, 7.5
cost allocation approach	7.3
incentive structures	7.6
Category 2 Capital Costs	
asset values: zone, service or asset category	4.1, 4.3, 4.5
asset valuation methodologies	4.1
assumptions: economic life for depreciation	4.2
depreciation	4.2
accumulated depreciation	4.2
committed capital works and investment	4.3
description: planned capital investment	4.3
rate of return: equity and debt	7.4
capital structure: debt : equity split	7.4
equity returns assumed: variables used	7.4
debt costs assumed: variables used	7.4
Category 3 Operations and Maintenance	
fixed vs. variable costs	5.1
cost allocation: zones, services, asset categories, regulated/unregulated	5, 7.3
wages and salaries	5.1
cost of services by others	5.1
gas used in operations	5.1
materials and supply	5.1
property taxes	5.1

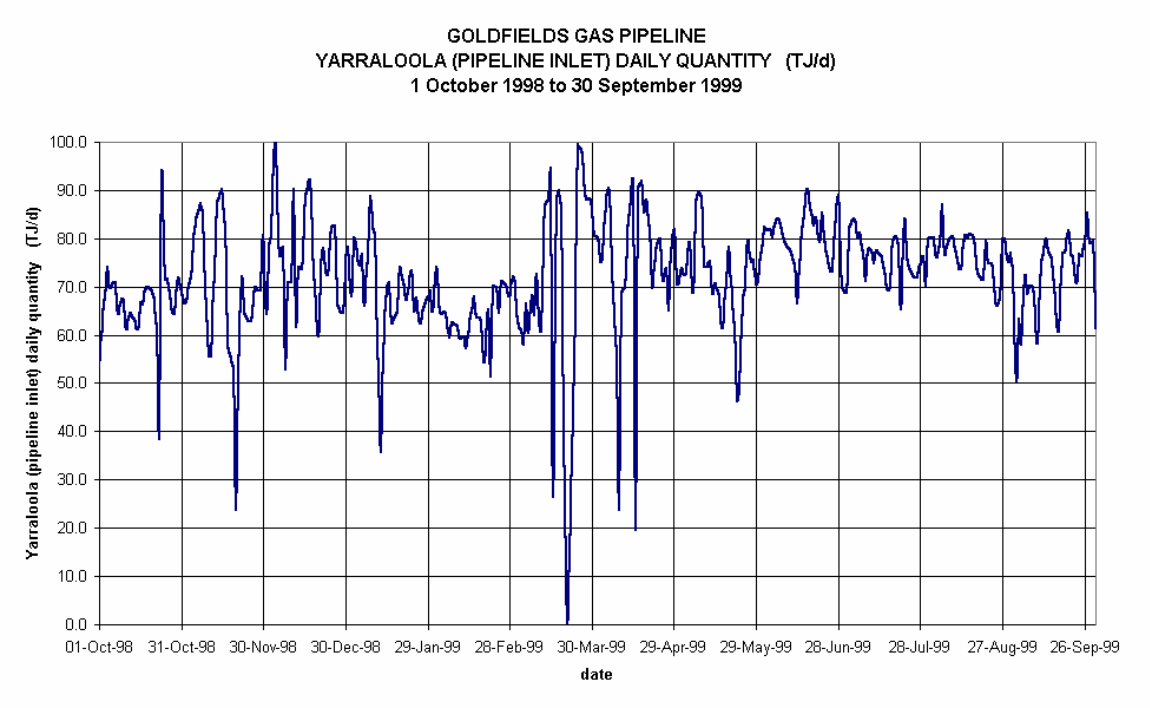
COMPLIANCE TABLE (continued)
GOLDFIELDS GAS PIPELINE ACCESS ARRANGEMENT INFORMATION

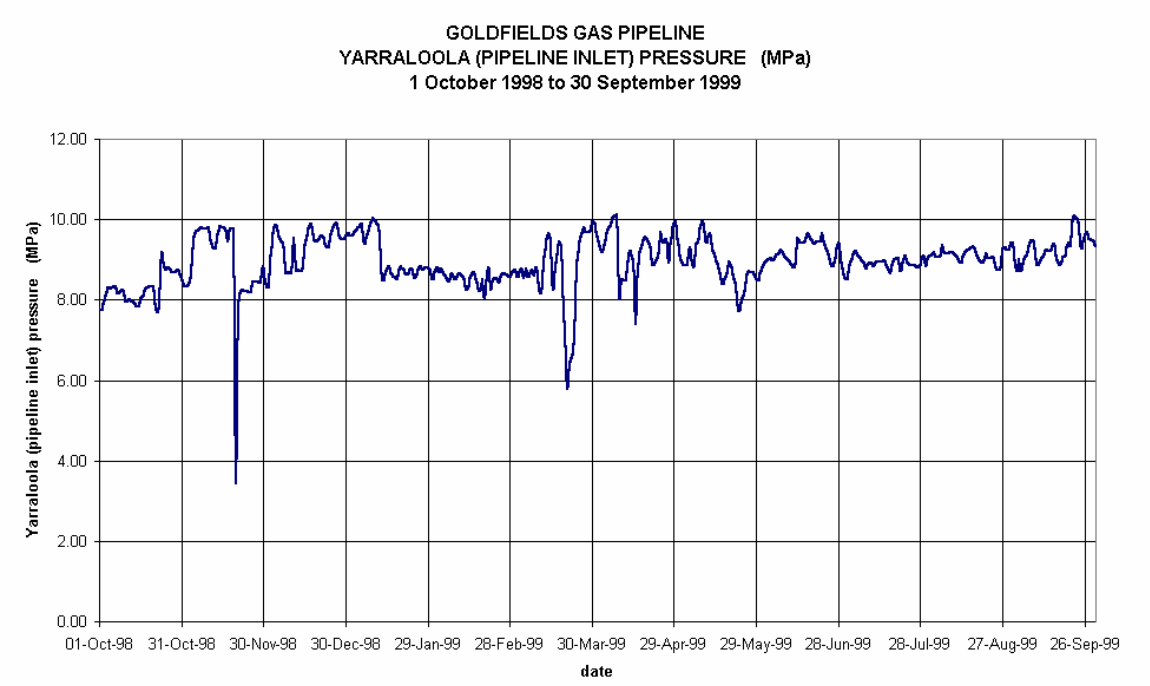
NATIONAL THIRD PARTY ACCESS CODE FOR NATURAL GAS PIPELINE SYSTEMS REQUIRED INFORMATION per ATTACHMENT A	ACCESS ARRANGEMENT INFORMATION REFERENCE
Category 4 **Overheads and Marketing Costs**	
total service provider costs: corporate	5.2
cost allocation: regulated & unregulated	5.2
cost allocation: zones, services, asset categories	5.2
Category 5 **System Capacity and Volume Assumptions**	
description of system capabilities	6.1
map of piping system	6.1, Appendix A
average daily and peak demand	6.2, Appendix C
total annual volume delivered	6.2
annual volume: pricing zone, service, asset category	6.2
system load profile by month	6.2
total number of customers	6.1
Category 6 **Key Performance Indicators**	
industry KPIs	8.1, 8.2, 8.3
service provider's KPIs	8.1

APPENDIX B

GOLDFIELDS GAS PIPELINE
YARRALOOLA INLET FLOW AND PRESSURE
October 1998 to September 1999

Note: when viewing this document from within the Microsoft Word software package, use Page Layout View to display graphs below

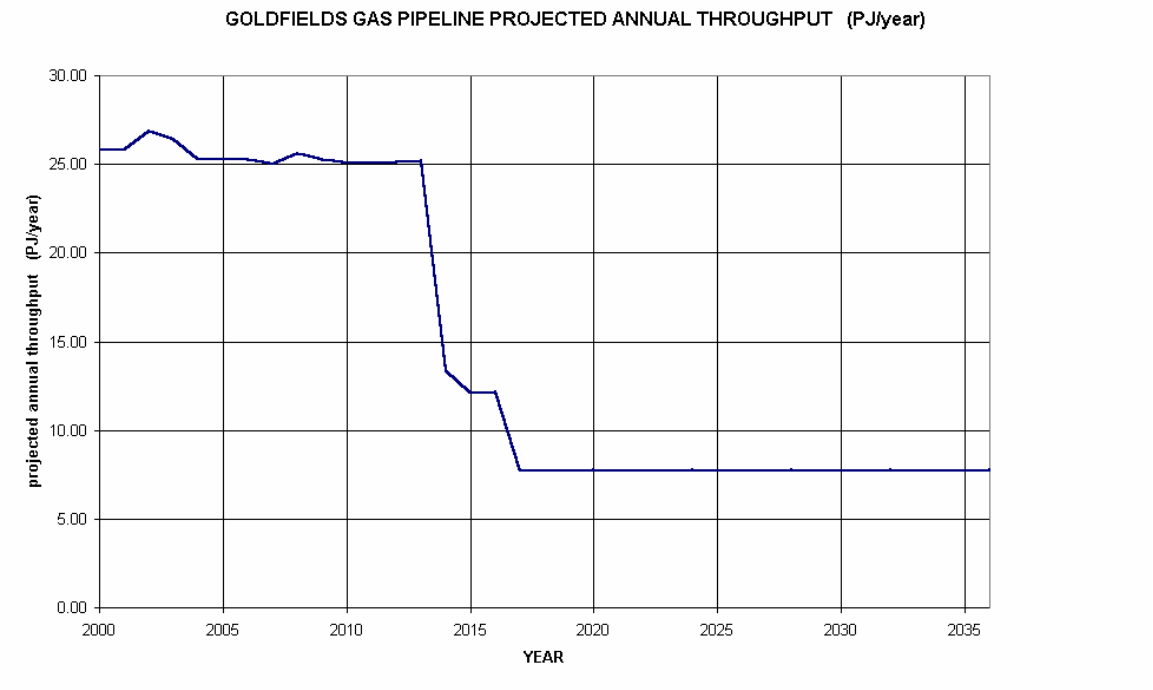

GOLDFIELDS GAS PIPELINE
YARRALOOLA (PIPELINE INLET) DAILY QUANTITY (TJ/d)
1 October 1998 to 30 September 1999
Yarraloola (pipeline inlet) daily quantity (TJ/d)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
01-Oct-98
31-Oct-98
30-Nov-98
30-Dec-98
29-Jan-99
28-Feb-99
30-Mar-99
29-Apr-99
29-May-99
28-Jun-99
28-Jul-99
27-Aug-99
26-Sep-99
date


GOLDFIELDS GAS PIPELINE
YARRALOOLA (PIPELINE INLET) PRESSURE (MPa)
1 October 1998 to 30 September 1999
Yarraloola (pipeline inlet) pressure (MPa)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
01-Oct-98
31-Oct-98
30-Nov-98
30-Dec-98
29-Jan-99
28-Feb-99
30-Mar-99
29-Apr-99
29-May-99
28-Jun-99
28-Jul-99
27-Aug-99
26-Sep-99
date

APPENDIX C

GOLDFIELDS GAS PIPELINE PROJECTED THROUGHPUT

Note: when viewing this document from within the Microsoft Word software package, use Page Layout View to display graph below


GOLDFIELDS GAS PIPELINE PROJECTED ANNUAL THROUGHPUT (PJ/year)
projected annual throughput (PJ/year)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2000
2005
2010
2015
2020
2025
2030
2035
YEAR

APPENDIX D

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