TRANSCO PRICING CONSULTATION PAPER PC9A, NOVEMBER 1997

OPTIONAL NTS COMMODITY TARIFF

Summary

This paper puts forward the proposal for the introduction of an optional NTS commodity tariff which was first mooted by Transco in March 1997. It is intended to initiate a further period of consultation with a view to introducing the new tariff early in 1998.

The paper includes extracts from the original consultation paper PC9 as an appendix, as the basis for the charge and the details of the calculation of the charging function have not changed. The function is based on the estimated costs to Transco of laying a dedicated pipeline, for a range of flowrates and distances from an entry terminal.

The paper also covers Transco's responses to the points made during the original consultation, and an updated analysis (post 1997 price control formula) of the effect of the proposed tariff on system users.

We believe that the need for a tariff of the type described in the paper is if anything even more urgent than when the proposal was first made, and that introduction of the tariff would lead to efficiency benefits for the transportation business and ultimately lower prices for system users.

1. Introduction

A consultation paper on a proposed optional NTS commodity tariff, PC9, was circulated to shippers and the industry on 4 March 1997.

In the consultation paper it was proposed that an optional NTS commodity tariff should be introduced. Where so elected by the shipper, the optional commodity tariff would be levied in place of the standard commodity tariff to the extent that the shipper brought gas into the system at the local terminal for offtake at the supply point. The standard commodity tariff would continue to apply to the extent that gas was sourced from other terminals. The tariff would be available to all daily metered supply points. However in practice it would only be attractive to large supply points/offtakes situated close to terminals.

The rationale for the optional tariff was to begin to address pricing policies that appear to give perverse economic incentives to system users and may appear to be unduly discriminatory between certain categories of users. The proposed tariff is based on the cost of building and maintaining a dedicated pipeline from the terminal to the supply point (i.e. the standalone cost of a transportation service). The price is a function of distance from terminal to supply point, load factor and load size.

The following price function to calculate the optional NTS commodity charge was determined (in p/kWh):

$$1410 \times [(SOQ)-0'840] \times D + 389 \times (SOQ)-0'654$$

where **SOQ** is the Registered Supply Point Capacity in kWh/day,

and D is the direct distance from the site boundary or non-Transco pipeline to the elected terminal in km.

In recognition of the fact that the supply point would continue to be connected to the integrated network, it was proposed that standard capacity charges would continue to be payable for a firm service.

A total of 19 responses to the consultation paper were received, the majority of which expressed support for the proposals. However although a draft consultation report was prepared by Transco, Ofgas informed Transco that if the report was submitted, including final proposals for the charge, they would be minded to veto the proposals at that stage. This was because a review of Transco's NTS charges by Ofgas was in progress at that time, and Ofgas considered that the results of this work could inform their decision on whether the introduction of an optional NTS tariff as proposed by Transco should be allowed.

The business pressures which originally gave rise to the new tariff proposal still exist, and have become even more intense. Transco therefore wishes to focus attention on the proposal for an optional NTS tariff again. Ofgas asked that a further industry consultation should be undertaken in view of the long timescale since the initial proposal was circulated (8 months), and in the light of the near finalisation of Transco's transportation price control formula, and also the changes in pricing methodology which took effect from 1 October 1997.

This follow-up consultation paper outlines the basis for the Transco proposals, Transco's response to the points made during the original consultation, and an updated analysis (post 1997 price control formula) of the effect of the proposed tariff on system users. The derivation of the original proposal, originally included with PC9, has been reproduced as an appendix.

2. Basis for the Transco Proposals

2.1 Relevant Objectives of Condition 4 of Transco's PGT Licence

Transco is obliged by Condition 4 of its PGT Licence to modify its charging methodology from time to time in order that it better achieves the relevant objectives of the methodology set out in Condition 4(5). We believe that the introduction of the proposed optional NTS commodity tariff would assist in achieving all these objectives, which are set out below.

a) Reflects costs

Transco has proposed that the present NTS pricing and services regime should be modified to reflect more accurately locational factors and the physical configuration of the system. However, making major changes to the regime is a long term process, and we believe that there is a more immediate need for a change which is simple to implement, in order to to address the cases where the present pricing regime is most clearly out of line with Transco's costs. There is no clear agreement yet on the appropriate long term structure and level of NTS charges, but we believe that the optional NTS tariff proposal represents a

significant improvement in cost reflectivity in some specific situations.

The proposed tariff is always greater than Transco's marginal costs for short distance transportation, and we believe that a tariff based on the cost of an alternative Transco stand-alone pipeline produces prices which are the maximum that can be justified.

b) Take account of developments in the transportation business

The present entry/exit method of charging for the use of the NTS represents a purposely simplified regime which was designed to facilitate the development of competition and the introduction of daily balancing. The present NTS charges are much simpler than the previous distance-related charges, which were arguably more cost-reflective in many circumstances, but much more difficult to administer (due to the need to link individual entry and exit points for all gas flows).

The uniform commodity charge for all gas flowing through the NTS based on 35 of total NTS revenues, is a simplification, and is out of line with Transco's variable costs for short distance transportation such that a few system users located near to terminals have a very strong, but apparently perverse, incentive to avoid using the Transco system. Transco is aware that this is now a real issue for a number of large loads (including the case of potential local flows to the Interconnector at Bacton), and the lack of a tariff which is appropriate for such loads could lead to these loads abandoning or by-passing the Transco system, even if sufficient capacity exists to accommodate them. This would contribute to a less efficient and economic use of resources by Transco and the industry generally.

c) Facilitates effective competition between gas shippers and between gas suppliers

If the large loads in question continue (or begin) to use the Transco system, they would be available for competitive supply by shippers/suppliers from the full range of NTS entry points, and would be able to participate in the gas trading markets based on the National Balancing Point and elsewhere. This would not necessarily be true in the case of stand-alone arrangements for individual loads, where long term contracts and lack of substitutability of gas could restrict competition in supply.

2.2 Gas Act obligations re efficiency

Section 9(1) of the Gas Act requires PGTs to develop and maintain an efficient and economical pipeline system. Section 4(2) records the duty of the Secretary of State and the Director General of Gas Supply to exercise her functions in a manner best calculated to promote efficiency and economy on the part of Licensees (including Transco).

We believe that there would be a reduction in efficiency if as a result of the present tariff structure users decide to abandon the Transco system (or potential new loads decide not to use the system). In this event there would be only a very small reduction in Transco's variable costs, and, assuming an agreed treatment of the relevant assets, the remaining fixed costs would continue to be met by the balance of system users. Therefore this would ultimately lead to higher prices for system users following the next review of Transco's price control.

An analysis of present and future pricing effects which would follow from the introduction of the new tariff is presented in Section 4.

2.3 Gas Act obligations re prevention of undue preference or discrimination

Condition 9(2) of the Gas Act requires PGTs to avoid undue preference or undue discrimination in the terms for conveying gas. Clearly all Transco prices differentiate between users on the basis of load size and location; this is the purpose of the pricing methodology. However Transco has been advised by Counsel that the proposed tariff is not unduly discriminatory. This is because there is an objective basis for the proposals, and because the tariff has been designed to correct what might be regarded as undue discrimination against large loads situated near to terminals.

Although there is no clearly agreed economic test of undue discrimination, Transco has been advised by Counsel that discrimination which has no adverse efficiency effects cannot be regarded as undue. We believe that basing the proposed tariff on the costs to Transco of building a dedicated pipeline should ensure that competition from alternative pipelines is not undermined, and competitive pressure on Transco is maintained. Conversely Transco believes that the proposed tariff would encourage efficiency, for the reasons outlined above.

3. Transco comments on consultation responses

3.1 Discrimination

A number of respondents commented that the proposed tariff was discriminatory against smaller loads who would not benefit from it.

Transco comments:
As outlined above, Transco does not believe that the proposed tariff is unduly discriminatory. It is true that small loads may not find the tariff attractive compared to the present standard NTS commodity rate, but that does not in itself make the tariff discriminatory.

The tariff would be available to all Daily Metered loads, with no discrimination due to individual circumstances.

3.2 Cost reflectivity/discounting

It was alleged that the tariff was not truly cost reflective, and/or that it involved predatory pricing.

Transco comments:
Transco related the proposed tariff to the costs of a standalone pipeline to avoid the accusation of predatory pricing. Our analysis shows that our marginal costs/savings are much lower; however we wish to ensure that application of the tariff should cover Transco's marginal costs and make the maximum possible contribution to fixed costs consistent with avoiding bypass. We believe that to price the service at a rate corresponding to the cost of the least expensive alternative should generate the highest price which is consistent with an efficient outcome.

In contrast to the above, it has also been suggested that the proposed requirement for firm loads to continue to book exit capacity could in some circumstances lead to a total transportation price which is still too high to prevent bypass. However, we believe that the benefits of connection to the Transco system are sufficient to justify the additional charges.

Accusations that the tariff involves discounting make the assumption that the current price correctly reflects costs. We do not believe that this is true, and would rather characterise the proposed tariff as correcting an existing cross subsidy

from large loads near to terminals to the generality of users.

3.3 Effects on Competition in Pipelines

Several respondents were concerned about the impact on competition in pipeline construction.

Transco comments:
As noted above, Transco believes that the present standard commodity tariff does not give the correct pricing signals about the costs to Transco of high volume, short distance transportation on the NTS. In these circumstances, the development of alternative pipelines would represent inefficient entry to the transportation market by encouraging the entry of competitors who have a higher cost base than Transco. This would not represent true competition in gas transportation. In the absence of Transco's ability to respond, this would merely represent opportunistic undercutting of an artificial and short-term inflated price. In fact it could be argued that at present Transco is precluded from competing in the market for short distance transportation from terminals.

Transco believes that the objections to the proposed tariff on the grounds that it would discourage competitive pipelines are unfounded, as the role of competition is to encourage efficiency rather than simply to create a multitude of players. We submit that the availability of the optional commodity tariff would enable Transco to compete in an efficiency-enhancing way.

One respondent claimed that "depending on the costs for Transco to build and operate its lines it may well be that an alternative line is an attractive competitive option; this is not necessarily an 'inefficient outcome'." However as explained above, the signals given by the present pricing structure do not accurately reflect the costs of short distance transportation, whereas the proposed tariff would better reflect these costs.

3.4 Effect on other system users

A number of respondents questioned Transco's proposal to recover the shortfall in NTS revenues resulting from offering the lower NTS optional rate by increasing prices to other users. However one respondent recognised that this increase would be less than the long term upward pressure on prices if loads by-pass the system.

Transco comments:
Several respondents have accepted the point which was made in the consultation paper - that future prices to existing users would be higher if existing or future potential loads abandon the Transco system.

There would be a particular advantage to UK consumers if the proposed tariff is influential in securing a connection to the NTS of gas which is to be landed at Bacton for onward transmission through the Interconnector. We have begun to reinforce the NTS to bring additional gas from northern terminals, and the 1997 Ten Year Statement outlines plans for an extensive reinforcement programme, necessary to make up for Bacton deliveries, to serve UK consumers. Unless some revenue is secured from 'Bacton to Bacton' gas destined for the Interconnector, the entire costs of this reinforcement will ultimately be met by UK consumers in the form of higher prices.

An updated analysis of the effects of the introduction of the proposed tariff on other system users, following the finalisation of Transco's price control formula, is presented in section 4 of this paper.

3.5 Short Term Need/ Long Term Initiatives

A number of respondents commented on the impact on the long term initiatives, with some suggesting that Transco should concentrate on the long term objectives and should not allow this proposal to affect these objectives.

Transco Comments:
Transco believes that there is an urgent need for this short-term initiative in advance of the implementation of medium-term proposals. We believe that decisions will be taken on whether to construct a number of possible by-pass pipelines in the near future, in the absence of any agreement on the medium-term NTS pricing structure. We also believe that the optional tariff is consistent with the direction in which prices would be expected to move in the medium-term.

3.6 Level and Structure of Tariff

i) Cost Assumptions

There were six respondents who commented on the level of costs and assumptions made in deriving the function.

Two respondents suggested that the pipeline costs may be understated, including the comment that there was insufficient detail to determine whether all costs were included. A further comment was to the effect that the use of direct pipeline distance rather than actual pipeline distance would be likely to understate the costs.

One respondent suggested that a project life of 15 years would be more appropriate rather than the 10 years assumed in the paper.

One respondent commented on the assumed average load factor of 70 % used in the derivation of the price function, and claimed that this did not take account of the lower load factors of NDM customers.

Transco comments:
The cost estimates used in the derivation of the charging function are industry standard project costs, as pipeline construction is outsourced. These estimates have included the required uplifts to take account of all potential additional costs, including project management and bad ground conditions. A list of the major components of fixed capital and operating costs is now included in the Appendix (section 6). The levels of capital and operating costs which have been used in the analysis are detailed in the tables in the Appendix, which were also included in the earlier consultation paper.

We accept the point that use of a direct distance will in general understate the actual pipeline distance. However this effect has been taken into account in the unit pipelaying costs, which have been uplifted by 15 % to cover deviations and bad ground conditions.

In assessing a suitable project life, we had to consider all types of large loads that would benefit from the tariff (power stations, large industrial plants) and use an appropriate project life. We believe that 10 years strikes the right balance.

As we explained in the paper, NDM customers will not be eligible for this service, and so the average load factor has not been influenced by these customers. Our original analysis indicated that a load factor of 70% is typical of very large loads and power stations. Our current analysis, including forecasts for the Interconnector load, indicates a somewhat higher load factor (75%) might be appropriate. However due to the uncertainty surrounding this assumption, we do not propose to change the recommended level of the proposed charge. Using the higher load factor in the analysis would reduce the level of the proposed charge by

around 7 % . We would welcome any further views of respondents on the appropriateness of our load factor assumption.

ii) Incurring Capacity Charges

Four respondents suggested that the level of the tariff was too high to discourage potential by-pass threats, due to fact that capacity charges were also payable. It was indicated that this did not give a true comparison with a dedicated pipeline.

One respondent recognised that excluding the capacity charges would increase costs to other users and that a pragmatic approach had been struck.

Transco comments:
We have maintained the need for shippers who choose this service to book exit capacity (for their firm loads) and entry capacity in accordance with Network Code. This is to reflect the benefits that shippers will enjoy in having access to the NBP. For example, in the event of supply difficulties at the local terminal they will be able to source gas from elsewhere, although at the higher uniform commodity rate. In this respect, this service differs from that offered by a dedicated pipeline and a higher charge is therefore appropriate.

iii) Structure of the Tariff

Two respondents suggested that the proposed price function was too complex, given the limited number of loads that may take up the proposed service.

Transco comments:
In deriving a charging function that reflects the cost analysis, we have sought to strike an appropriate balance between complexity and accuracy. We believe that the function is reasonably simple to apply. Once established, the price for a particular site would not need to be recalculated.

3.7 Administration of Service

Three respondents commented on the administration of the service, and in particular, on the issue of daily gas flow allocations. Of these, two respondents questioned the additional costs and resource required to administer the service.

Concern was also expressed that effort spent in developing additional systems for this service would detract resource from UK Link and therefore impact on the more fundamental system changes required.

The comment was made that there was insufficient incentive to ensure that shippers delivered gas through the local terminal.

Transco comments:
We believe that the additional administration costs from the implementation of this service will not be significant. The two areas that will require manual effort will be the checking of daily entry allocations against daily exit allocations for the nominated load on a monthly basis and the application of the relevant NTS commodity rate at the invoicing stage. Since the number of loads who take up the optional tariff will be limited (and many of these are already billed by manual systems) we estimate that the additional workload will only amount to less than one man-day per month.

We can confirm that the manual systems required for this system are already in place for existing procedures that Transco have to undertake. These manual systems are unrelated and much smaller than system changes to UK Link and any resource requirements would have to be met individually.

With regard to incentives to deliver gas to the local terminal, we believe that this tariff will provide such an incentive, which over time will encourage the efficient development of the transportation network.

3.8 Definition of SOQ

Three respondents questioned the treatment of allocation agreements, with two of these suggesting an aggregate SOQ (rather than individual SOQs) to determine the optional NTS rate. The argument put forward was that charges based on the building of a single pipeline to a load with an allocation agreement would better reflect the true costs involved.

Transco comments:
Transco now accepts the suggestion that the calculated optional rate should be based on the aggregate SOQ for allocation agreements. We agree that this would be consistent with the Network Code treatment of Connected Systems and third party pipelines. It would appear perverse with an Interconnector arrangement, for example, to determine the charges based on a fraction of the total peak daily flow rate. **Therefore the current proposal is to use aggregate SOQs in calculating NTS commodity rates using the proposed function.**

3.9 Expected Duration of Service

Four respondents raised issues about the anticipated life of the service. Assurance was sought about the likely duration of the proposed service and whether the tariff would be periodically reviewed.

Transco comments:
There is no planned expiry date of this service. If the proposal is not vetoed by Ofgas, it would form a part of Transco's Condition 3 pricing methodology, and would require a further consultation (and Ofgas approval) if Transco wished to modify the basis for the service or to terminate the service. It might be expected that the level of the tariff could change from time to time (following an appropriate notice period as specified in Transco's Licence), but price levels would follow the capital and operating costs of transmission pipelines, which are not expected to change significantly over time.

4. Effects on other system users of introducing the tariff

Our most recent analysis shows that over the next few years there are eight existing/future loads which might potentially benefit from the introduction of the optional NTS tariff (i.e. for which the NTS commodity charge under the proposed tariff would be lower than the standard rate). Of these eight, three are existing sites and five are potential new loads. Two of the five new potential new loads were not included in the volume forecasts accepted by the MMC, and should be considered to be speculative at this stage.

We have carried out a broad brush assessment of the additional capital and operating costs of supplying these loads through the NTS (or reductions in costs in the case of the existing sites). Without undertaking detailed engineering assessments, we estimate that the additional, or decremental, capital costs associated with supplying any of the sites are negligible. In addition there would be a very small increase, or decrease for existing sites, in the operating costs (total effect of the order of £200k per annum differential operating costs).
Beyond the period of the current regulatory formula, the addition of extra load which leads to increased utilisation of NTS assets should benefit all users of the system through a reduction in average prices.

In order to assess the potential impact of the proposed tariff on the level of charges for other users we have taken the current year's charges and loads, as used in

setting the October 1997 prices, as the base situation and have then considered two cases. In the first case none of the eight sites are supplied through the NTS, and in the second case all of the eight sites are supplied at the optional NTS tariff rates. In practice some of the sites not currently supplied would not be connected for some years.

For each case we have estimated the actual revenue at current price levels and the allowed regulatory revenue. Where the allowed regulatory revenue would be less than the actual revenue then price levels would decrease to compensate; the converse would lead to higher price levels. This analysis considers only price levels within a single year and not the actual level of price changes through the year to year operation of the price control formula.

In addition we have considered the impact of the second case beyond the period of the current regulatory formula. Since we have identified negligible capital or operating costs associated with supplying the particular additional loads it might be expected that at that time, in the absence of other changes, the inclusion of these loads would not change the allowed regulatory revenue. This third case looks at the possible change in overall price levels at that time, around 2002.

The table below shows the revenues and hence the impact.

TABLE 1: **POTENTIAL IMPACT OF OFFERING OPTIONAL NTS TARIFF**

	Actual Income	**Regulatory Income**	**Impact on Charges for other users**	
	£m	**£m**	**£m**	**%**
Base Situation - 97/8 current loads	3051	3051	0	
Case 1: None of the current or potential loads supplied through the NTS				
Change	- 2 cap - 3 std corn - 5 total	- 6		
New situation	**3046**	**3045**	-1	0.0%
Case 2: All current and potential loads supplied, paying optional NTS tariff				
Change	+ 12 cap + 6 opt corn - 3 std corn + 15 total	+31		
New situation	**3066**	**3082**	+16	+0.5%
Case 3: All current and potential loads supplied, beyond current regulatory formula period				
Change	+ 15 total (as Case 2)	0		
New situation	**3066**	**3051**	-15	-0.5%

Note
- % impact based on forecast overall revenue of £3,051m (formula year 1997/8; 1997 transportation Ten Year Statement, Table A 11.2.1, p 122)

Case 1 shows that if the existing loads which could benefit from the optional tariff were lost to the system following construction of bypasses, there would be negligible immediate effect on prices. However there would be no longer term benefit in the form of reduced prices in the following formula period.

Case 2 shows that the maximum potential impact on the level of charges, within the current regulatory formula, of the combination of the existing/new loads taking up the optional NTS tariff is an increase of 0.5 % on other charges. However it should be noted that the bulk of the additional load which could take advantage of the optional NTS tariff is not expected to begin flowing until after 1999. Therefore most of the +0.5 % effect on other charges would not apply until this time.

Case 3 shows that in the subsequent formula period beginning April 2002, we would, in the absence of any other change, expect the level of charges to decrease if the additional load was attracted by the optional NTS tariff. This is because the additional income from the loads would not be matched by entitlement to additional formula revenue as explained above. The analysis above shows that prices should decrease by around 0.5 % (£15m out of £3051 m) due to this effect.

5. Questions for Consultation

In the light of Transco's responses to the points made during the previous consultation, respondents are again invited to give their views on whether an optional NTS commodity tariff should be introduced by Transco.

Respondents are also invited to give their views on the structure and level of the proposed tariff, and on the administrative arrangements for implementing the new charge.

APPENDIX - DERIVATION OF THE PRICING FUNCTION IN PC9

A1. Proposed Optional NTS Commodity Tariff

Transco has investigated the possibility of introducing an alternative NTS commodity tariff for transportation from a beach entry terminal to a specific offtake point, such as a daily metered load, an interconnector or connected system. The tariff would be related to the geographical distance of the load or non-Transco pipeline from the nearest terminal. It is proposed that shippers would have the option of choosing the alternative tariff, or remaining with the standard, uniform commodity charge, on a site-by-site basis, to optimise their total charges.
Recognising that such loads are connected to the integrated Transco network, the proposed service would still allow the load to be supplied from any entry point. However, the optional tariff would only be available to the extent that the relevant shipper flowed gas at the specified terminal.

The methodology which is proposed for the new tariff is to calculate charging functions based on the estimated costs of laying a dedicated pipeline, for a range of flowrates and distances from an entry terminal. To undertake the economic analysis it is necessary to make assumptions regarding load factor, project life and project discount rate, and operating costs. A commodity charge can then be established as outlined below.

As the cost per kWh of this option is higher than the marginal cost per kWh in supplying gas through the NTS, the prices derived from the optional NTS tariff are higher than Transco's marginal costs.

A2. Basis for the Service

A2.1 The shipper would buy entry and exit capacity (if applicable) as normal, and would continue to receive the benefits of connection to the integrated network and access to the National Balancing Point.

A2.2 The standard NTS commodity charge would be payable, except to the extent that the shipper's gas enters the system at the local terminal and leaves at the relevant supply point or interconnector on the same day. The requirement to track daily flows means that the service would only be available to Daily Metered supply points.

A2.3 For these purely 'local' gas flows the optional commodity charge would be payable.

A2.4 The service would be available to all combinations of Daily Metered offtakes and terminals (but in practice it will only be attractive for large loads within a relatively short distance of an entry point).

A3. Administering the Service

A shipper would initially inform Transco that it wished to utilise the optional tariff for a particular combination of terminal and Daily Metered offtake. Implementation would be by means of individual Ancillary Agreements to the Network Code. The application of the optional tariff to NTS flows would then depend on confirmation that gas has been delivered at the elected (nearest) terminal and offtaken gas at the supply point on the same day.

Arrangements will be put in place to allow entry allocations to be matched against

the output allocations for each gas flow day during each monthly billing period. Where the allocations do not match, the optional tariff will apply to the lesser amount, with the difference in the allocation incurring the standard NTS commodity charge. It is important to note that it is only the transportation charges which will be affected; there will be no effect on the energy balancing process.

A4. Proposed Pricing Function

A relationship of price per kWh against flowrate and pipeline distance has been derived based on the capital and operating costs of a notional dedicated pipeline. This relationship is based on an average load factor of 70 % which is representative of the typical loads which Transco anticipates are likely to take advantage of the optional NTS tariff. The proposed price function is made up of two elements, both related to load size. The first element is based on those costs which do not vary with distance (metering, telemetry, terminal connection, volumetric control etc.). The second element is related to the geographical distance from the local terminal to the site.

Based on these principles, the following price function to calculate the optional NTS commodity charge has been determined (in p/kWh):

$$1410 \times [(SOQ-0'840] \times D + 389 \times (SOQ)-0'654$$

where **SOQ** is the Registered Supply Point Capacity in kWh/day,

and **D** is the direct distance from the site boundary or non-Transco pipeline to the elected terminal in km.

Where there is an existing allocation agreement for a supply point then the aggregate total SOQ will be the relevant quantity in determining the optional commodity charge.

To demonstrate the levels of NTS commodity charge under the optional tariff, the table below gives the calculated prices, in p/kWh, for a range of distances and supply point capacities.

SOQ	Distance - km							
GWh/d	0	5	10	15	20	30	40	50
5.0	0.0162	0.0328	0.0494	0.0661	0.0827	0.1160	0.1493	0.1825
10.0	0.0103	0.0196	0.0289	0.0382	0.0475	0.0660	0.0846	0.1032
20.0	0.0065	0.0117	0.0169	0.0221	0.0273	0.0377	0.0481	0.0585
40.0	10.0042	0.0071	0.0100	0.0129	0.0158	0.0216	0.0274	0.0332

For ease of comparison, 20 GWh/d is approximately equivalent to 1.86 mcmd, equivalent to 175 mth/a at 70 % load factor. A typical 750 MW CCGT power station consumes of the order of 36 GWh/d (approx. 3.3 mcmd). The example charges may be compared with the standard NTS commodity charge of 0.0192 p/kWh.

The figures at the end of this appendix show graphs of the optional NTS commodity rate against distance and peak load, to further illustrate the values generated by the function.

NTS entry and exit capacity charges would also be payable as normal (if applicable).

The estimated costs used are standard Transco project costs used in assessing and tendering for all large construction projects and so represent competitive rates.

The assumptions used in deriving the indicative charges are:

i) a project life of 10 years

ii) an average load factor of 70

iii) a project pre-tax discount rate of 10 % (appropriate to the competitive market)

A5. Derivation of Price Function to determine Optional NTS Commodity Rate

The methodology adopted to derive the price function is based on an assessment of the costs involved in building and maintaining a dedicated pipeline to supply gas for a range of flowrates and distances.

Figure 1 shows the pipe diameters required to meet typical peak day flowrates for a range of pipeline distances, and pipeline costs per unit length, based on Transco planning and design specifications. In addition there are a number of non-distance related costs, e.g. connection, metering, volumetric control, etc. The total capital costs for a range of pipeline diameters and lengths may then be calculated by adding the distance related and non-distance related costs. This process is also shown in Figure 1.

The ongoing costs of the hypothetical pipeline comprise costs for maintenance of the plant facilities and the pipeline, and formula rates. Again, these comprise distance related and non-distance related costs. The total project costs over a ten year period are then calculated, for each combination of pipeline diameter and length, by assuming a project life of 10 years and a pre-tax discount rate of 10 The project costs are annuitised to establish annual costs as shown in Figure 2.

The next step is to divide the annuitised costs by the annual quantities (corresponding to the supply point capacities using an average load factor of 70 %) to generate a matrix of unit costs, expressed in p/kWh, for a range of supply point capacities and distances.

Separate functions relating non-distance related and distance related unit costs and supply point capacities may then be obtained by means of regression analysis on the data. These functions are best expressed as power relationships and are illustrated in Figure 3.

The two elements can be combined to generate the overall commodity charge function defined above.

The form of the optional NTS commodity tariff is further illustrated in Figure 4, which shows how the charge varies with peak day capacity for a range of distances, and how it varies with distance for a range of supply point capacities.

A6. Breakdown of costs

The fixed capital costs (shown in the 3rd table of Figure 1) comprise those costs which are non-distance related and arise from the following items:

Pipeline connection
Pig traps
Calorimetry
Pressure reduction/volumetric control

The annual costs (shown in the 2nd table of Figure 2) are made up of annuitised capital costs and ongoing (revenue) costs. The ongoing costs arise from the following items:

Operation and maintenance (based on 1 % of pipeline capital costs and 2.5 % of installation capital costs) Formula rates Gas control operations

Figure 1

1) Pipeline Diameters, in mm, for a range of distances and peak-day flowrates

		Pipeline Length, km							
SOQ mcmd	SOQ (GWh	5	10	15	20	25	30	40	50
15	162.45	450	450	450	600	600	600	600	600
12	129.96	450	450	450	450	600	600	600	600
10	108.30	300	450	450	450	450	450	450	600
7	75.81	300	450	450	450	450	450	450	450
5	54.15	300	300	450	450	450	450	450	450
3	32.49	300	300	300	300	300	300	300	300
1	10.83	150	150	150	200	200	200	200	200
0.5	5.42	100	150	150	150	150	150	150	150
0.4	4.33	100	150	150	150	150	150	150	150
0.3	3.25	100	100	150	150	150	150	150	150
0.2	2.17	100	100	100	100	100	100	100	150
0-1	1.08	50	100	100	100	100	100	100	100

2) Pipelaying Unit Costs

Diam./mm	£/km
50	125,000
100	150,000
150	187,500
200	202,500
300	238,750
450	355,000
600	414,000

3) Total Capital Costs (Unit Length Costs & Fixed Costs, £'000's) for a range of distances and peak-day flowrates

	Pipeline Length, km								
SOQ mcmd	0	5	10	15	20	25	30	40	50
15	£3,525	£5,300	£7,075	£8,850	£11,805	£13,975	£16,045	£20,185	£24,425
12	£3,130	£4,905	£6,680	£8,455	£10,230	£13,580	£15,650	£19,690	£24,030
10	£2,930	£4,705	£6,480	£8,255	£10,030	£11,905	£13,680	£17,230	£23,830
7	£2,630	£3,824	£6,180	£7,955	£9,730	£11,605	£13,380	£16,830	£20,580
5	£2,630	£3,824	£5,018	£7,955	£9,730	£11,605	£13,380	£16,830	£20,580
3	£1,940	£3,134	£4,328	£5,521	£6,715	£8,009	£9,203	£11,590	£14,078
1	£1,505	£2,443	£3,380	£4,318	£5,555	£6,668	£7,680	£9,705	£11,830
0.5	£1,095	£1,845	£2,970	£3,908	£4,845	£5,883	£6,820	£8,695	£10,670
0.4	£1,095	£1,845	£2,970	£3,908	£4,845	£5,883	£6,820	£8,695	£10,670
0.3	£915	£1,665	£2,790	£3,728	£4,665	£5,703	£6,640	£8,515	£10,490
0.2	£915	£1,665	£2,415	£3,165	£3,915	£4,765	£5,515	£7,015	£10,490
0.1	£770	£1,395	£2,270	£3,020	£3,770	£4,620	£5,370	£6,870	£8,470

Figure 2

1) Total Capital Costs (£'000's) , annuitised over a 10 year period

	Pipeline Length, km								
SOQ mcmd	0	5	10	15	20	25	30	40	50
15	£522	£784	£1,047	£1,310	£1,747	£2,068	£2,375	£2,987	£3,615
12	£463	£726	£989	£1,251	£1,514	£2,010	£2,316	£2,914	£3,557
10	£434	£696	£959	£1,222	£1,484	£1,762	£2,025	£2,550	£3,527
7	£389	£566	£915	£1,177	£1,440	£1,718	£1,980	£2,491	£3,046
5	£389	£566	£743	£1,177	£1,440	£1,718	£1,980	£2,491	£3,046
3	£287	£464	£640	£817	£994	£1,185	£1,362	£1,715	£2,084
1	£223	£362	£500	£639	£822	£987	£1,137	£1,436	£1,751
0.5	£162	£273	£440	£578	£717	£871	£1,009	£1,287	£1,579
0.4	£162	£273	£440	£578	£717	£871	£1,009	£1,287	£1,579
0.3	£135	£246	£413	£552	£690	£844	£983	£1,260	£1,553
0.2	£135	£246	£357	£468	£579	£705	£816	£1,038	£1,553
0.1	£114	£206	£336	£447	£558	£684	£795	£1,017	£1,254

2) Annual Costs (£'000's), summated from annuitised costs and maintenance and ongoing costs

	Pipeline Length, km								
SOQ mcmd	0	5	10	15	20	25	30	40	50
15	£690	£1,055	£1,386	£1,716	£2,233	£2,626	£3,003	£3,757	£4,527
12	£622	£987	£1,317	£1,648	£1,978	£2,558	£2,935	£3,673	£4,459
10	£587	£952	£1,283	£1,613	£1,944	£2,290	£2,620	£3,281	£4,424
7	£535	£809	£1,231	£1,561	£1,892	£2,238	£2,569	£3,214	£3,906
5	£495	£769	£1,007	£1,521	£1,852	£2,198	£2,529	£3,174	£3,866
3	£434	£707	£946	£1,184	£1,423	£1,677	£2,467	£3,128	£3,805
1	£376	£649	£888	£1,126	£1,365	£1,620	£1,858	£2,335	£2,828
0.5	£370	£615	£825	£1,035	£1,359	£1,613	£1,852	£2,329	£2,822
0.4	£300	£534	£732	£930	£1,175	£1,401	£1,611	£2,031	£2,467
0.3	£189	£393	£621	£819	£1,017	£1,231	£1,429	£1,825	£2,237
0.2	£189	£393	£621	£819	£1,017	£1,231	£1,429	£1,825	£2,237
0.1	£158	£362	£590	£788	£986	£1,200	£1,398	£1,794	£2,206

3) Unit Costs, in p/kWh, derived from Annual Costs and Annual Throughputs assuming a load factor of 70%

	Pipeline Length, km								
SOQ mcmd	0	5	10	15	20	25	30	40	50
15	0.0017	0.0025	0.0033	0.0041	0.0054	0.0063	0.0072	0.0091	0.0109
12	0.0019	0.0030	0.0040	0.0050	0.0060	0.0077	0.0088	0.0111	0.0134
10	0.0021	0.0034	0.0046	0.0058	0.0070	0.0083	0.0095	0.0119	0.0160
7	0.0028	0.0042	0 0064	0.0081	0.0098	0.0116	0.0133	0.0166	0.0202
5	0.0036	0.0056	0.0073	0.0110	0.0134	0.0159	0.0183	0.0229	0.0279
3	0.0045	0.0078	0.0107	0.0136	0.0164	0.0195	0.0224	0.0281	0.0341
1.1	0.0109	0.0193	0.0264	0.0336	0.0425	0.0506	0.0582	0.0734	0.0891
0.5	0.0137	0.0284	0.0449	0.0592	0.0735	0.0890	0.1033	0.1319	0.1617
0.4	0.0171	0.0355	0.0561	0.0740	0.0919	0.1112	0.1291	0.1649	0.2021
0.3	0.0191	0.0436	0.0710	0.0949	0.1188	0.1445	0.1684	0.2161	0.2658
0.2	0.0286	0.0654	0.0958	0.1263	0.1567	0.1900	0.2205	0.2814	0.3987
0.1	0.0481	0.1146	0.1826	0.2435	0.3044	0.3710	0.4319	0.5537	0.6812