AGL Gas Networks

Access Undertaking
&
Access Undertaking Information

July 1997

AGL **Gas Networks Limited** ACN 003 004 322

AGL

Energy Utilities

21 July 1997

Professor T. G. Parry
Chairman
The Independent Pricing and Regulatory Tribunal of New South Wales
Level 2
44 Market Street
SYDNEY NSW 2000

Dear Professor Parry

Access Undertaking Varied as Agreed and
Access Undertaking Information Varied as Directed

Further to Formally Lodging the AGL Access Undertaking under the NSW Access Code, we enclose the AGL Access Undertaking varied as agreed between AGL and IPART, and the AGL Access Undertaking Information varied as directed by IPART.

We trust that establishment of the AGL Access Undertaking will proceed as quickly as possible.

Yours faithfully

P. R. Blackband.

P R Blackband
General Manager AGL Gas Networks

AGL Gas Networks

Access Undertaking

PURSUANT TO GAS SUPPLY ACT 1996 (NSW)

Varied as agreed with the

Independent Pricing and Regulatory Tribunal

of New South Wales

July 1997

AGL Gas Networks Limited -- Access Undertaking

Varied as Agreed with
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of New South Wales

OVERVIEW OF ACCESS UNDERTAKING

This Undertaking contains the Queuing, Service, and Trading Policies required by the Gas Supply Act and the Code, and AGL's policy on Negotiated Services.

A. Queuing Policy

The **Queuing Policy** (section 2) describes the order in which capacity will be allocated to Prospective Users where there is insufficient capacity on the transportation route to satisfy all Requests for Service on that route.

B. Service Policy

The Service Policy (section 3) consists of three Reference Price Services - that is, three different and defined services for which a Reference Price has been determined. Those service are:

- **Transportation Service** is a basic transport service from the Receipt Point to the Delivery Point of the User. (section 3.1.)

- **Tradeable Capacity Service** is a transport service from the Receipt Point to the Delivery Point of the User, or to the Delivery Point of a Secondary Buyer. The User has the right to trade capacity with the Secondary Buyer without AGL's approval where conditions (such as being on the same transportation route) are met, and with AGL's approval where those conditions are not met. (section 3.2.)

- **Multiple Delivery Point Transportation Service** is a transport service from one Receipt Point to a number of Delivery Points for a single User. The User may nominate each Delivery Point as subject to the conditions applying to either a Transportation Service or a Tradeable Capacity Service. (section 3.3.)

A Delivery Point may be a point at which gas is delivered into a third party network.

The Reference Tariff applicable to each of these Services is set out in Schedule E. AGL's policy on **Variation of Reference Tariffs** is set out in section 5. The Pricing Principles and the process by which Reference Tariffs have been determined are set out in AGL's Access Undertaking Information.

There are two key provisions applicable to the Reference Price Services which result in additional charges to the User, namely:

- **Overruns -** Users will nominate and pay for a level of Maximum Daily Quantity (MDQ) sufficient to meet their needs. However, to deal with situations where a User takes a quantity greater than MDQ, overrun provisions for both authorised and unauthorised overruns are described in section 3.6. To encourage Users to

seek AGL's authorisation for overruns, overrun charges are larger for unauthorised than authorised overruns. To encourage Users to minimise overruns, there is an additional charge for any month where an overrun occurs on more than three days, and for any contract year in which an overrun occurs on more than nine days. The additional charges are a function of the overrun quantities. Overrun charges are set out in section 3.6.

- **Gas Balancing** - As Network operator, AGL manages the gas balance in the Network by using contractual facilities to interrupt or curtail withdrawals, and if necessary by **load shedding** as set out in section 6. The extent to which these measures are invoked depends upon the extent to which Users ensure that the amount of gas delivered into the Network on their behalf and the amount withdrawn on any day are equal. Since it is inevitable that imbalances will occur, gas balancing arrangements are designed to both provide an incentive for Users to minimise their daily imbalances, and ensure that, over time, each User supplies to the Network the same quantity of gas as it withdraws. The gas balancing arrangements are set out in section 3.7. The charges applicable are set out in section 3.7 and illustrated by example in schedule D. These charges are not a source of revenue for AGL - any charges collected will be redistributed among Users in a manner consistent with maintaining the incentive for Users to minimise their daily imbalances.

Other **Key Terms and Conditions for the Provision of Reference Price Services,** including term, daily forecasts and nominations, metering, gas quality, receipt stations, change of Receipt Point or Delivery Point and substituted transfers are set out in section 3.5.

C. Trading Policy

The **Trading Policy** consists of the right to substituted transfer contained in all of the Reference Price Services as set out in section 3.5.7, together with the Tradeable Capacity Service described in section 3.2.

D. General

- AGL's policy on **Negotiated Services**, which relates to agreements negotiated to meet the needs of a User which differ from those in the Service Policy, is set out in section 4.
- The **Term** for which this Undertaking remains in force is set out in section 7.
- **Definitions** applicable throughout the Undertaking are set out in schedule G.
- AGL's policy on **requests for information** concerning existing Users and about the Network generally is set out in section 8.

AGL Gas Networks Limited -- Access Undertaking

Varied as Agreed with
the Independent Pricing and Regulatory Tribunal
of New South Wales

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1 UNDERTAKING

1.1 General

1.1.1 This Undertaking is established by AGL Gas Networks Limited (ACN 003 004 322) (hereinafter referred to as "AGL") in accordance with the Gas Supply Act 1996 (the Act) and the provisions of the Access Code established under the Act.

1.1.2 This Undertaking relates to the provision of gas transportation services to System Users on AGL's Network.

1.2 AGL:

(a) has as its Queuing Policy the procedures set out in section 2 of this Undertaking;
(b) has as its Service Policy the Reference Price Services, and Reference Tariffs related to those Services, set out in this Undertaking;
(c) has as its Trading Policy the rights set out in relation to Reference Price Services; and
(d) undertakes to negotiate with Prospective Users in good faith in circumstances where the Prospective User has specific needs which differ from those which would be served by a Reference Price Service.

1.3 National Access Code

The New South Wales Government has stated its intention to adopt as the access code under the Act, the National Third Party Access Code when it is completed.

If the National Code contains additional provisions or provisions which differ substantially from the comparable provisions of the Access Code under which this Undertaking is established, this Undertaking may not comply with the Act or the then applicable Access Code. In that case, AGL may seek to vary this Undertaking to ensure that it continues to comply with the Access Code in force under the Act.

1.4 Consultation

In developing this Undertaking and the policies contained in it, AGL has consulted with and taken into account, the views of Prospective Users and other interested parties, particularly in relation to technical matters. AGL intends to maintain a process of consultation with interested parties during the term of the Undertaking, to obtain the views of those groups on the how the Undertaking is operating in practice, and on changes that might be considered for future undertakings.

2 ACCESS

AGL's Queuing Policy is defined in this section 2. By way of illustration, a flow diagram of the process is provided in section 2.6.

2.1 Request for Service

2.1.1 A Prospective User, in seeking access to the Network, shall firstly lodge a completed Request for Service with AGL. A Request for Service shall include details of:

(a) the Prospective User;
(b) the type of service requested;
(c) the proposed Receipt and Delivery Points for the proposed service;
(d) the characteristics of the proposed load;
(e) the period over which the proposed service is required and the proposed commencement date; and
(f) details of the supplier's authorisation (if applicable)
.

The Request for Service may be in the form of schedule F and must include as a minimum, the level of detail envisaged by schedule F.

AGL may also wish to satisfy itself of the Prospective User's creditworthiness. To that end, AGL may, among other things, seek information from the Credit Reference Association of Australia; and/or obtain trade references; and/or bank opinions. The Prospective User must provide AGL with such authorisation as AGL reasonably requires to enable AGL to obtain such information, references, or opinions.

2.1.2 A Prospective User may not have more than one active Request for Service in relation to a particular tranche of capacity for the transportation of gas between a particular Receipt Point and a particular Delivery Point.

2.1.3 Unique and Common Services

The services sought by Prospective Users may be classified as either:

(a) "Unique Service" -- where only one Prospective User is seeking the particular service; or
(b) "Common Service" -- where, in the opinion of AGL, two or more Prospective Users are seeking what is essentially the same service. This may occur, for example, where several authorised suppliers are competing to supply a particular gas consumer. AGL will determine whether two or more Prospective Users are seeking a Common Service after seeking and considering any relevant information from them.

In this context, a "service" is broadly characterised by its proposed delivery point, MDQ, MHQ, and commencement date.

2.1.4 Where a Request for Service is received by AGL and it is complete, AGL will acknowledge receipt of the request within seven days and will, within 30 days:

(a) advise whether capacity is available to satisfy the Request for Service and, if it is, at what price; and, if relevant
(b) provide the Prospective User with the information specified in section 2.3.3.

2.1.5 Where a Request for Service is materially incomplete or deficient, AGL will promptly advise the Prospective User of that fact and of the nature of the shortcoming. So long as the Prospective User corrects the shortcoming within seven days of that advice, the date on which the Request for Service was first received by AGL will continue to determine the priority of the Request for Service for queuing purposes. Otherwise the priority date for the Request will be the date on which AGL receives the completed Request.

2.1.6 Processing of Requests for Service will be subject to charges as set out in section E.3 of schedule E.

2.2 Processing of Requests for Service where Capacity is Available

2.2.1 Where there is sufficient capacity available on the requested transportation route to meet the Request of a Prospective User, there will be no queue for access to that capacity.

2.2.2 Where AGL has advised the Prospective User under section 2.1.4 that capacity is available, then unless:

i) the Prospective User has entered into a Reference Price Service Agreement within 30 days of that advice; or
ii) bona fide negotiations have commenced within 30 days of that advice, and are in progress; or
iii) the Prospective User has notified an access dispute;

the Request for Service will be deemed to have lapsed.

2.2.3 AGL will, during the term of this Undertaking, develop a publicly accessible information system (for example, a bulletin board) to provide Prospective Users with information required under section 5.8 of the Access Code insofar as it is relevant to do so for a network as distinct from a pipeline. In the meantime, that information will be available on request.

2.3 Processing of Requests for Service where Capacity is Inadequate

Formation of a Queue

2.3.1 Where capacity on a transportation route is insufficient to satisfy all Requests for Service on that route, provision is made for queuing to ensure that when capacity does become available, it is made available to Prospective Users in a predetermined

manner. Queue positions relating to a particular transportation route will be allocated to Prospective Users as described in section 2.4.

2.3.2 Where a Prospective User lodges a Request for Service and there is insufficient capacity available on the route to satisfy the Prospective User's request, either as the only Prospective User seeking access to capacity on that route or because part or all of the capacity to which the request relates is already the subject of a Request for Service by one or more other Prospective Users, then a queue will be established for that transportation route. The queue will include all Prospective Users with current Requests for Service relating to the transportation route including any Prospective User which has an outstanding Request for Service relating to the transportation route and is covered by section 2.2 at the time the queue is formed ("a Section 2.2 Prospective User").

2.3.3 At the time the queue is formed, or when a new Prospective User joins an existing queue, AGL will promptly advise each Prospective User which is on the queue of:

(a) the existence of the queue and the Prospective User's position on the queue;
(b) the aggregate capacity sought by Prospective Users (if any) which are ahead on the queue; and
(c) its estimate of when capacity (either as Developable Capacity or by extension of the Network) may become available and at what estimated cost, or that an engineering investigation is required to establish how the requested services can be provided. The cost to Prospective User(s), and timing, for any such investigation will be a matter for agreement between AGL and the Prospective User(s).

Within twenty-one days of AGL's advice, any Prospective User on the queue (other than a Section 2.2 Prospective User) wishing to proceed with its Request for Service must provide confirmation of that fact to AGL. If a Prospective User fails to provide that confirmation, its Request for Service will be deemed to have lapsed and its position on the queue will be lost.

2.3.4 Where a queue has formed and includes a Section 2.2. Prospective User, then unless the Section 2.2. Prospective User enters into a Service Agreement or notifies an access dispute within 30 days from the date of formation of the queue, its Request for Service shall be deemed to have lapsed and its position on the queue will be lost.

At the time of formation of a queue, AGL shall inform any Section 2.2. Prospective User on the queue of the matters set out in section 2.3.3 and of the provisions of this section 2.3.4.

2.3.5 Whenever adequate capacity becomes available to meet the aggregate capacity requirements of all Prospective Users on a queue, that queue shall be dissolved and the Requests for Service of those Prospective Users shall be dealt with under section 2.2.

Conditions Applicable on a Queue

2.3.6 Once allocated a position on a queue and while on the queue, a Prospective User may reduce the capacity specified in its Request for Service but cannot increase it.

2.3.7 If, at any time, a Prospective User on a queue decides that it does not wish to proceed with its Request for Service, it will advise AGL of that fact as soon as practicable. The Request for Service will be withdrawn and the Prospective User's position on the queue will be vacated.

AGL may, no more frequently than once every three months, seek confirmation from a Prospective User on a queue that it wishes to continue with its Request for Service. A period of fourteen days will be allowed for the Prospective Users to respond to any such request. If a Prospective User fails to provide confirmation when requested, its Request for Service will be deemed to have lapsed and its position in the queue will be lost.

2.3.8 The Prospective User may assign its position on a queue but only to a person who is a bona fide purchaser of the business and/or of the assets associated with that position and who demonstrates its creditworthiness as reasonably determined by AGL.

2.3.9 Where a controlling interest in the shares of a Prospective User is transferred to a third party prior to the execution of a Service Agreement and it was a condition of that proposed Service Agreement that some other person would guarantee the obligations of the Prospective User, then AGL may delete the Prospective User from the queue if the third party fails to execute such a guarantee or fails to meet the prudential requirements of AGL.

Procedure when Capacity can be Made Available

2.3.10 Whenever a Prospective User's position on a queue changes and/or the capacity sought by those ahead of the Prospective User on the queue changes and/or there is a change to the timing of when a new tranche of developable capacity may become available, AGL will promptly advise the Prospective User of the changes and of their effect upon the Prospective User.

2.3.11 As soon as practicable after making a decision that capacity will be made available on a transportation route which is the subject of a queue, AGL will advise each Prospective User on that queue of its decision; of its plans for making capacity available; of the terms and conditions under which a service is offered; and whether the offer is an offer which does not contain a surcharge for developable capacity ("a Basic Offer") or an offer which does contain a surcharge for developable capacity ("a Surcharge Offer"), and will make an appropriate offer to the Prospective User with the highest priority on the queue or, where the offer is contingent on more than one Prospective User accepting the offer, to those Prospective Users.

2.3.12 Basic Offers

Where a Basic Offer to make capacity available to a Prospective User(s) has been made under section 2.3.11, then unless within 30 days of that Basic Offer, the Prospective User has either:

i) entered into a Service Agreement subject, if necessary, to AGL entering into Service Agreements with other Prospective Users on the queue; or
ii) notified an access dispute;

the Prospective User's Request for Service will be deemed to have lapsed and its position in the queue will be lost.

2.3.13 Surcharge Offers

Where a Surcharge Offer to make capacity available to a Prospective User(s) has been made under section 2.3.11, then unless within 30 days of that Surcharge Offer, the Prospective User has either:

i) entered into a Service Agreement subject, if necessary, to AGL entering into Service Agreements with other Prospective Users on the queue; or
ii) notified an access dispute;

the priority of the Prospective User's Request for Service will be altered so that the Request for Service of any User who accepts a Surcharge Offer and whose Service Agreement in respect of that Surcharge Offer becomes unconditional shall be deemed to have taken priority over the Request for Service of the Prospective User.

Progression of Offers Made under Section 2.3.11

2.3.14 Where AGL has made an offer of service under section 2.3.11 which was not contingent on the acceptance of the offer by more than one Prospective User, and the Request for Service of the Prospective User to whom that offer was made has lapsed under section 2.3.12 or may lose priority under section 2.3.13, then AGL may, without further notice under section 2.3.11, make an offer to the next Prospective User having priority on the queue.

2.3.15 Where AGL has made an offer of service under section 2.3.11 which was contingent on more than one Prospective User accepting the offer, and the Request for Service of any Prospective User to whom that offer was made has lapsed under section 2.3.12 or may lose priority under section 2.3.13, then AGL will review its position in relation to making the required expansion or reinforcement and, as appropriate, will make a new offer under section 2.3.11.

2.4 Priority of Prospective Users in Obtaining Services

2.4.1 Priority dates

- The date of a Request for Service is the first date on which AGL receives the Request for Service, or such later date as may be determined under section 2.1.5.

- A group of two or more Prospective Users who seek a Common Service (as defined in section 2.1.3) will be treated as one in terms of their priority, and will take priority based on the date of the earliest of their Requests for Service. That priority date will be retained by the Requests of all members of the group, even if

the Prospective User whose Request establishes the date should subsequently withdraw its Request.

- AGL will negotiate concurrently, and equally without preference with all Prospective Users in a group seeking a Common Service. However, only one Prospective User from the group (or from either group where AGL has re-determined one Common Service group into two Common Service groups pursuant to section 2.4.2) will have the right, subject to the group's priority on the queue, to enter into a Service Agreement for the requested service. Prior to entering into that Agreement, AGL will require the Prospective User to provide satisfactory evidence that it has the appropriate standing in the group e.g. written advice from the ultimate consumer of the gas. Upon entering into that Agreement, the Requests for Service of all other Prospective Users in that Common Service group or groups will be deemed to have lapsed.

- Where a Prospective User seeks a Unique Service, the right of that Prospective User to enter into a Service Agreement will be determined by its priority on the queue.

2.4.2 Priorities within queues

(a) If a queue relates to a transportation route where capacity is available to serve the needs of one or more of the Prospective Users on the queue then:

i) those Prospective Users on the queue seeking a Reference Price Service will rank in priority ahead of those seeking a Negotiated Service and which have declined to accept an offer from AGL of a Reference Price Service (as determined by AGL). Where AGL has determined that Prospective Users on the queue are seeking a Common Service, the offer of a Reference Price Service will be made to all of those Prospective Users, and those which accept the offer will form one group of Prospective Users seeking a Common Service, and those which reject the offer will form a separate group seeking a Common Service.

ii) Within the categories in i) above, priority will be assigned to Prospective Users in order of the dates of their Requests for Service. The Request for Service which has the earliest date has the highest priority and first right to enter into a Service Agreement.

(b) If a queue relates to a transportation route where an expansion or reinforcement of the Network is required to make capacity available then subject to section 2.3.13, the priority of a Prospective User on the queue will be determined by the order of the dates of their Requests for Service. Where AGL has determined that a group of Prospective Users on the queue are seeking a Common Service, the offer of a service including a Surcharge Offer, will be made to all Prospective Users in the group, and those which accept the offer will form one group of Prospective Users seeking a Common Service and those which reject the offer will form a separate group seeking a Common Service.

2.5 Compensation for Holding Capacity

The period between the date on which a Service Agreement is executed and the date on which the service is to commence will normally be shorter than 30 days. Where a Prospective User wishes that period to be longer than 30 days, and where the commitment of capacity to meet the requirements of the Prospective User contributes:

(a) to the continuation of a queue for capacity on the relevant transportation route or to the formation of such a queue at any time prior to the commencement date of the service; or
(b) to the acceleration of investments by AGL to provide capacity for other users on the transportation route;

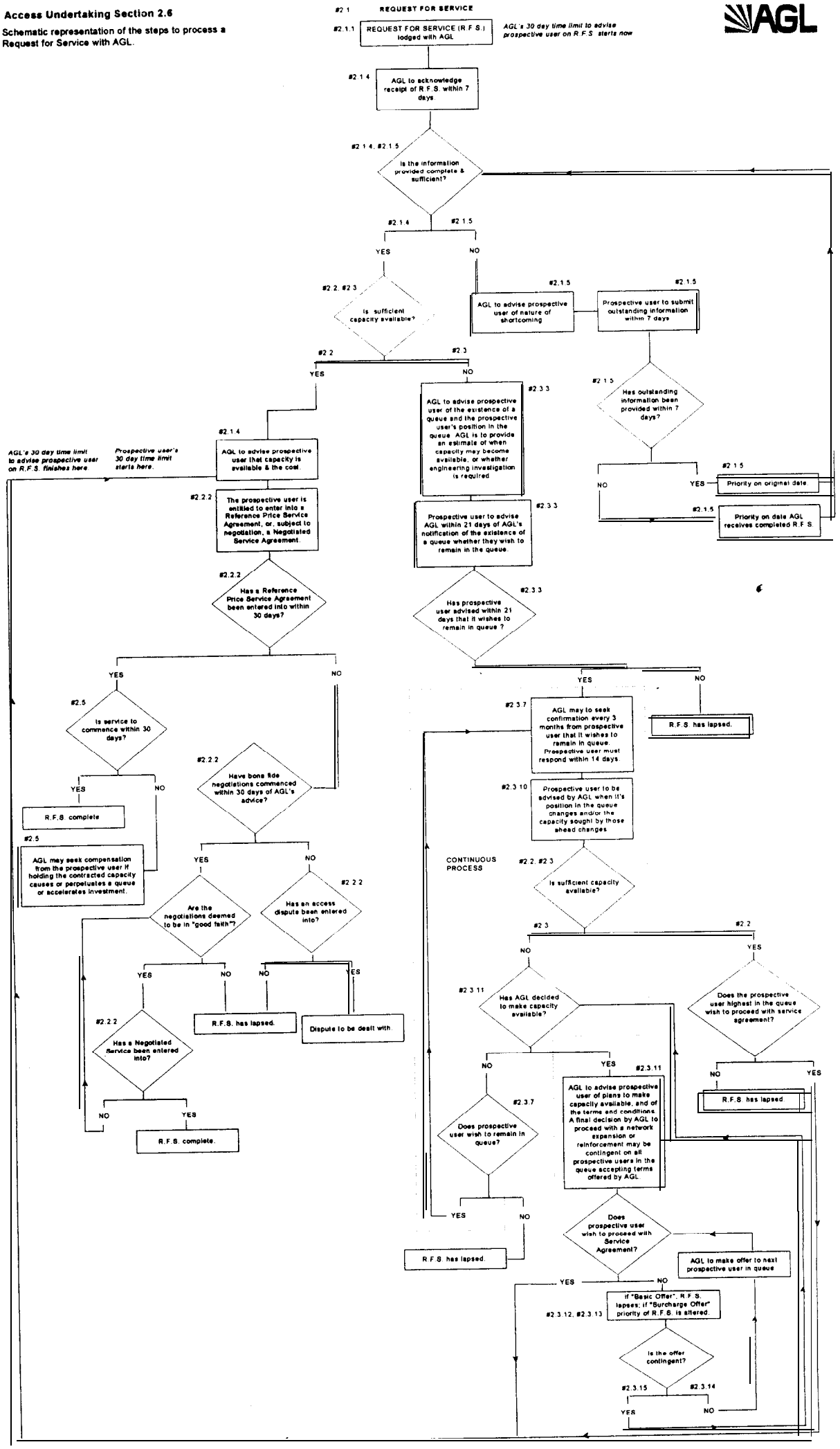
AGL may seek to be compensated for holding the contracted capacity.

2.6 Illustration of the Queuing Policy Process

On the next page is a flow diagram which shows schematically, the steps taken to process a Request for Service under the Queuing Policy. However, the diagram does not deal comprehensively with all of the matters contained in the Policy as set out in the foregoing parts of this section 2. In the event of any inconsistency between the flow diagram and the Queuing Policy as set out above, the Queuing Policy as set out above takes precedence.

Access Undertaking Section 2.6

Schematic representation of the steps to process a Request for Service with AGL.



2.7 Users with Existing Reference Price Service Agreements

Transportation Service Agreements and Tradeable Capacity Service Agreements will provide the User with an option to renew its right to obtain the service. That option will be limited to the capacity contracted for in that Agreement and must be exercised at least two months before the Agreement expires. Any additional capacity required by the User will be the subject of a Request for Service.

Under a Multiple Delivery Point Transportation Service the option to renew will apply to Delivery Points individually.

2.8 Ownership of Network

2.8.1 Subject to section 2.8.2, AGL and the Prospective User may agree, in a Negotiated Service Agreement, that the Prospective User will contribute to the funding of any expansion or reinforcement of the Network required to meet the Prospective User's needs.

2.8.2 The User shall not become owner of any part of the Network upstream of the Delivery Point, except with the express agreement of AGL.

3 REFERENCE PRICE SERVICES

Any User of a service described in this Undertaking will be required to enter into a Service Agreement specific to that User and that service. The Reference Price Services described in this section 3 apply to transportation of Gas to Delivery Points:

(a) on that network from which non-Tariff Customers existing as at the date of this Undertaking were served [1,2]; and
(b) which are served from facilities where the maximum allowable operating pressure is less than or equal to 1,050 kPa.

Where a Prospective User requires terms and conditions which are different from those of a Reference Price Service the Prospective User may seek to negotiate such different terms and conditions as a Negotiated Service as described in section 4.[3]

AGL's Service Policy consists of three services -- Transportation Service, Tradeable Capacity Service, and Multiple Delivery Point Transportation Service -- which are described below in sections 3.1, 3.2, and 3.3 respectively. Those sections also include an outline of the contractual terms and conditions associated with the principal elements of those Services.

A number of other terms and conditions which are common to the provision of all Reference Price Services including term, forecasting and nomination requirements, metering, and gas quality, are described in section 3.5.

The treatment of overruns and gas balancing are important elements of all services and they are dealt with in sections 3.6 and 3.7 respectively. Schedule D provides details of the operation of the incentive charge mechanism which is an integral part of gas balancing arrangements.

Reference Tariffs relating to Reference Price Services, along with other third party access charges are detailed in schedule E. Pricing principles, and the process by which Reference Tariffs have been determined, are set out in AGL's Access Undertaking Information.

3.1 Transportation Service

3.1.1 General

- Under a Transportation Service Agreement and subject to the terms of that agreement, AGL will:

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[1] The "network" is a sub-network of the Network and is depicted on the maps which form part of Schedule E. Services from existing Network facilities operating at pressures greater than 1,050 kPa are not available as Reference Price Services but are available as Negotiated Services.

[2] Negotiated Services are available for transportation on the network.

[3] Where the Network must be extended or reinforced to meet a Prospective User's requirements, then provision of service to that Prospective User will be subject to negotiation as provided in section 4.

(a) receive Gas at the Receipt Point;
(b) transport Gas through the Network;
(c) deliver Gas at a specific Delivery Point (defined to include the point of delivery into a third party network).

- The pressure at which gas will be provided at the Delivery Point will be the standard or alternative metering pressure corresponding to the maximum allowable operating pressure of the Network at the point where gas is taken off to the Delivery Point (refer schedule A).

- Bare transfers as defined in the Access Code, are not permissible under a Transportation Service Agreement.

3.1.2 Contract MDQ and MHQ, and Overruns

Users will be expected to nominate a level of MHQ which fairly reflects the maximum hourly requirement at the Delivery Point, and to nominate and pay for a level of Contract MDQ sufficient to meet their needs.

Normally, AGL's maximum obligation to deliver gas to the User is MHQ in any hour, and Contract MDQ over a Day. An overrun will have occurred if withdrawals at the Delivery Point on a Day exceed the Capacity Entitlement for the Delivery Point on the Day. The quantification and treatment of overruns is dealt with in section 3.6.

3.1.3 Gas Balancing Arrangements

Transportation Service is subject to gas balancing arrangements as described in section 3.7.

3.1.4 Charges applicable under a Transportation Service Agreement

There are three categories of charges under a Transportation Service Agreement -- General Charges which are dealt with in sub-section (a); Overrun Charges in sub-section (b); and Gas Balancing Incentive Charges in sub-section (c).

(a) General Charges

i) Charge for Contract MDQ;
ii) Transitional Charge; and
iii) Metering charge

are applicable as set out in schedule E.

(b) Overrun charges as provided in section 3.6.

(c) Gas Balancing incentive charges as provided in section 3.7.

3.2 Tradeable Capacity Service

3.2.1 General

The second Reference Price Service is Tradeable Capacity Service.

- Under a Tradeable Capacity Service Agreement, and subject to the terms of that agreement, AGL will:

  (a) receive Gas at the Receipt Point;
  (b) transport Gas through its Network;
  (c) deliver Gas at a principal Delivery Point (defined to include the point of delivery into a third party network), and/or at one or more other delivery points subject to the conditions outlined in this section.

- A User may trade its capacity with another User ("the Secondary Buyer"). Trading may occur between the User and a Secondary Buyer which is:

  i) upstream of and on the same transportation route as the User; or
  ii) downstream of and/or on a different transportation route from that of the User.

- Where the Secondary Buyer is upstream of and on the same transportation route as the User (as described in the Service Agreement), trading may occur on any Day and on any terms the User and the Secondary Buyer may agree, subject to the following conditions:

  (a) the Quantities of MDQ and MHQ proposed to be traded are less than or equal to the User's Contract MDQ and MHQ;
  (b) the gas metering and other facilities at the Delivery Point for the Secondary Buyer have the capacity to receive the MHQ contemplated by the trade, in addition to the MHQ which the Secondary Buyer may be entitled to receive under any other arrangement, such as a Service Agreement, during the period of the intended trade;
  (c) facilities exist whereby the quantity of gas being withdrawn at the Secondary Buyer's Delivery Point is recorded, and the recorded information can be accessed remotely by AGL; and
  (d) the User is required to advise AGL of the Secondary Buyer’s identity and the amount of capacity transferred to the Secondary Buyer under the trade by 3:00pm on the Day immediately following the Day of a trade.

- Where the Secondary Buyer is downstream of and/or on a different transportation route from that of the User (as determined by AGL), capacity trading may take place only with the prior approval of AGL. AGL’s approval, which will not be unreasonably withheld, will specify the maximum amount that may be traded and the day or days or time over which trading may take place.

  An additional distance-based charge will be payable in respect of any such trade. The User will be liable for that additional charge unless the parties to the trade

agree otherwise and the Secondary Buyer notifies AGL of that agreement and that it agrees to be liable for the charge.

- The pressure at which gas will be provided at the Delivery Point will be the standard or alternative metering pressure corresponding to the maximum allowable operating pressure of the Network at the point where gas is taken off to the Delivery Point (refer schedule A).

3.2.2 Contract MDQ and MHQ, and Overruns

Users will be expected to nominate a level of MHQ which fairly reflects the maximum hourly requirement at the Delivery Point, and to nominate and pay for a level of Contract MDQ sufficient to meet their needs.

Normally, AGL's maximum obligation to deliver gas to the User is MHQ in any hour, and Contract MDQ over a Day. If withdrawals on a Day at the User's Delivery Point exceed the Capacity Entitlement for that Delivery Point and Day, then an overrun will have occurred and the User will be subject to overrun charges. Likewise, if withdrawals on a Day at a Secondary Buyer's Delivery Point exceed the Capacity Entitlement for that Delivery Point and Day, then an overrun will have occurred and the Secondary Buyer will be subject to overrun charges. The quantification and treatment of overruns is dealt with in section 3.6.

3.2.3 Gas Balancing

Tradeable Capacity Service is subject to gas balancing arrangements as described in section 3.7.

3.2.4 Charges applicable under a Tradeable Capacity Service Agreement are:

(a) General

i) Charge for tradeable Contract MDQ;
ii) Transitional Charge;
iii) Metering charge;
iv) Trade request charge for receiving and processing each request, in excess of one per month, to engage in a capacity trade with a Secondary Buyer which is downstream of the User or off the User's transportation route. This charge will apply whether or not a trade is approved; and
v) Additional distance-based charges for downstream/off route capacity trades

as set out in schedule E.

(b) Overrun charges as provided in section 3.6.

(c) Gas Balancing incentive charges as provided in section 3.7.

3.3 Multiple Delivery Point Transportation Service

The third Reference Price Service is Multiple Delivery Point Transportation Service.

Multiple Delivery Point Transportation Service is available to any System User which requires transportation of gas between a particular Receipt Point and multiple Delivery Points all of which are served through that Receipt Point, as an alternative to the System User taking a separate Transportation Service or Tradeable Capacity Service in respect of transport to each of those Delivery Points.

Except as provided below, the terms and conditions of a Multiple Delivery Point Transportation Service Agreement, as they relate to a particular Delivery Point, will be the same as those which would apply if the Delivery Point were served under a separate Transportation Service Agreement or a separate Tradeable Capacity Service Agreement, whichever is the case. In particular, pricing and overrun provisions will be the same. The exceptions are as follows:

3.3.1 Schedule of Delivery Points -- Additions and Deletions

(a) All of the Delivery Points covered by the Service Agreement will be listed in a schedule to the Agreement.
(b) Each Delivery Point will be identified as being either a Transportation Service Delivery Point or a Tradeable Capacity Service Delivery Point as the case may be, and the service for a Delivery Point will be subject to the relevant terms and conditions. (In this context, a single physical Delivery Point may appear in the schedule more than once. This could occur, for example, where part of the capacity for the physical Delivery Point is to be designated as tradeable and part not.)
(c) Additional Delivery Points will be accepted onto that schedule at any time subject to the requirements of section 2 being satisfied and, if more than one year has elapsed since the commencement of the Agreement, at the discretion of AGL.
(d) A Delivery Point may be changed as provided in section 3.5.6 and will be deleted from the list in the schedule upon expiry of its term. A Delivery Point may not be deleted under any other circumstances.

3.3.2 Nominations and Forecasting

The User will not be required to nominate in respect of Delivery Points individually (refer section 3.5.2). Instead, the User will nominate in aggregate for all of the Delivery Points on a particular Network Section.

3.3.3 Term

The term for a particular Delivery Point will begin on the commencement date of the service to the Delivery Point and, subject to the User's option to renew the service to the Delivery Point as provided in section 2.7, will extend for a period of one or two years as elected by the User at the time the Delivery Point is added to the schedule to the Agreement. The Service Agreement itself will remain in force for so long as there is a Delivery Point listed in the schedule.

3.4 Firm Service Back-haul

Firm service back-haul, if required during the term of this Undertaking, will be a Negotiated Service (refer section 4).

3.5 Key Terms and Conditions for the Provision of Reference Price Services

The principal features of Reference Price Services and their associated terms and conditions, have been described already in this section 3. Other terms and conditions common to Reference Price Service Agreements are described in this section 3.5. Provisions relating to overruns and gas balancing are dealt with separately in section 3.6 and 3.7 respectively.

3.5.1 Term

The term of a Reference Price Service Agreement shall extend from the commencement date of the service for one or two years, at the election of the User. That election will be made at the time the Service Agreement is entered into.

3.5.2 Daily Forecasts and Nominations for Measuring Daily Imbalances

Forecasts of gas requirements are required by AGL for two purposes:

(a) for operational planning; and
(b) in circumstances where a Receipt Point is shared by two or more Users, as the basis for establishing the Users' Confirmed Nominations which are in turn used for determining the Quantity of Gas actually received by the Network from each of those Users on a Day as described in section 3.7.4.1.

Each Day, the User will provide AGL with its forecast of withdrawals from the Network for each of the next three Days. The forecasts for the second and third of those Days are required by AGL solely for operational planning purposes. The information required in respect of the first of the three Days (the "Nomination Day") is more detailed and has special significance in that it will form the basis for determining the User's Confirmed Nomination(s) for the Nomination Day. (Confirmed Nominations are required as the starting point for determining the User's Post-trading Input as described in section 3.7.4, and hence the User's Daily Imbalance as described in section 3.7.3). The following steps will be involved in establishing a User's Confirmed Nomination(s):

i) Each Day the User will inform AGL of its gas requirements for the Nomination Day for each relevant Network Section. This information will include among other things: the Quantity which the User wishes to have delivered at the User's Delivery Point(s) [4] on that Day, and the Quantity (if any) by which the User would like to reduce its cumulative network imbalance for the Network Section by operational means i.e. by delivering into the Network on the Nomination Day, a

[4] Where a User takes gas at more than one Delivery Point on a Network Section, then the User will generally need to provide no more than its aggregate requirements for that Section. However, specific details will be required for any Delivery Point at which an overrun is requested; or which is a designated critical or high consumption Delivery Point.

Quantity which is greater (or less) than the Quantity which would otherwise be required for a zero Daily Imbalance on that Day.

ii) AGL will advise the User of the Quantity of Gas which the User should plan to deliver or have delivered into the Network at the Receipt Point on the Nomination Day in order to enable AGL to satisfy the User's request.

iii) The User will advise AGL of the Quantity of Gas which the User intends to deliver or have delivered into the Network on the Nomination Day (the User's "Confirmed Nomination" for the Nomination Day).

iv) If the User's Confirmed Nomination is different from the Quantity advised by AGL in ii), AGL will advise the User of the Quantity which AGL would expect to deliver to the User on the Nomination Day on the basis that the User's Daily Imbalance for the relevant Network Section is zero for that Day.

3.5.3 Metering

3.5.3.1 Receipts

For the purposes of the Service Agreement, the quantity of gas received by the Network each Day at the Receipt Point will be the User's Actual Input as determined in accordance with section 3.7.4.1.

3.5.3.2 Withdrawals

Withdrawals at the User's Delivery Point will be metered. During the term of this Undertaking, IPART has approved that all meters on the Network be owned by AGL.

i) Where facilities exist Quantities passing through the meter each Day will be recorded and telemetered to AGL's premises daily and will be accessible by AGL, by the User, and by other persons as permitted by the User[5].

In the event of a failure of the telemetering facilities, the User and AGL will cooperate to obtain a manual reading of the meter as soon as practicable after the end of the Day.

If the User requires more immediate metering information than the daily information which AGL will make available, the User may, at its expense, take information directly from the Metering Facilities. Any connection made to the Metering Facilities by the User must be made in accordance with the manufacturer's specification, and must be made in such a way as not to interfere with the proper operation of those Facilities.

[5] As at the date of this Undertaking, over 97% of the collective load of contract (non-tariff) customers is served through meters which have daily recording and telemetering facilities. It is expected that the greater part of the remainder will have those facilities by 1 July, 1997.

ii) A single Delivery Point may be served under two or more Service Agreements and those Agreements may involve one or more different Users. The User(s) could be the consumer at the Delivery Point and/or one or more suppliers.

Before a second or subsequent service commences to a particular Delivery Point, the User(s) and the consumer of the gas will provide AGL with evidence of an agreement between them as to the method to be adopted by them to apportion the total Quantity of Gas metered at the Delivery Point each Day among the Service Agreements; and the parties will establish and agree with AGL on a procedure for providing the results of the apportionment to AGL in a timely manner.

3.5.3.3 Relationship between Delivery Points and sets of Metering Facilities

In most cases, the transportation service to a particular consumer's site or premises, or to a third party network, will be provided through a single set of Metering Facilities. For a Reference Price Service, the relationship between the Delivery Point and set(s) of Metering Facilities will be as follows:

(a) Except as provided in (b) below, the Delivery Point for service to a particular consumer's site or premises, or to a third party network, will consist of no more than a single set of Metering Facilities.
(b) If a particular consumer's site or premises was connected to the Network as at the date of this Undertaking, and was being served at that time through more than one set of Metering Facilities under contract billing arrangements, then the Delivery Point for service to that site or premises may consist of any or all of those sets of Metering Facilities[6].

In either case, services to additional/other sets of Metering Facilities serving the same site, premises or third party network will not be available as Reference Price Services.

3.5.4 Gas Quality

As at the date of this Undertaking, a National Standard specification for distribution quality gas is being developed under the auspices of AGA. AGL expects to adopt that standard when it becomes available. In the meantime, AGL's gas quality specification is set out in schedule C.

Before entering into a Service Agreement, AGL will require the Prospective User to demonstrate that it has arrangements in place to ensure that gas presented at the Receipt Point for transportation will conform to the quality specification.

3.5.5 Receipt Station

If one does not already exist, the User will install or cause to be installed, a receipt station at the Receipt Point, immediately upstream of any connection to the Network.

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[6] For election by the User at the time of entering into the Service Agreement.

The receipt station will comply with specifications approved by AGL. Those specifications, which will vary according to the situation of the proposed Receipt Point, will conform to good engineering practice and industry standards, and will be available from AGL on request. The receipt station will comprise a filtration and liquid separation system, Gas quality measurement facilities, Gas Quantity measurement facilities, and a flow and pressure control system which meet AGL's specifications.

There is no requirement that measurement facilities at the Receipt Station be owned by AGL.

AGL reserves the right, upon reasonable notice, to operate the pressure and flow control facilities at any Receipt Station.

3.5.6 Change of Receipt Point or Delivery Point

The User may change the Receipt Point and/or Delivery Point specified in the Service Agreement with prior written consent of AGL which shall not be unreasonably withheld. Consent will generally be given if:

(a) the proposed Receipt Point is downstream of the Receipt Point specified in the Service Agreement;
(b) the proposed Delivery Point is upstream of the Delivery Point specified in the Service Agreement; and
(c) the proposed Receipt Point and the proposed Delivery Point are both on the transportation route between the Receipt Point and Delivery Point specified in the Service Agreement.

No other term or condition of the Service Agreement will be varied.

In circumstances where one or more of the above conditions is not met, and AGL does not consent to the change, the User may seek to negotiate terms and conditions under which the change can proceed.

3.5.7 Substituted Transfers

The User may effect a Substituted Transfer (as define in the Access Code) with the prior written consent of AGL which shall only be withheld on reasonable commercial or technical grounds.

3.5.8 Variation of Reference Tariffs

It is a condition of a Reference Price Service Agreement that the Reference Tariff will be subject to variation as provided in section 5.

3.6 Overruns

3.6.1 General

- Overrun provisions are applicable to all Reference Price Services.

- An overrun occurs if withdrawals at a Delivery Point on a Day exceed the Capacity Entitlement for the Delivery Point on the Day.

- If an overrun is approved before the event by AGL, then it will be termed an authorised overrun.

- If the User's total withdrawals on a Day exceed the sum of the Capacity Entitlement and any authorised overrun quantity for the Day, then an unauthorised overrun will have occurred and the excess will be an unauthorised overrun quantity. The User will be liable for any damages suffered by AGL as a consequence of an unauthorised overrun.

- Overruns, whether authorised or unauthorised, will be subject to charges as described in section 3.6.3.

- Notwithstanding the provisions of this section 3.6, an overrun will be deemed not to have occurred and the overrun quantity for the Day will be deemed to be zero if, due to failure or unavailability of Metering Facilities, it is not possible to determine the Quantity of Gas withdrawn at the Delivery Point on a Day by meter reading. This will be the case even if, based on the Quantity subsequently estimated to have been withdrawn on that Day, an overrun would have occurred.

3.6.2 Capacity Entitlement

(a) Under a Transportation Service Agreement

The Capacity Entitlement on a Day for the User's Delivery Point under a Transportation Service Agreement will be the Contract MDQ plus any amount of capacity purchased by the User from another User on that Day under a capacity trading arrangement (i.e. purchased by the User as the Secondary Buyer in a capacity trading arrangement with another User which has the right to trade capacity under a Tradeable Capacity Service Agreement, or a Multiple Delivery Point Transportation Service Agreement).

(b) Under a Tradeable Capacity Service Agreement

The Capacity Entitlement on a Day for the Delivery Point under a Tradeable Capacity Service Agreement will be the Contract MDQ plus any amount of capacity purchased by the User from another User on that Day under a capacity trading arrangement and minus any amount of capacity sold by the User on the Day under a capacity trading arrangement with another User.

(c) Under a Multiple Delivery Point Transportation Service

The Capacity Entitlement for a particular Delivery Point served under a Multiple Delivery Point Transportation Service will be determined according to whether the Delivery Point is identified as a Transportation Service Delivery Point or a Tradeable Capacity Service Delivery Point (refer section 3.3.1)

(d) Where a Single Delivery Point is Served under more than one Service Agreement

A special case arises in circumstances where services are provided to a particular Delivery Point under more than one Service Agreement. In those circumstances the determination of whether an overrun has occurred, and any corresponding overrun quantity, must take into account the Capacity Entitlements under all of those Agreements. An overrun quantity, once identified, must then be attributed to the Service Agreements in an appropriate manner. Thus, where services are provided to a particular Delivery Point under more than one Service Agreement, and irrespective of whether more than one User is involved, overruns will be determined by reference to the aggregate of the Capacity Entitlements of all the relevant Service Agreements, and overrun quantities will be attributed to those Agreements in proportion to their Capacity Entitlements.

3.6.3 Overrun Charges

Overruns are subject to charges as follows:

i) There will be a charge for processing each request for an approval to overrun, whether or not the request is approved.
ii) Overrun quantities will be subject to a charge of 1/365 of the Annual Unit Charge for Capacity if authorised, and 1.5/365 of the Annual Unit Charge for Capacity if unauthorised.
iii) If an overrun (authorised or unauthorised) occurs on more than three Days in a month, there will be an additional charge for that month equal to one twelfth of the Annual Unit Charge for Capacity applied to the maximum daily overrun quantity for the month.
iv) If an overrun (authorised or unauthorised) occurs on more than nine Days during a contract year, there will be an additional charge for the year equal to the time-weighted average Annual Unit Charge for Capacity [7] for the year multiplied by the Relevant Quantity for the year. The rules for determining the Relevant Quantity are as follows:

- If there are 10 overrun Days during the year, the Relevant Quantity will be the daily overrun quantity which is third in the order of all daily overrun quantities for the year when ranked from largest to smallest. (For example, if an overrun occurred on 10 Days in a contract year and the daily overrun quantities were 9, 3, 2, 8, 8, 7, 6, 2, 4 and 5, then the ranking would be 9, 8, 8, 7, 6, 5, 4, 3, 2, 2, and the Relevant Quantity would be 8.);
- if there are 11 overrun days during the year then the Relevant Quantity will be the second in that ranking (8 in the above example, assuming the overrun quantity on the eleventh day was less than 8);
- if there are 12 overrun days then it will be the largest daily overrun quantity for the year (9 in the above example, assuming the overrun quantity on the twelfth day was less than 9); and
- if there are more than 12 overrun days during the contract year, the Relevant Quantity will be 1.2 times the largest daily overrun quantity for the year

[7] Time-weighting is required to reflect the fact that the Annual Unit Charge for Capacity is likely to change in the course of a contract year.

(9*1.2=10.8 in the above example, assuming the overrun quantities on the twelfth and subsequent days were less than 9).

v) The charge under iv) will apply progressively beginning with the month in which the cumulative number of overrun days for the contract year first exceeds nine.

vi) Any payments made in accordance with iii) will be credited towards the obligation under iv).

Charges in relation to overruns will be in addition to and not in substitution for any other charges payable under the Service Agreement.

Payment of overrun charges described above does not change the User's Contract MDQ.

3.7 Gas Balancing

3.7.1 Principles

As Network operator, AGL is responsible for managing Network balance and must be prepared for the possibility that, at times, aggregate withdrawals of gas will exceed aggregate receipts to the point where pressure in a Network Section is declining unacceptably. In those circumstances, the only action AGL can take to maintain Network operability is to curtail or interrupt withdrawals. AGL expects to establish the right to interrupt transportation to selected Users to give it the ability to manage such situations. The cost of those contractual facilities will be reflected in the cost of providing transportation services generally. Load shedding arrangements may also be invoked as described in section 6.

The level of interruptible capacity which AGL will require, and the extent to which interruptibility provisions and load shedding arrangements are invoked, will depend on how conscientious Users on each Network Section are in ensuring that their Daily Imbalances are minimised.

As a general principle, a User will be in balance for a Network Section on a Day (i.e. its Daily Imbalance for the Network Section will be zero) if the Quantity of Gas "input" to the Network Section by the User on the Day is equal to the Quantity withdrawn from the Network Section by the User on the Day plus(minus) any increase(reduction) in the User's allocated share of the inventory in the Network Section over the Day. The input Quantity which results in a zero Daily Imbalance is termed the User's Target Input for the Network Section for the Day. The User's Daily Imbalance is then the difference between the User's "input" and its Target Input.

Each User is expected to act in good faith to arrange its deliveries into and withdrawals from the relevant Network Section so that its Daily Imbalance on each Day is zero or, failing that, as small as possible. However, it is inevitable that imbalances will occur. Gas balancing arrangements are designed to:

(a) provide an incentive for Users to manage their affairs in such a way that their Daily Imbalances are minimised; and
(b) ensure that, over time, each User supplies to the Network the same quantity of gas as it withdraws or otherwise disposes of.

The incentive to manage and minimise Daily Imbalances is provided through a system of charges which will be applied to each User's Daily Imbalance. The amount of the charge increases as the size of the User's Daily Imbalance increases. Users will be given the opportunity to trade to reduce their imbalances as described in section 3.7.4.3, and the "input" to be used in determining the size of the Daily Imbalance upon which incentive charges will be paid will be the User's Post-trading Input i.e. the User's Actual Input to the Network Section plus(minus) any quantity purchased(sold) in trading.

It should be noted that the incentive charge mechanism is not to be a source of revenue for AGL -- any charges collected will be redistributed among Users in a manner consistent with maintaining the incentive for Users to minimise their Daily Imbalances. The incentive charges and the operation of the charging mechanism are described in section 3.7.2 and illustrated by example in schedule D.

Users' Daily Imbalances will be carried forward i.e. Users' imbalance positions will run cumulatively. However, it is expected that each User will act to ensure that the magnitude of its cumulative imbalance for a Network Section at the end of a month is no greater than 10% of the average daily quantity withdrawn from that Network Section by or on behalf of the User during the month. Users will have some flexibility in the way they manage their cumulative positions to stay within that limit. A User could reduce its cumulative imbalance using operational means i.e. by supplying more or less gas to the Network than is withdrawn on a Day. Alternatively, Users within a group [8] may manage their cumulative imbalances by trading gas among themselves. This they may do at any time and on any terms they may agree [9]. The parties to such a trade will advise AGL of the identity of the buyer and the seller and of the Quantity traded, and AGL will adjust their cumulative imbalances accordingly.

Where a User's cumulative imbalance as at the end of a month exceeds the 10% limit, and the User has no satisfactory proposal to return its cumulative imbalance to within that limit, either by operational measures or trading, AGL may, at its discretion, direct the User to limit or suspend deliveries of gas into the Network or withdrawals from the Network so as to return the User's cumulative imbalance to within the 10% limit.

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[8] All Users whose transport services utilise any part of the Trunk Section (which serves Sydney, the Central Coast, Newcastle, and Wollongong) will be treated as one group of Users. In the case of users whose services do not utilise any part of the Trunk Section (those whose services utilise country sub-networks), any two or more Users who share a common Receipt Point will constitute a group of Users.

[9] Trading of gas to manage cumulative imbalances may occur at any time. However, as described in section 3.7.4.3, Users may also trade gas to manage/avoid daily imbalances which would otherwise occur, and time constraints do apply to trading under that section.

3.7.2 Incentive Charges Applicable to Daily Imbalances

All Users are subject to gas balancing incentive charges EXCEPT THAT if the User's service is a Transportation Service or a Tradeable Capacity Service and if, due to failure or unavailability of Metering Facilities, it is not possible to determine the Quantity of Gas withdrawn at the Delivery Point on a Day by meter reading, then the charge will be zero. This will be the case even if, based on the Quantity subsequently estimated to have been withdrawn on that Day, the Daily Imbalance calculated for the Day would have been such as to attract a charge. In circumstances where this exception applies, the User will not share in any redistribution of charges (as provided in iii) below) in respect of that Day.

The User's Daily Imbalance for a Day will be calculated as described in section 3.7.3

To determine the gas balancing incentive charge applicable to a User's Daily Imbalance, the absolute value of the Daily Imbalance is allocated to charging bands ("Tranches") as in i); and the charge calculated as in ii). Since the charging mechanism is not to be a source of revenue for AGL, charges will be redistributed among Users in the manner set out in iii).

i) The amount to be charged in respect of a User's Daily Imbalance will be determined by applying the formula set out in ii) to the Daily Imbalance after allocating the absolute value of the imbalance to Tranches in accordance with the following Table:

ALLOCATION OF DAILY IMBALANCE TO TRANCHES		
Column 1	Column 2	Column 3
Tranche Number	Quantity allocated to Tranche (GJ)	Charge applicable to Quantity allocated to Tranche -- $/GJ [1]
1	The smaller of the first six Percentage Quotas and the entire Daily Imbalance.	0.00
2	If any remaining, the smaller of the next five Percentage Quotas and the remainder.	0.20
3	If any remaining, the smaller of the next five Percentage Quotas and the remainder.	0.45
4	If any remaining, the smaller of the next five Percentage Quotas and the remainder.	0.60
5	Remainder if any.	0.75
[1] AGL may, on the basis of its assessment of the effectiveness of the gas balancing charges set out in Column 3, and with the approval of IPART, increase these charges. AGL will give Users at least one month's written notice of its intention to increase the charges, and the earliest an increase may be introduced is July 1, 1998. Charges will be increased no more than once during the term of this Undertaking.		

"Percentage Quota" for a Day for a User means a quantity of gas equal to the greatest of:

(a) 1% of the User's Post-trading Input for the relevant Network Section and Day;

(b) 1% of the User's Target Input for the Day; and
(c) if I_o is greater than I_c for the Day, one sixth of the difference between I_o and I_c for the Day.

ii) The charge in respect of the Daily Imbalance will be the sum, over all Tranches, of the product, for each Tranche, of:

(a) the Quantity of Gas allocated to the Tranche (Column 2); and
(b) the charge applicable to that Tranche (Column 3 or such higher charges as may be advised by AGL).

iii) Redistribution of Net Collections of Gas Balancing Incentive Charges

If the aggregate of gas balancing incentive charges for a Day for a group of Users is an amount other than zero, then that amount will be redistributed among that group of Users in proportion to the Users' Post-trading Inputs for the Day.

3.7.3 Measurement of Daily Imbalance

A User's Daily Imbalance for a Network Section for a Day ("D") is determined by the following formula:

$D = R - \text{Target Input for the Day} = R - (W + I_c - I_o)$

where:

- R is the User's Post-trading Input to the Network Section on the Day, determined as described in section 3.7.4;
- W is the Quantity withdrawn from the Network Section by the User on the Day, determined as described in section 3.7.5;
- I_c is the User's allocated share of closing (end of Day) inventory [10] in the Network Section; and
- I_o is the User's allocated share of opening (beginning of Day) inventory in the Network Section (equal to I_c from the previous Day).

Under a Multiple Delivery Point Transportation Service Agreement, the User's Post-trading Input will be a Quantity which relates to all of the User's Delivery Points on the Network Section, taken in aggregate; and the Quantity withdrawn will be the aggregate Quantity withdrawn at all of those Delivery Points on the Day.

3.7.4 Determination of Users' Post Trading Inputs

[10] For Gas Balancing purposes, the inventory contained in the Trunk Section will be determined by AGL as at the end of each Day. The quantity so determined will be allocated among Users whose services utilise the Trunk Section in proportion to the MDQs of those Users. The inventory in those sections of the Network other than the Trunk Section will be attributable in its entirety to the gas supplier affiliated with AGL and will be deemed to vary only when a new Network Section is pressured up or an old section decommissioned.

The following steps are involved in determining a User's Post-trading Input for a Day:

(a) The User's Confirmed Nomination for the Day is established prior to the commencement of the Day as described in section 3.5.2
(b) After the Day is over, the User's Actual Input is determined by AGL as described in section 3.7.4.1. If the User's Receipt Point is shared by two or more Users, the User's Actual Input will be a function of the User's Confirmed Nomination for the Day.
(c) Actual Inputs and Target Inputs for the Day, determined on a provisional basis, are made available to Users by AGL as described in section 3.7.4.2.
(d) Users may trade gas among themselves so as to reduce or eliminate the Daily Imbalances they would otherwise have. The conditions on which trading may take place are set out in section 3.7.4.3.
(e) The User's Post-trading Input for the Day is then determined, as described in section 3.7.4.4, by adjusting the User's Actual Input for the Quantity, if any, sold or acquired by the User by way of trading.

3.7.4.1 Determination of the User's Actual Input on a Day

Where a Receipt Point is the Receipt Point for a single User, the User's Actual Input will be the total Quantity measured at the Receipt Point, less any Quantity of Gas acquired from the User by AGL for UAG[11].

Where a Receipt Point is shared by two or more Users, the User's Actual Input will be the User's allocated share of the total Quantity measured at the Receipt Point on the Day. The allocation will be performed by AGL, after the event, as follows:

(a) For each User of the shared Receipt Point the difference between the User's Target Input and the User's Confirmed Nomination for the Day (the User's "Individual Difference") will be determined.

(b) The difference for the Day between the total measured input at the shared Receipt Point (less any Quantity of Gas acquired by AGL on the Day for UAG) and the aggregate of Confirmed Nominations for the Receipt Point (the "Aggregate Difference") will also be determined.

(c) The User's Actual Input at the shared Receipt Point will then be determined as follows:

i) for those Users whose Individual Differences lie in the same direction (i.e. are of the same sign; positive or negative) as the Aggregate Difference, the Aggregate Difference will be allocated among those Users in proportion to their Individual Differences. The User's Actual Input will then be the User's Confirmed Nomination plus the Quantity so allocated to the User; and

[11] Users are not accountable for any Quantities of Gas which they may sell to AGL at the Receipt Point for UAG.

ii) the Actual Input for each other User of the shared Receipt Point will be the User's Confirmed Nomination.

3.7.4.2 Within 24 hours of the end of each Day, AGL will determine Users' Target Inputs and Actual Inputs on a provisional basis for the Day, and make them available to Users.

3.7.4.3 Gas Trading to Reduce Daily Imbalances

Users may trade Gas among themselves so as to reduce or eliminate Daily Imbalances which they would otherwise have. Trading may take place on any terms which the parties to the trade may agree, subject to the following conditions:

(a) The parties to a trade must both be Users of the same Network Section.
(b) Gas traded must relate to the same Day for both the buyer and the seller. That is, if a User sells Gas from its Actual Input for a particular Day, then the trade will be reflected in the buyer's Post-trading Input for that same Day as described in section 3.7.4.4.
(c) The parties to the trade will advise AGL of the identity of the buyer and the seller, the Day to which the trade relates, and the Quantity traded. That advice must be provided to AGL no later than the later of:
    i) the fourth day of the month immediately following the month of the Day to which the trade relates; and
    ii) three days after AGL makes Target Inputs and Actual Inputs for the Day available to Users.

3.7.4.4 Post-trading Inputs

(a) If a User has traded Gas in respect of a Day and advised AGL as provided in section 3.7.4.3, the User's Post-trading Input for that Day will be the User's Actual Input on the Day plus (if the User was the buyer in the trade) or minus (if the User was the seller) the Quantity of Gas traded.

(b) If AGL is advised of a trade and the parties do not specify a Day to which the trade relates, or an advice specifying a Day is not provided to AGL within the time set out in section 3.7.4.3(c), then AGL will assume that the trade was made for the purposes of managing the parties' cumulative imbalance positions and will treat the Quantity traded accordingly (refer section 3.7.1). In those circumstances, or if the User has not traded any Gas in respect of a Day, the User's Post-trading Input for the Day will be the User's Actual Input for the Day.

3.7.5 Determination of Quantities Withdrawn from the Network on a Day for Purposes of Gas Balancing

The Quantity of Gas withdrawn at a Delivery Point on a Day will be determined by Metering Facilities at the Delivery Point as described in section 3.5.3.2.

If, due to the failure or unavailability of Metering Facilities at a Delivery, it is not possible to determine the Quantity withdrawn at the Delivery Point on a Day by meter

reading, then the Quantity withdrawn on the Day will be estimated. Note that in circumstances where an estimate must be made:

(a) gas balancing incentive charges will not apply in respect of that Delivery Point for the Day if the Delivery Point is served under a Transportation Service Agreement or a Tradeable Capacity Service Agreement (refer section 3.7.2); and
(b) overrun charges will not apply in respect of that Delivery Point for the Day irrespective of the type of service (refer section 3.6.1)

4 NEGOTIATED SERVICES

Where a Prospective User requires terms and conditions which are different from those of a Reference Price Service the Prospective User may seek to negotiate such different terms and conditions as a Negotiated Service. Should a dispute arise, it will be resolved in accordance with the dispute resolution procedures in the Act and the Access Code, unless the parties agree otherwise.

5 VARIATION OF REFERENCE TARIFFS

5.1 It is AGL's intention that the Reference Tariffs not be changed during the term of this Undertaking, and that prices under Reference Price Service Agreements not be varied other than:

(a) as specifically provided in the Agreement; or
(b) as a result of the variation of taxes etc as described below.

5.2 AGL has established the Reference Tariffs on the basis that the level of authorisation fees payable by AGL under the Act in respect of its authorisation covering the Network will reduce with time. The following schedule of amounts payable has been provided by IPART:

Assumed Authorisation Fee		
Payable in March:	1998	1999
Fee -- $million	4.7	3.2

Otherwise AGL has established Reference Tariffs on the basis of government taxes, charges, levies imposts and fees ('charges') existing at 31 March 1997.

If new charges are imposed, or the level of existing charges is substantially increased, or the assumed reduction in authorisation fees does not materialise, AGL may seek to recover the amount from Users under Service Agreements, and to vary this Undertaking so as to increase the Reference Tariffs. If an existing charge ceases to apply or the level of existing charges is substantially decreased, AGL will pass on to Users the benefit of that reduction in its costs.

Any variation of this Undertaking and Reference Tariffs under this provision will be made only with the prior approval of IPART.

6 OPERATIONAL PRINCIPLES

6.1 Curtailment of Supply

6.1.1 Policy

In the event of a Natural Gas supply failure in a part of the Network, AGL will initiate a load shedding procedure to preserve the integrity of the Network and minimise the disruption to operations at users' sites.

6.1.2 Load Shedding

Load shedding is defined as a controlled interruption or reduction in gas supply to consumers that may be required by conditions causing shortfalls in the supply of natural gas.

6.1.3 Procedure

Load shedding is done on a priority ranking basis with the aim of achieving the maximum load reduction in the shortest time possible with minimal effect to any plant and/or production processes. This means that the load shedding begins with large users where the process is controllable and provides the required level of responsiveness.

6.1.4 Ranking and Priorities

Load shedding, if required, will be implemented by AGL according to the following schedule of priorities:

Load Shedding Priority	Load Type
1	Interruptible Loads
2	A Delivery Point which serves more than one consumer, and where no arrangement exists between AGL and the operator of the facilities beyond the Delivery Point for shedding loads served by those facilities (refer Section 6.2.5).
3	Sites where gas is not used for production.
4	Sites where load is transferable to an alternative fuel.
5	Load that may be **reduced** without damage to product or plant.
6	Load that may be **halted** without damage to product or plant.
7	Load where halting will cause **product** damage.
8	Load where halting will cause **plant** damage.
9	Load not transferable to alternative fuel at hospital and essential service sites.
10	Tariff sites (Residential, Commercial and Industrial).

6.1.5 Reconnection

When the supply failure is declared over, the reconnect phase begins. Reconnection will be in reverse order to disconnection i.e. last off first on.

6.1.6 Emergency Load Management Systems (ELMS)

Emergency Load Management is the process of contacting consumer sites to notify them of an interruption to their gas supply as a result of a problem with the delivery of gas, and subsequently reconnecting them when delivery has been restored. All Users of the Network will be required to participate in and comply with the scheme.

ELMS is an AGL computer based system used as an aid in contacting and recontacting consumer sites in the event of a supply failure. Information on the ELMS system is available to Users on request.

Site and Network information is maintained through ELMS, in consultation with users, and is used as the basis for the initiation and execution of a load shedding action.

6.2 Connection of Third Party Distribution Systems to AGL's Network

A Prospective User may, provided it has the relevant authorisations, and subject to the conditions set out below, construct and operate its own pipe or system of pipes from any agreed point on the Network to the point(s) where the gas is to be utilised.

6.2.1 Off take Point

The pipe or system of pipes installed by the Prospective User which becomes a User as provided in this section 6.2.1, shall comply with the following requirements in order to ensure that the integrity, safety and operability of AGL's system is not compromised.

(a) The location of the off take point on the Network will be agreed to by the potential user and AGL. AGL will only withhold its agreement to a location sought by a potential user on the grounds of technical, operational or safety considerations.

(b) The hot tap connection to connect the User's facilities to the Network will be performed to AS2885-1987 at the User's expense. The work will be performed either by AGL or by a contractor approved by AGL and engaged by the User. In the latter case, AGL reserves the right to supervise the work.

6.2.2 Equipment upstream of the Point of Delivery

Isolation valves and metering equipment will be installed at the point of off take from the Network, upstream of the Delivery Point. If the off take point is on a Network Section where the Maximum Allowable Operating Pressure is above 1,050 kPa, the installation will include a remotely controlled isolation valve.

Facilities upstream of the Delivery Point will be installed, owned and operated by AGL.

6.2.3 Delivery Point

The Delivery Point will be at the flange immediately downstream of the facilities referred to in section 6.2.2. All facilities downstream of the Delivery Point will be the responsibility of the User.

6.2.4 Cathodic Protection of Facilities

A person who installs facilities which are connected to AGL's facilities will design, install, and operate, any cathodic protection system installed to protect its facilities, in such a manner as to avoid any interference which may be detrimental to AGL's facilities.

6.2.5 Load Shedding and Gas Balancing

The User will be subject to load shedding arrangements. The User must have facilities available to it to reduce or discontinue the withdrawal of gas if called upon to do so.

If there is an agreement on load shedding between AGL and the operator of the third party distribution system, the User will be subject to that agreement, otherwise the User will be subject to Load Shedding Priority 2.

The User also will participate in Gas Balancing arrangements.

6.2.6 Installation and Operation

In the interests of safety, and ensuring the integrity of AGL's pre-existing facilities, a person who plans to install gas transportation facilities in the vicinity of those owned by AGL, and AGL, will cooperate to establish, in a timely manner, appropriate arrangements and procedures for the safe installation and operation of that person's facilities, and for the management of emergency situations involving the facilities of either of them.

6.2.7 Abandonment/Disconnection

In the event that the third party network ceases to be used to take gas at the Delivery Point then the person responsible for that network at that time will ensure (at its expense) that the facilities are disconnected and isolated from AGL's facilities. This requirement does not apply where the cessation of use is temporary.

6.2.8 Approvals and Indemnity

The person responsible for a third party network connected to the Network will provide AGL with evidence that it has fulfilled all applicable statutory requirements and that it holds all necessary permits and licences in relation to its facilities downstream of the Delivery Point. That evidence must be provided before the commencement of any service to the Delivery Point.

That person will also indemnify AGL against any claim of liability in relation to or arising out of those facilities.

7 TERM

This Undertaking remains in force until and including 30 June, 1999. AGL's proposal for a new Undertaking to apply after that date will be submitted to IPART no later than 31 December, 1998.

Except in the circumstances set out in section 5.1, AGL does not intend to seek a review of Reference Tariffs during the term of this Undertaking. In its proposal for a new Undertaking to apply after the expiry of this Undertaking, AGL will propose that Reference Tariffs to be established under that and subsequent undertakings be reviewed at intervals of not less than four years nor more than five years.

8 MISCELLANEOUS

8.1 Response to Requests for Information

8.1.1 Information concerning existing Users

Information available to prospective gas suppliers relating to existing consumers.

- A person may, with prior written consent of a consumer, request information from AGL in respect of the load and pattern of usage, over a specified period, of the consumer.
- AGL may verify that consumer's consent.
- AGL will respond to requests for information within 30 days of receipt of that request.
- AGL will charge a fee per metered site of the consumer, to recover the cost of responding to requests for information.

8.1.2 Information about the Network generally

A person may request information from AGL about the Network generally. Where the information requested is contained in this Undertaking, in the Access Undertaking Information, or is available through the system to be developed under section 2.2.3, it will be provided free of charge. Charges as set out in schedule E.3, will apply for the provision of other information.

SCHEDULE A

NETWORK DESCRIPTION

This Undertaking applies to the Network as described in this schedule A, situated within the following Local Government Areas under the Local Government Act 1993:

Ashfield	Cowra	Leeton	Rockdale
Auburn	Drummoyne	Leichhardt	Ryde
Bankstown	Evans	Liverpool	Shellharbour
Bathurst	Fairfield	Maitland	Singleton
Baulkham Hills	Gosford	Manly	South Sydney
Blacktown	Goulburn	Marrickville	Strathfield
Bland	Greater Lithgow	Mosman	Sutherland
Blayney	Griffith	Mulwaree	Sydney
Blue Mountains	Hawkesbury	Muswellbrook	Warringah
Boorowa	Holroyd	Narrandera	Waverley
Botany	Hornsby	Newcastle	Willoughby
Burwood	Hunters Hill	North Sydney	Wingecarribee
Camden	Hurstville	Oberon	Wollondilly
Campbelltown	Junee	Orange	Wollongong
Canterbury	Kiama	Parramatta	Woollahra
Cessnock	Kogarah	Penrith	Wyong
Concord	Ku-ring-gai	Pittwater	Yass
Coolamon	Lake Macquarie	Port Stephens	Young
Cootamundra	Lane Cove	Randwick	

DESCRIPTION OF THE NETWORK CAPABILITIES

The Network extends to Sydney, Newcastle, Wollongong, Central Coast and country areas of New South Wales.

Natural Gas is supplied to the Network by the Moomba-Sydney Pipeline owned and operated by East Australian Pipeline Limited (EAPL). A combination of 27 TRSs (Trunk Receiving Stations), and 16 POTS (Packaged Off Take Stations) owned by AGL, supply the various local High Pressure (HP) distribution networks. The Medium Pressure (MP) and Low Pressure (LP) parts of the Network are served via district regulators from the HP system or, in some cases, directly from a POTS.

HP distribution networks operate at pressures in the range 525 kPa to 7,000 kPa. MP networks operate in the range 70 kPa to 500kPa, and LP networks operate in the range 1.5 kPa to 7 kPa.

Those sections of the Network which are in Sydney, Newcastle and Wollongong are supplied by the AGL Trunk Main which interconnects with the EAPL Pipeline at Wilton.

Those sections of the Network which are in country NSW are supplied directly or by laterals from the Moomba-Wilton pipeline. All country trunk pipelines are owned and operated by EAPL.

The TRS and POTS Locations, Network Descriptions, and the Local Government Areas supplied by each are listed in the following table and shown schematically in the attached drawings.

SCHEDULE A: iii.

TRUNK MAIN											NETWORK DESCRIPTION		LOCAL GOVERNMENT AREAS
	RECEIPT AND SUPPLY POINTS												
	TRS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ. MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	POTS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ.MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	HP	MP	
Moomba-Young (EAPL)						West Wyalong	1750	1750		To 30 June 1998 (Y1): $34.051 Year to 30 June 1999 (Y2): $33.581		✓	Bland
Young - Lithgow (EAPL)	Cowra	1750	1750	n.a.	To 30 June 1998 (Y1): $34.051 Year to 30 June 1999 (Y2): $33.581						✓		Cowra
	Blayney	1750	1750	n.a.							✓		Blayney
	Orange	1750	1750	n.a.							✓		Orange
						Millthorpe	1750	1750	n.a.			✓	Orange
	Bathurst	1750	1750	n.a.							✓		Bathurst
													Evans
	Oberon	1750	1750	n.a.							✓		Oberon
	Lithgow	1750	1750	n.a.							✓		Greater Lithgow
						Wallerawang	1750	1750	n.a.			✓	Greater Lithgow
Young - Griffith (EAPL)	Young	1750	1750	n.a.							✓		Young
	Cootamundra	1750	1750	n.a.							✓		Cootamundra
	Junee	1750	1750	n.a.							✓	✓	Junee
						Coolamon	1750	1750	n.a.			✓	Coolamon
						Ganmain	1750	1750	n.a.			✓	Coolamon
						Narrandera	1750	1750	n.a.			✓	Narrandera
	Rockdale	1750	1750	n.a.								✓	Narrandera
						Leeton	1750	1750	n.a.		✓	✓	Leeton
						Murrami	1750	1750	n.a.			✓	Narrandera
	Yoogali (Griffith)	1750	1750	n.a.							✓	✓	Griffith
Young - Wilton (EAPL)						Boorowa	1750	1750	n.a.			✓	Boorowa
						Yass	1750	1750	n.a.		✓		Yass
	Goulburn	1750	1750	n.a.							✓		Goulburn
	Marulan	1750	1750	n.a.							✓		Mulwaree
						Sally's Corner	1750	1750	n.a.		✓		Wingecarribee
	Moss Vale	1750	1750	n.a.							✓		Mittagong
	Bowral	1750	1750	n.a.							✓		Wingecarribee
						Bargo	1750	1750	n.a.		✓	✓	Wingecarribee

SCHEDULE A: iv.

TRUNK MAIN											NETWORK DESCRIPTION		LOCAL GOVERNMENT AREAS
	RECEIPT AND SUPPLY POINTS												
	TRS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ. MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	POTS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ.MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	HP	MP	
Wilton CTS		3800+	3800										
Wilton-Wollongong (AGL)	Wollongong	3800 +	1750	5300	Y1: 108.163 Y2: 106.670						✓		Wollongong Shellharbour Kiama
Wilton-Horsley Park (AGL)	Appin	3800 +	1750	1000	Y1: 84.613 Y2: 83.445	Appin	3800	1750	100	Y1: 84.613 Y2: 83.445	✓	✓	Wollondilly
	Campbelltown	3800 +	1750	1000							✓		Sydney (see List)
	West Hoxton	3800 +	1750	1500							✓		
Horsley Park - Plumpton (AGL)	Horsley Park	3800 +	3500	26000							✓		Sydney (see List)
Plumpton - Kooragang Island (AGL)	Plumpton	3800 +	17,50	3,500		Maroota	3800	1750	100	Y1: 84.613 Y2: 83.445	✓		Sydney (see List)
	Windsor	3800 +	1,750	500							✓		
	Gosford	3800 +	1750	500	Y1: 248.664 Y2: 245.231	Warnervale			100	Y1: 248.664 Y2: 245.231	✓		Gosford
	Wyong	3800 +	1750	500							✓		Wyong
						Morisset	3200		100			✓	Lake Macquarie
						Minmi	3200		100			✓	
	Hexham	3800 +	1750	5000	Y1: 367.041 Y2: 361.973					Y1: 367.041 Y2: 361.973	✓		Newcastle Maitland Cessnock Singleton Muswellbrook
	Kooragang Island	3800+	1750	500							✓		Port Stephens

[1] If marked "+" then the Minimum Receipt Pressure may be subject to future increase to a maximum of 7,000kPa.

[2] Rates listed here are the Trunk Charge (applicable to the Trunk Section) or Pressure Reduction Charge (applicable to Network Sections other than the Trunk Section) for Transportation Service at the outlet of the TRS or POTS. Local Network Charges, Transitional Charges, and Metering Charges must be added to these figures to obtain the full Reference Tariff (refer Schedule E).

Primary Regulator Stations -- Sydney Local Network				
PRS Location	Minimum Receipt Pressure	Minimum Delivery Pressure at Inlet to PRS	Spare Capacity April 1997 (GJ. MDQ)	Local Network Charge at Outlet to PRS ($/GJ.MDQ pa)
Horsley Park	3,800	1,750	400 (E) [1] 1,100 (D)	Y1: 6.120 Y2: 6.036
Auburn			1,500 (E) 4,400 (D)	Y1: 55.586 Y2: 54.818
Flemington			1,100 (E) 3,300 (D)	Y1: 73.632 Y2: 72.616
Mortlake			300 (E) 800 (D)	Y1: 207.540 Y2: 204.674
Haberfield			800 (E) 2,600 (D)	Y1: 149.956 Y2: 147.886
Tempe			1,200 (E) 3,600 (D)	Y1: 128.370 Y2: 126.598
Mascot			1,100 (E) 3,300 (D)	Y1: 171.293 Y2: 168.928
Banksmeadow			900 (E) 2,700 (D)	Y1: 175.581 Y2: 173.156
North Ryde			1,600 (E) 2,800 (D)	Y1: 176.528 Y2: 174.091
Willoughby			200 (E) 400 (D)	Y1: 792.905 Y2: 781.957

1 Capacity of Primary Main in Sydney at PRS location: E = Existing; D = Developable

Standard Operating and Metering Pressures

Maximum Allowable Operating Pressure (kPa)	Normal Operating System Minimum Pressure (kPa)	Emergency System Minimum (kPa)	Standard Metering Pressure (kPa)	Alternative Metering Pressures (kPa)
1,050	525	400	100	-
500	70	40	2.75	7, 15, 35
400	70	40	2.75	7, 15, 35
300	70	40	2.75	7, 15, 35
210	70	40	2.75	7, 15, 35
7	3.5	2.8	1.38	2.75
2	1.5	1.4	1.38	-

List of Local Government Areas Served Through the Wilton Custody Transfer Station

Ashfield	Fairfield	Maitland	Shellharbour
Auburn	Gosford	Manly	Singleton
Bankstown	Hawkesbury	Marrickville	South Sydney
Baulkham Hills	Holroyd	Mosman	Strathfield
Blacktown	Hornsby	Muswellbrook	Sutherland
Blue Mountains	Hunter Hill	Newcastle	Sydney
Botany	Hurstville	North Sydney	Warringah
Burwood	Kiama	Parramatta	Waverley
Camden	Kogarah	Penrith	Willoughby
Campbelltown	Ku-ring-gai	Pittwater	Wollondilly
Canterbury	Lake Macquarie	Port Stephens	Wollongong
Cessnock	Lane Cove	Randwick	Woollahra
Concord	Leichhardt	Rockdale	Wyong
Drummoyne	Liverpool	Ryde	

Re AGL High Pressure Gas Network Maps

Please see separate pdf document

SCHEDULE B

EXCERPT REPRODUCED FROM AGL TECHNICAL POLICY REVIEW COMMITTEE PROCEDURES MANUAL

TECHNICAL POLICY REVIEW COMMITTEE

TPC.PROC.4.99.17

DESIGN CRITERIA FOR HIGH PRESSURE GAS DISTRIBUTION SYSTEMS

AUTHORISED BY: [Robert A. Paton] Chairperson TPC DATE:

TPC.PROC.4.99.17 Design for High Pressure Gas Distribution Systems

1. Purpose

The purpose of this policy is to define the criteria for design of high pressure gas distribution systems.

2. Scope

This policy applies to the high pressure distribution networks with MAOP above 500 kPa.

3. References

Australian Standards:	AS1697 SAA Gas Pipeline Code
AGA Codes:	AG603 Gas Distribution Code
DD.PROC.4.4.1:	Design Control Procedures
TPC.PROC.4.99.5:	Distribution System Performance Validation for Supply Reliability

4. Definitions

MAOP:	Maximum Allowable Operating Pressure
TPC:	Technical Policy Review Committee (also referred to as TPRC)

5. Procedure

Design Criteria: Refer to table.

All proposed designs must be verified by computer models based on up-to-date system data.

On the completion of the project, the design must be validated against monitored field data. High pressure system performance validation for supply reliability must be performed as per requirements of TPC.PROC.4.99.5 “Distribution System Performance Validation for Supply Reliability”.

All design for high pressure networks must be approved by Manager Distribution Design Services.

6. Documentation

Recommendations for high pressure distribution designs will be maintained in the form of a report for at least 5 years and thereafter will be incorporated in the network validation process (TPC.PROC.4.99.5).

SOURCE OF DESIGN REQUEST	DESIGN INPUTS	DESIGN CAPACITY PROVISION	LONG TERM STRATEGY PLANNING
(a) New Contract and Tariff Projects (b) Capacity Enhancement for Under-Performing Networks (c) Enhancement to Improve Security of Supply and Reliability of the High Pressure Networks (d) Mains Relocation due to Third Party Request	(i) Data of existing system performance, including computer modelling and simulation. (ii) Contract load information. (iii) Potential loads for tariff and contract markets for periods of 5, 10 and 20 years in consultation with area marketing. (iv) Analysis of the requirements and opportunities to improve security and reliability of supply in the area. (v) The minimum pipe size for high pressure networks will be 100 mm. (vi) Tariff market demand is calculated for a 1:20 year winter load factor	(i) Existing Contract and Tariff loads. (ii) Requested new Contract loads. (iii) Projected 5 year growth in tariff market.* (iv) Capacity provisions to improve reliability and security of supply in the area, if justifiable. * Note: To ensure optimum network development, the elements of design which could not be efficiently staged would be allowed to be designed up to the capacity of the existing and requested contract loads and projected 20 year tariff demands.	Strategic plan for the gradual implementation of the design to provide for the contract and tariff markets for the periods after 5, 10, and up to 20 years. Before implementation of any stage of the long term strategic plans, network enhancement requirements and opportunities for improving reliability and security of supply must be revised.

SCHEDULE C

GAS QUALITY SPECIFICATION

	Parameter	Specification Limit	Permissible Variation (Notwithstanding the Specification Limit, a parameter may be within the range specified below, but for no more than two hours cumulatively in any 24 hours)
1	Heating Value	Minimum Daily Average 37.45 MJ/m³	35.58 MJ/m³ to 37.30 MJ/m³
2	Wobbe Index	Min. 47.4 Max. 51.1	51.1 to 51.3
3	Water Dewpoint	Max. 0ºC at 6,895 kPaG	0ºC to 5ºC
4	Hydrocarbon Dewpoint	Max. 10ºC at 3,500 kPaG	10ºC to 14ºC November to February inclusive
5	Carbon Dioxide	Max. 3.0% v/v	3.0% to 4.0% v/v
6	Oxygen	Max. 0.1% v/v	Specification Limit must be met at all times
8	Total Sulphur [1]	Max. 23 mg/m³	23 mg/m³ to 35 mg/m³
9	Mercaptan Sulphur [1]	Max. 4.6 mg/m³	4.6 mg/m³ to 7.0 mg/m³
10	Hydrogen Sulphide	Max. 5.7 mg/m³	5.7 mg/m³ to 11.5 mg/m³
11	Solid Matter and Liquids	Nil Permitted	Nil permitted
12	Temperature at Receipt Point	-5ºC to 50ºC	Specification Limit must be met at all times
13	Odorant	Odorant to be of a type approved by AGL. Level of odorant to be 12 milligrams per cubic meter or such other level as AGL may require.	Specification Limit must be met at all times

[1] Excluding odorant

SCHEDULE D

OPERATION OF INCENTIVE CHARGE MECHANISM TO MINIMISE DAILY IMBALANCES

Charges will apply to users' Daily Imbalances ("D" -- defined in section 3.7), as an incentive for users to organise their affairs so that their Daily Imbalances are minimised: the objective is that D should be as close as practicable to zero for every user. The charging mechanism is described below. References (in the form "Refer line n") are made from the text to relevant lines in the worked example at the end of this schedule.

- The aggregate of users' Daily Imbalances is zero for each Network Section i.e. each section is in balance in aggregate (Refer line 2).

- If, under relevant Service Agreements, a user takes delivery of gas on more than one Network Section then the user will be accountable for its imbalance on each Network Section separately. If a user takes delivery of gas at more than one Delivery Point on a particular Network Section, then the quantities withdrawn at those Delivery Points will be aggregated for the purpose of determining the user's Daily Imbalance in respect of that Network Section.

- The absolute value of each user's Daily Imbalance quantity (Refer line 10) will be allocated across a series of tranches as described below. The gas balancing incentive charge increases progressively with each tranche, so that the greater the imbalance (expressed as a percentage of the greater of the user's actual input to the relevant Network Section on the Day and the user's Target Input for the Day) the greater the charge to the user.

    - Tranche 1: for that part of the absolute imbalance quantity which is less than or equal to 6 Percentage Quotas (where Percentage Quota is as defined in section 3.7.2.i)), there will be no charge (Refer line 13).
    - Tranche 2: for that part, if any, of the absolute imbalance quantity which is in excess of 6 and up to 11 Percentage Quotas: a charge of $0.20/GJ (Refer line 14).
    - Tranche 3: for that part, if any, of the absolute imbalance quantity which is in excess of 11 and up to 16 Percentage Quotas: a charge of $0.45/GJ (Refer line 15).
    - Tranche 4: for that part, if any, of the absolute imbalance quantity which is in excess of 16 and up to 21 Percentage Quotas: a charge of $0.60/GJ (Refer line 16).
    - Tranche 5: for that part, if any, of the absolute imbalance quantity which is in excess of 21 Percentage Quotas: a charge of $0.75/GJ (Refer line 17).

    (Note that the Tranche charges referred to here are those applying as at the date of this Undertaking and may, with IPART's approval be increased during the term of the Undertaking as described in section 3.7.2.i).)

- The total incentive charge in respect of the user's Daily Imbalance for the Day is then the sum over all tranches of the product for each tranche of the 'Charge for the Tranche -- $/GJ' and the quantity allocated to the tranche (Refer line 19).

- The net collection (by AGL) of charges from all users for the Day is then redistributed among users in proportion to their inputs to the network on the Day (Refer line 20) to yield the net amount paid/received by the user in respect of the Day's imbalance (Refer lines 21 and 22).

- In qualitative terms, the net effect of the process from the user's perspective is that the greater the user's imbalance (in percentage terms) the smaller will be the net credit, or the greater the net charge, to the user when expressed in $/GJ of gas input to the network by the user on the Day. The user with the smallest percentage imbalance on the Day will receive the largest net credit (in $/GJ), and the user with the largest percentage imbalance will make the largest net payment (in $/GJ).

- The operation of the gas balancing incentive charging arrangements is illustrated by the following simplified four user example:

Line Ref	User:			A	B	C	D	Total
	Quantities:							
1	MDQ (TJ)			40	4	140	216	400
2	BOD Cumulative Imbalance (TJ) [2]			5	1	4	-10	0
3	BOD Target Share of Inventory (TJ)			6.00	0.60	21.00	32.40	60
4	EOD Target Share of Inventory (TJ) [3]			5.00	0.50	17.50	27.00	50
5	Withdrawals (TJ)			26	4	123.5	203.5	357
6	Target Input (TJ)			25.00	3.90	120.00	198.10	347
7	Post-trading Input (TJ)			22	5	110	210	347
	Allocation of Absolute Value of Imbalance to Tranches:							
8	Daily Imbalance for Day (TJ)			-3.00	1.10	-10.00	11.90	0
9	EOD Cumulative Imbalance (TJ)			2.00	2.10	-6.00	1.90	0
10	Absolute Value of Imbalance for Day (TJ)			3.00	1.10	10.00	11.90	
11	Absolute % Imbalance for Day [4]			12.00%	22.00%	8.33%	5.67%	
12	Percentage Quota (TJ) [5]			0.25	0.05	1.20	2.10	
		Charge for Quantity in Tranche -- $/GJ	Max. No. of Percentage Quotas in Tranche					
13	Tranche 1	0.00	6	1.50	0.30	7.20	11.90	
14	Tranche 2	0.20	5	1.25	0.25	2.80	0.00	
15	Tranche 3	0.45	5	0.25	0.25	0.00	0.00	
16	Tranche 4	0.60	5	0.00	0.25	0.00	0.00	
17	Tranche 5	0.75	Excess	0.00	0.05	0.00	0.00	
18	Total			3.00	1.10	10.00	11.90	
	Financial:							
19	Initial Charge ($)			(362.50)	(350.00)	(560.00)	0.00	(1272.50)
20	Redistribution ($)			80.68	18.34	403.39	770.10	1272.50
21	Net Credit/(Charge)		$	(281.82)	(331.66)	(156.61)	770.10	0.00
22			$/GJ Input	(0.0128)	(0.0663)	(0.0014)	0.0037	

Notes:

1 Outlined cells are input -- all others are calculated. Quantities are notional.

2 BOD = beginning of Day = EOD from previous Day

3 EOD = end of Day

4 "Absolute % Imbalance for Day" is the Absolute Value of Imbalance for the Day expressed as a percentage of the greater of the User's Post-trading Input and Target Input

5 "Percentage Quota" is that quantity as defined in section 3.7.2.i)

6 A user's actual total inventory is the sum of user's Target Share of Inventory and the user's Cumulative Imbalance

SCHEDULE E

NATURAL GAS TRANSPORTATION SERVICES TARIFFS AND CHARGES

E.1 REFERENCE PRICE SERVICES

This section E.1 deals with the Reference Tariffs which relate to Transportation Services and Tradeable Capacity Services. Charges described here as relating to those Services apply equally under a Multiple Delivery Point Transportation Service to Delivery Points with the corresponding designations (refer section 3.3 in the body of the Undertaking).

E.1.1. Common Elements of Reference Tariffs Related to Transportation Service and Tradeable Capacity Service

There are five heads of charge which are common to the Reference Tariffs related to both Transportation Service and Tradeable Capacity Service. They are:

i) Charge for Contract MDQ;
ii) Transitional Charge;
iii) Metering charge;
iv) Overrun charges; and
v) Gas balancing incentive charges.

The bases for and amounts of charges under the first three of these heads are set out in sections E.1.1.1, E.1.1.2, and E.1.1.3 respectively. In section E.1.1.4, it is noted that there are no throughput-related charges for either type of service. Overrun charges are a function of the User's Unit Charge for Capacity and other factors as described in section 3.6.3, and the basis for those charges, along with the basis of gas balancing incentive charges, is described in section 3 in the body of the Undertaking. Additional heads of charge specific to Tradeable Capacity Service are described in section E.1.2. Miscellaneous charges applicable to both types of service are set out in section E.4.

E.1.1.1 Charges for Contract MDQ

E.1.1.1.1 Transportation Service

(a) Trunk Section Users

Where a transportation service utilises any part of the Trunk Section, the Annual Unit Charge for Capacity (AUC) related to the relevant Transportation Service Agreement will be a Trunk Charge (T) (the Trunk Charge includes costs associated with pressure reduction equipment) plus a Local Network Charge (L) where:

T = the relevant Trunk Charge from Table 1 below; and

L = the Local Network Charge represents the User's share of the costs associated with the Local Network assets utilised in providing the service to the Delivery Point.

***Trunk Charges** (T)*

TABLE 1				
Trunk Charges -- $/GJ of Contract MDQ per Annum				
Trunk Section	**SOUTHERN**	**NORTHERN**		
Zone	***Wollongong***	***Sydney***	***Central Coast***	***Newcastle***
Trunk Charge				
Period Ending 30 June, 1998	108.163	84.613	248.664	367.041
Year Ending 30 June, 1999	106.670	83.445	245.231	361.973

Local Network Charges (L)

The Local Network Charge is different for each Delivery Point. An estimate of the Local Network Charge for a particular Delivery Point can be obtained by referring to the maps provided at the end of this schedule which show indicative price bands for locations on the Network. In addition, the exact Local Network Charge that would apply at the outlet of each primary regulator station is given in schedule A.

Note that there is not always a linear relationship between price and distance within the price (colour) bands shown on the maps. The precise Local Network Charge for each Delivery Point has been calculated as at the date of this Undertaking. The Charge for such a Delivery Point will be provided by AGL on request, and free of charge, to the relevant gas consumer, the consumer's authorised supplier and, subject to the consent of the consumer, to other authorised suppliers. Local Network Charges for any other/proposed Delivery Point will be provided in response to a Request for Service.

(b) Non-Trunk Section Users

Where a transportation service does not utilise any part of the Trunk Section, the Annual Unit Charge for Capacity (AUC) related to the Transportation Service Agreement will be a Pressure Reduction Charge of $34.051 per GJ of MDQ per annum for the period ending 30 June, 1998, and $33.581 per GJ of MDQ per annum for the year ending 30 June, 1999, plus the relevant Local Network Charge (L).

E.1.1.1.2 Tradeable Capacity Service

The Annual Unit Charge for Capacity (AUC) related to a Tradeable Capacity Service Agreement will be 1.4 times the Annual Unit Charge for Capacity that would apply if the service were an otherwise identical Transportation Service.

E.1.1.2 Transitional Charge

The Transitional Charge (expressed in $/GJ of Contract MDQ per Annum) relates equally to Transportation Services and Tradeable Capacity Services. The Transitional Charge (C_y) for a particular Delivery Point for a particular Period (y), varies according to the following formula:

$$C_y = \left(\frac{B - \left(\left(A_y \times MDQ \right) + S \right)}{MDQ} \right) \times F_y$$

where:

y = the period to which the calculation relates. y equals 1 for the period beginning on the access date fixed by the Minister in relation to the Network and ending on 30 June, 1998; and y is 2 for the year ending on 30 June, 1999.

B = for Delivery Points to which a service was provided prior to 31 January, 1997, the Network revenue which was, or would have been, derived from the provision of that service for the full year to 31 January, 1997 and;
for Delivery Points to which a service is first provided after 31 January 1997, the Network revenue that would have been derived from the provision of that service had it been provided throughout the year ended 31 January 1997 at AGL's then applicable standard contract rates. Those rates are set out in Table 2 which follows.

TABLE 2
Standard Contract Prices ($/GJ of Throughput) as at 31 January 1997

	Sydney, Wollongong	Newcastle	Central Coast	Goulburn, Moss Vale, Mittagong	Bathurst, Orange, Lithgow, Oberon	Cootamundra, Young, Junee, Riverina
Distribution						
First 1,000 GJ/month	5.863	5.863	5.863	5.906	7.09	5.824
Next 12,000 GJ/month	3.054	4.448	3.678	3.096	3.805	3.014
Additional GJ/month	2.665	3.749	3.252	2.707	3.241	2.625
Fees and Taxes						
First 1,000 GJ/month	0.114	0.114	0.114	0.114	0.130	0.114
Next 12,000 GJ/month	0.078	0.096	0.086	0.079	0.089	0.079
Additional GJ/month	0.073	0.087	0.081	0.074	0.082	0.074
Total Network Price						
First 1,000 GJ/month	5.977	5.977	5.977	6.020	7.220	5.938
Next 12,000 GJ/month	3.132	4.544	3.764	3.175	3.894	3.093
Additional GJ/month	2.738	3.836	3.333	2.781	3.323	2.699

A_y = if the service is a Transportation Service, the Annual Unit Charge for Capacity for that service. Alternatively, if the service is a Tradeable Capacity Service, the Annual Unit Charge for Capacity for that service divided by 1.4.

MDQ = Contract MDQ

S = The metering charge for the Delivery Point ($ per annum)

and:

$$F_y = \frac{R_y - R_3}{R_0 - R_3}$$

in which:

R_y = that part of the contract market annual revenue path expected to be derived from Reference Price Services (assumed all to be Transportation Service) for Period y. R_1 = $98.613 million, and R_2 = $80.325 million.

R_0 = $122.616 million, being the summation of the values of "P", as defined above, for all Delivery Points expected to be served by Reference Price Services as at the date of this Undertaking.

R_3 = $64.887 million. This amount is the share of Greenwood Challoner's assessment of the subsidy-free cost of serving the contract market (refer section 1.2 of AGL's Access Undertaking Information), which is attributable to non-decrement customers i.e. those which are capped or are taking Reference Price Services.

It follows that:

F_1 = 0.5842; and

F_2 = 0.2674.

E.1.1.3 Metering

E.1.1.3.1 Metering charges apply equally under Transportation Service Agreements and Tradeable Capacity Service Agreements. Metering charges will be determined on the basis of the type(s) of meter(s) installed at the Delivery Point as follows:

Type of Meter	Metering Charge ($ per Year)	Type of Meter	Metering Charge ($ per Year)
Domestic	25	RM200	1,253
AL1000	372	RM30	253
AL1400	887	RM55	448
AL2300	1,236	RM85	594
AL425	75	ROCK 5000	1,236
AL5000	1,659	ROCK T140	6,013
AL800	372	ROCK T18	1,354
G16	372	ROCK T30	1,544
G6	84	ROOTS 1.5	360
G1600	10,883	ROOTS 11	1,498
GT12	6,940	ROOTS 16	2,133
GT4	1,135	ROOTS 3	564
GT6	1,355	ROOTS 5	902
GT8	2,096	ROOTS 7	1,253
INSTRO 12	10,139	T60	2,267
MT10	75	TP9	999
RM140	879		

E.1.1.3.2 Where a Delivery Point is served under more than one Service Agreement, the metering charge payable in respect of the Delivery Point will be allocated among all those Agreements in proportion to their Contract MDQs.

E.1.1.4 Charges in Relation to Quantities Transported

Nil

E.1.2. Charges Specific to Tradeable Capacity Service

E.1.2.1 Charge for receiving and processing each request, in excess of one per month, to engage in a capacity trade with a Secondary Buyer which is downstream of the User or off the User's transportation route.

$100 per request.

This charge will apply whether or not a trade is approved.

E.1.2.2 Additional distance-based charges for downstream/off-route capacity trades.

E.1.2.2.1 Where the Secondary Buyer in a capacity trade is downstream of and/or on a different transportation route from that of the User, an additional distance-based charge will apply to the amount of capacity traded on each day that a trade takes place. The charge will be calculated as follows:

If:

the Annual Unit Charge for Capacity for Tradeable Capacity Service at the Secondary Buyer's Delivery Point
minus
the User's Annual Unit Charge for Capacity

is greater than zero, then the additional distance-based charge for a downstream/off-route capacity trade on a day, will be equal to 1/365 times that difference, applied to the amount of capacity traded on the day. Otherwise the additional charge will be zero.

E.1.2.2.2 The User will be liable for the additional charge unless the parties to the trade agree otherwise and the Secondary Buyer notifies AGL of that agreement and that it agrees to be liable for the charge.

E.2 NEGOTIATED SERVICES

Tariffs and charges for negotiated services are as agreed.

E.3 MISCELLANEOUS CHARGES:

i) Requests for Information (Refer section 8)
- Concerning an existing User
- Concerning the Network generally as provided in section 8.1.2

$50 plus $50 per hour after the first hour.

ii) Request for Service (Refer section 2)

The cost for processing a Request for Service, excluding the cost of any engineering and liaison investigation that may be required (Refer section 2.3.3) will be $50 plus $50 per person hour after the first hour, up to a maximum of $2,000.

iii) Receipt and processing of a request for Authorised Overrun

$50 per request

This charge will apply whether or not an overrun is authorised.

For colour maps please contact AGL

SCHEDULE F

NATURAL GAS TRANSPORTATION SERVICES
FORM OF REQUEST FOR SERVICE

F.1 PROSPECTIVE USER (PU) DETAIL:

Name of Prospective User (PU): . . . . . .
ACN No.: . . . . . .
Contact Officer: . . . . . .
Title: . . . . . .
Address: . . . . . .
. . . . . .
Telephone: . . . . . .
Fax: . . . . . .
Service Requested by the PU: . . . . . .

If requested service is not a Reference Price Service, then what conditions, different from those available under a Reference Price Service, are sought, and what are the special circumstances or conditions which give rise to that need?

. . . . . .
. . . . . .
. . . . . .
. . . . . .

Date for Commencement of Service: . . . . . .

Duration of Service Agreement sought: . . . . . .

F.2 RECEIPT POINT INFORMATION:

Receipt Point Location: . . . . . .

Will Gas to be provided at the Receipt Point conform to AGL's Specification: Yes/No

Entity Responsible for Delivery of Gas to Receipt Point: . . . . . .
(if other than the PU)
ACN No.: . . . . . .
Contact Officer: . . . . . .
Title: . . . . . .
Address: . . . . . .
. . . . . .
. . . . . .
Telephone: . . . . . .
Fax: . . . . . .

F.3 DELIVERY POINT INFORMATION:

Delivery Point Location: . . . . . .
(full address please) . . . . . .
. . . . . .
. . . . . .
. . . . . .

Minimum Delivery Point Pressure Desired (kPa): . . . . . .

Maximum Delivery Point Pressure Desired (kPa): . . . . . .

Entity Controlling Withdrawal of Gas at Delivery Point: . . . . . .
(if other than the PU)
ACN No.: . . . . . .
Contact Officer: . . . . . .
Title: . . . . . .
Address: . . . . . .
. . . . . .
. . . . . .
Telephone: . . . . . .
Fax: . . . . . .

F.4 TRANSPORTATION INFORMATION:

Annual Quantity to be Transported (GJ): . . . . . .
Maximum Daily Quantity - MDQ (GJ): . . . . . .
Maximum Hourly Quantity - MHQ (GJ): . . . . . .

Transportation Patterns:
(graphically if possible, to assist with the assessment of the request)

- Typical Daily Profile
- Typical Weekly Profile
- Typical Annual Profile
- Examples of Atypical Profiles

Description of gas application(s) at the Delivery Point: . . . . . .
. . . . . .
. . . . . .
. . . . . .

Is the transportation service being sought to serve a new load or an existing load on the Network?

DEFINITIONS

"Access Code" means the access code established under the Gas Supply Act 1996 as at the date of this Undertaking.

"Act" means the Gas Supply Act 1996

"Actual Input" means a User's actual input to a Network Section on a Day determined in accordance with section 3.7.4.1.

"Annual Unit Charge for Capacity" means the price for Contract MDQ expressed in dollars per GJ of Contract MDQ per annum.

"Capacity Entitlement" means capacity entitlement as defined in section 3.6.2.

"Common Service" means a service of the type defined in section 2.1.3.

"Contract MDQ" or "MDQ" means the maximum daily quantity of gas which AGL is required to transport and the User may withdraw under a Service Agreement

"Daily Imbalance" for a particular User, Network Section and Day means the difference (positive or negative) between the User' Post-trading Quantity for the Network Section for the Day (refer section 3.7.4), and the User's Target Input for the section for the Day (refer section 3.7.1.)

"Day" means a period of twenty-four hours beginning at 06:30 a.m. Eastern Standard Time

"Delivery Point" means a delivery point nominated or defined in a Service Agreement at which gas is withdrawn from the Network by a User. Subject to certain restrictions in the case of Reference Price Services (refer section 3.5.3.3), a Delivery Point may consist of one, two, or more sets of Metering Facilities servicing a particular consumer's site or premises, or serving a third party network.

"IPART" means the Independent Pricing and Regulatory Tribunal of New South Wales.

"Metering Facilities" means the meter(s) and any associated filter(s), regulator(s), or other equipment, and pipework, by which the gas delivered to the User is conditioned, controlled, and metered.

"MHQ" means the quantity of gas specified in a Service Agreement as the maximum hourly quantity which AGL undertakes to receive and deliver in any hour under the agreement.

"Multiple Delivery Point Transportation Service" is a service for transportation of gas under a Transportation Service Agreement.

"Multiple Delivery Point Transportation Service Agreement" means an agreement for a gas transportation service as described in section 3.3.

“Negotiated Service Agreement” means an agreement for transportation of gas on terms and conditions different to those in a Reference Price Service Agreement.

"Negotiated Service" means a service for the transportation of gas provided under a Negotiated Service Agreement.

"Network" means AGL's system of pipes and associated facilities including meters and meter sets as they exist from time to time, within the Local Government Areas listed in schedule A. A description of the Network, as at the date of this Undertaking, is also provided in schedule A.

“Network Section” means the Trunk Section, or a country sub-network served by a particular Receipt Point.

“Person” means a natural person or a corporation within the meaning of the Corporations Law.

“Post-trading Input” for a particular User, Network Section, and Day means the Quantity determined in accordance with section 3.7.4.

“Prospective User” means a System User who seeks access to the Network.

“Queuing Policy” means a queuing policy as defined in the Access Code.

“Receipt Point” means the point at which Gas is received from the User's Pipeliner's system into the Network.

"Reference Price Service Agreement" means a Transportation Service Agreement, a Tradeable Capacity Service, or a Multiple Delivery Point Transportation Service Agreement or, where the context requires, any combination or all of them.

"Reference Price Service" means a service for the transportation of gas provided under a Reference Price Service Agreement.

“Reference Tariff” means a tariff which relates to a Reference Price Service.

“Request for Service” or “Request” means a completed Request for Service under section 2.1.

"Service Agreement" means a Reference Price Service Agreement, or a Negotiated Service Agreement or, where the context requires, both.

“Service Policy” means a service policy as defined in the Access Code.

“System User” means a person who is a system user as defined in the Act.

“Tariff Customer” means a person who is a tariff customer as defined in the Act.

“Target Input” in respect of a particular User, Network Section and Day means the Quantity of Gas which a User should deliver or have delivered into the Network Section on the Day so that the User’s Daily Imbalance for the Network Section on the Day is zero (refer section 3.7.1.).

"Tradeable Capacity Service" is a service for transportation of gas under a Tradeable Capacity Service Agreement.

"Tradeable Capacity Service Agreement" means an agreement for a tradeable capacity service as described in section 3.2.

“Trading Policy” means a trading policy as defined in the Access Code.

“Transitional Charge” means that element of the Network tariff which recovers the transitional component determined by IPART as provided in the Access Code.

"Transportation Service" is a service for transportation of gas under a Transportation Service Agreement.

"Transportation Service Agreement" means an agreement for a gas transportation service as described in section 3.1.

"Trunk Section" means that part of the Network being the pipe system which extends from Wilton to the trunk receiving station (TRS) at Mount Keira; and from Wilton to the TRS at Kooragang Island in Newcastle and supplying TRSs at Appin, Campbelltown, West Hoxton, Horsley Park, Plumpton, Windsor, Gosford, Warnervale, Wyong, and Hexham, and packaged off take stations (POTS) at Appin, Morisset, and Minmi and such other TRSs and POTS as may be installed from time to time EXCEPT THAT for the purposes of determining the price of a Transportation Service involving the transportation of gas through the TRS at Mount Keira (and only for those purposes), the section of pipe from the Mount Keira TRS to Springhill Road in Wollongong shall also be deemed to be part of the Trunk Section.

“Unaccounted for Gas” or “UAG” means Gas purchased by AGL to make up for Gas lost or unaccounted for in the Network.

“Unique Service” means a service of the type defined in section 2.1.3.

“User” means a person to whom AGL provides a service under a Service Agreement.

“User’s Actual Input” for a User, Network Section and Day means the Quantity of Gas received by the Network Section determined in accordance with section 3.7.4.

“User's Pipeliner” means the person responsible for the carriage of the User's Gas to the point where it is received into the Network.

AGL Gas Networks

Access Undertaking Information

Varied as directed by the

Independent Pricing and Regulatory Tribunal

of New South Wales

July 1997

AGL Gas Networks Limited ACN 003004 322

AGL Gas Networks Limited -- Access Undertaking Information

Varied as Directed by
the Independent Pricing and Regulatory Tribunal
of New South Wales

CONTENTS

1 ACCESS AND PRICING PRINCIPLES

1.1 Tariff Determination Methodology

This section describes how the Reference Tariff Pricing Principles in the Access Code have been applied in calculating Reference Tariffs for Reference Price Services.

Reference Tariffs relate to the provision of Network services and exclude retail margins and gas costs.

1.1.1 IPART Assessment

IPART has directed AGL to change its Access Undertaking Information (AUI) to explain the Access Undertaking as varied.

Several references are made in this AUI to assumptions and views that are categorised as "IPART Assessment". In this context, IPART Assessment means that IPART has expressed a view that these matters appear consistent with the requirements of the Gas Supply Act 1996 and the Access Code.

Other references are made to elements that have been determined by IPART. The values of these elements in the AUI are the values that IPART was prepared to agree, and despite being values that AGL would not propose, they are values that AGL accepted for the purposes of determining Reference Tariffs.

1.1.2 Access Code Requirements for Determination of Sustainable Revenue Stream and Reference Tariff Paths

Section 8.1 of the Access Code provides that a Reference Tariff should provide Users with outcomes that replicate a competitive market, consistent with providing the Reticulator with a commercial, sustainable revenue stream which is consistent with an appropriate return on the capital base.

1.1.2.1 Capital Base

Section 8.3 defines the Initial Capital Base as the Capital Base at the commencement of the first Reference Tariff Period.

Section 8.4 determines the calculation of the Capital Base at the beginning of any subsequent Reference Tariff Period.

Section 8.5 through Section 8.9 provide guidelines for determining the Initial Capital Base.

Section 8.14 to Section 8.21 provide guidelines to prudent New Facility Investment; and Section 8.22 to the treatment of Redundant Capital.

1.1.2.2 Depreciation

Section 8.11 through Section 8.13 provide guidance in the determination of the charge for depreciation of the assets component of the Capital Base.

1.1.2.3 Rate of Return

Section 8.23 requires that the Rate of Return should reflect a level of return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering each reference service.

Section 8.24 provides that the Rate of Return may be determined as the Weighted Average Cost of Capital using the Capital Asset Pricing Model.

1.1.2.4 Non-Capital Costs

Section 8.25 defines Non-Capital Costs to be the lesser of actual expenditure and that expenditure which would be incurred by a prudent Reticulator (as defined in the Act), acting efficiently, in accordance with accepted and good industry practice.

1.1.2.5 Check on Revenue Stream for Sustainability

The Access Code requires that the revenue stream be tested for reasonableness across a range of financial performance indicators (preamble to Section 8.23). The indicators defined by IPART, in consultation with AGL, have been categorised as relevant to users, lenders, regulators, and investors, as follows:

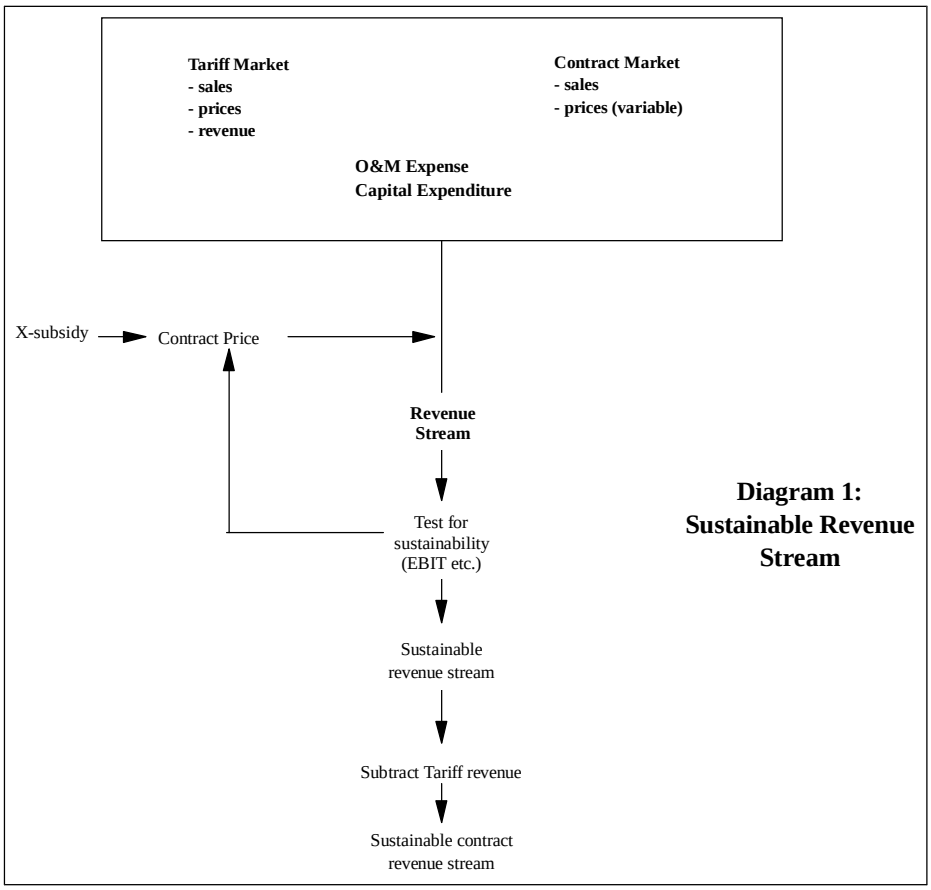
Stakeholder	Indicators

Users	Price
Lenders	Funds Flow Adequacy Funds Flow Interest Coverage Funds Flow Net Debt Pay Back Internal Financing Ratio Pre-tax Interest Coverage Total Debt / Total Capital Funds From Operations / Total Debt Net Cash Flow / Long-term Debt
Regulator	Return on Rate Base (PAT+Int) / FE PBIT / Sales Volume PBIT /Revenue PBITD / Sales Volume PBITD / Revenue Real Operating Cost per Customer
Investors	PBIT PAT PBIT / FE Earnings per share Earnings per share growth Operating cash flow per share (and real growth) PAT / Total Assets Price / Earnings.

1.1.3 Determination of Sustainable Revenue Stream

The sustainable revenue stream is the Network sustainable revenue stream and excludes retail margins and gas costs.

Diagram 1 -- Determination of Sustainable Revenue Stream



The maximum price path for the Network component of gas sales to tariff customers is currently subject to a cap of CPI-1.5. This will continue for the term of the Undertaking. On this basis a tariff revenue stream was derived using IPART Assessment of volumes and prices.

An initial contract market revenue was calculated and combined with this tariff revenue. This revenue stream, and its components (EBIT etc.), was tested for commercial sustainability against the range of financial performance indicators set out in section 1.1.2.5 above.

Contract market network price inputs were then varied, with the objective of reducing the cross-subsidy from the contract market to the tariff market while maintaining a commercial sustainable revenue stream. This cross-subsidy was assessed in a report entitled “Retail Margin Analysis Applicable to Gas Distribution”, commissioned by IPART, and prepared by Greenwood Challoner. Given the findings of Greenwood Challoner and the objective of removing the cross-subsidy while maintaining a commercial sustainable revenue stream, IPART determined the revenue path for network services delivered to the contract market (see Table 1.1. below). This revenue path is designed, if extended beyond the term of this Undertaking, to remove the Greenwood Challoner assessment of cross-subsidy by the beginning of the 1999/2000 financial year.

Summary of the Analysis

The most significant IPART Assessments in this analysis are summarised below:-

Initial Capital Base: $1,185 million

Rate of Return (WACC) pre tax: 13.5% (EBIT/FE measure)

Expenses, Capital Expenditure and Sustainable Revenue Stream:

TABLE 1.1

	1995/96	1996/97	1997/98	1998/99
Customer Numbers (average '000)	658	680	693	707
Net Operating Cost per customer				
- Real ($1995/96)				
- Government Levies	16	12	9	7
- Departmental Cost	204	188	175	162
- Other	-14	-1	-13	-21
	206	199	171	150
- Nominal ($)				
- Government Levies	16	12	10	8
- Departmental Cost	204	192	183	176
- Other	-14	-1	-14	-22
	206	203	179	162
Net Operating Cost ($M)				
- Government Levies	10.8	8.0	6.7	5.5
- Departmental Cost	134.0	130.0	127.3	124.9
- Other	-9.2	-0.4	-9.8	-15.9
Total Net Operating Cost	135.6	137.6	124.2	114.5
Depreciation/Amortisation ($M)	53.9	56.3	57.3	59.0
Goldline Rentals ($M)	24.1	28.8	31.6	34.5
Total Expenses ($M)	213.6	222.7	213.1	208.0
Capital Expenditure ($M)	74.2	53.1	50.8	48.6
Sustainable Revenue Stream ($M)				
Tariff Market	178.3	187.0	200.9	212.7
Contract Market	147.0	147.0	117.0	99.0
Total	325.3	334.0	317.9	311.7
For Regulatory Purposes:				
Depreciation/Amortisation ($M)	59.2	60.8	61.6	63.1
Goldline Rentals ($M)	-	-	-	-

1.2 Cost Allocation Approach -- between Contract and Tariff

The Greenwood Challoner assessment of cross-subsidy was determined on the basis of the principle that a market is being subsidised if it is contributing, by way of revenue, less than its Long Run Avoidable Cost (LRAC). In this context, and recognising the relationship in a two product market that:

$$\text{Total Cost} = \text{Stand Alone Cost}_{Contract} + \text{Long Run Avoidable Cost}_{Tariff}$$

the cross-subsidy from contract to tariff can be calculated as the difference between tariff revenue and tariff market LRAC, or as the difference between contract revenue and contract stand-alone cost.

If the contract revenue path outlined in Table 1.1 was extended to the 1999/2000 year, contract revenue would equal Greenwood Challoner's assessment of the subsidy-free cost of serving the contract market.

The Access Code, in section 9, allows IPART to approve reference tariffs which include a Transitional Component being an amount which is additional to IPART's estimate of the costs of providing the services which are the subject of the reference tariffs. While the cross-subsidy is being unwound, the contract revenue includes a Transitional Component and thus exceeds the subsidy-free cost as assessed by Greenwood Challoner. The amount of the Transitional Component is to be recovered by AGL through Transitional Charges which will form part of contract market Network tariffs.

The components of the sustainable revenue stream are revenue from:

a) existing loads;
b) net contract market growth, allowed for at a rate of 1.4% per annum;
c) overrun charges (refer section 3 of the Undertaking) estimated at 0.46% of the revenue to be derived from basic capacity and metering charges; and
d) the Transitional Component.

Those components are as follows:

TABLE 1.2

Sustainable Revenue Stream ($M)	1996/97	1997/98	1998/99
Existing Loads		82.5	82.0
Net Growth		0.4	1.2
Overrun Charges		0.4	0.4
Sub-Total		83.3	83.6
Transitional Component		33.7	15.4
Total	147	117	99

1.2.1 Cost Allocation Approach -- Tariff Market

The average price charged for Network transport for the tariff market is constrained by a CPI-1.5 price cap (to be reviewed in 1998).

1.2.2 Cost Allocation Approach -- Contract

This section describes how the contract sustainable revenue stream (after exclusion of revenue estimated to be derived from overrun charges) is allocated to determine contract Reference Tariffs. The elements of the Tariffs are:

a) Capacity charges -- expressed as the Annual Unit Charge for Capacity ($/GJ of MDQ per annum)
b) Metering Charges -- expressed as $ per annum and varying according to meter type.
c) Transitional Charges -- expressed in $/GJ of MDQ per annum.

The derivation of these elements is described in sections 1.2.2.1, 1.2.2.2, and 1.2.2.3 respectively.

1.2.2.1 Derivation of Capacity Charges

The process of deriving capacity charges involves the following principal steps:

- Determine the allocable component of the contract market sustainable revenue stream for the year 1999/2000, which is the year in which contract market revenues would reach the Greenwood Challoner assessment of the subsidy-free cost of serving the contract market (1.2.2.1 a)).

- Allocate the allocable component of the sustainable revenue stream to asset classes (1.2.2.1 b)).

- Determine Trunk Charges for those regions served by the Southern and Northern Trunks (Wollongong, Sydney, Central Coast, and Newcastle) (1.2.2.1 c)).

- Determine Pressure Reduction Charges relating to Country TRSs (1.2.2.1 d)).

- Determine Local Network Charges for individual customers (1.2.2.1 e)).

- Identify decrement and/or capped customers and, if there are any, roll back their decrements and recalculate (1.2.2.1 f)).

- Determine the annual unit charge for capacity for a customer (1.2.2.1 g)).

a) Determination of Allocable Component of the Contract Market Sustainable Revenue Stream

The allocable component of the contract market sustainable revenue stream is the total stream amount less overrun charges (estimated to be 0.46% of revenue from capacity and metering charges) i.e.

$$\frac{\$84,000,000}{1.0046} = \$83.615 \text{ million}$$

b) Allocation of the Allocable Component of the Sustainable Revenue Stream to Assets Classes

The allocable component is split between the various asset classes based on the contract market's share of asset replacement cost. The asset classes to which the revenue pool is allocated are:

• Northern Trunk	The trunk main between Wilton and Newcastle which supplies Sydney, Newcastle and the Central Coast. This asset class includes the Trunk Receiving Stations (TRSs) on the line.
• Southern Trunk	The trunk main between Wilton and Springhill Road (supplying the Wollongong market). This includes the primary main between Mt Keira and Springhill Road as well as the TRS and PRS.
• Sydney Local Network	
• Newcastle Local Network	Includes the Central Coast
• Wollongong Local Network	
• Country TRSs	
• Country Local Networks	
• Meters	

The contract market's share of the replacement cost of trunk mains is calculated by taking the optimised replacement value of the trunk which would be required to serve both the contract and the tariff market, and allocating that value between the markets in proportion to their shares of throughput on the system peak day.

The contract market's share of the replacement cost of local networks is determined as the replacement cost of the optimised stand-alone design for the local networks that would be required to serve the contract market alone. The procedure used to establish the optimised stand-alone design is described in Attachment 1. The replacement cost of that design was then calculated using the unit costs agreed to by J P Kenny.

The allocation of the allocable component is shown in the following table:

TABLE 1.3			
	Optimised Replacement Cost ($,000)		Contract Revenue Allocation ($,000)
	Total	Contract Share/ Stand-alone	
Northern Trunk	161,573	116,616	31,415
Southern Trunk	17,941	13,994	3,770
Sydney Local Network	-	135,003	36,369
Newcastle Local Network	-	23,493	6,329
Wollongong Local Network	-	4,169	1,123
Country TRSs	-	2,287	616
Country Local Networks		10,936	2,946
Meters [1]	-	3,887	1,047
Total			83,615
[1] Note that the revenue allocation to meters is recovered by way of metering charges as described in section 1.2.2.2			

c) Trunk Charges for Each Region served by the Southern and Northern Trunks

As a preliminary step in determining regional Trunk Charges, the revenue allocation for the Northern Trunk is further allocated to the three regions it serves (Sydney, Central Coast and Newcastle) as follows:

$$\text{Trunk Revenue}_{\text{Region}} = \text{Northern Trunk Revenue} \times \frac{\sum_i (\text{MDQ}_i \times \text{Distance}_i)_{\text{Region}}}{\sum_i (\text{MDQ}_i \times \text{Distance}_i)_{\text{Sydney, Central Coast, Newcastle}}}$$

where Distance_i = 51.5km for a customer in the Sydney region (the distance from Wilton to Horsley Park);
151.35km for a customer on the Central Coast (the distance from Wilton to half way between Gosford and Wyong);and
223.4km for a customer in Newcastle (the distance from Wilton to Hexham)

MDQ_i = AGL's estimate of Contract MDQ requirements for customer i. The estimate takes into account the customer's historical consumption pattern and factors associated with the new (open access) environment.

The allocation of Northern Trunk revenue to the three regions is shown in the following table:

TABLE 1.4					
Region	Revenue ($,000)	MDQ(GJ)	Distance (km)	MDQ*Distance	Revenue Allocation ($,000)
Sydney		194,230	51.5	10,002,845	11,805
Central Coast		2,675	151.35	404,861	478
Newcastle		72,571	223.4	16,212,361	19,133
Total	31,415	269,476		26,620,068	31,415

The unit Trunk Charge for each region of the Trunk Section (Sydney, Central Coast, Newcastle and Wollongong) is then calculated as follows:

$$\text{Unit Trunk Charge for Region (\$/GJ MDQ)} = \frac{\text{Revenue}_{TRK}}{\sum_i \text{MDQ}_i}$$

where Revenue_{TRK} = Revenue allocation to the Trunk and TRSs for the region ($)

MDQ_i = estimated Contract MDQ for contract customer i in the region (GJ)

d) Pressure Reduction Charges Relating to Country TRSs

Pressure Reduction Charges for the country sub-networks are analogous to Trunk Charges for the Trunk Section, and recover the revenue allocated to country TRSs and POTS as follows:

$$\text{Unit Pressure Reduction Charge (\$/GJ MDQ)} = \frac{\text{Revenue}_{TRS}}{\sum_i \text{MDQ}_i}$$

where Revenue_{TRS} = Revenue allocation to the country TRSs and POTS ($)

MDQ_i = estimated Contract MDQ for country contract customer i, i.e. one not served by the Trunk Section (GJ)

e) Calculation of Local Network Charge for Individual Contract Customers

The local network charge for each customer is calculated by the following formula:

$$\text{Local Network Charge for a Customer i (\$/GJ MDQ)} = \frac{Alloc_{LN} \times \left(\text{SAV}_{\text{PRS(i)}} + \text{SAV}_{\text{mains(i)}}\right)}{MDQ_i}$$

where:

i)

$$\text{Alloc}_{LN} = \frac{\text{Revenue}_{\text{LN}}}{(\text{AV}_{mains} + \text{AV}_{PRS})}$$

in which:

$\text{Revenue}_{\text{LN}}$	=	Revenue allocated to the Local Network ($)
AV_{mains}	=	Replacement value of Mains in the optimised contract stand-alone Local Network ($)
AV_{PRS}	=	Replacement value of PRSs in the optimised contract stand-alone Local Network ($)

ii)

$\text{SAV}_{\text{mains(i)}}$ = Customer i's Share of Local Network Mains Value, ($)= $\Sigma_j\left(\frac{Q_{i,j}}{Q_{T_j}} \times L_j \times C_{P_j}\right)$

in which:

$Q_{i,j}$	=	The portion of the customer i's estimated Contract MDQ calculated to flow through the pipe j
Q_{Tj}	=	Total calculated flow for all contract customers through pipe j $\left(\Sigma_i(Q_{i,j}) = Q_{T_j}\right)$
L_j	=	Length of pipe j (m)
C_{pj}	=	Unit cost of pipe j (a function of the pipe diameter) ($/m)

iii)

$\text{SAV}_{\text{PRS(i)}}$ = Customer i's Share of PRS Value, ($)= $\Sigma_j\left(\frac{F_{i,j}}{F_{T_j}} \times C_{T_j}\right)$

in which:

$F_{i,j}$	=	The portion of the customer i's estimated Contract MDQ calculated to flow through PRS j
F_{Tj}	=	Total calculated flow for all contract customers through PRS j $\left(\Sigma_i(F_{i,j}) = F_{T_j}\right)$
C_{Tj}	=	Contract market's share of PRS j replacement cost

iv)

MDQ_i	=	the estimated Contract MDQ for customer i.

In ii) and iii) above the quantities $Q_{i,j}$ and $F_{i,j}$ for a particular customer (i) and asset (j) are determined by network analysis. The optimised contract stand-alone network design is modelled for each customer, at the customer's estimated Contract MDQ and with no other loads present, to determine the flow through each network pipe segment ($Q_{i,j}$) and PRS ($F_{i,j}$) supplying the customer.

f) Roll in of Decrement and Capped Customers

There are customers (decrement customers) whose revenue is to be kept at its current level, subject to annual CPI increases; and other customers (capped customers) whose prices are capped so as not to exceed the equivalent of the tariff for Industrial and Commercial Tariff Customers. The shortfall between the expected revenue from these customers and the revenue that would be achieved if they were to pay the Reference Tariff is rolled back in to be borne by remaining customers. The roll-in is performed differently according to the class of customer.

i) Decrement Customers

The revenue from decrement customers is attributed to metering charges, local network charges and then to trunk charges, in that order. This means that a decrement customer will always cover its metering charge, at least part of its local network charge and, in some cases, part of its trunk charge. The result overall is a shortfall in local network and trunk revenues. These shortfalls are calculated on a regional basis so that, for example, a shortfall in the local network in Sydney will not affect Newcastle's local network price.

ii) Capped Customers

Capped customers are dealt with in a similar manner to decrement customers. The difference is that the "shortfall" is always attributed to the local network. Thus, a capped customer will pay the same metering and trunk charges as a reference price customer, but will pay less in local network charges. Capped customers are likely to be small and located in areas where there is a low concentration of contract customers.

iii) Iteration

The process of section 1.1 is repeated for the remaining reference price customers with the expected contributions of decrement and capped customers to revenue, MDQs, AV_{mains} and AV_{PRS} eliminated from the calculations. The whole process is repeated until no new decrement or capped customers are identified.

g) Annual Unit Charge for Capacity

For Transportation Service, the Annual Unit Charge for Capacity for a particular end user on the Trunk Section is the sum of the appropriate Trunk Charge and Local Network Charge. If the Delivery Point is on a country sub-network then the Annual Unit Charge for Capacity is the sum of the Pressure Reduction Charge and Local Network Charge.

For Tradeable Capacity Service, the Annual Unit Charge for Capacity is 1.4 times the rate for a corresponding Transportation Service.

Asset replacement values are shown in Table 1.5 while Table 1.6 shows the derivation of Trunk Charges and Pressure Reduction Charges.

1.2.2.2 Derivation of Metering Charges

The revenue allocation to meters (section 1.2.2.1 b)) is allocated to customers in proportion to the replacement costs of their meters as follows:

$$\text{Metering Charge}_{Cust}\ (\$) = \frac{MRC_{Cust} \times Revenue_M}{\sum MRC_{Cust}}$$

where $Revenue_M$ = Revenue allocation to the meters ($)
MRC_{Cust} = The replacement cost of a customer's meter ($)

1.2.2.3 Derivation of Transitional Charges

The difference between the stand-alone cost of service to the contract market as a whole as assessed by Greenwood Challoner and the sustainable revenue stream for a particular year has been determined by IPART to be a Transitional Component and is recovered from Users of Reference Price Services by way of a Transitional Charge. The annual amounts of the Transitional Component are set out in Table 1.2. The Transitional Charge for a particular Delivery Point for a particular year (expressed as $/GJ of MDQ per annum) is determined by the formula set out in section E.1.1.2 of the Undertaking.

In simplistic qualitative terms, if the Transitional Component for the market as a whole for a year is a fraction "F" of the amount of the cross-subsidy as it was prior to the commencement of the Undertaking, then the amount payable in Transitional Charges by a particular Delivery Point in that year will be that fraction ("F") of the Delivery Point's "contribution" to the prior cross subsidy.

Transitional Charges will apply equally to Transportation Services and Tradeable Capacity Services and irrespective of whether the service to the Delivery Point is the continuation of a pre-existing service, or it commences at some time after the date of the Undertaking.

1.3 Incentive Structures

Section 8.31 of the Access Code provides that the Reference Tariff may contain an Incentive Mechanism. Section 8.32(i) describes such a mechanism where Reference Tariffs are specified for each year of the Undertaking, at the outset. The Reference Tariffs in this Undertaking are specified at the outset based on assumptions about pre-determined efficiency gains (refer section 3). Under such a regime, the network operator must improve its productivity in the manner assumed in order to maintain current profitability, and has the incentive of higher returns between reviews of its Undertaking to improve beyond that.

The network operator has additional incentives to improve efficiency of operation in the new regulatory environment, including:

- the potential for Users to by-pass parts or all of the network, thereby reducing network revenue;
- the potential for stranding of assets if Users by-pass the network, downgrade consumption, or leave the network; and
- the requirement to unwind a significant cross-subsidy from contract to tariff, while containing tariff prices within the current price cap of CPI-1.5.

Third Party Access also exposes the AGL retail arm to the risk of paying for gas and haulage (Moomba to Sydney) that it cannot sell in the market (by virtue of take-or-pay conditions in long-term contracts for gas and haulage). In recent years, AGL has been selling just above its take-or-pay, therefore even a small loss of market could give rise to take-or-pay penalties.

Table 1.5: ASSET VALUES BY PRICING REGION ($,000 Replacement Cost)

		Sydney	Newcastle/Central Coast	Wollongong	Country	Total
Mains by Pricing Zones	**Trunk**	65,538	83,976	14,689		**164,203**
	HP Network	242,291	42,316	10,210	18,378	**313,194**
	MP/LP Network	1,057,508	126,511	56,172	131,130	**1,371,321**
Components	**TRS**	10,910	4,786	2,138	4,227	**22,061**
	ALB Valves	289	290	193		**772**
	HPRS	12,112		1,114		**13,226**
	HP Valves	2,823				**2,823**
	HP Meters and Services	15,314	760	814	761	**17,650**
	Secondary Regulators	9,570	1,001	908	1,052	**12,530**
	MP/LP Meters and Services	403,855	51,901	21,496	32,076	**509,329**
	Total	**1,820,210**	**311,541**	**107,733**	**187,624**	**2,427,108**

TRS - Trunk Receiving Station
ALB Valve - Automatic Line Break Valve
HPRS - High Pressure Regulating Station

*** Reconciliation with J P Kenny**

J P Kenny Valuation			2,438,027
AGL Differences			
Gosford & Wyong at Newcastle lay rates		(612)	
Optimised Trunk	Sydney	(1,464)	
	Newcastle	(10,326)	
Arithmetic Differences	Country	1,526	
	Newcastle Trunk	(42)	
			(10,918)
AGL Valuation			2,427,109

Table 1.6: Trunk/TRS Charges

							Decrement Customers		Reference Price and Capped Customers				
	Revenue ($)	MDQ (GJ)	Distance (km)	MDQ * Distance (GJ.km)	Revenue Allocation ($)	Unit Cost ($/GJ.MDQ)	Revenue ($)	MDQ (GJ.MDQ)	Revenue ($)	MDQ (GJ)	MDQ * Distance (GJ.km)	Revenue Allocation ($)	Unit Cost ($/GJ.MDQ)
Northern Trunk													
Sydney		194,230	51.5	10,002,845	11,805	60.777	1,128	53,869		140,361	7,228,592	11,551	82.293
Central Coast		2,675	151.35	404,861	478	178.614				2,675	404,861	647	241.845
Newcastle		72,571	223.4	16,212,361	19,133	263.643	10,659	51,755		20,816	4,650,294	7,431	356.975
Total	**31,415**	**269,476**		**26,620,068**	**31,415**		**11,787**	**105,624**	**19,628**	**163,852**	**12,283,747**	**19,628**	
Southern Trunk													
Wollongong	3,770	35,836			3,770	105.197			3,770	35,836			105.197
Country													
	Revenue ($)	**MDQ (GJ)**		**Replacement Cost ($)**	**Revenue ($)**	**Unit Cost ($/GJ.MDQ)**			**Revenue ($)**	**MDQ (GJ)**			**Unit Cost ($/GJ.MDQ)**
Mains				10,936	2,946								
TRS				2,287	616	33.117			616	18,605			33.117
Total	3,562	18,605		13,224	3,562								
TOTAL	38,748	323,917			38,748		11,787	105,624	23,398	199,688			

1. All dollar amounts are in $,000.

2. The calculation presented in this table is based on the subsidy-free cost of service for the contract market as assessed by Greenwood Challoner. This state is assumed to be reached in 1999/2000. The total revenue requirement allocated is $82.568 million. Estimated collections from overrun charges and metering charges ($1.047 million) have been excluded.

3. MDQs include growth, determined by IPART to be 1.4% per annum. Unit Trunk Charges and Pressure Reduction Charges for years prior to 1999/2000 are calculated by taking the values tabulated above and multiplying by 1.014 for 1998/99, and by 1.014 again to derive the rate for the period ending 30 June, 1998.

2 CAPITAL COSTS

2.1 Asset Value Allocation

Table 1.5 shows the distribution of asset values (by asset type) to pricing regions. The asset values are in replacement cost terms, and can be referenced against the values in the J P Kenny Report.

Note: This value excludes the Blue Mountains extension, the high pressure (HP) extension to Mona Vale, the 550mm HP main from Leppington to Liverpool and the 150mm HP main to Sithe. It should also be noted that replacement costs have been used for the purposes of allocation, not for the purposes of calculating costs to be recovered through Reference Tariffs.

Why replacement cost, and not depreciated replacement costs? Replacement costs have been chosen as allocators for a number of reasons:

- depreciated replacement costs are known for the system as a whole, but not for individual assets.

- if depreciated replacement costs for individual assets were known, and used, a smaller portion of overall costs would be allocated to older assets than would be the case if replacement costs were used. Intuitively, this seems to make sense. However, it ignores the reality that older assets require greater maintenance; if older assets should attract a smaller portion of capital charges, the same logic suggests that they should attract a higher portion of maintenance costs. If both these considerations are taken into account there may be little difference between the overall costs attributable to younger and older assets. The adoption of replacement costs for allocating both capital and maintenance costs treats all assets the same regardless of age.

Attachment 2 is an excerpt from Section 4 of the J P Kenny report and describes the Asset Valuation Methodology -- replacement cost -- adopted by them.

2.2 Assumptions on Life of Assets for Depreciation

For the purposes of Reference Tariff determination, depreciation expense is historic cost straight line depreciation.

Depreciation rates for principal categories of assets are as follows:

Buildings	2%
Gas Mains	2%
Gas Services	5% (IPART determined)
Meters	6.7%
Regulators	6.7%
Fixed Plant	10%
Mobile Plant	20%

2.3 Accumulated Depreciation: Historic Cost Depreciation (as at 1 July 1996).

The following is provided for information only. Reference prices will be determined by reference to the Initial Capital Base, not to historic cost values or historic cost depreciation. As required by the NSW Code, the Initial Capital Base will be depreciated according to economic life.

$,000	**Historic Cost**	**Accum. Deprec**	**WDV**
Mains	583, 895	101,635	482,260
Services Lines	195,751	75,358	120,393
Meters, regulators & filters	88,449	24,498	63,951
Land & Buildings	13,566	0	13,566
Plant	37,990	18,569	19,421
Total	919,651	220,060	699,591

Note: the above table does not include those assets under Goldline trusts.

2.4 Committed Capital Works and Capital Investment

Capital expenditure comprises distribution system expenditure (being market expansion and system replacement) and non-distribution system expenditure - typically replacement of motor vehicles, computer equipment etc.

Non-distribution expenditure is on a needs basis and significant amounts of capital are not committed in advance.

Distribution system expenditure varies depending upon the profile of projects currently under way. Contractors are typically engaged on an ongoing basis but little capital is firmly committed with the exception of significant one-off projects such as those currently under way relating to the Blue Mountains and the Central West.

2.5 Planned Capital Investment

Forecast capital expenditure on the existing network is shown in Table 1.1. The forecast is not "planned" expenditure but represents the expenditure which is consistent with the growth and other assumptions on which the Sustainable Revenue Stream was determined. The forecast can be subdivided into:

$Million	1994/95	1995/96	1996/97	1997/98	1998/99
Market Expansion					
- Serving both Markets	1.3	4.6	10.6	4.1	-
- Specific to Tariff Market	40.8	35.6	16.0	16.8	17.7
- Specific to Contract Market	-	-	-	3.0	3.0
- Total	42.1	40.2	26.6	23.9	20.7
Systems Replacement					
- Goldline	26.5	15.4	11.8	12.0	12.5
- Other	13.7	10.8	9.1	9.1	9.1
Other Expenditure	8.3	7.8	5.5	5.8	6.3
Total	90.6	74.2	53.1	50.8	48.6

2.5.1 Justification of Capital Investment

Future expenditure on market expansion is consistent with the growth in IPART's assessment of market growth.

Goldline expenditure is for completion of Sydney, especially the northern peninsula, and in Newcastle. Other system expenditure, and other expenditure, is replacement capital.

All capital expenditure must be evaluated prior to approval.

A capital budget is prepared annually to set the direction of future capital expenditure and to establish broad parameters as to level of capital expenditure for the next financial year.

For any capital project to proceed, the expenditure must not only meet the broad budget parameters but also:

- be necessary to ensure a safe and reliable supply of gas; and/or
- meet predetermined hurdle rates for economic profitability (IRR) and accounting profitability (EBIT/funds employed).

Various financial models are used to evaluate projects, depending upon the nature of the project. All relevant factors are included in the analyses, including:

- projected increases in sales
- present and predicted contract and tariff prices
- engineering estimates of proposed capital expenditure
- incremental operating costs of both setting up and running the proposed plant
- tax and accounting depreciation rates

2.5.2 Capital Additions -- Prudent Investments

The Code requires that the value of 'surplus' capacity be excluded from the capital base (for price setting) until such time as it becomes income producing (at which time it would be included at initial cost plus escalation).

The guidelines for "Design criteria for high pressure gas distribution systems" in AGL's Procedures Manual will be adopted as the benchmark for determining surplus capacity. (The guidelines are reproduced in the Access Undertaking as Schedule B).

Surplus capacity will be removed from capital expenditure by including, in the Capital Base, only the capital expenditure required for optimum design, rather than actual capital expenditure.

2.6 Rate of Return

The Weighted Average Cost of Capital (WACC) calculated to apply to Earnings before Interest and Tax on Funds Employed (EBIT/FE) is employed as the benchmark for rate of return. IPART's Assessment of the WACC (and the elements from which it is derived using the Capital Asset Pricing Model) is summarised in the following two tables:

Risk free rate	7.3% - 8.3%
Market risk premium	6.0% - 7.0%
AGL equity beta	0.65 - 0.90
Gearing ratio	40% - 60%
Imputation credit utilisation rate	20% - 60%

Range of Values -- Capital Asset Pricing Model

Cost of Capital Determination -- Range of Inputs	Low	Medium	High
Nominal risk free rate (R_f)	7.68%	7.80%	8.30%
Market risk premium (R_m - R_f)	7.0%	7.0%	7.0%
Market rate of return (R_m)	14.68%	14.80%	15.30%
Equity beta (β)	0.64	0.74	0.88
Nominal pre-tax cost of debt (R_d)	9.0%	9.0%	9.0%
Gearing ratio (debt/(debt+equity))	40%	50%	60%
Tax rate	36%	36%	36%
Imputation credit utilisation rate	50%	34%	21%
Nominal post-tax cost of equity (R_e)	9.49%	10.88%	12.96%
Nominal post-tax WACC	8.00%	8.32%	8.64%
Nominal pre-tax WACC	12.5%	13.0%	13.5%

In all but exceptional circumstances, AGL will calculate Reference Tariffs, as required in the Access Code, to recover efficient operating costs, and to provide the opportunity to realise returns equal to the Company's Weighted Average Cost of Capital (WACC) on Funds Employed.

A significant cross-subsidy from the contract market to the tariff market, existing at this time when new competition policy requires cost-reflective pricing, constitutes exceptional circumstances. IPART requires that prices to contract users be lowered during the term of this Undertaking to reduce the cross-subsidy. As a consequence, AGL will not have a realistic opportunity to earn its WACC in this term.

2.7 Initial Capital Base

The Access Code calls for the determination of an Initial Capital Base, which will thenceforth be the foundation (with adjustments for depreciation and new capital) on which AGL will be entitled to seek a return. Appropriate returns then become one input in the determination of a commercial revenue stream which becomes the basis on which Reference Tariffs are calculated. The Access Code allows IPART to

establish an interim Initial Capital Base for the first Undertaking period, which may be varied once, in the second Undertaking. The Initial Capital Base in the second Undertaking then becomes the foundation on which AGL will be entitled to earn a return in future.

IPART has determined the interim Initial Capital Base to be $1,185M. This Base includes all assets employed in the business, including those assets under Goldline Trusts, and finance lease arrangements.

3 NON-CAPITAL COSTS: OPERATIONS AND MAINTENANCE AND OVERHEADS AND MARKETING

The following factors have been taken into consideration in determining the measure employed to assess operating efficiency.

The measure should:

i) reflect the nature of the business, especially the nature of Network cost drivers;
ii) be purposely high-level to avoid distracting AGL from the strategic direction it has chosen to maximise its performance;
iii) be minimally influenced by external factors outside the control of the reticulator, and be capable of effective "normalisation" to remove the effect of these factors; and
iv) be sympathetic with the nature of the regulatory system. The underlying measure in CPI-X price cap regulation, for example, is past performance;

In this first Undertaking term, Operating Cost per Customer is the principal benchmark for determining efficient operating costs. Operating Cost per Customer (sometimes called O&M Expense) is an accepted industry standard.

The sustainable revenue stream for the term of this Undertaking is based on the following growth and operating cost per customer targets (IPART Assessments) being achieved during the term of the Undertaking:

Measure	Actual 1995/96	Change	IPART Assessment 1998/99
Contract Market	68.5PJ/yr	0.5PJ/yr	79.0PJ/yr
Domestic Tariff Market			
- number of customers (end of year)	649,000	38,000 increase	687,000
- average consumption per customer	21.0GJ/yr	1.5GJ/yr increase	22.5GJ/yr
- sales volume	13.3PJ/yr	1.9PJ increase	15.2PJ/yr
Other Tariff			
- sales volume	10.7PJ/yr	0.3PJ increase	11.0PJ/yr
Net Operating Cost per Customer (real terms)	$206/yr	$56 reduction	$150/yr

* Net Operating Cost per Customer includes Network activities only i.e. retail activities are excluded.

3.1 Fixed versus Variable

Network costs do not vary with throughput.

3.2 Cost Allocation

3.2.1.1 Cost allocation between regulated and un-regulated segments

The city-gate cost of gas, and retail costs (identified by Greenwood Challoner) which together constitute the costs of the un-regulated segment, have been removed to determine the regulated network cost as follows:

1995/96			
	Contract	Tariff	Total
Retail Revenue	350.8	280.9	631.7
less City-gate cost	(200.1)	(79.9)	(280.0)
less Retail cost	(3.7)	(22.7)	(26.4)
Regulated Network Cost (including profit)	147.0	178.3	325.3

3.2.1.2 Cost allocation between pricing regions

The Revenue Requirement, including operating and capital costs, was allocated to asset classes in proportion to the allocation of capital costs (see section 1.2.2.1(b) and Table 1.3). The revenue allocation to the Northern Trunk was further allocated to the three regions it serves (Sydney, Central Coast and Newcastle) as described in section 1.2.2.1(c).

3.3 Wages & Salaries, Purchased Services, UAG, Materials & Supply, Allocations of Costs to Categories of Users.

The following is an analysis of "Operations and Maintenance cost" and "Overhead and Marketing costs". The categorisation of the 1995/96 actuals has been estimated.

1995/96 Annual Cost ($'000)

	Shared Costs	**Contract Costs**	**Tariff Costs**	**Total Operating**	**Labour**	**Other**
Operations & Maintenance (including O&M network, services and meters; gas measurement; network design).	20,627	482	24,080	**45,189**	25,237	19,952
Cust. A/c'ts, S & M, Adm. & Gen., etc. (including billing, contract adminsitration, sales and marketing, legal, treasury, insurance, secretary, finance, accounting, regulatory affairs, personnel, training, and government levies)	21,030	2,624	60,631	**84,285**	39,508	44,777
UAG	6,201			**6,201**		6,201
Net Total Operating Costs	47,858	3,106	84,711	**135,675**	64,745	70,930
Capital Costs						
Depreciation & Amortisation	53,934			**53,934**		53,934
Goldline Rentals			24,151	**24,151**		24,151
Profit, Interest & Tax	111,578			**111,578**		111,578
Total Capital Costs	165,512		24,151	**189,663**		189,663
Total	213,370	3,106	108,862	**325,338**	64,745	260,593

These costs have been allocated, as part of the revenue requirement, to pricing regions as detailed described in section 3.2.

4 SYSTEM CAPACITY AND VOLUME ASSUMPTIONS

The following documents are attached:

4.1 System Description

The description of AGL's Network (Schedule A of the Access Undertaking) is reproduced here as Attachment 3. Relevant excerpts from Section 2 of the J P Kenny Report are also included here as Attachment 4.

4.2 Map of piping system and pipe sizes etc

Maps of the Network are included in Schedule A of the Access Undertaking which is reproduced here as Attachment 3. Relevant excerpts from the J P Kenny Report -- Section 2.6, showing pipe sizes and lengths are also included as Attachment 5.

4.3 Peak Flow Rates

Average and Daily Peak Flow Rates and Total Volumes (in TJ) for 1995/96 for the Contract and Tariff markets are:

	Sydney	**Newcastle**	**Wollongong**	**Country**
Average Daily Flow Rates (TJ)	146	62	28	18
Peak Day Flow Rates (TJ)	212.8	70.3	40.0	30.8
Total Volume (PJ)	53.4	22.5	10.1	6.6

Excerpts from Section 2 of the J P Kenny report, which contain related flow rate information are included as Attachment 6.

4.4 Total volume across each pricing region -- Contract Only

Customer MDQs within pricing regions as at February, 1997 -- (TJ)

Zone	**Sydney**	**Newcastle**	**Wollongong**	**Country**	**Total**
Total	189	74	35	18	314

These figures include Sithe and adjustments for two customers which are about to discontinue taking gas, and another two which are expected to begin.

4.5 System Load Profile by Month

Gas Issues in TJ for the calendar year 1996 (Gas issues = gas measured through TRSs)

	Sydney	Newcastle	Wollongong	Country	TOTAL
January	3,496	1,933	841	337	6,607
February	3,873	1,660	724	437	6,694
March	4,289	1,401	624	458	6,772
April	4,155	1,813	714	578	7,260
May	5,215	2,118	755	689	8,777
June	5,380	2,114	817	737	9,048
July	6,093	2,207	960	785	10,044
August	5,893	2,190	856	754	9,693
September	5,211	1,925	735	657	8,528
October	4,884	1,960	632	513	7,989
November	4,860	1,864	545	486	7,755
December	4,762	1,796	586	379	7,523
Total	58,111	22,981	8,789	6,810	96,690

4.6 Numbers of Contract customers in each pricing region as at February, 1997

Zone	**Sydney**	**Newcastle**	**Wollongong**	**Country**	**Total**
Total	328	47	18	42	435

5 KEY PERFORMANCE INDICATORS

Information on Key Performance Indicators is provided in the sections which follow as indicated:

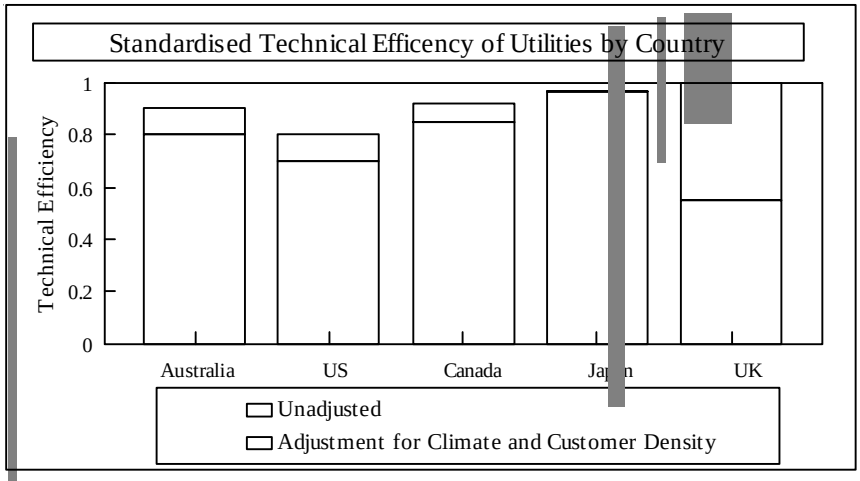
Section	Contents
5.1	BIE 1994 International Performance Indicators -- DEA results.
5.2	Australian Gas Association -- Gas Distribution Performance Indicators 1995 • Real controllable cost per customer • Real controllable cost per km of main
5.3	Comparison with 35 of the largest US gas distribution companies • Operating Expense per km • Operating Expense (excluding sales and marketing) per km
5.4	American Gas Association Best Practices Benchmarking surveys conducted in 1994 and 1995. • Mains Replacement ($/Foot) • Service Replacement $/Foot Replaced $/Service Replaced • Labour per foot of service • New Main Construction ($/Foot) • Routine O&M $/Mile $/Leak • Field Meter/Regulator $/Meter In Field $/Meter changed/removed • Regulation O&M ($/City Gate Station) • Leakage Surveys $/Mile in use $/Mile Surveyed • Meter Test Repair $/Meter In Field $/Meter Tested/Repaired • Corrosion Prevention $/mile surveyed $/mile in service • Locating and Staking ($/Mile)

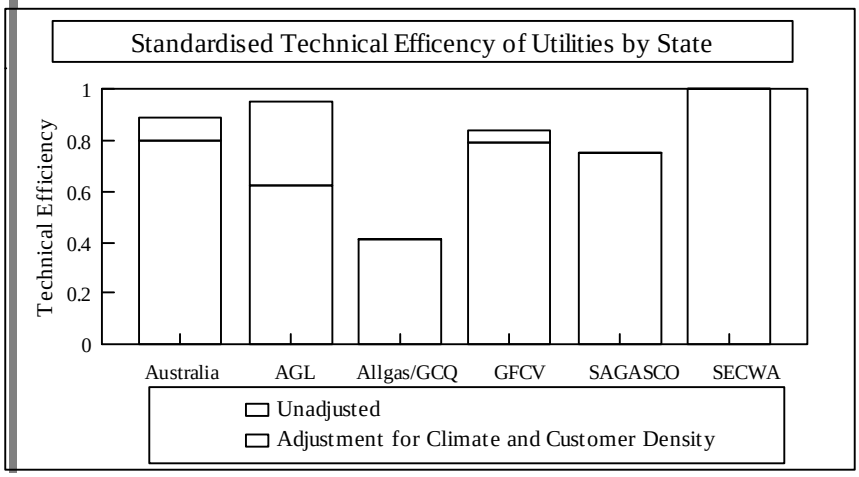
5.1 BIE 1994 International Performance Indicators -- DEA results.

"While partial indicators such as labour and capital productivity provide useful information, they can provide a misleading picture of overall performance if viewed in isolation. For example, it may be possible to improve labour productivity dramatically by substituting large amounts of capital for labour. This would have the effect of worsening capital productivity at the same time that labour productivity was being improved. To find out whether overall performance has improved as a result of changes, a holistic productivity measure is required which takes account of all outputs produced and all inputs used. Total factor productivity (TFP) and data envelopment analysis (DEA) are two such measures."[1]

The following graphs are reproduced from the document cited above. They show Technical Efficiency statistics for:

a) Australian utilities compared to utilities in other countries; and
b) utilities in each of the Australian States compared to each other.



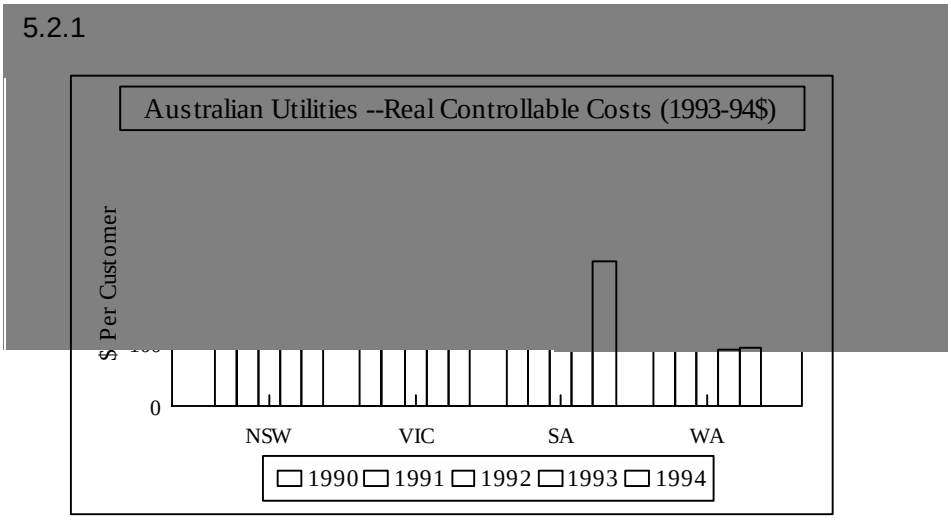


[1] International Performance Indicators, Gas Supply; Bureau of Industry Economics, December 1994.

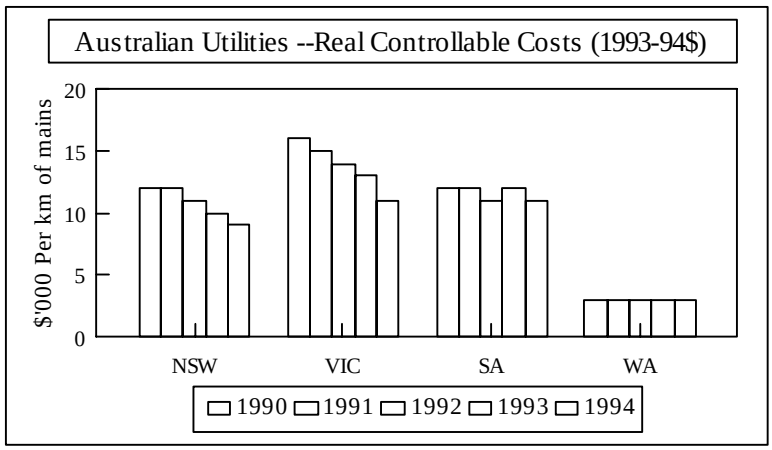
5.2 Australian Gas Association -- Gas Distribution Performance Indicators 1995

Real controllable costs for the years ending June 30, 1990 to 1994, for Australian distribution utilities are shown in the two graphs which follow. The first shows costs per customer and the second, cost per km of main. (Source: Gas Distribution Industry Performance Indicators, 1995; The Australian Gas Association.)

5.2.1



5.2.2



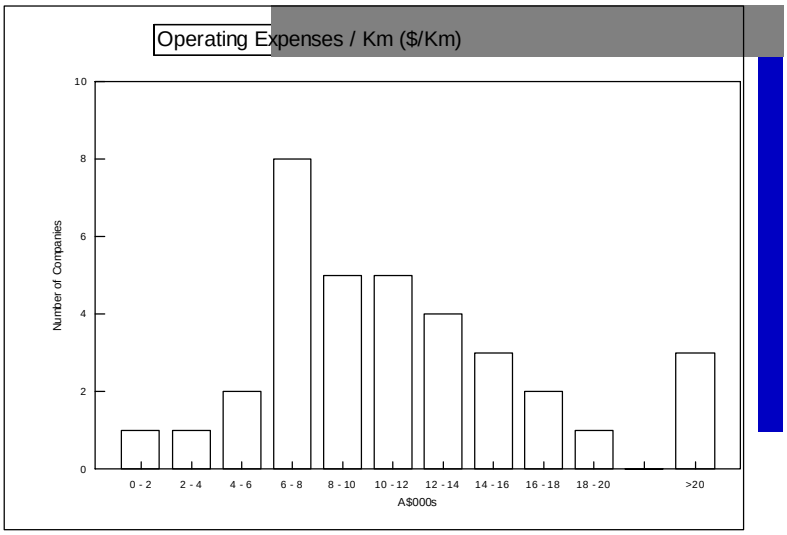
5.3 Comparison with 36 of the largest US gas distribution companies.

Financial data was drawn from company filings to their regulatory agencies. Length of mains was drawn from "Pipeline and Gas Journal" September 1996.

US distribution companies are listed (in decreasing size by customer numbers):

Southern California	Wisconsin Gas
PG&E	Piedmont Natural Gas
Northern Illinois	Washington Natural Gas
Public Service Electric & Gas	Indiana Gas
Consumers Power	Illinois Power
Atlanta Gas Light	Northwest Natural Gas
Columbia Gas of Ohio	Cincinnati Gas & Electric
Brooklyn Union	Wisconsin Natural Gas
Michigan Consolidated	New Jersey Natural Gas
Consolidated Edison	Southwest Gas Corp
PSC of Colorado	Dayton Power & Light
Peoples Gas Light & Coke	PSC of North Carolina
Washington Gas Light	Rochester Gas & Electric
Northern Indiana Public Service	Louisville Gas & Electric
Baltimore Gas & Electric	Bay State
Laclede Gas	Equitable Gas
Boston Gas	National Fuel Gas Distribution
Niagara Mohawk Power	

The first chart illustrates a histogram of Operating Cost per km for the 35 US distributors.



Operating Expense includes:

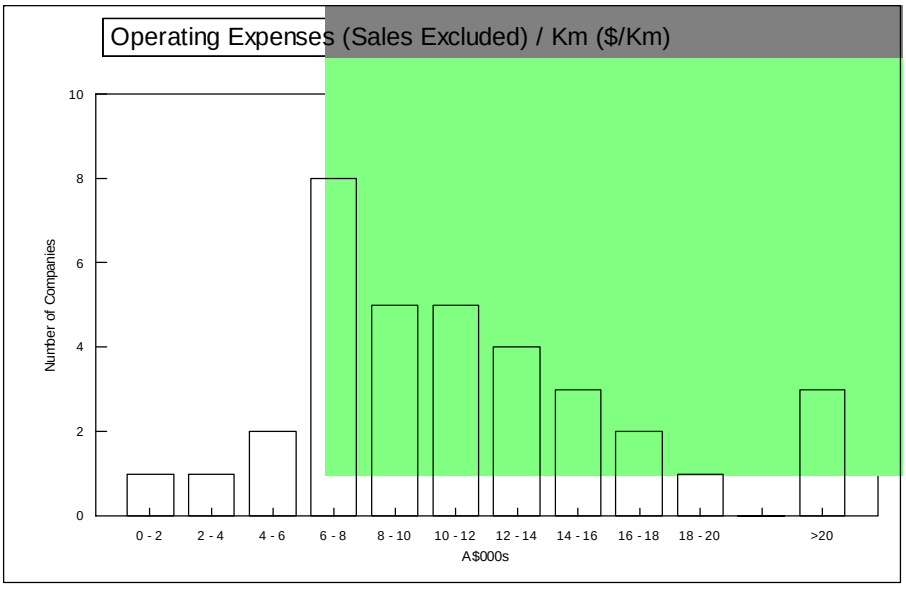
- Distribution O&M
- Customer Accounts
- Customer Service
- Sales and Marketing
- Administration and General

On this measure, 13 companies have a lower Operating Expense/km than AGL, 5 are in the same band, 17 have a higher figure. AGL is in the middle of the 8-10 band, in 15th place overall.

By virtue of its cold climate, the USA is a "natural" gas market. This is reflected in very high penetration rates, and very high average household consumption. The advantage of climate, and relatively expensive electricity, means that US gas distributors have very modest sales and marketing activities; they are not necessary to achieve high penetration.

The coastal regions of NSW, where the majority of the population lives, and where most of AGL's network is established, are warm. As a consequence, sales and marketing tends to be a more significant component of Operating Expenses.

The second chart excludes the sales and marketing expense from the analysis. On this 'normalised' measure, there are 4 companies with a lower Operating Expense / km than AGL, 8 are in the same band, and 24 have a higher figure. AGL is in overall 5th place on this measure.



5.4 American Gas Association Best Practices Benchmarking surveys, 1994 and 1995

The following information is derived from Best Practices Benchmarking surveys conducted by the American Gas Association in 1994 and 1995. In each case there were of the order of 70 responding distribution utilities (including AGL).

The performance measures have been ranked according to the level of AGL's expenditure in each area -- highest to lowest. Overall performance can best be improved by concentrating on those facets of the operation where expenditure is greatest and which therefore offer the greatest leverage. AGL's relative performance is generally best in those high expenditure areas.

Criterion	**Quartile in which AGL Lies**
Mains Replacement ($/Foot)	1
Service Replacement	
$/Foot Replaced	1
$/Service Replaced	1
Labour per foot of service	2
New Main Construction ($/Foot)	1
Routine O&M	
$/Mile	1
$/Leak	1
Field Meter/Regulator	
$/Meter In Field	3
$/Meter changed/removed	1
Regulation O&M ($/City Gate Station)	4
Leakage Surveys	
$/Mile in use	1
$/Mile Surveyed	2
Meter Test Repair	
$/Meter In Field	1
$/Meter Tested/Repaired	1
Corrosion Prevention	
$/mile surveyed	4
$/mile in service	3
Locating and Staking ($/Mile)	4

ATTACHMENT 1

Optimised Stand-alone Design Methodology

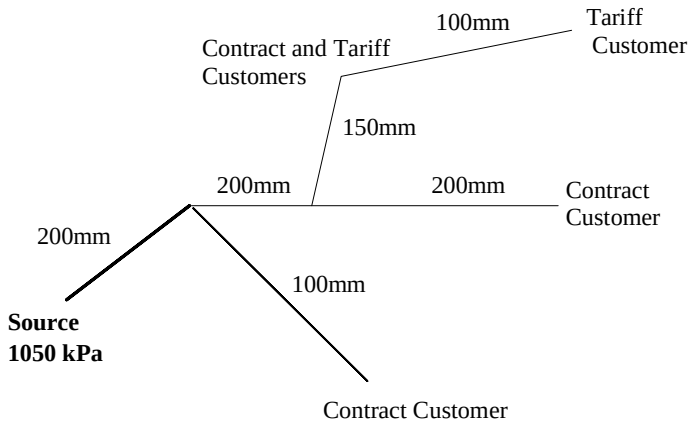
AGL Gas Networks Limited

OPTIMISED STAND-ALONE DESIGN METHODOLOGY

For the purposes of revenue allocation, the contract market's share of the replacement cost of local network assets is taken to be the cost of the "optimised stand-alone" design for the local network that would be required to serve the contract market alone. The procedure by which the optimised stand-alone design was established is described here. The replacement cost of this design was then calculated using the unit costs agreed to by J P Kenny.

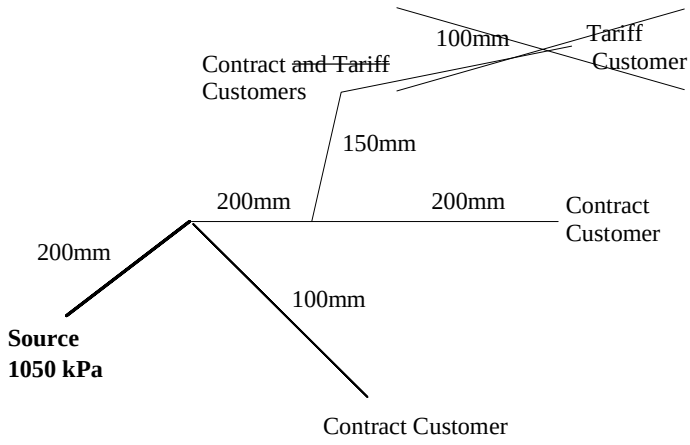
The high pressure local networks were analysed using the Stoner Network package. The redesign of the networks for the contract customers alone was based on the current configuration of the distribution mains (Figure 1).

Figure 1: Current Distribution System



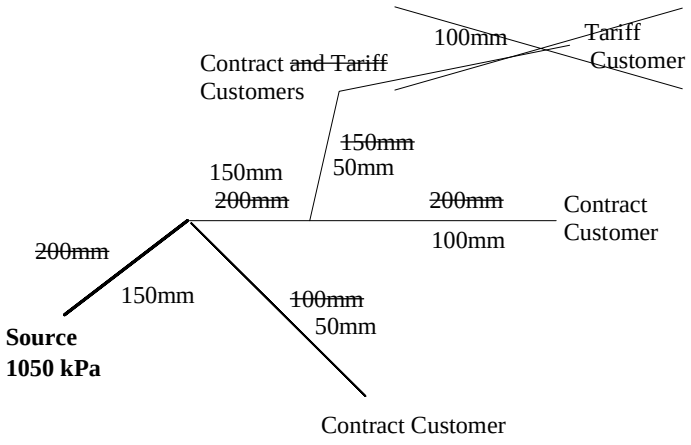
Mains which did not service any contract customers were considered redundant and were therefore removed (Figure 2). In the case where a contract customer was supplied from the medium pressure system the nearest node on the secondary system was assigned to this customers. Their optimised medium pressure assets were accounted for in the pricing model.

Figure 2: Removal of Mains Servicing Tariff Market Only



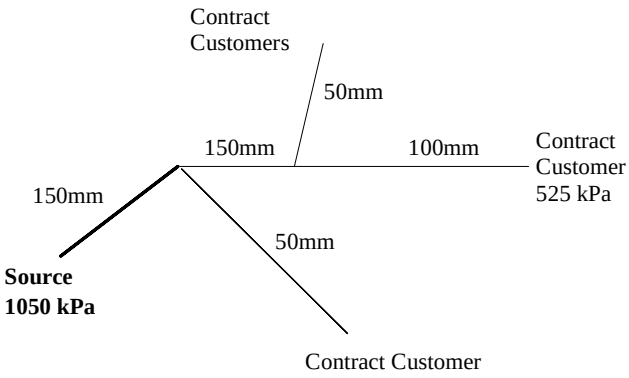
The mains were re-sized to maximise the utilisation of the network systems. Pipes were down-sized where required to eliminate any excess capacity and no redesigned pipe was allowed to be larger than that currently in the ground (Figure 3). Only standard pipe sizes were used and the smallest pipe size used was 50mm steel pipe 2.

Figure 3: Down-sizing of Mains



The minimum allowable pressures adopted for the primary and secondary networks, were 1750 and 525 kPa respectively (Figure 4).

Figure 4: Optimised Contract Stand-alone Design



The loads used to design the optimised stand alone network were based on historic customer usage data collected over the 12 month period from February 1996 to January 1997.

[2] In practice the minimum size pipe that would currently be laid in the secondary system is 100mm.

ATTACHMENT 2

Asset Valuation Methodology -- Replacement Cost

J P Kenny Report -- Section 4

AGL Gas Networks Limited

Section Four

VALUATION OF DISTRIBUTION SYSTEM

4.1 GENERAL

In line with the Gas Council's cost of service study to determine the costs associated with different service offerings, AGLGC has performed a valuation of its assets. This valuation can then be split so that the cost associated with different zones of AGLGC's network can be determined. From this the actual cost of the service to each customer will be determined. On behalf of the Gas Council, J P KENNY has performed an audit of AGLGC's network infrastructure valuation.

J P KENNY has also reviewed the appropriateness of the existing infrastructure for the current and predicted load requirements. This review allows the optimised valuation of AGLGC's network.

AGLGC's asset valuation will be split into zones. This split is required as the Gas Council is proposing that the price customers are charged reflects the proportion of the infrastructure that each customer uses. However, the Gas Council also requires a pricing structure that is easily applied and transparent to the customer. Hence, a dynamic pricing structure that charged each customer for the exact proportion of the system they used, although technically feasible is not considered appropriate. The next step is to divide the region into zones and average the customer charges for each zone.

4.2 J P KENNY'S ASSESSMENT METHODOLOGY

J P KENNY has evaluated the accuracy of AGLGC's asset valuation in an audit fashion. That is, J P KENNY has not valued AGLGC's assets separately and then compared final values, but has checked the valuation by AGLGC. However, the reasonableness of AGLGC's cost estimates were able to be verified because of J P KENNY's pipeline design and construction expertise.

When auditing the valuation of AGLGC's assets the information required was being supplied from numerous different documents. In some instances this meant that values did not correlate exactly. The difference was minor but it meant that in some cases J P KENNY was verifying the reasonableness of the order rather than the exact value of the number.

The majority of the verification information supplied by AGLGC was in the form of summary tables and excerpts from various reports. Where possible the report and files that the information came from were viewed to ensure accuracy of the numbers. However, the source files and documents for every item in the valuation were not viewed.

J P KENNY believes that the information supplied for cross referencing is intended to be true and accurate as no gross inaccuracies were found.

4.3 PRESENT SYSTEM VALUATION AUDIT

The value of AGLGC's pipeline (and associated attachments) replacement cost provided for J P KENNY, differed from the replacement costs provided by the Gas Council. The trunk system, mains, services, regulators, filters and meters replacement cost on the Gas Council's document (Ref. 7) totals $2249 million. The replacement cost valuation provided by AGLGC (Ref. 8) totals $2341 million which represents a 5% increase. AGLGC puts this difference down to its current document being more accurate and up to date. J P KENNY audited the values presented by AGLGC.

J P KENNY's optimised valuation of AGLGC's pipeline assets differs from AGLGC's replacement cost. J P KENNY believes a lower trunk line replacement cost can be used along with a reduction in the size of the trunk main to Mt. Keira and reduced lengths of primary system pipework. These changes lower the replacement value of AGLGC's pipework system. However, J P KENNY believes that the engineering costs for parts of AGLGC's system have not been included. In some cases supporting cost information details material, labour and equipment costs only. This assumption was confirmed by AGLGC. When the reduced rates, optimised quantities and engineering cost are included, the resultant replacement value is $2438 million. This represents a 8% increase over the Gas Councils original document and a 4% increase over AGLGC's valuation.

Throughout AGLGC's replacement cost valuation, average replacement costs have been used. This method of asset valuation is commonly used and usually yields acceptable results. The following section assesses the reasonableness of these assumptions.

Trunk Mains

The valuation of the trunk mains has been based on a $/mm.km basis. This valuation method is used internationally and is regarded as being a representative assessment method

The rates used by AGLGC are:

1) Central Trunk Main $1457/mm.km
2) Other Trunk Mains $1772/mm.km
3) Short Trunk Main Sections $2165/mm.km

These values are taken from AGLGC's statement of insurable property document (Ref 1). The exact source of these figures was difficult to establish, however, reviewing pipeline pricing information supplied by AGLGC (Ref 2) which included an independent paper, the average construction cost of natural gas pipelines laid in NSW varied from a high of $1490/mm.km to a low of $800/mm.km. The recommended rate for cost estimates was $1200/mm.km. This value is considered reasonable by J P KENNY and hence has been used for J P KENNY's optimised valuation of AGLGC's assets. A table detailing the effects of this rate reduction is given in Appendix A.

Trunk Line ALB Valves, Trunk Receiving, Primary Receiving Station 2 and Primary Valve Costs

These costs were taken straight from AGLGC's statement of Insurable Property Document (Ref.1) however, they are believed to be representative for reasons outlined in Section 4.4.

Primary Mains

These replacement costs were calculated from typical laying costs for each different pipe diameter. These costs were originally calculated with a restoration rate of $\$80/m^2$. Reviewing AGLGC's standard schedule of rates (Ref 3), this value appears very low. Averaging the roadway restoration rates for the Sydney area, a value of $\$223/m^2$ results. Recalculating the replacement costs with this restoration rate, the following values for costs per linear metre are obtained:

Primary Main Size	$/m
150	319
250	410
500 & 550	923

Details of these calculations are given in Appendix A

Secondary Mains

The secondary mains replacement costs vary significantly depending on the restoration rate that is applicable. AGLGC has prepared graphs highlighting the relationship between mains laying cost and the ease of the project. The ease of the project is generally dependent on the restoration required.

Although an exact laying cost cannot be extracted from the graph, by plotting the values used in the valuation on the graph and comparing these to known project costs, the reasonableness of the values can be assessed. Not all values were checked, however, the values that have been checked were considered to be reasonable. The values that were not checked have similar ($/mm.m) rates indicating that they are also reasonable. Details of these rates and supporting graphs are given in Appendix A.

Secondary Regulator Sets

These values were taken straight from AGLGC's statement of insurable property (Ref.1) however, they are believed to be representative for reasons outlined in Section 4.4.

Secondary Services

This replacement cost is the weighted average value of the typical laying cost of a short and long customer secondary service. Where possible, AGLGC has laid the

secondary main on the side of the street with the majority of potential customers. It is assumed that approximately 70% of the secondary services are short services.

The resultant weighted average with 70% short services is $2654 per service. Details of these costs and supporting information is given in Appendix A.

Lump Meters

The lump meter costs are actual replacement costs and these have been summarised in Appendix A.

MP & LP Mains

As with the secondary mains, the laying costs of MP & LP mains have been graphed for various different scenarios and hence an exact cost cannot be interpreted. However, statistical information is available for different mains laying situations. This enables the most likely cost area on the graph to be pinpointed. When this is done, it can be seen that the general laying rate of $79/m is reasonable. The graph and supporting documentation is detailed in Appendix A. The refurbishment cost is claimed to be $79/m. Hence the refurbishment cost is the same as the replacement cost. This value has been used in the report.

MP & LP Services

Similar to the secondary services, the MP & LP replacement cost is the weighted average value of the typical laying cost of a short and long service. Once again, it is assumed that 70% of the MP & LP services are short services.

The weighted average with 70% short services is $594 per service. Cost details and supporting documentation is given in Appendix A.

Gass Meters

The gass meter replacement cost has also been calculated using weighted averages. The weighted average is determined from the number of domestic customers compared to the number of industrial and commercial (I & C) customers. The I & C meters are more expensive than the domestic meters. The weighted average meter value is $190 each. The cost details and supporting information is given in Appendix A.

4.4 OPTIMISED SYSTEM VALUATION

To formulate an optimised system valuation, J P KENNY performed independent flow analysis of the trunk main. Analysis was performed for the peak winter flow rates of 1995. This occurred on the 21 June '95. Lines that appeared oversized for these flow rates were checked for the forecast increase in gas flow.

The trunk main from Wilton to Newcastle is currently undersized. Due to the pressures and flow rates required from this line, the inlet pressure at Wilton has been

increased. This increase in pressure has increased the effective capacity of the Wilton to Mt. Keira trunk line. The capacity of the Mt. Keira line has been checked for both the original contracted pressure at Wilton of 3800 kPa and the increased contract pressure of 4600 kPa to 4900 kPa. Under the original contract pressures, a 350NB pipeline is required. With the new contract pressures a 200NB pipeline is required. The optimised valuation has been carried out for the pipe required under the original contract conditions. It is expected that with the increased gas demand, AGLGC will move to compression to upgrade line capacity. This will allow AGLGC to reduce the contract pressure at Wilton. It is assumed this pressure will be the original contract pressure.

As well as optimising the trunk main lengths J P KENNY has also modified the replacement rate used in the report to $1200/mm.km. This rate is taken from AGLGC's Pipeline Pricing Document (Ref 2) and is considered reasonable by J P KENNY. The original values used in AGLGC's valuation were taken straight from its insurance document (Ref 1). These values are considered high as they are for emergency replacement of the existing lines.

In the report different replacement rates have been used for Trunk, Primary and Secondary mains. This reflects the different pressure and regulatory requirements for each of these lines. The cost of installing a trunk main, in particular the 100 mm trunk main, is lower than the cost of installing a 100 mm secondary main due to the reduced restoration required and the ease of the installation (ie more open country). This argument does not hold true for the primary and secondary mains as they are both laid in similar terrain with similar restoration requirements. The replacement cost for the Primary Main is higher than that for the Secondary main as a function of its higher operating pressure, ie 3400 kPa as opposed to 1050 kPa.

As a consequence of the higher operating pressure the following design criteria are effected.

DESCRIPTION	PRIMARY	SECONDARY
Wall thickness (mm) Nom Diameter 150 250 500	 4.8 6.4 9.6	 3.6 4.8 Not required
Deeper Cover (mm) ground level to top of pipe	1,200	750
Valves and Fittings (Note: this effectively doubles the cost of fittings)	ANSI 300	ANSI 150
Others: X Ray of all welds Concrete capping along length of main	 Yes Yes	 Not required Not required
Restoration	Larger surface area	Smaller surface area

The regulator stations and other equipment costs that have been taken from the insurance document consists of actual construction costs and escalated construction costs. Escalated replacement costs are also considered suitable as unlike pipeline

construction costs, plant and refinery construction costs have remained stable and hence have been subject to inflation rate increases only.

The other area of AGLGC's system that can be optimised is the primary and secondary main system. The optimised sizes were taken from work done using the Stoner system detailed in attachment 3 of AGLGC's information pack forwarded to the Gas Council in October 1995 (Ref. 4). This work resulted in changes in diameter and reduced pipeline lengths as detailed in Appendix A.

These changes reduced AGLGC's valuation, however, this reduction in valuation is offset when engineering cost are included The result is a total optimised replacement value of $2 438 027 000. A summary of the optimised replacement values is given in Table 4.5.

ATTACHMENT 3

Network Description

Access Undertaking Schedule A

AGL Gas Networks Limited

SCHEDULE A

NETWORK DESCRIPTION

This Undertaking applies to the Network as described in this schedule A, situated within the following Local Government Areas under the Local Government Act 1993:

Ashfield	Cowra	Leeton	Rockdale
Auburn	Drummoyne	Leichhardt	Ryde
Bankstown	Evans	Liverpool	Shellharbour
Bathurst	Fairfield	Maitland	Singleton
Baulkham Hills	Gosford	Manly	South Sydney
Blacktown	Goulburn	Marrickville	Strathfield
Bland	Greater Lithgow	Mosman	Sutherland
Blayney	Griffith	Mulwaree	Sydney
Blue Mountains	Hawkesbury	Muswellbrook	Warringah
Boorowa	Holroyd	Narrandera	Waverley
Botany	Hornsby	Newcastle	Willoughby
Burwood	Hunters Hill	North Sydney	Wingecarribee
Camden	Hurstville	Oberon	Wollondilly
Campbelltown	Junee	Orange	Wollongong
Canterbury	Kiama	Parramatta	Woollahra
Cessnock	Kogarah	Penrith	Wyong
Concord	Ku-ring-gai	Pittwater	Yass
Coolamon	Lake Macquarie	Port Stephens	Young
Cootamundra	Lane Cove	Randwick	

DESCRIPTION OF THE NETWORK CAPABILITIES

The Network extends to Sydney, Newcastle, Wollongong, Central Coast and country areas of New South Wales.

Natural Gas is supplied to the Network by the Moomba-Sydney Pipeline owned and operated by East Australian Pipeline Limited (EAPL). A combination of 27 TRSs (Trunk Receiving Stations), and 16 POTS (Packaged Off Take Stations) owned by AGL, supply the various local High Pressure (HP) distribution networks. The Medium Pressure (MP) and Low Pressure (LP) parts of the Network are served via district regulators from the HP system or, in some cases, directly from a POTS.

HP distribution networks operate at pressures in the range 525 kPa to 7,000 kPa. MP networks operate in the range 70 kPa to 500kPa, and LP networks operate in the range 1.5 kPa to 7 kPa.

Those sections of the Network which are in Sydney, Newcastle and Wollongong are supplied by the AGL Trunk Main which interconnects with the EAPL Pipeline at Wilton.

Those sections of the Network which are in country NSW are supplied directly or by laterals from the Moomba-Wilton pipeline. All country trunk pipelines are owned and operated by EAPL.

The TRS and POTS Locations, Network Descriptions, and the Local Government Areas supplied by each are listed in the following table and shown schematically in the attached drawings.

TRUNK MAIN											NETWORK DESCRIPTION		LOCAL GOVERNMENT AREAS
	RECEIPT AND SUPPLY POINTS												
	TRS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ. MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	POTS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ.MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	HP	MP	
Moomba-Young (EAPL)						West Wyalong	1750	1750				✓	Bland
Young - Lithgow (EAPL)	Cowra	1750	1750	n.a.	To 30 June 1998 (Y1): $34.051 Year to 30 June 1999 (Y2): $33.581					To 30 June 1998 (Y1): $34.051 Year to 30 June 1999 (Y2): $33.581	✓		Cowra
	Blayney	1750	1750	n.a.							✓		Blayney
	Orange	1750	1750	n.a.							✓		Orange
						Millthorpe	1750	1750	n.a.			✓	Orange
	Bathurst	1750	1750	n.a.							✓		Bathurst
													Evans
	Oberon	1750	1750	n.a.							✓		Oberon
	Lithgow	1750	1750	n.a.							✓		Greater Lithgow
						Wallerawang	1750	1750	n.a.			✓	Greater Lithgow
Young - Griffith (EAPL)	Young	1750	1750	n.a.							✓		Young
	Cootamundra	1750	1750	n.a.							✓		Cootamundra
	Junee	1750	1750	n.a.							✓	✓	Junee
						Coolamon	1750	1750	n.a.			✓	Coolamon
						Ganmain	1750	1750	n.a.			✓	Coolamon
						Narrandera	1750	1750	n.a.			✓	Narrandera
	Rockdale	1750	1750	n.a.								✓	Narrandera
						Leeton	1750	1750	n.a.		✓	✓	Leeton
						Murrami	1750	1750	n.a.			✓	Narrandera
	Yoogali (Griffith)	1750	1750	n.a.							✓	✓	Griffith
Young - Wilton (EAPL)						Boorowa	1750	1750	n.a.			✓	Boorowa
						Yass	1750	1750	n.a.		✓		Yass
	Goulburn	1750	1750	n.a.							✓		Goulburn
	Marulan	1750	1750	n.a.							✓		Mulwaree
						Sally's Corner	1750	1750	n.a.		✓		Wingecarribee
	Moss Vale	1750	1750	n.a.							✓		Mittagong
	Bowral	1750	1750	n.a.							✓		Wingecarribee
						Bargo	1750	1750	n.a.		✓	✓	Wingecarribee

TRUNK MAIN											NETWORK DESCRIPTION		LOCAL GOVERNMENT AREAS
	RECEIPT AND SUPPLY POINTS												
	TRS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ. MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	POTS Location	Minimum Receipt Pressure [1]	Minimum Delivery Pressure at Inlet to TRS/POTS	Spare Capacity April 1997 (GJ.MDQ)	Charge at Outlet to TRS/POTS ($/GJ.MDQ pa) [2]	HP	MP	
Wilton CTS		3800+	3800										
Wilton-Wollongong (AGL)	Wollongong	3800 +	1750	5300	Y1: 108.163 Y2: 106.670						✓		Wollongong Shellharbour Kiama
Wilton-Horsley Park (AGL)	Appin Campbelltown West Hoxton	3800 + 3800 + 3800 +	1750 1750 1750	1000 1000 1500	Y1: 84.613 Y2: 83.445	Appin	3800	1750	100	Y1: 84.613 Y2: 83.445	✓ ✓ ✓	✓	Wollondilly Sydney (see List)
Horsley Park - Plumpton (AGL)	Horsley Park	3800 +	3500	26000							✓		Sydney (see List)
Plumpton - Kooragang Island (AGL)	Plumpton Windsor	3800 + 3800 +	1750 1750	3500 500		Maroota	3800	1750	100	Y1: 84.613 Y2: 83.445	✓ ✓		Sydney (see List)
	Gosford Wyong	3800 + 3800 +	1750 1750	500 500	Y1: 248.664 Y2: 245.231	Warnervale			100	Y1: 248.664 Y2: 245.231	✓ ✓ ✓		Gosford Wyong
	Hexham	3800 +	1750	5000	Y1: 367.041 Y2: 361.973	Morisset Minmi	3200 3200		100 100	Y1: 367.041 Y2: 361.973	✓	✓ ✓	Lake Macquarie Newcastle Maitland Cessnock Singleton Muswellbrook
	Kooragang Island	3800+	1750	500							✓		Port Stephens

[1] If marked "+" then the Minimum Receipt Pressure may be subject to future increase to a maximum of 7,000kPa.

[2] Rates listed here are the Trunk Charge (applicable to the Trunk Section) or Pressure Reduction Charge (applicable to Network Sections other than the Trunk Section) for Transportation Service at the outlet of the TRS or POTS. Local Network Charges, Transitional Charges, and Metering Charges must be added to these figures to obtain the full Reference Tariff (refer Schedule E).

Primary Regulator Stations -- Sydney Local Network				
PRS Location	Minimum Receipt Pressure	Minimum Delivery Pressure at Inlet to PRS	Spare Capacity April 1997 (GJ. MDQ)	Local Network Charge at Outlet to PRS ($/GJ.MDQ pa)
Horsley Park	3,800	1,750	400 (E) [1] 1,100 (D)	Y1: 6.120 Y2: 6.036
Auburn			1,500 (E) 4,400 (D)	Y1: 55.586 Y2: 54.818
Flemington			1,100 (E) 3,300 (D)	Y1: 73.632 Y2: 72.616
Mortlake			300 (E) 800 (D)	Y1: 207.540 Y2: 204.674
Haberfield			800 (E) 2,600 (D)	Y1: 149.956 Y2: 147.886
Tempe			1,200 (E) 3,600 (D)	Y1: 128.370 Y2: 126.598
Mascot			1,100 (E) 3,300 (D)	Y1: 171.293 Y2: 168.928
Banksmeadow			900 (E) 2,700 (D)	Y1: 175.581 Y2: 173.156
North Ryde			1,600 (E) 2,800 (D)	Y1: 176.528 Y2: 174.091
Willoughby			200 (E) 400 (D)	Y1: 792.905 Y2: 781.957

1 Capacity of Primary Main in Sydney at PRS location: E = Existing; D = Developable

Standard Operating and Metering Pressures

Maximum Allowable Operating Pressure (kPa)	**Normal Operating System Minimum Pressure (kPa)**	**Emergency System Minimum (kPa)**	**Standard Metering Pressure (kPa)**	**Alternative Metering Pressures (kPa)**
1,050	525	400	100	-
500	70	40	2.75	7, 15, 35
400	70	40	2.75	7, 15, 35
300	70	40	2.75	7, 15, 35
210	70	40	2.75	7, 15, 35
7	3.5	2.8	1.38	2.75
2	1.5	1.4	1.38	-

List of Local Government Areas Served Through the Wilton Custody Transfer Station

Ashfield	Fairfield	Maitland	Shellharbour
Auburn	Gosford	Manly	Singleton
Bankstown	Hawkesbury	Marrickville	South Sydney
Baulkham Hills	Holroyd	Mosman	Strathfield
Blacktown	Hornsby	Muswellbrook	Sutherland
Blue Mountains	Hunter Hill	Newcastle	Sydney
Botany	Hurstville	North Sydney	Warringah
Burwood	Kiama	Parramatta	Waverley
Camden	Kogarah	Penrith	Willoughby
Campbelltown	Ku-ring-gai	Pittwater	Wollondilly
Canterbury	Lake Macquarie	Port Stephens	Wollongong
Cessnock	Lane Cove	Randwick	Woollahra
Concord	Leichhardt	Rockdale	Wyong
Drummoyne	Liverpool	Ryde	

For AGL Gas Network Maps
see separate PDF file

ATTACHMENT 4

System Description

J P Kenny Report -- Section 2

AGL Gas Networks Limited

Section Two

SYSTEM DESCRIPTION AND DATA

2.1 GENERAL

This section provides details of the AGLGC gas distribution network as supplied by AGLGC including the design data used for evaluating the system capacity.

2.2 SYSTEM DESCRIPTION

AGLGC's distribution pipe work system has a long history starting in 1837 to light the streets of Sydney. Currently, AGLGC's distribution networks function is to supply natural gas as an alternative energy source to both the domestic and industrial markets. The original network has been constantly modified, in order to increase its capacity and point of delivery capabilities.

Because of this development process, the current system does not necessarily represent the most cost effective method of distributing gas over the existing areas. However, as it would not be cost effective to replace the existing network with an optimised design, the current system does represent a justifiable method for distributing gas over the existing areas, taking into account AGLGC's history. The major elements of the system are described below.

Trunk Main

This pipeline transports high pressure gas from the East Australian Pipelines Limited (EAPL) pipeline termination point at AGLGC's Trunk Receiving Station at Wilton to AGLGC's distribution networks at Wollongong, Sydney and Newcastle. The inlet pressure at Wilton varies between 4600 and 4900 kPa.

The trunk main supplies gas to AGLGC's primary and secondary networks via either Trunk Reduction Stations (TRS's) or Pressure Offtake Trunk Stations (POTS).

Primary High Pressure System

The primary network is fed by TRS's on the trunk main. The maximum allowable operating pressure (MAOP) of the system is 3400 kPa with the minimum allowable operating pressure being 1750 kPa.

The primary network supplies gas to the AGLGC secondary networks via Primary Reduction Stations (PRS's).

Secondary High Pressure Distribution System

The secondary network is fed by either TRS's or POTS on the trunk main or PRS's on the primary network. The MAOP of the system is 1050 kPa with the minimum allowable pressure being 525 kPa.

The secondary network supplies gas to the medium and low pressure distribution systems as well as tariff and contract customers directly.

Medium and Low Pressure Distribution Network

The medium and low pressure (MP & LP) networks are fed by the secondary network. The MAOP's are 400 to 210 kPa and 7 kPa respectively.

These systems supply domestic and tariff customers directly.

2.3 HISTORY OF DEVELOPMENT

AGLGC's original pipe network was established in 1837 to provide lighting in the streets of Sydney from town, or manufactured, gas. At this time, the distribution network mainly consisted of underground cast iron pipes. Very little consideration was given to corrosion protection of the pipes and consequently the majority of this original pipework still in existence is in very poor condition. However, the leakage of gas from the system was contained as the town gas was very wet and tended to seal the surrounding soil.

In 1976 AGLGC changed from the supply of manufactured gas to natural gas. The natural gas was supplied to AGLGC by a consortium of South Australian Cooper Basin (SACB) producers and the natural gas is transported to the AGLGC distribution networks by a pipeline owned by Easy Australian Pipelines Ltd (EAPL).

The change to the very dry natural gas caused some problems for AGLGC as the badly corroded cast iron pipes leaked. This gas leakage prompted the goldline project, where nylon pipes were inserted into the cast iron pipes. Currently, 95% of the cast iron pipe work has been refurbished with the Goldline pipe. All new MP & LP networks are installed using the Goldline nylon pipe.

Apart from the ongoing Goldline project, AGLGC has recently completed extensions to its secondary mains network in the Mona Vale and Parklea areas. AGLGC is currently extending its secondary mains network into the Blue Mountains.

Further development of the AGLGC network is currently on hold as they evaluate the possible ramifications of the proposed changes in the New South Wales gas market.

2.4 STONER COMPUTER MODEL

The AGLGC uses the Stoner computer program to model its primary and secondary pipe work systems. The program assumes steady state conditions only. Each year the program is verified against actual pressures and flows during the peak gas usage period.

The Stoner program provides a useful information base when evaluating AGLGC's asset valuation. The information in Stoner is constantly being updated, ensuring that the Stoner model is valuable when used in making day to day decisions. For this reason, J P KENNY believes that Stoner provides a good cross reference for the technical data in AGLGC's asset valuation.

NSW Transmission Pipeline

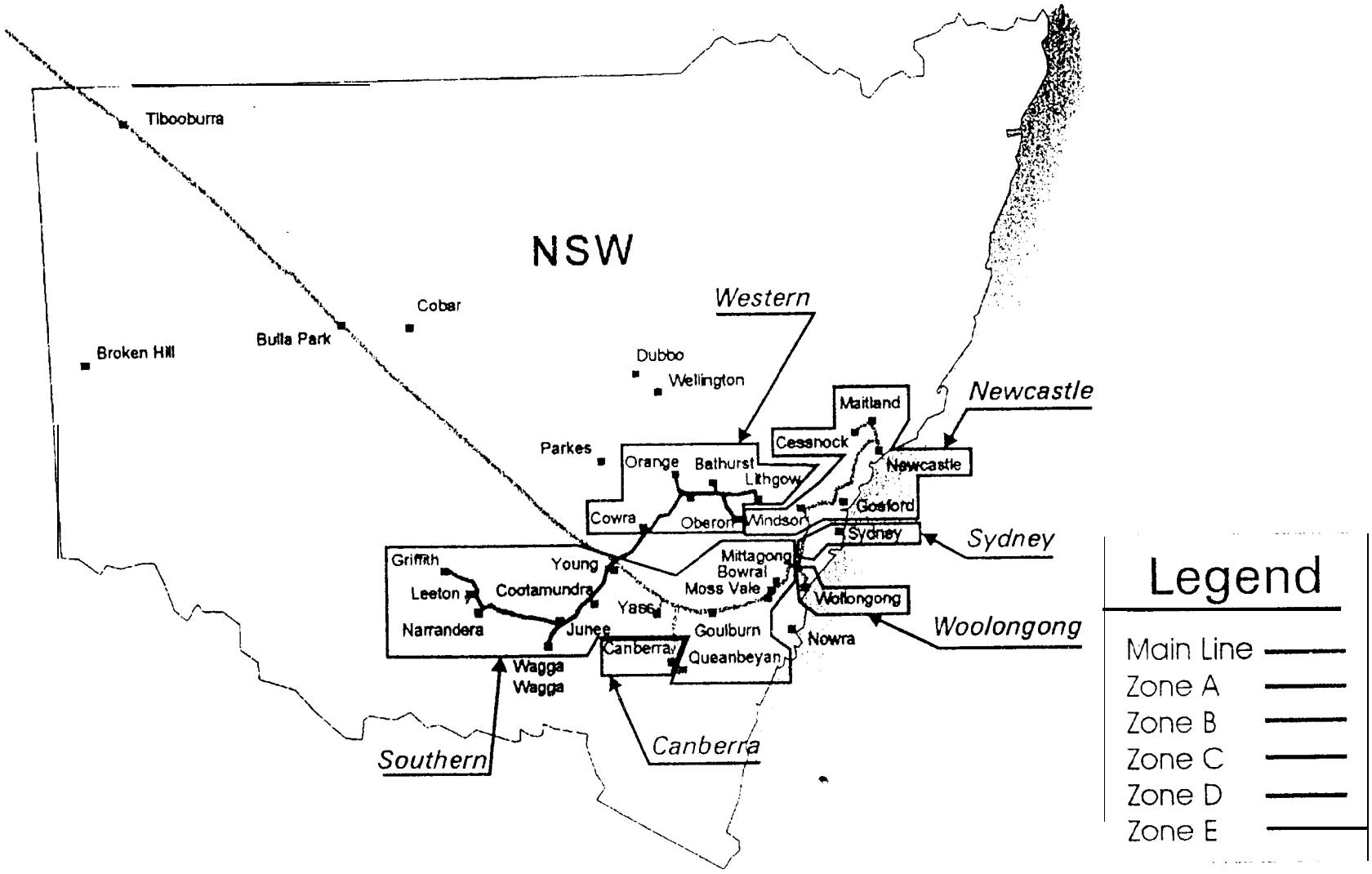


Figure 200

ATTACHMENT 5

Map of piping system and pipe sizes etc
Pipe sizes and lengths

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2.6 DESIGN DATA

Trunk line Diameters and Lengths

The existing pipeline diameters, wall thickness and lengths for various sections of the trunk line between Wilton and Incitec, including Mr Keira, are given in Table 2.2 below.

Table 2.2
AGLGC TRUNK LINES

FROM	TO	DIAMETER O.D. (mm) / (inch)	W.T.(1) (mm)	LENGTH (km)
Wilton	Mt Keira	500/20	6	21.6
Wilton	Campbelltown	850/34	12	22.5
Campbelltown	W. Hoxton	850/34	12	13.5
W. Hoxton	Horsley Park	850/34	12	15
Horsley Park	Plumpton	500/20	6	9.4
Plumpton	Windsor	500/20	6	15
Windsor	Gosford	500/20	6	62.3
Gosford	Wyong	500/20	6	27.1
Wyong	Hexham	500/20	6	58.5
Hexham	Kooragang Is.	350/14	6.9	12.1
Kooragang Is.	Incitec	250/10	5.3	1.6

Note: (1)The pipeline wall thickness within each section of the trunk line varies considerably due to pipe availability and various safety factors applied to different design zones. Hence, the wall thicknesses presented above are average values for each section of pipeline.

AGLGC Rates And Quantities Summary

		Sydney			
		AGLGC		J P KENNY	
Item	Size	Length / Quantity (m/No)	Unit Cost $	Length /Quantity (m/No)	Unit Cost $
Trunk Mains	850 mm	51,000	1,260	51,000	1,020
	500 mm	9,400	900	9,400	600
	350 mm				
	100 mm	2,000	220	2,000	120
ALB Valves	NA	3	96,267	3	96,267
Trunk Reduction Station	NA	8	Various	8	Various
Primary Reduction Stations	NA	11	Various	11	Various
Primary Valves	NA	11	Various	11	Various
Primary Mains	150 mm	15,186	319	8,314	319
	250 mm	9,328	410	10,820	410
	500 mm	1,400	923	1,330	923
	550 mm	62,816	923	52,186	923
Secondary mains	50 mm	1,093	100	1,093	100
	75 mm	6,101	100	6,101	100
	100 mm	200,035	135	207,340	135
	150 mm	329,489	164	328,643	164
	200 mm	125,627	220	124,367	220
	250 mm	99,248	275	98,920	275
	300 mm	20,729	330	20,729	330
	350 mm	74,650	380	72,506	380
	450 mm	14,877	500	12,150	500
Secondary Regulator Sets	NA	290	30,000	290	30,000
Secondary Services	NA	1,360	2,654	1,360	2,654
Lump Meters	NA	434	Total Cost	434	Total Cost
Additional Lump Meters	NA	2,086	Total Cost	2,086	Total Cost
MP & LP Mains	NA	12,237,661	79	12,237,661	79
MP & LP Services	NA	449,650	594	449,650	594
Gass Meters	NA	542,531	184	542,531	184

Note: Shaded Cells Are Optimised Values

AGLGC Rates And Quantities Summary

		Newcastle			
		AGLGC		J P KENNY	
Item	Size	Length / Quantity (m/No)	Unit Cost $	Length /Quantity (m/No)	Unit Cost $
Trunk Mains	850 mm				
	500 mm	163,000	900	163,000	600
	350 mm	132,000	630	13,200	420
	100 mm				
ALB Valves	NA	3	96,600	3	96,600
Trunk Reduction Station	NA	5	Various	5	Various
Primary Reduction Stations	NA				
Primary Valves	NA				
Primary Mains	150 mm				
	250 mm				
	500 mm				
	550 mm				
Secondary mains	50 mm	1,300	90	1,300	90
	75 mm				
	100 mm	4,860	120	19,183	120
	150 mm	59,500	150	55,689	150
	200 mm	11,270	220	2,915	220
	250 mm	38,600	250	40,893	250
	300 mm	480	300	5,302	300
	350 mm	32,853	300	23,581	300
	450 mm				
Secondary Regulator Sets	NA	26	3,500	26	35,000
Secondary Services	NA	52	2,123	52	2,123
Lump Meters	NA	66	Total Cost	66	Total Cost
Additional Lump Meters	NA				
MP & LP Mains	NA	1,969,754	58	1,969,754	58
MP & LP Services	NA	71,375	478	71,375	478
Gass Meters	NA	71,119	184	71,119	184

Note: Shaded Cells Are Optimised Values

AGLGC Rates And Quantities Summary

		Wollongong			
		AGLGC		J P KENNY	
Item	Size	Length / Quantity (m/No)	Unit Cost $	Length /Quantity (m/No)	Unit Cost $
Trunk Mains	500 mm	21,600	900	21,600	420
	350 mm				
	100 mm				
ALB Valves	NA	2	96,600	2	96,600
Trunk Reduction Station	NA	1	2,137,800	1	2,137,800
Primary Reduction Stations	NA				
Primary Valves	NA				
Primary Mains	150 mm	3,080	319		
	250 mm	4,240	410	13,700	410
	500 mm	9,700	923		
	550 mm				
Secondary mains	50 mm	811	81	811	81
	75 mm				
	100 mm	9,953	122	17,039	122
	150 mm	39,854	128	41,334	128
	200 mm				
	250 mm	6,980	254	2,204	254
	300 mm				
	350 mm	7,810	320	4,020	320
	450 mm				
Secondary Regulator Sets	NA	31	Various	31	Various
Secondary Services	NA	42	1,592	42	1,592
Lump Meters	NA	37	Total Cost	37	Total Cost
Additional Lump Meters	NA				
MP & LP Mains	NA	1,068,932	48	1,068,932	48
MP & LP Services	NA	34,678	364	34,678	364
Gass Meters	NA	37,581	184	37,581	184

Note: Shaded Cells Are Optimised Values

AGLGC Rates And Quantities Summary

		Western			
		AGLGC		J P KENNY	
Item	Size	Length / Quantity (m/No)	Unit Cost $	Length /Quantity (m/No)	Unit Cost $
Trunk Mains	500 mm				
	350 mm				
	100 mm				
ALB Valves	NA				
Trunk Reduction Station	NA	8	Various	8	Various
Primary Reduction Stations	NA				
Primary Valves	NA				
Primary Mains	150 mm				
	250 mm				
	500 mm				
	550 mm				
Secondary mains	50 mm				
	75 mm				
	100 mm	3,400	110	13,000	110
	150 mm	37,624	110	28,024	110
	200 mm				
	250 mm				
	300 mm				
	350 mm				
	450 mm				
Secondary Regulator Sets	NA	14	Various	14	Various
Secondary Services	NA	18	2,123	18	2,123
Lump Meters	NA	23	Total Cost	23	Total Cost
Additional Lump Meters	NA				
MP & LP Mains	NA	824,206	51	824,206	51
MP & LP Services	NA	16,894	429	16,894	429
Gass Meters	NA	17,838	184	17,838	184

AGLGC Rates And Quantities Summary

		Southern			
		AGLGC		J P KENNY	
Item	Size	Length / Quantity (m/No)	Unit Cost $	Length /Quantity (m/No)	Unit Cost $
Trunk Mains	500 mm				
	350 mm				
	100 mm				
ALB Valves	NA				
Trunk Reduction Station	NA	17	Various	17	Various
Primary Reduction Stations	NA				
Primary Valves	NA				
Primary Mains	150 mm				
	250 mm				
	500 mm				
	550 mm				
Secondary mains	50 mm	1,000	61	1,000	61
	75 mm				
	100 mm	71,225	71	63,675	71
	150 mm	42,500	81	50,050	81
	200 mm	14,475	150	14,475	150
	250 mm				
	300 mm				
	350 mm				
	450 mm				
Secondary Regulator Sets	NA	29	Various	29	Various
Secondary Services	NA	41	1,592	41	1,592
Lump Meters	NA	43	Total Cost	43	Total Cost
Additional Lump Meters	NA				
MP & LP Mains	NA	1,515,209	51	1,515,209	51
MP & LP Services	NA	29,714	397	29,714	397
Gass Meters	NA	32,185	212	32,185	212

ATTACHMENT 6

Peak Flow Rates

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AGL Gas Networks Limited

Table 2.4

CURRENT FLOWRATE

From	To	FLOWRATES (k.m^3/day)		
		WINTER (21/06/95)	DESIGN	VERIFICATION
Wilton	Mt Keira	1,275	1,265	1,275
Wilton	Campbelltown	9,931	10,358	10,358
Campbelltown	W Hoxton	9,689	10,171	10,171
W Hoxton	Horsley Park	9,297	9,621	9,621
Horsley Park	Plumpton	3,259	3,083	3,259
Plumpton	Windsor	2,250	1,977	2,250
Windsor	Gosford	2,198	1,932	2,198
Gosford	Wyong	2,074	1,848	2,074
Wyong	Hexham	1,968	1,788	1,968
Hexham	Kooragang Is.	703	660	703
Kooragang Is.	Incitech	676	648	676

Note:

1. The difference between daily flows of Table 2.3 and daily flowrates of Table 2.4 is a result of a variation in demand throughout the day.

2. Where "design" rates exceed "winter" rates this represents a difference between assumed probabilities of simultaneous downstream peaks and the actual combination of downstream peaks on that day.

Trunk line Historical Flow

The historical flows for the trunk line at Wilton between l988 and l995 are given in Table 2.3 below. The flows have been obtained from network peak day energy values using a contract heating value (HV) for the gas of 38.6 MJ/m^3.

Table 2.3

HISTORICAL FLOWS AT WILTON

DATE	PEAK DAY FLOWS ($k.m^3$/day)
09/08/88	8424
08/08/89	8911
28/06/90	8385
25/07/91	8461
22/07/92	8077
09/06/93	8251
09/08/94	8523
21/06/95	8836

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