OFGEM

GAS DISTRIBUTION PRICE CONTROL REVIEW

FIVE YEAR CONTROL

(OPEX)

REPORT 7

NORTH WEST NETWORK

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1 EXECUTIVE SUMMARY

1.1 OPEX

PB Power has reviewed the submission by National Grid Gas (NGG) for the direct controllable operating cost allowances for the North West network for the period 2008/09 to 2012/13, and sets out in this report its proposed cost projections, and the reason for any changes to NGG's submission.

Direct controllable operating costs are the total costs of operating the following:

- Direct activities (Work management, emergency service, repairs, maintenance, other direct)
- xoserve
- Shrinkage

For each activity, we have identified the benchmark activity costs by examining the unit costs in the base year (2005/06). Setting the level of the benchmark unit costs has also been informed by NGG's forecast costs for 2006/07. When the actual operating costs for 2006/07 are known, we will review our proposals and make adjustments if appropriate. The analysis also reviewed GDN's forecast costs for 2008/09 to 2012/13 to identify any trends and movement in costs.

This report makes proposals for NGG's direct operating cost allowances for the next price control period (2008/09 to 2012/13). In this report we have made adjustments to bring NGG's forecast expenditure towards the benchmark. In most cases our proposed costs reach the benchmark before the end of the price control period

Our proposals and NGG's submission are summarized in the following chart and table

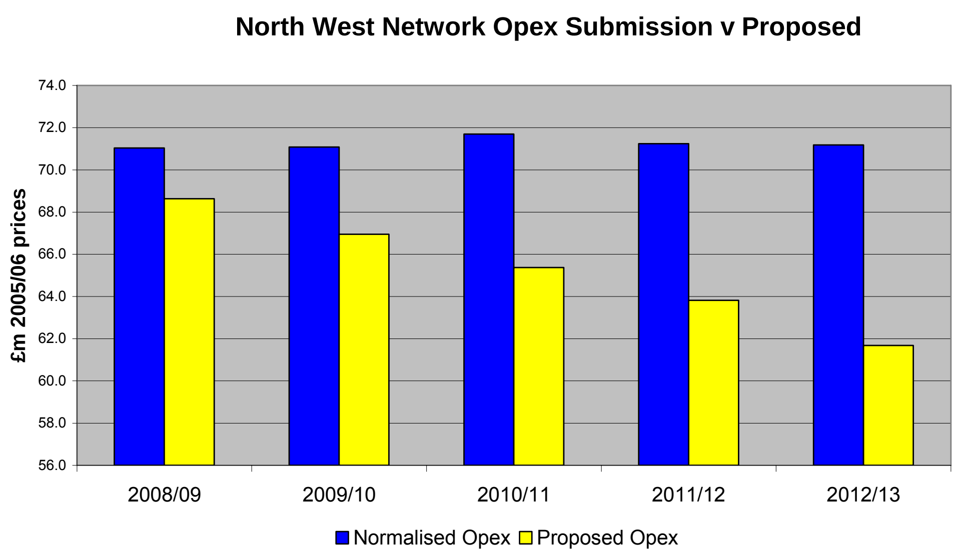

Figure 1-1

North West Net Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Work Management	35.6	36.0	36.4	35.8	34.9	**178.8**
Emergency	13.0	9.2	9.8	10.5	11.0	**53.5**
Repairs	10.7	10.8	10.9	10.9	11.4	**54.7**
Maintenance	13.9	13.5	14.4	13.4	14.6	**69.9**
Other Direct Activities	1.9	1.9	1.9	1.9	1.9	**9.6**
Shrinkage	0.0	0.0	0.0	0.0	0.0	**0.0**
xoserve	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**75.1**	**71.5**	**73.5**	**72.5**	**73.9**	**366.4**
Normalisation Adjustments						
Work Management	-12.6	-12.9	-13.1	-12.8	-12.4	**-63.7**
Emergency	-1.9	1.8	1.5	1.0	0.5	**2.9**
Repairs	-0.9	-1.1	-1.2	-1.1	-1.7	**-5.9**
Maintenance	-1.7	-0.8	-1.5	-0.4	-0.6	**-5.0**
Other Direct Activities	-0.6	-0.6	-0.6	-0.6	-0.6	**-3.0**
Shrinkage	10.1	9.8	9.6	9.2	8.7	**47.3**
xoserve	3.5	3.5	3.5	3.4	3.4	**17.3**
Total	**-4.1**	**-0.4**	**-1.8**	**-1.2**	**-2.7**	**-10.2**
Normalised Opex						
Work Management	23.0	23.1	23.4	23.0	22.5	**115.1**
Emergency	11.1	11.0	11.3	11.4	11.5	**56.4**
Repairs	9.8	9.8	9.7	9.8	9.7	**48.8**
Maintenance	12.2	12.7	13.0	13.0	14.0	**64.8**
Other Direct Activities	1.4	1.3	1.3	1.3	1.3	**6.6**
Shrinkage	10.1	9.8	9.6	9.2	8.7	**47.3**
xoserve	3.5	3.5	3.5	3.4	3.4	**17.3**
Total	**71.0**	**71.1**	**71.7**	**71.2**	**71.2**	**356.2**
Adjustments						
Work Management	-0.9	-1.5	-2.3	-2.4	-2.5	**-9.6**
Emergency	-0.1	-0.1	-0.7	-1.0	-1.2	**-3.1**
Repairs	-0.7	-0.8	-1.0	-1.2	-1.3	**-5.0**
Maintenance	-0.9	-1.9	-2.6	-2.9	-4.6	**-12.9**
Other Direct Activities	0.2	0.2	0.2	0.1	0.1	**0.7**
Shrinkage	0.0	0.0	0.0	0.0	0.0	**0.0**
xoserve	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**-2.4**	**-4.1**	**-6.3**	**-7.4**	**-9.5**	**-29.8**
Proposed Opex						
Work Management	22.2	21.6	21.1	20.6	20.0	**105.5**
Emergency	11.0	10.8	10.7	10.5	10.3	**53.3**
Repairs	9.1	8.9	8.8	8.6	8.4	**43.8**
Maintenance	11.3	10.8	10.4	10.1	9.4	**51.9**
Other Direct Activities	1.5	1.5	1.5	1.4	1.4	**7.3**
Shrinkage	10.1	9.8	9.6	9.2	8.7	**47.3**
xoserve	3.5	3.5	3.5	3.4	3.4	**17.3**
Total	**68.6**	**67.0**	**65.4**	**63.8**	**61.7**	**326.5**

Table 1-1

2 INTRODUCTION

2.1 PRICE CONTROL REVIEW TIMETABLE

The final proposals for the one-year price control have been accepted by the GDNs. Ofgem is now carrying out a further review to set price control allowances for 1st April 2008 to 31st March 2013. The full process is shown in the following diagram.

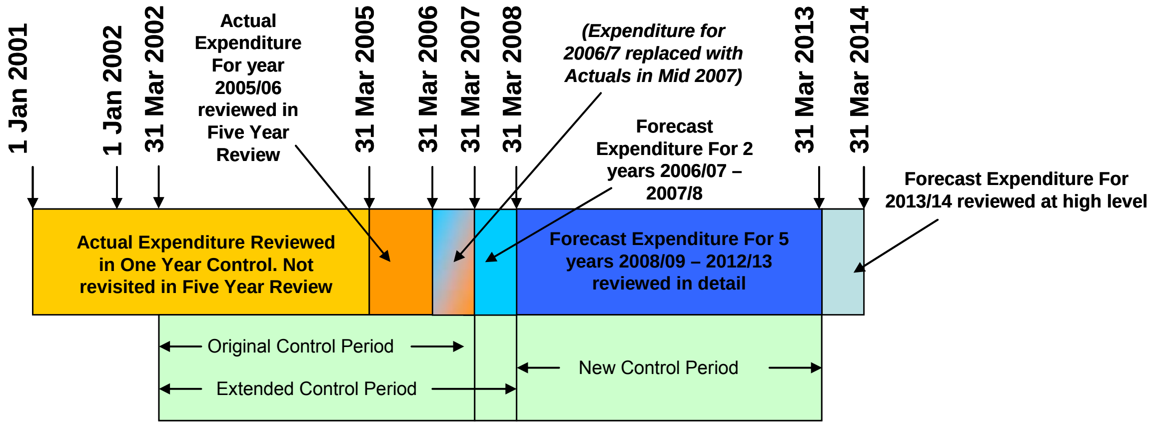

Figure 2-1

2.2 FIVE YEAR CONTROL

Ofgem appointed PB Power working in partnership with Rune Associates Limited to assist them in the preparation of the Capex and Repex elements of the Business Plan Questionnaires (BPQs). Subsequently Ofgem extended this work to include the analysis of the Capex, Repex and Direct Opex submissions by the GDNs.

Our findings on the direct Opex submissions are contained in this report, whilst the Capex and Repex findings are the subject of a separate report.

The questionnaires were issued on 30 June 2006. These were returned to Ofgem between 6 and 13 October 2006. Additionally a series of cost visits were held with the GDNs between 10 November and 1 December 2006. Our findings have been drawn from the BPQs, costs visits and responses to supplementary questions sent to the GDNs.

2.3 BUSINESS PLAN QUESTIONNAIRE

A combined BPQ was issued on 30 June. This covered the Financial Statements, Opex, Capex and Repex requests

GDNs were asked to respond to Ofgem by 6 October 2006 and to upload all the data onto PB Power's file management system, PBShare. All parties in the process were granted appropriate access to relevant folders and documents. Some documents had to be provided in paper copy and these were sent both to PB Power and to Ofgem.

As the analysis of the submissions progressed and where the return was either unclear or insufficient it became necessary to ask the GDNs for additional information. These supplementary questions requests and the additional information, which was presented in reply, were logged and stored on PBShare.

At the end of the process the worksheets were updated to include all amendments submitted and should be read in conjunction with this report.

2.4 PURPOSE

The purpose of the report is for PB Power to provide recommendations to Ofgem on the efficient levels of expenditure required by NGG to carry out their activities in North West.

Ofgem will consider these recommendations together with other information in proposing appropriate expenditure allowances for 2008/09 to 2012/13.

2.5 ANALYSIS AND REPORTING PROCESS

The BPQ was designed to collect all the data required for analysis.

PB Power has structured this report into the following workstrands:

i) Work Management

ii) Emergency service

iii) Repairs

iv) Maintenance: covering LTS, Storage and Maintenance Other

v) Other Direct

vi) Shrinkage

vii) xoserve

The expenditure projections for the efficient level of expenditure required by the GDN have been reviewed in a number of different ways depending on the activity and quality of information available. Principally two main techniques have been used; a comparative benchmarking between GDNs where workload is sufficiently well defined to obtain reliable regression analysis, and a bespoke review by our consultants to form a judgement on the appropriate expenditure projections based on the information provided. With both methods full analysis of the information presented in the context of the requirements of a Gas Distribution business has been carried out to support the findings.

2.5.1 COST NORMALISATION

A key requirement for robust analysis is that GDN costs for particular Opex activities should be allocated on a consistent basis. Following detailed analysis of the BPQ returns, a number of adjustments have been made to achieve this objective.

These adjustments include applying the results of the work on accounting adjustments carried out by Ofgem, adjustments that have been identified by LECG in their work on indirect Opex, costs which have been removed for the comparative analysis to be carried out and also movement of costs between activities to ensure that costs for each activity are on a consistent basis across all GDNs. This latter set of adjustments includes items identified by NGG in response to our supplementary questions on the allocation of sub-activity costs.

The process restates the GDNs' BPQ submissions on this "normalised" basis. In each section any adjustments to achieve this are specified including the reasoning behind the adjustments.

The adjustments have been classified into the following areas

- **Transfer of costs** – transfers identified by PB Power or LECG which bring allocation of costs into a comparable position for all GDNs.
- **GDN reallocation** – the outcome of reallocation process in which NGG identified the changes to their BPQ submission to reflect our proposed allocation of sub-activities.
- **Accounting adjustments** – which have been provided by Ofgem
- **Pensions adjustments** – GDNs included different assumptions regarding the amounts required to cover the costs of the employer's normal level of contributions to their employees' pension schemes. At Ofgem's request and to bring the direct Opex on to a consistent basis across all GDNs, we have removed the GDN reported pension contributions and replaced them with an amount equal to 22% of direct employee salary/wage costs. The figure reported under this category is the net change between the reported pension costs and the standard assumption.
- **Removed costs** – these costs are one off or special costs which are removed prior to the comparative analysis.

2.5.2 COST ASSESSMENT PROCESS

The expenditure projections for the efficient level of expenditure required by the GDN have been carried out in a number of different ways depending on the activity and quality of information available for this review.

Principally two main techniques have been used:

- comparative benchmarking between GDNs where workload is sufficiently well defined to obtain reliable regression analysis, and
- a bespoke review by our consultants to form a judgement on the appropriate expenditure projections based on the information provided.

With both methods full analysis of the information presented in the context of the requirements of a Gas Distribution business has been carried out to support the findings.

The process of developing our expenditure proposals has the following steps:

- Cost normalisation,
- Establishing base year for cost analysis,
- Benchmarking costs derived from the base year costs,
- Workload projections for the period 2005/06 to 2012/13,
- Cost projections,
- Gap adjustment.

2.5.3 ESTABLISH BASE YEAR

A base year was chosen in order to carry out the comparative regression analysis. The preferred year was 2005/06, where the availability of actual outturn values removed any element of variation due to GDN forecast values. However, for some activities the year 2006/07 has been used due to variations in the 2005/06 data. Generally it has been found that the year 2004/05 contains too many inconsistencies in data reporting, mainly due to the network sales process, and is not suitable as a base year for comparative analysis.

2.5.4 BENCHMARK COST ANALYSIS PROCESS

We have determined benchmark costs in the manner most appropriate to the data and the activity.

Some costs were best assessed on an individual basis. For example, [redacted] pipeline costs are contract specific.

These costs were removed before determination of the benchmark costs of an activity, and were assessed separately. If appropriate an allowance for such costs were added back after the assessment of the costs for the activities which are common across GDNs.

Where possible we used comparative analysis to determine benchmark activity costs. In general we have used the following type of cost function which is common in the regulatory literature:

$$Cost = K\, w^{a} \qquad (1)$$

where K and a are constants.

Where there are economies of scale associated with an activity, a<1, so that the unit cost of an activity for a larger network will be less than for a smaller network. For each activity we have used our knowledge and experience to explore different cost drivers and select the most appropriate workload driver (w) for the activity concerned.

By taking the natural log of equation (1) we can derive the following equation:

$$\ln(Cost) = \ln(K) + a \ln(w) \qquad (2)$$

This equation is used to carry out the regression analysis and estimate each of the parameters of the cost function.

Some costs may be better modelled with a cost function of the form

$$Cost = C + A\, w \qquad (3)$$

where C and A are constants.

For each activity we have assessed which form of equation (1) or (2) better explains the variation in costs.

To obtain the frontier costs it is usual to reduce the constant K in equation (1) or the constant C in equation (2), so that the regression line passes through the observation with the lowest error term. This gives the Corrected OLS (COLS) line. We have applied an alternative approach which recognises that differences between the GDNs' regression line and their actual costs may reflect other factors than just efficiency. This involves adjusting the regression line so that it passes through the upper quartile error level. This gives us the upper quartile line.

However, the effect of reducing C in equation (3) by an amount Δ is to reduce unit costs at each workload w by Δ/w. This means that the impact on unit costs is different at different workload levels and smaller networks will be required to reduce unit costs by more than larger networks both in absolute and proportional terms.

On the other hand, the effect of reducing K by an amount Δ in equation (1) is to reduce all costs at all workloads by the same proportion $(K-\Delta)/K$.

We have therefore used a different method for setting the benchmark performance when using the linear regression which aligns more closely with the method used with equation (1).

We have defined the benchmark performance in the linear model not by reducing C but by reducing the slope A in equation (3). Assuming that the intercept C is fixed, the error term reflects differences in unit (variable) costs. The benchmark is determined by the upper quartile unit cost.

The effect of this is to reduce the unit costs of all networks by the constant amount δ where δ is the difference between the regression slope and the benchmark slope.

Since the change in each GDN unit costs is independent of workload, smaller networks will be required to make smaller percentage changes in unit costs than larger networks. Effectively, we are assuming that the changes required to give benchmark performance have an economy of scale attached to them.

Assessment of regression outcome

When we have carried out regression analysis we have assessed the fit of the regression line to the data points by calculating the r^2 value and by carrying out hypothesis testing where the r^2 values are not directly comparable.

The value of r^2 is one indicator of goodness of fit. It is the proportion of the variance in the cost data that is explained by the variance in the cost data derived from the OLS regression.

We have used appropriate tests to determine whether the linear or the logarithmic linear regression gives the better fit to the data and have used the regression with the better fit. Where there is no significant difference in fit the logarithmic linear regression has been used.

For all the regression relationships used in this report r^2>0.7. Unit cost and/or bottom-up analysis has been used in all other cases.

These values of r^2 have the following significance:

- It is possible that the data points could show a relationship between the reported costs and the explanatory variable by chance. Analysis of variance identifies the component of the cost variable which is explained by the regression and the component unexplained by the regression. This gives a value for the F statistic and taking into account the number of data points, this can be used to test whether the explanation provided by the regression is better than is likely to have arisen by chance. With 8 (GDN) data points the test value for the F statistic is 5.99 and the corresponding value for r^2 is 0.5. If r^2>0.5 we can reject the hypothesis that the relationship arose by chance at the 5% significance level. If r^2>0.7 we can further reject the hypothesis at the 1% significance level

In order to test for the robustness of the regression results and in particular of the slope of the regression line, we have tested each regression result for heteroscedasticity (that is for a relationship between the variance in the disturbance term and the magnitude of the explanatory variable). This is important since evidence of heteroscedasticity could indicate a mis-specification in the regression model. The regression results presented in this report do not show such evidence at a significant level

Although we have carried out detailed work to seek to ensure that the costs used in the regression analysis have been allocated to activities on a consistent basis across all GDNs, we recognise that that some different allocations may remain and that the use of regression to determine benchmark costs could potentially lead to an inadequate level of total Opex for a particular GDN. We have addressed this possibility by selecting the upper quartile value, rather than the lowest value as the benchmark cost, with any remaining effects mitigated by the gap closure process.

Two or more workload drivers

In some cases activity costs are driven by a number of different workload types. In such cases we have constructed a composite scale variable (CSV) which includes the different drivers scaled by the proportion of costs attributable to each type of workload.

Linear regression has been used to determine the relationship between costs and the CSV.

Unit cost analysis

Here we have ranked the unit costs and selected the upper quartile unit cost as the frontier unit cost. Where there is a wide variation in unit costs we have selected the average unit cost as the benchmark.

Bottom-up analysis

Using consultant's knowledge, judgement and analysis of similar activities, we have developed costs for a typical task representing the workload driver, or for a range of such tasks. The results have been used to confirm or adjust the benchmark costs obtained by regression or unit cost analysis and in some cases it has been the main method where regression gave poor fit or there were large variations in reported costs. The specific techniques used to determine the benchmark costs for each Opex activity are set out in the text for that activity.

Regression Values

Further details of the regression calculations and numbers are given in Appendix 7.

2.5.5 WORKLOAD PROJECTONS

The above approach has allowed the analysis to fully reflect the workload forecast by the GDNs, adjusted as deemed appropriate by our consultants. It has also minimised any inconsistent allocation of costs between activities, which is suspected in a number of areas.

The PB Power workload projections for the activity are determined for the period 2005/06 to 2012/13 from the activity analysis.

2.5.6 COST PROJECTIONS

This benchmark performance applied to our workload projections has then been used as the target which all under performing GDNs should move towards.

The following shows the performance measures used in assessing the Opex proposals.

Performance Measures Used in Determining The Opex Proposals	
Benchmark Performance	The Upper Quartile performance as determined from the regression analysis tracked forward from the base year to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects.
Baseline Performance	The GDNs BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects.

Table 2-1

The benchmark costs against workload are shown in pink on the graphs. This is the target which all under performing GDNs should move towards

In the logarithmic linear regressions the pink line is parallel to the regression line.

In the linear regressions, the pink line has the same intercept as the regression line but with a slope equal to the upper quartile unit cost.

In our approach annual productivity improvements are applied to total costs. This gives the end (2012/13) target cost line, shown in yellow on the graphs. This represents the expected position of the benchmark 2012/13 costs after allowing for the productivity improvements we expect to apply to a frontier efficient company.

2.5.7 GAP ADJUSTMENT

In order to form a view of the speed at which the GDNs should be expected to move towards this target performance, extrapolation of the base year performance has also been carried out for the whole period using our standard assumptions for any price rises which are expected to be in excess of the Retail Prices Index (RPI). Section 2.7 provides more details on real price effects.

A gap adjustment has been included where appropriate to provide a smooth transition from the BPQ level of costs at the PB Power workload levels to the benchmark performance by 2012/13. The gap adjustment will allow the GDN a period to review and amend their work arrangements to achieve the proposed benchmark efficient cost levels.

2.5.8 SUMMARY CHART

The overall process for deriving our recommended expenditure projections is shown in the flow chart below.

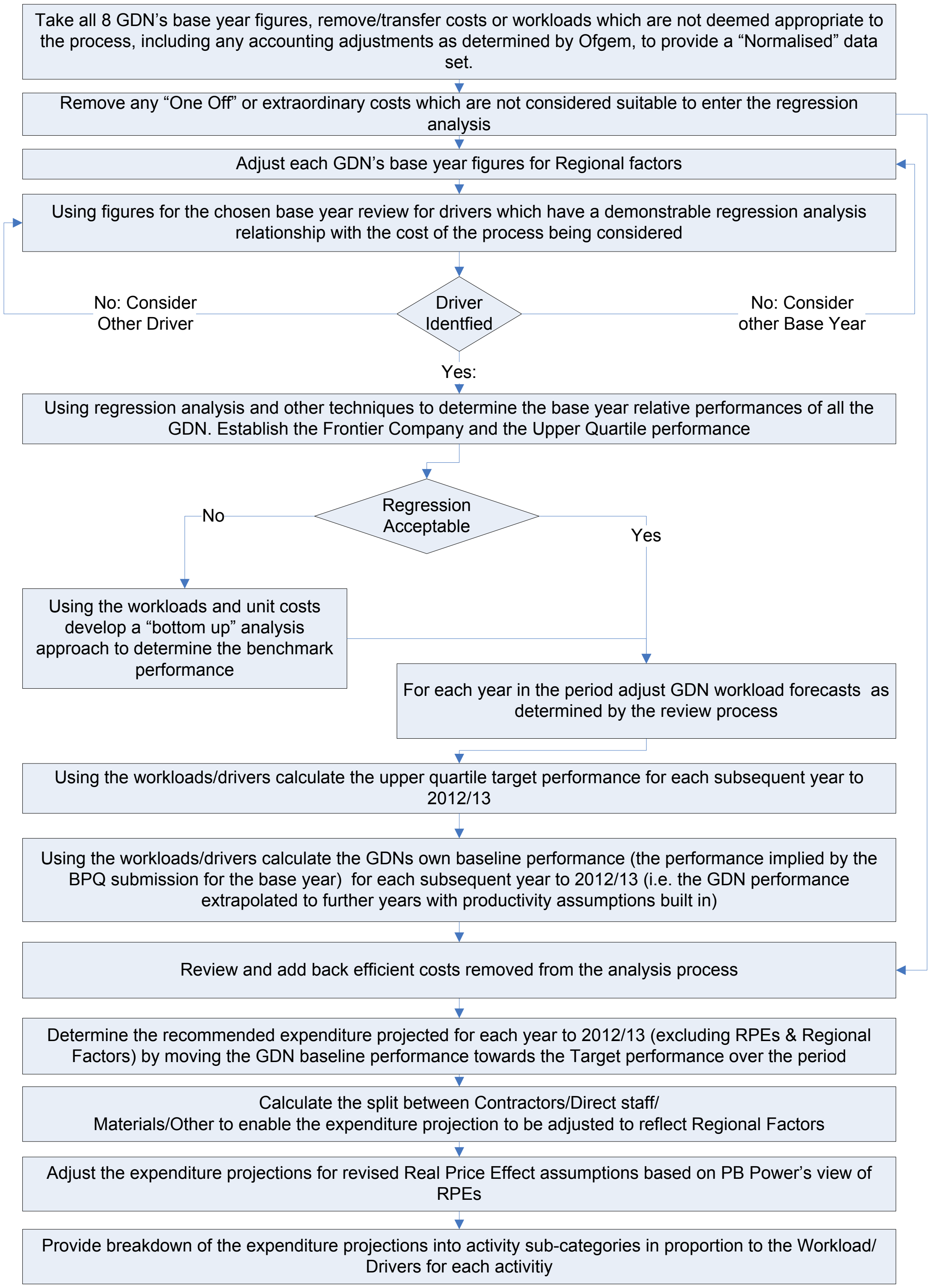
Take all 8 GDN's base year figures, remove/transfer costs or workloads which are not deemed appropriate to the process, including any accounting adjustments as determined by Ofgem, to provide a "Normalised" data set.
Remove any "One Off" or extraordinary costs which are not considered suitable to enter the regression analysis
Adjust each GDN's base year figures for Regional factors
Using figures for the chosen base year review for drivers which have a demonstrable regression analysis relationship with the cost of the process being considered
No: Consider Other Driver
Driver Identfied
No: Consider other Base Year
Yes:
Using regression analysis and other techniques to determine the base year relative performances of all the GDN. Establish the Frontier Company and the Upper Quartile performance
No
Regression Acceptable
Yes
Using the workloads and unit costs develop a "bottom up" analysis approach to determine the benchmark performance
For each year in the period adjust GDN workload forecasts as determined by the review process
Using the workloads/drivers calculate the upper quartile target performance for each subsequent year to 2012/13
Using the workloads/drivers calculate the GDNs own baseline performance (the performance implied by the BPQ submission for the base year) for each subsequent year to 2012/13 (i.e. the GDN performance extrapolated to further years with productivity assumptions built in)
Review and add back efficient costs removed from the analysis process
Determine the recommended expenditure projected for each year to 2012/13 (excluding RPEs & Regional Factors) by moving the GDN baseline performance towards the Target performance over the period
Calculate the split between Contractors/Direct staff/ Materials/Other to enable the expenditure projection to be adjusted to reflect Regional Factors
Adjust the expenditure projections for revised Real Price Effect assumptions based on PB Power's view of RPEs
Provide breakdown of the expenditure projections into activity sub-categories in proportion to the Workload/ Drivers for each activitiy

Figure 2-2

2.6 COSTS

All costs in the report are in 2005/06 prices unless otherwise stated.

The table below shows the factors which have been used to convert pre 2005/06 costs to 2005/06. These factors have been used throughout the analysis.

Convert to \ Convert from	2000	2001	Q1 2002	2002/03	2003/04	2004/05	2005/06
Index	170.25	173.35	173.87	177.52	182.48	188.15	193.11
2000	1.00	0.98	0.98	0.96	0.93	0.90	0.88
2001	1.02	1.00	1.00	0.98	0.95	0.92	0.90
Q1 2002	1.02	1.00	1.00	0.98	0.95	0.92	0.90
2002/03	1.04	1.02	1.02	1.00	0.97	0.94	0.92
2003/04	1.07	1.05	1.05	1.03	1.00	0.97	0.94
2004/05	1.11	1.09	1.08	1.06	1.03	1.00	0.97
2005/06	1.13	1.11	1.11	1.09	1.06	1.03	1.00

Table 2-2

2.7 REAL PRICE EFFECTS

The submissions have been made on the basis of 2005/06 prices and RPEs have also been identified, Appendix 7 gives details of the rates we have assumed have been used by NGG in the compilation of their BPQ submission. In addition to the increases from the Retail Prices Index (RPI) assumed at an annual rate of 2.5%, other costs have been assessed as potentially rising faster than this rate. These additional increases used in this report have been summarised in Table 2-3 and are discussed further in the sections below.

We have made adjustments to the submissions for all areas of the BPQ excluding Non-Operational Capex as we consider most of this expenditure is project based which will have been made on the basis of the best available planned processes at the time of the submissions. We consider it more appropriate to consider adjustments to this type of expenditure on a case by case basis.

Real Price Effects		2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Contractor Rates Year on Year	2.25%	100.0	102.3	104.6	106.9	109.3	111.8	114.3	116.9
Materials year on Year	1.00%	100.0	101.0	102.0	103.0	104.1	105.1	106.2	107.2
Direct Labour	1.00%	100.0	101.0	102.0	103.0	104.1	105.1	106.2	107.2

Table 2-3

2.7.1 CONTRACTOR PRICES

Contractor prices have a major impact on the costs of the GDN operations particularly in the areas of connections, mains replacement works and LTS projects. All GDNs have forecast that contractor prices will increase at a greater rate than the RPI. They have quoted particularly the Price Adjustment Formulae for Construction Contracts Indices published by the DTI (commonly known as the Baxter Indices) as evidence of the historical rate of real price inflation for these contracts. These trends have been set out in Figure 2-3 below.

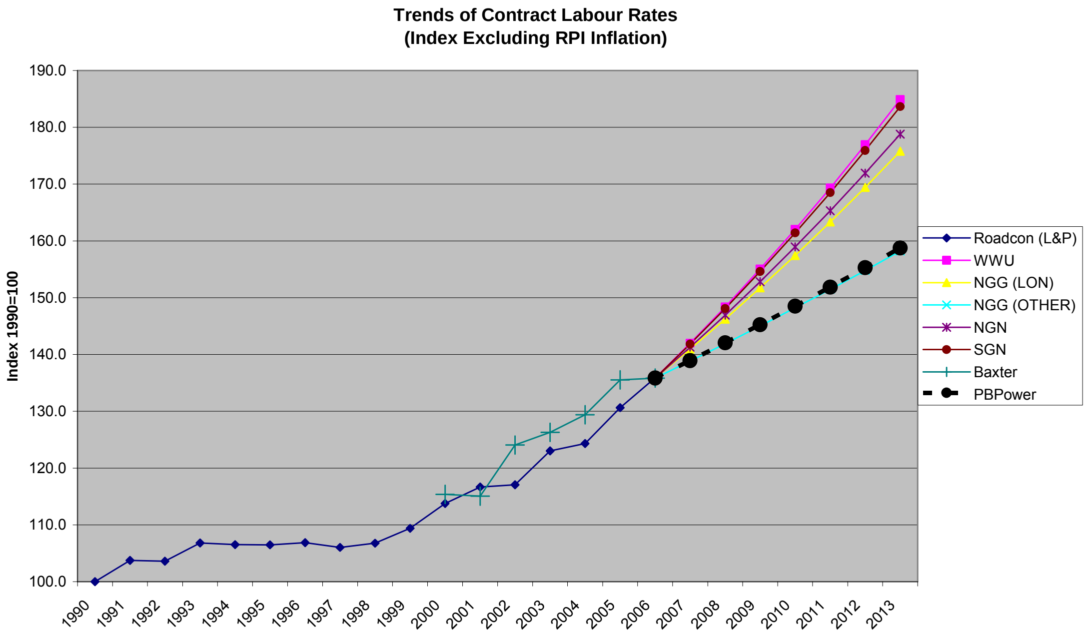

Figure 2-3

We have investigated these trends looking for comparisons for the gas distribution costs. These indices do not uniformly increase month by month as there tends to be step changes each year as contracts are re-negotiated. Examination of the most recent trends suggests that the high increases experienced a year ago have flattened out.

We have also compared the data with the Public Sector Construction Works Indices (Road Construction) published by the DTI. Whilst this sector is not directly reflective of gas distribution activities it is useful as a comparator to the Baxter Indices. As can be seen from Figure 2-3, whilst the two indices show small differences year on year the trends demonstrate very similar increase.

Having considered all of the previous trend information we have concluded that a projection of 2¼% is appropriate which is also shown in Figure 2-3.

Our analysis assumes a single rate of Contractor price increases across all GDNs with no differences between regions of the UK for the rate of increase.

2.7.2 DIRECT LABOUR COSTS

All GDNs have submitted the view that direct labour costs will continue to increase at a greater rate than the RPI.

Forecasting future wage and salary trends in relation to inflation is a matter of speculating on the outcome of future negotiations and many complex factors. Government's concern is with the control of inflation and as such encourages settlements at or below inflation.

The best evidence for future trends comes from recent experience. The DTI Employment Relations Research Series document No 56 dated March 2006 indicates that in the past decade, UK employees have enjoyed strong real (inflation adjusted) wages growth of 2¾ per cent a year in the private sector. Public sector employees saw a slightly lower annual growth rate of around 2¼ to 2½ per cent in real earnings. This period spanned the introduction of the minimum wage and it appears that more recent real growth has slowed. The most recent Annual Survey of Hours and Earnings (ASHE) in April 2006 indicated that median gross weekly earnings were 4.1% in 2005. During this period inflation averaged 3%. Continuing this trend, the Ernst & Young ITEM Club indicated recently that average earnings increased by 4.1% in the year to November, despite a tightening labour market.

Based on recent evidence, a real price effect forecast of 1% for direct staff costs has been used in our analysis.

2.7.3 MATERIAL COSTS

All GDNs have submitted the view that material costs will continue to increase at a greater rate than the RPI. Having reviewed these rates we believe a reasonable rate of increase above RPI will be 1%. We conclude that this figure should be taken together with the productivity savings assumed which balance the effect of these increases.

2.7.4 OTHER COSTS

No specific evidence has been provided on real price rises for other costs and therefore our analysis has assumed no increases above RPI.

2.8 REGIONAL FACTORS

2.8.1 CONTRACTOR PRICES

We have based our initial views on the Quarterly Review of Building Prices as published by the Building Construction Information Service (BCIS) of the Royal Institution of Chartered Surveyors (RICS). This document provides a complete regional index of construction costs for the UK. For the purposes of our analysis we have rebased the October 2006 indices with Northern Ireland, Jersey and the Scottish Highlands excluded. We have estimated the percentage for each county falling into each GDN, thus being able to derive an index of construction costs for each GDN. The table below sets out the values used for the analysis, the same factors have been used for each year. Details of the assumptions used to determine these factors are given in Appendix 5.

Regional Factors	WW	No	Sc	So	EoE	Lon	NW	WM
Regional Factors (Contractor Prices)	0.96	1.01	0.99	1.06	1.00	1.11	0.93	0.94

Table 2-4

2.8.2 DIRECT LABOUR COSTS

The Annual Survey of Hours and Earnings (ASHE) published by the DTI shows that there is a substantial London effect on average earnings. This shows that London wages are on average 30% higher than the national average.

Using this figure for London only, an assessment has been made as to how this impacts the GDNs. We concluded that only Southern and London GDNs are affected and that they are not fully exposed to the 30% uplift as the whole of the GDN is not within London and many activities are carried out away from the London location.

Our conclusions are set out in Table 2-5.

Regional Factors	WW	No	Sc	So	EoE	Lon	NW	WM
Regional Factors (Direct Labour)	0.98	0.98	0.98	1.03	0.98	1.10	0.98	0.98

Table 2-5

2.8.3 MATERIAL COSTS

No specific evidence has been provided of a regional impact on material prices and therefore our analysis has not used any regional factors for material costs.

2.8.4 OTHER COSTS

Having reviewed the evidence supplied by NGG on exceptional costs (predominately in London), we have concluded that this evidence does not support a generalised regional indexation of the "Other" cost category across.

2.9 PRODUCTIVITY

Although we have not undertaken a full study of past productivity we have examined published information to determine an assumed base annual increase in productivity. We understand other consultants are undertaking broader economic studies of the operation of the GDN businesses.

Looking at the productivity information published by National Statistics on output per worker the average annual increase over the last 10-40 years is in the range 1.7% - 2.0%. In addition a report on the OFWAT web site compiled by Stone & Webster Consultants Limited in 2004 concluded "Broadly, the average rate of Opex productivity growth for [Water and Sewage Companies] has been in the range 1.7-1.9% per annum over the [period 1992-93 to 2002/03]". In the light of these figures we have made a conservative assumption of 1% base annual increase. We have then used our engineering experience and judgement when reviewing the business plans of the companies to determine where we believe there is scope for additional productivity above this base rate.

The table below lists the areas in which our analysis has used an assumption for productivity to automatically generate our proposals over the period. The table also shows where we believe there is scope for productivity improvements, higher scope being identified by more ticks.

In other areas of analysis we have used the GDN's own forecasts modified as appropriate for specific issues.

Activities	Rate	Potential Opportunities (Above base Productivity)					
		New Techniques	Labour Productivity	Clerical Support Costs	Process Improvements	Contractual Reductions	IS Improvements
Opex – Work Management	1%						√√√
Opex – Remaining	1%						
Capex - Connections	3%	√	√√	√√√	√√√	√√	√√
Capex – Mains Reinforcement	2%	√√	√	√	√	√√√	√
Repex - All	1.75%	√	√	√	√	√√	√

Table 2-6

Our productivity assumptions are extrapolated to subsequent years based on the regression carried out on the information provided in the regression base year. We recommend that following the update of 2006/07 outturn figures, our assumptions are reviewed in the light of potential performance improvements already achieved during the 2006/07 financial year.

2.10 OUTER MET AREA

A geographical area on the boundary of the East of England Network and the London Network, the Outer Met Area, is for regulatory and income accounting purposes part of the East of England Network. However, the area is managed by NGG as part of the London Network. In the review of Direct Opex all comparative analysis has been carried out on the basis that the costs and work for the Outer Met Area have been included within the London figures. The BPQ has been completed by NGG on this basis with the exception of low pressure gas holders. We have therefore modified these returns for London and East of England Networks to ensure the analysis has been carried out on a consistent basis. The operating costs, assets and liabilities are deemed to be 9% of the transportation business operating costs, assets and liabilities of the London Network. We recommend that future returns and analysis is carried out on the basis that all aspects of the Outer Met Area is reported and analysed as being part of East of England Network.

2.11 PENSION ADJUSTMENTS

GDNs have included different assumptions regarding the amounts required to cover the costs of the employer's normal level of contributions to their employees' pension schemes. To bring the direct Opex on to a consistent basis across all GDNs, we have removed the GDN reported pension contributions and replaced them with an amount equal to 22% of direct employee salary/wage costs as advised by Ofgem

3 WORK MANAGEMENT

3.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	35.6	36.0	36.4	35.8	34.9	**178.8**
Normalisation Adjustments	-12.6	-12.9	-13.1	-12.8	-12.4	**-63.7**
Normalised BPQ	23.0	23.1	23.4	23.0	22.5	**115.1**
Adjustments	-0.9	-1.5	-2.3	-2.4	-2.5	**-9.6**
Proposed	**22.2**	**21.6**	**21.1**	**20.6**	**20.0**	**105.5**

Table 3-1

3.2 POLICIES & PROCEDURES

3.2.1 INTRODUCTION

NGG North West Network has a clear route of Governance by which Policies and Procedures are formed, approved, and implemented. North West shares common Policies and Procedures, which operate across all NGG Networks. Within the Network Strategy Directorate of NGG, the Engineering Policy group identifies the need for new or reviewed documents brought about by legislation, regulations or internal Company requirements. Changes in legislation are picked up by NGG Public Affairs, and also by NGG staff contributions to IGEM and industry committees Appendix 1 reviews the financial and Technical framework under which North West operates, the structure they utilise to manage their assets effectively and the key policies they adopt to ensure they meet their statutory and licence obligations and other regulatory requirements.

This section reviews the various statements made by North West in support of their planning and decision-making processes, which drive their Work Management activity

3.2.2 SCOPE OF POLICES AND PROCEDURES

The Work Management activity has to carry out its functions in such a way that the pipe laying and relaying, emergency, repair and maintenance activities are able to comply with their key Policies and Procedures.

This includes meeting the standards of performance under the Gas Act in relation to handling of calls to the emergency call centre and the repairs of escapes in accordance with the timescales set out in the Gas Safety (Management) Regulations (GS(M)R).

Policies and procedures, which apply specifically to Work Management, include those that are established to govern the capture and retention of essential information about assets, when they are added to or removed from the network asset inventory, or when they are maintained. Key Policies for this are:

- T/PL/RE/1: Policy for Capture, Update and Retention of Engineering Asset Records.
- T/PL/DR/1: Policy for the Capture of Pipe Asset Records

3.2.3 REVIEW AND UPDATE PROCESS

NGGs Engineering Policy Committee receives, reviews and approves all new or amended Policies and Procedures. The Engineering Policy group manages the production of draft documents, to be reviewed by a representative peer group, before being submitted for approval. NGG staff, Service Providers and Specialist Consultants, may provide input to the drafting process. Governance responsibility for all documents is held by NGG. When new documents are approved, briefings and/or detailed training is given to those affected.

3.2.4 EFFICIENCY AND PRODUCTIVITY

We have not carried out detailed audits of the degree of compliance within the Network to the stated Policies and Procedures. However, within the category of Work and Asset Management, we can say that, from the evidence offered within the BPQ responses, responses during our visit, and replies to Supplementary questions, there are no indications that they are not being followed. There is no evidence of systematic failures of equipment processes or systems, which could indicate lack of compliance. Similarly, within safety related statistics, such as lost time accidents, there is no evidence of unsafe practices being employed, which could be used as an indicator of the lack of compliance with documented Policies and Procedures.

Unlike the iDNs, no major change has been made in updating Front office systems, and current performance will reflect the complex relationships and interfaces between the legacy IT systems.

We recommend that the current approach to Policies and Procedures is viewed as effective, and viewed as a satisfactory basis for compiling expenditure forecasts.

3.3 HISTORICAL PERFORMANCE

3.3.1 INTRODUCTION

We would expect the historical performance of Work Management to be represented by the combination of historical Management Information drawn from Job Statistics and costs for this category of work. This historical performance could be helpful in developing trends of workload, costs, and unit costs, which could be then used to make comparisons year on year, and also to make comparisons with other GDNs` performance.

Historical management Information, pre 2005/06 is of limited value in making comparisons because in the preceding years National Grid undertook a number of organizational restructures, moving some support sections between Networks (LDZs), Network Clusters (lead Networks), and Central Support functions. During these periods, changes occurred in the way such support costs were allocated across Networks and activities. Inter year, and inter Network comparisons of costs cannot be substantiated for this period.

Work Management encompasses a range of work activities from Call Centre operation to Supervision on site, from Safety and Environment management to Records management.

We have therefore used the cost data only for the years 2005/06 and 2006/07 for benchmarking and to understand the costs. We believe that it represents the best approach based on the available information. We anticipate replacing the forecast 2006/07 figures with `actuals` before the end of this Review process.

The factors influencing historical costs will be the following:

Staff costs

Work management is a labour intensive activity, with approximately 85% of costs being staff related. Real increases in salaries and wages have a very significant impact on Work Management costs. Using staff efficiently, having staff with the correct competencies, adequate training, supportive IT systems, and only engaged in the processes that are essential, will minimise waste and minimise the costs of Work Management. Coaching for Excellence (C4E) is an initiative within NGG implemented by Spring 2005, which aimed to focus staff on the key elements of their jobs, and provide mentoring and coaching, to ensure knowledge about, and performance on those key elements were improved. Initial indications for the year to October 2006 indicate that productivity improvements of approximately 1% per annum were being achieved in the number of maintenance jobs completed per day. This improvement is attributed to C4E, an unidentified proportion of this attributed to Work Management. In the same period, the injury frequency rate has reduced, shown to be as a direct result of the Safe and Unsafe Act (SUSA) discussions held during the C4E process. This will also contribute to productivity improvements.

Technology

Getting the most from staff requires appropriate tools to complete their tasks. NGG now lag behind the other GDNs by retaining the legacy front office IT systems. Whilst legacy IT systems are planned to be replaced during the period of this review, currently, they should be seen as a deterrent to efficiency.

3.3.2 DEFINITION OF ACTIVITY

Work management encompasses disparate work activities. The sub activities included in this assessment are:

Staff and other non-operational costs, including activities associated with:

a) Asset Management
   - network integrity
   - planning and design.

b) Supervisory costs
   - Field supervision

c) Project Support
   - NRSWA management
   - Work scheduling, dispatch and closure
     - Emergency
     - Repairs
     - Maintenance
     - Capex
     - Repex

d) Contract Management
   - managing the relationship with engineering contractors
   - managing the relationship with other bought in services

e) Customer Management
   - Call handling
   - managing the processes that interface with consumers
   - managing the processes that interface with shippers

f) Network Support, costs associated with engineering back office
   - records management
   - network analysis
   - work and resource planning processes.

g) Health, Safety and Environment.

h) Network Policy

i) Safety & Engineering

In addition, the reported costs under Work Management include the costs of System Operations and specialist or bought-in services.

NGG currently carry out System Operation on behalf of all GDNs. System Operations for the IDNs will be transferred out of NGG into the IDNs as part of a collaborative project SOMSA Exit, during the next price control period. The impact on Opex is that as the project proceeds, staffing numbers will be reduced in NGG, and there will be a corresponding increase in staffing numbers in the other GDNs. As with other services supplied by NGG after the point of sale, continued use of NGG System Control has been the subject of an NSA, resulting in a charge levied by NGG to the other GDNs. The staffing for NGG`s own Systems Operation, are assumed to be 50% of the current level of 126 staff, and this figure has been used in our bottom up analysis (ie 16 FTE per network). This reflects the improved productivity through automation and streamlined processes, as new integrated systems are introduced.

3.3.3 ESTABLISH UNDERLYING COSTS

Cost normalisation

To establish the underlying costs, it was necessary to normalise the data for each GDN

The Section 2.5.1 gives details of the generic normalisation adjustments which have been carried out. For Work Management the principal normalisation adjustments are outlined below.

- **Cost transfer** – there have been two transfers from Work Management. These relate to the costs associated with shrinkage and xoserve, which have been moved to new categories for clarity of analysis.
- **GDN reallocation** – the outcome of reallocation process in which NGG identified the changes to the allocation of costs, to reflect our proposed allocation of sub-activities[1].
- **Accounting adjustments** – which have been provided by Ofgem
- **Pensions adjustments** – these adjustments are the net adjustments between NGG's reported pension costs and the standard pension costs used by PB Power
- **Removed costs** – there are no removed costs in the Work Management category.

The detail of the adjustments to the BPQ costs submitted by NGG for North West Network, is given in the following Table 3-2.

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	-13.6	-14.9	-14.1	-13.6	-13.2	-13.0	-12.6	-12.1	-107.1
Shrinkage	-10.3	-11.0	-10.6	-10.1	-9.8	-9.6	-9.2	-8.7	
xoserve	-3.3	-3.9	-3.5	-3.5	-3.5	-3.5	-3.4	-3.4	
GDN reallocation	2.0	3.3	2.1	1.7	1.0	0.7	0.6	0.4	11.6
Ofgem Accounting Adjustments	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.0
Pension Adjustments	0.0	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-4.7
Removed costs	0	0	0	0	0	0	0	0	0.0
Total	**-13.6**	**-12.2**	**-12.7**	**-12.6**	**-12.9**	**-13.1**	**-12.8**	**-12.4**	**-102.2**

Table 3-2

NGG has recently provided additional information on maintenance related staff resources coded to the Work Management activity. This was not provided at the time of the GDN reallocation and although the data has been included in the normalisation table above, we have not had the opportunity to analyse this information in detail. We recommend that this area of cost allocation is reviewed as part of the 2006 update.

In this Section all costs are shown on a normalised basis as described above.

[1] Full details of the GDN reallocation are given in Appendix 6

2005/06 and 2006/07 costs

The cost trends for work management are only available for the years 2005/06 and 2006/07, and for North West are shown below, in Table 3-3:

Controllable Work Management Opex by category adjusted for regional factors (£m)	2005/06	2006/07
Contract	2.5	1.4
Direct	14.1	13.4
Materials	0.3	0.3
Other	7.3	7.6
Total	**24.1**	**22.7**

Table 3-3

* £2.2m has been removed from `Other`, at Ofgems request as Accounting adjustments.for 2005/06.

The 4 largest value items, which comprise `other`, are given in the Table 3-4 below:

Line item (£m)	2005/06	2006/07
Non-Salary Staff Costs	3.3	2.8
Safety, Health, Environment & Security	1.4	1.6
Share Options	1.1	1.0
Rents and Buildings	1.1	0.5

Table 3-4

For the years 2005/06 and 2006/07 North West Work Management cost falls by 6%, at the average of all GDNs costs.

Work Management Unit Costs

Section 2 sets out the approach we use to set frontier costs. The following techniques are used:

- Bottom-up analysis.
- Regression analysis
- Unit cost analysis

To use these techniques we need to establish a cost driver or explanatory variable. For Work Management we have done this as part of the bottom-up analysis described below.

Bottom-up cost analysis

We believe that Work Management costs are driven by a combination of drivers, all of which are related in some way to the size or scale of the network operation. Initially our work concentrated on the alternatives of the length of <7bar network, or the energy throughput. We felt that neither of these truly reflected the changes on Work Management workload from the changes in Repair and Emergency Services workloads for which Work Management provides support and supervisory resources.

We have reviewed the number of staff that a typical GDN would require to operate effectively and efficiently. Our assumption is that we have estimated the minimum number of Work Management Staff for the average GDN, commensurate with safe working and sustaining the business. We have further assumed that, on average, staff related costs are 85% of Work Management costs.

Work Management Activity Cost Element 2005/06	£m	£m	%
Staff costs including Agency Staff	99		
Sub Contractors	16		
Non-Salary Staff Costs	20		
NSA (75% staff related)	17		
		152	82
Total Work Management		**186**	**100**

Table 3-5

Given that other costs within Work Management are people related, such as technical services and consultancy, we believe a figure of 85% is representative.

Based on BPQ information an average GDN has a length of <7 bar pipe network of 33,000km, with 20,000repairs per annum and 135,000 PREs per annum. These parameters are taken from rounded averages of all GDN statistics.

We have estimated the minimum number of FTEs required to support this workload. The results of this analysis are set out in Table 3-6.

In assessing these numbers we have assumed increases in efficiency in the area of support staff in the belief that impacts of improved IT systems will have a major effect on back office activities, job/task closure process and record management. We believe that we have established the minimum number of FTEs for a DN operating with a centralised support service, which we believe to be the most efficient operational structure. When compared with 2006/07 staffing levels, this represents a 19% cut in staff.

A cost per FTE has been used to estimate total costs. This has been obtained by dividing the total staff costs for all GDNs, including normal pensions, standby, and overtime, by the number of FTEs employed on Work Management by all GDNs. This results in a cost of £35,000 per FTE.

Work Management sub-activity	FTEs	Cost @£35,000 per FTE £m
Operational Supervision	147	5.1
Network Support	202	7.1
Network Strategy	59	2.1
Commercial	12	0.4
Total	**420**	**14.7**

Table 3-6

Table 3-6 addresses 85% of Work Management costs, and gives a cost of £14.7m. The remaining 15% of total Work Management costs is for non-staff related costs. Based on our calculations from Table 3-6 above this amount is £2.6m. Our bottom-up estimate of the efficient Work Management costs for an average GDN is therefore, £17.3m per annum.

To refine this analysis, we have reviewed the percentage of Work Management resources which are used to support the Repair activity, the Emergency Service, and all other Opex activities. Few parts of Work Management, exclusively support one activity, Emergency call handling however, being an exception. We have made a judgement on the proportion of work management costs associated with each of the activities as set out in Table 3-7 below

The table also shows the proposed driver of costs in each case.

Activity Serviced by Work Management	Driver	Work Management Resource Driver %
Emergency Response	Number of PREs	30
Emergency Repairs	Number of repairs	30
Other Operational Activities	Length of <7bar Pipe (Kms)	40

Table 3-7

We have therefore developed a composite cost driver based on the proportion of costs driven by each activity shown in the above table.

The composite cost driver CSV = Average length of mains x

(0.3 x No. of PREs / Average no. of PREs

+ 0.3 x No. of repairs / Average no. of repairs

+ 0.4 x length of < 7bar main / Average length of mains)

The component variables of the CSV are each scaled by their respective average GDN values so that the balance between the components of the CSV is independent of the choice of units used to quantify each component variable.

The unit cost for the average of all GDNs is £17.3m divided by 33000 (the CSV for the average network), or £524/CSV

Regression analysis

This CSV driver is used in a regression analysis to establish a relationship between costs and volume of Work Management activities.

As discussed in section 2, the starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2005/06). The regression calculation determines a relationship between the costs and the workload driver. The regression line is shown in black on the graphs. The r^2 value is one indicator of how well the variation in costs is explained by the variation in the workload driver.

As discussed in section 2 we have then adjusted the regression line to give the upper quartile regression line which is the target which all under performing GDNs should move towards. This is shown in pink on the charts.

High performing networks will be expected to continue to improve their performance over the period to 2012/13. The resulting target costs for 2012/13 are shown in yellow on the charts.

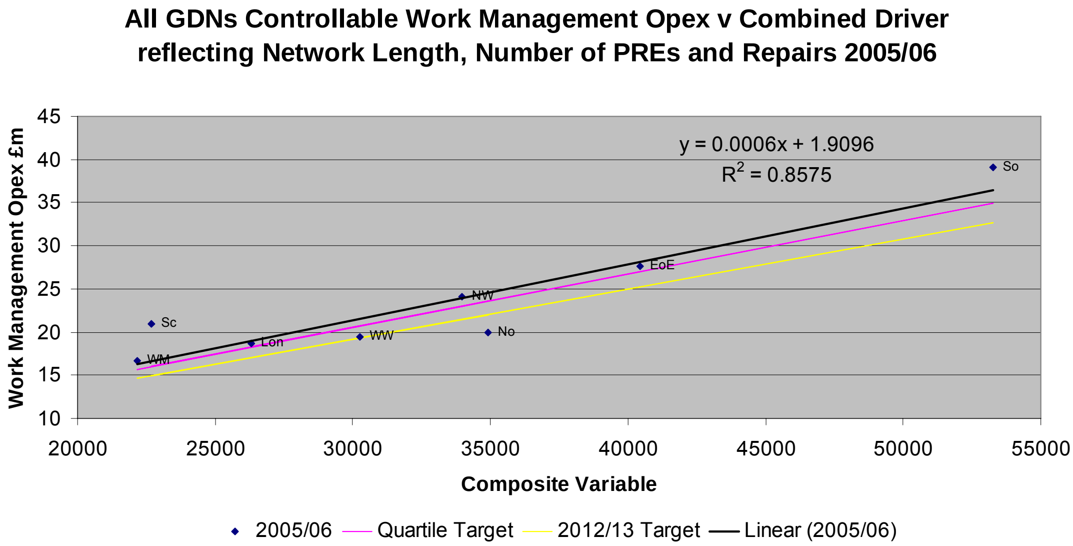

Figure 3-1

The regression line shows an acceptable fit to the data points. North West is positioned on the regression line at £24.1m.

Unit cost analysis

The following table compares the unit costs from the bottom-up and regression analyses with the costs provided by North West.

The bottom-up analysis described above gave a cost of £17.3m per annum for an average network. Such a network would have a CSV of 33000, giving a unit cost for the average GDN of £524 per CSV. Applying this unit cost to North West gives a total cost of £18.4m per annum.

The following table compares the total costs and unit costs obtained from the three cost assessments.

	CSV	2005/06 cost £m	Cost per £ per CSV
North West submission	33961	24.1	711
Upper Quartile from regression analysis	33961	23.0	677
Bottom-up analysis	33961	17.8	524

Table 3-8

This shows the bottom up cost below the yellow line target costs in Figure 3-1, but that is to be expected. There are already two GDNs performing on or near the target line, our bottom up cost we believe denotes the minimum that can be ultimately expected, without significant changes of policy, or technology.

3.3.4 COMPANY PROPOSALS

The Work Management costs reported in the BPQ submission by North West Network for the years 2006/07 to 2012/13 are shown below. This shows that neither North West nor GDNs, on average expect significant changes in Work Management costs over the period.

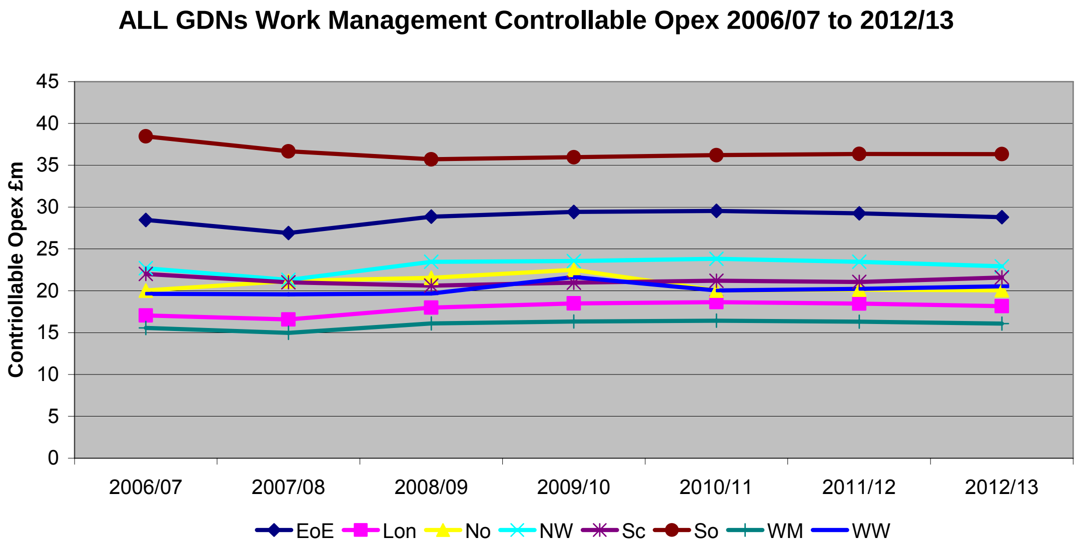

Figure 3-2

3.3.5 PROPOSED PROJECTIONS

We have shown that a combined driver of network length (<7bar), repair numbers and PRE numbers, is an appropriate explanatory variable to use when comparing network performance. To calculate the Work Management costs for the control period, we therefore need to take into account the planned growth in the network, and the variations in Repairs and PRE workloads.

The following table shows the PB Power forecasts of workload for North West for repairs and emergency (from Sections 4 and 5), and the growth in Network length for North West.

North West	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
No. of repairs	21325	20762	20191	19637	19098	18575	18067	17572
No. of PREs	153884	153232	152594	151969	151357	150759	150172	149598
Length of network (<7bar) km	33569	33598	33635	33658	33691	33725	33754	33785

Table 3-9

The benchmark unit cost established in section 3.3.3 is applied to the composite variable (CSV) projections to establish the path of efficient Work Management costs for North West. The results are shown in Table 3-11, below.

Specific costs

In reviewing the Capex expenditure plans for IT we have not been able to specifically identify the benefits planned to be delivered by each project. Having considered the total planned IS investment we are of the opinion that at least some of these projects would have been the subject of a cost benefit investment decision. We have assumed 20% of the total IT investment in Infrastructure and Systems would have been justified on a cost benefit basis, recognising that some investment will be to meet mandatory requirements. The total investments are listed in Table 3-10.

For 20% of the total investment, we have therefore calculated the minimum annual benefits which would be required for a standard cost benefit analysis. We have assumed the benefits will accrue over a 7 year period following the investment and have used a 6.25% per annum discount rate.

As this investment has been incurred after the start of the 2005/06 base year used in our regression analysis, it can be assumed that these saving are additional to those which could be expected from our conclusions from the regression analysis. These savings have been included in the allowed adjustments line in Table 3-11. We would expect most savings to result from the further automation of information flows to and from the field, particularly for Map and Engineering Drawing information. We would expect further optimisation of resource utilisation and supervision to be assisted by remote video transmission and automated data collection on job closure.

North West	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	5 year total
Infrastructure	1.4	2.0	1.8	2.1	1.8	1.3	2.0	2.6	9.8
Field Force Device Replacement	0.0	1.0	2.1	0.0	0.0	0.0	0.6	2.1	2.7
FFE Consolidation	0.0	0.0	0.0	0.0	0.7	1.5	1.5	0.3	4.0
Traffic Management Act	0.0	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0
UKD Systems - GPS Asset Data Capture	0.0	0.1	0.3	0.1	0.0	0.0	0.1	0.3	0.5
UKD Systems -Basecase	0.0	0.1	0.5	0.4	0.0	0.3	0.3	0.0	1.0
UKD Systems - Replacement	0.0	0.0	0.0	0.0	1.7	1.6	1.6	0.9	5.8
Shared Services Projects allocation	0.1	1.4	1.9	2.0	0.0	0.2	0.4	0.4	3.0
IS Systems < 0.5m	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.1
Total IS Capex	1.5	5.8	7.9	4.6	4.2	4.9	6.5	6.7	26.9
Assumed Productivity 20% Total	0.3	1.2	1.6	0.9	0.8	1.0	1.3	1.3	5.4
Expected opex savings				-0.5	-0.7	-0.9	-1.0	-1.3	-4.5

Table 3-10

We believe that a general productivity improvement of 2% per annum in the benchmark costs is achievable, however, taking into account the IS improvements already outlined above this general productivity has been reduced to 1% per annum. This is in addition to the specific IT related items referred to above.

	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**35.6**	**36.0**	**36.4**	**35.8**	**34.9**
Normalised Adjustments	**-12.6**	**-12.9**	**-13.1**	**-12.8**	**-12.4**
Normalised Submission	**23.0**	**23.1**	**23.4**	**23.0**	**22.5**
Combined Driver	**33078**	**32797**	**32525**	**32260**	**32002**
Benchmark (Ex RF RPE)	21.8	21.4	21.0	20.7	20.3
Baseline (Ex RF RPE)	22.9	22.4	22.1	21.7	21.3
Gap	1.1	1.0	1.0	1.0	1.0
Convergence	0.8	0.7	0.5	0.4	0.3
Recommended (Ex RF and RPE)	22.6	22.1	21.6	21.1	20.6
Recommended (Inc RF and RPE)	22.7	22.3	22.0	21.6	21.3
IS Productivity Adjustments	-0.5	-0.7	-0.9	-1.0	-1.3
Recommended (Inc RPE)	**22.2**	**21.6**	**21.1**	**20.6**	**20.0**

Table 3-11

This table shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the workload driver over the period 2008/09 to 2012/13 and the benchmark unit costs which are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The GDNs are not expected to close any gap immediately. The convergence adjustment provides a glide path of cost to the Benchmark performance. The gap is reduced to 30% in 2012/13.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)

The allowed adjustments for specific cost areas are then added to give the Recommend cost (Inc RPE).

3.3.6 REAL PRICE INCREASES

Section 2.7 sets out the approach to real price effects proposed by PB Power.

In addition to any efficiency adjustments, the Network costs have been normalised by adjustments to remove the GDN real price effects and the PB Power real price effect assumptions have subsequently been added in deriving the proposed allowances.

3.3.7 RECOMMENDATIONS

The result of the analysis, showing the normalised GDN forecast, the target cost and the line representing the recommended allowance cost is shown on the following graph.

Chart showing North West Recommended Work Management Opex

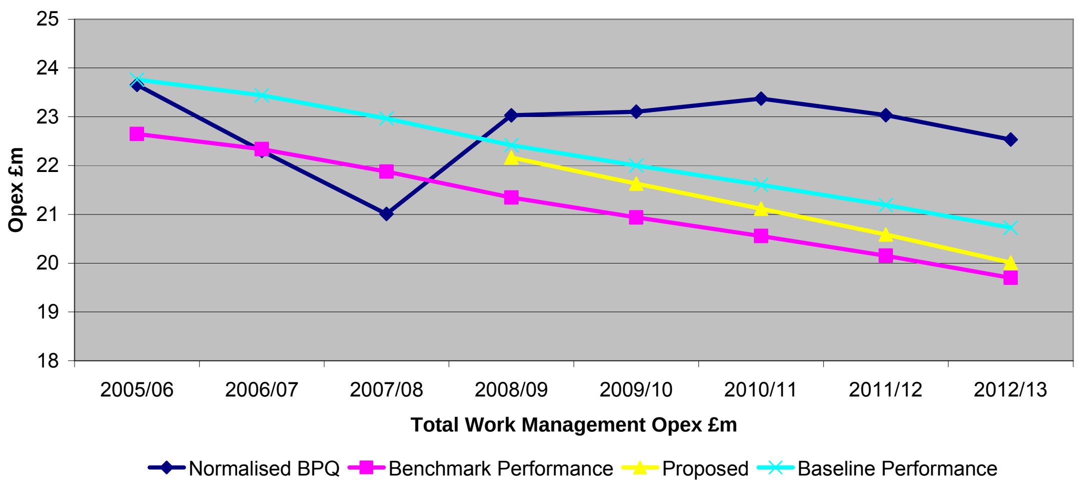

Figure 3-3

Note: the Benchmark and Baseline Performance lines include Adjustments

4 EMERGENCY

4.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	13.0	9.2	9.8	10.5	11.0	**53.5**
Normalisation Adjustments	-1.9	1.8	1.5	1.0	0.5	**2.9**
Normalised BPQ	11.1	11.0	11.3	11.4	11.5	**56.4**
Adjustments	-0.1	-0.1	-0.7	-1.0	-1.2	**-3.1**
Proposed	**11.0**	**10.8**	**10.7**	**10.5**	**10.3**	**53.3**

Table 4-1

4.2 POLICIES & PROCEDURES

4.2.1 INTRODUCTION

The primary roles of the emergency service are to:

- Receive emergency calls (usually electronically)
- Attend site within pre determined time scales
- Assess the situation on site and make safe as appropriate
- Call for support and assistance to deal with externally located gas escapes (if safe to do so the escape will be programmed and repaired within a defined period)
- Re-commission the supplies to consumers after mains/services renewal work
- Complete safety checks on re-programmed escape repairs (D2 rechecks)

NGG policy T/PL/EM1 - Policy for Dealing with as Escapes and other Emergencies - covers the management of actual and suspected gas escapes and other emergencies. These include the emission of fumes from gas appliances, fires or explosions where gas is thought to be the cause, and loss of supply.

The emergency service also carries out network asset related work and meter work (under contract), where such activities improve resource utilisation and do not impair the primary emergency service role.

4.2.2 SCOPE OF POLICES AND PROCEDURES

The policy T/PL/EM1 is applicable in relation to NGG's obligations as a Gas Transporter, an Emergency Service Provider and the Network Emergency Co-ordinator. It also applies in instances where NGG has entered into commercial arrangements to operate as an Emergency Service Provider for a third party e.g. another Gas Transporter or other Gas Conveyer.

4.2.3 REVIEW AND UPDATE PROCESS

Appendix 1 reviews the financial and technical framework under which NGG operates, the structure they utilise to manage their assets effectively and the key policies they adopt and maintain to ensure they meet their statutory and licence obligations and other regulatory requirements.

4.2.4 EFFICIENCY AND PRODUCTIVITY

The cost of implementing the policy is influenced by obligations under the Network's Safety Case and the Gas Act regarding standards of performance for dealing with Public Reported

Escapes (PREs). It is also influenced by the availability of fill-in work between PRE call-outs including work obtained through contracts with third party organisations (e.g. meterwork see section 4.3.4.) or other fill-in work available internally.

4.3 HISTORICAL PERFORMANCE

4.3.1 INTRODUCTION

In this section the historical performance of the Network between 2002/03 and 2006/07 is reviewed in an attempt to establish the proposed efficient level of costs associated with the Emergency Service (ES).

Where possible both workload and cost trends have been analysed although for the reasons outlined in 4.2.2 historical trends of PREs are not always helpful when attempting to forecast future work volumes since these are influenced by factors beyond the control of the Network.

4.3.2 DEFINITION OF ACTIVITY

The Emergency Service is the process set up to discharge the Networks obligations, under the Gas Safety (Management) Regulations(GS(M)R) 1996, to respond to Public Reported Gas Escapes (PREs). However ES staff and First Call Operatives (FCOs) also undertake other work activities including meterwork for external organisations and other internal activities such as leakage surveys.

There are two categories of PREs:

- uncontrolled, i.e. the source of the leak cannot be isolated by turning off a valve, or
- controlled if the source of the leak can be isolated.

The majority of PREs are uncontrolled.

All PREs are visited by emergency service FCOs. There is a requirement under the Network's Safety Cases and Overall Standards of Performance to attend to uncontrolled PREs within 1 hour of receiving the report and to controlled PREs, within 2 hours. It is accepted that attending all PREs within these timescales may not be practical on all occasions and some tolerance is allowed. The current standard of performance target is to attend to 97% for uncontrolled PREs within 1 hour, and 97% of controlled PREs within 2 hours.

Once the FCO has carried out an investigation the PRE is defined as either an Internal PRE (i.e. emanating from a source inside a building down stream of the emergency control valve), an External PRE (i.e. emanating from a source outside a building upstream of the emergency control valve and including the valve) or a No-Trace which is a false alarm.

There are two main cost drivers for the Emergency activity; the first is the requirement to attend to uncontrolled gas escapes within 1 hour and the second is the volume of PREs.

The requirement to attend uncontrolled PREs within one hour, results in Networks having to deploy FCOs throughout their areas on a 24/7 basis. This may lead to high levels of unproductive time (i.e. waiting time) since the number of PREs fluctuates and is influenced by factors beyond the management's control such as weather and media focus on gas related incidents, including explosions and carbon monoxide poisonings.

Minimising waiting time is a key management objective when attempting to minimise the cost of the Emergency Service.

During the current price control period a significant source of fill-in work has been the Network's meterwork contracts with meter asset managers such as Onstream and National Grid Gas Metering.

The emergency teams generally need to be located geographically throughout a network in order to respond appropriately to all emergency calls.

4.3.3 ESTABLISH UNDERLYING COSTS.

Cost normalisation

Section 2.5.1 gives details of the generic normalisation adjustments which have been carried out. For Emergency, the principal normalisation adjustments are outlined below.

- **Cost transfer** – appropriate emergency service Opex costs associated with service relays following escapes have been transferred from Repex.
- **GDN reallocation** – the outcome of reallocation process in which NGG identified the changes to the allocation of costs to reflect our proposed allocation of sub-activities[2].
- **Accounting adjustments** – which have been provided by Ofgem
- **Pensions adjustments** – these adjustments are the net adjustments between NGG's reported pension costs and the standard pension costs used by PB Power
- **Removed costs** – special costs associated with early retirement and loss of meter work have been removed prior to the comparative analysis, more detail is provided later in the section.

The detail of the adjustments to the BPQ costs submitted by NGG for North West network is given in the following table.

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	2.4	2.2	2.0	2.0	2.0	2.1	2.1	2.1	16.7
Service relay transfer from Repex	2.4	2.2	2.0	2.0	2.0	2.1	2.1	2.1	
GDN reallocation	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.6
Ofgem Accounting Adjustments	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3
Pension Adjustments	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.7
Removed costs	0.0	0.0	-0.1	-3.6	0.0	-0.4	-1.0	-1.5	-6.6
Early Retirement	0.0	0.0	-0.1	-3.6	0.0	-0.3	-0.7	-1.2	
Waiting time - loss of meter work	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.3	
Total	**2.1**	**2.0**	**1.6**	**-1.9**	**1.8**	**1.5**	**1.0**	**0.5**	**8.6**

Table 4-2

In this Section all cost are on a normalised basis as described above unless otherwise indicated.

[2] Full details of the GDN reallocation are given in Appendix 6

Workload and costs

The following figure shows the path of PREs over the period 2002/03 to 2006/07. It shows that the number of internal PREs declining over the period with external PREs declining and then increasing in 2005/06.

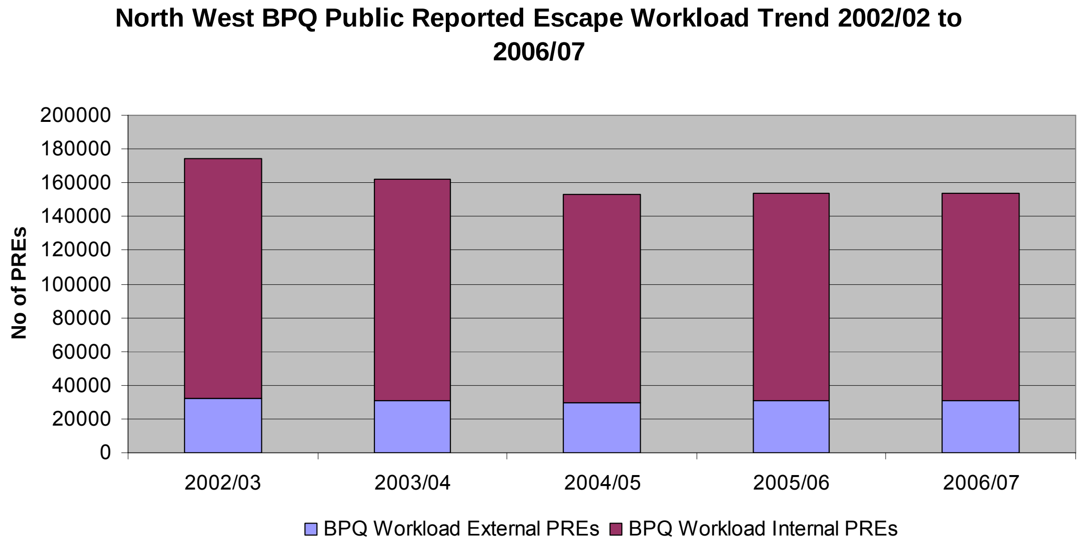

Figure 4-1

Figure 4-2 shows the Network has a higher level of total PREs compared to the average GDN and the historical trend is consistent with the general trend over the period.

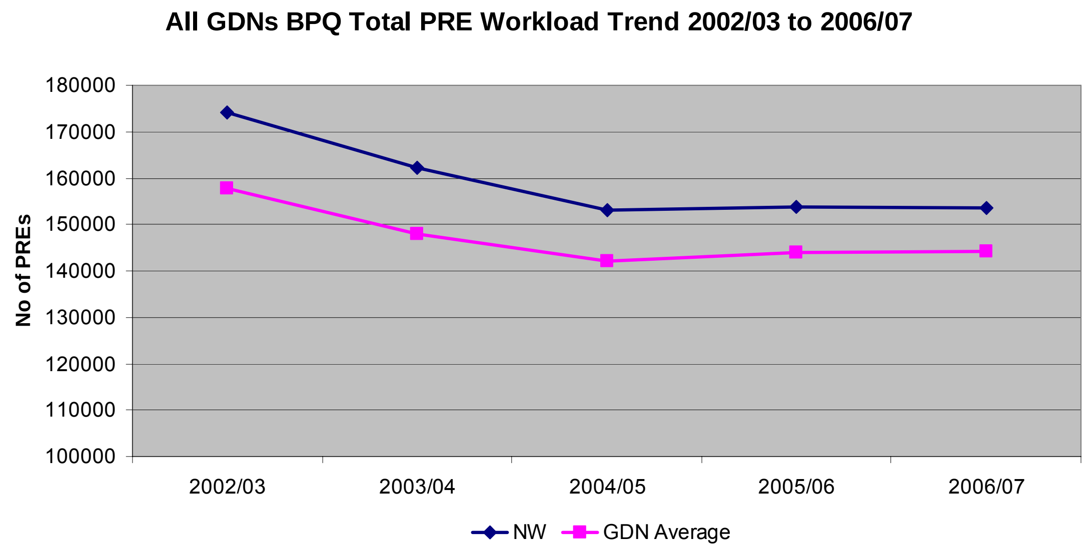

Figure 4-2

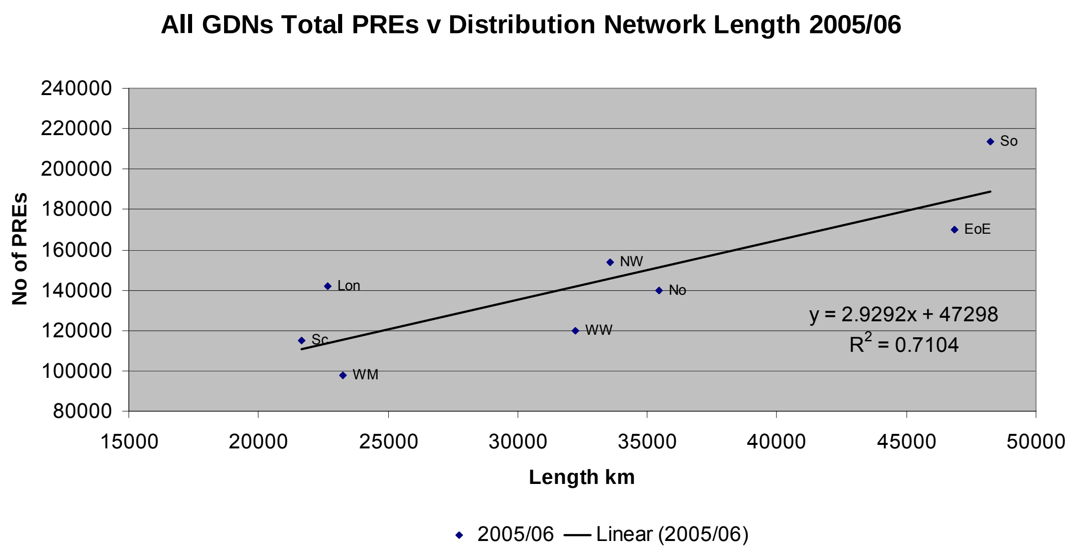

Figure 4-3

Figure 4-3 shows the PRE workload is generally commensurate with the network's size expressed in terms of network length.

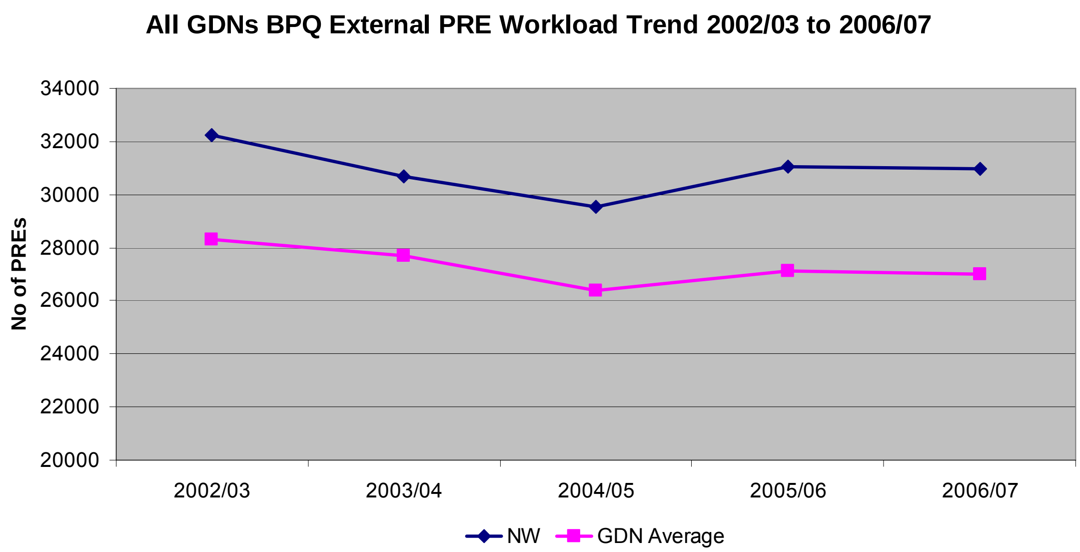

Figure 4-4

The number of External PREs is influenced by the mains replacement programme, operating pressures, management initiatives (such as gas conditioning and those designed to reduce interference damage) and the effects of asset ageing (see section 4.3.3). Figure 4-4 shows that, historically, the various factors influencing the number of external PREs have balanced out, both across all GDNs and in the case of North West network.

One of the key drivers of emergency costs is the number of PREs. We have therefore calculated the unit costs for the emergency service in terms of £ per PRE.

In this analysis no distinction has been made between Internal, External and No-trace reports and hence the unit cost is the average cost of these three categories. The following chart shows the unit costs (£ per PRE) for the emergency service in 2005/06, based on normalised costs.

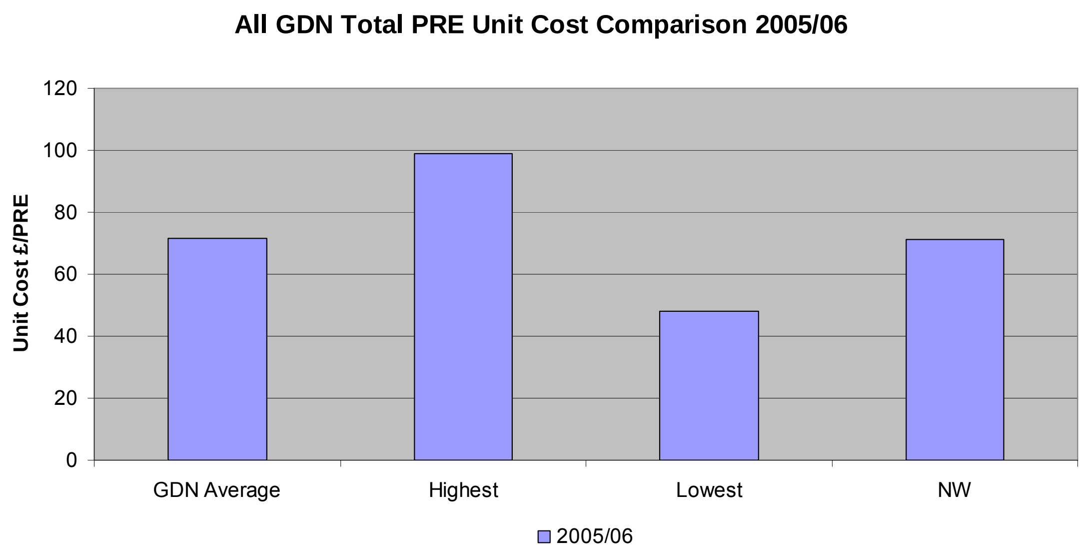

Figure 4-5

This shows that North West has unit costs just below the average of all the GDNs.

Historical costs

The table below shows the cost of the process over the two years 2005/06 – 2006/07. The Network has provided costs for the period 2002/03 - 2004/05 but due to different organisational structures in those years we cannot establish whether they are comparable with 2005/06 costs.

Expenditure breakdown (2005/06 prices)	2005/06	2006/07
Contract	2.0	2.0
Direct	7.8	8.2
Materials	0.3	0.3
Other	0.8	1.0
Total	10.9	11.6

Table 4-3

4.3.4 PROPOSE EFFICIENT LEVEL OF COSTS

Section 2 sets out the approach we use to set benchmark costs. The following techniques are used:

- Regression analysis
- Bottom-up analysis.
- Unit cost analysis

To use these techniques we will use total PREs as the explanatory variable, as discussed above.

Regression analysis

We have reviewed the most appropriate driver of costs. The number of PREs is clearly an important driver. The monitoring of emergency repairs which can safely be reprogrammed (D2 rechecks) also forms a component of the emergency First Call Operative (FCO) activities, and this workload is not counted in PRE numbers. The cost of carrying out D2 rechecks is included as part of the bottom-up analysis described below together with site monitoring following service relays.

We have concluded that a composite variable (CSV) as follows is most appropriate.

CSV = 0.8 x total no. of PREs/Average no. of GDN PREs

+ 0.2 x no. of repairs / Average no. of GDN repairs.

The component variables of the CSV are each scaled by their respective average GDN values so that the balance between the components of the CSV is independent of the choice of units used to quantify each component variable.

The weights reflect the assumed proportion of FCO time allocated to responding to PREs and to D2 rechecks together with site monitoring activities. These latter activities are driven by the number of repairs. (see Appendix 3)

The following graph shows the regression analysis using this CSV as an explanatory variable.

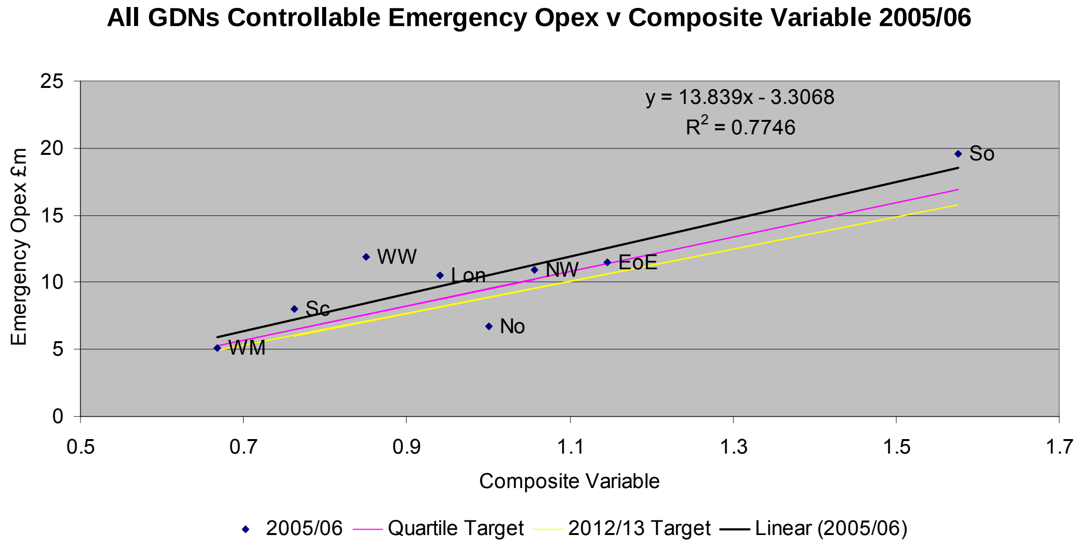

Figure 4-6

The regression analysis gives an upper quartile cost for North West of £10.2m.

In rural, sparsely populated areas, minimising waiting time can be more difficult than in more densely populated urban areas since there are fewer FCOs and they are more widely dispersed. We have examined various factors which reflect sparcity and applied them to the data set, but have found no improvement to the regression fit.

In the chart above, the r^2 value, a measure of the fit of the data, is 0.77 and we have therefore reviewed additional analysis techniques. We have considered using a reduced data set by removing outliers, but the spread of the data points is such that there are no clear data points for exclusion. Instead, we have carried out a bottom-up analysis to test whether the upper quartile unit cost is reasonable.

Bottom up analysis

The bottom-up cost analysis is described in Appendix 3.

Assuming that meterwork is retained, a unit cost of £43.6/PRE was obtained from the bottom-up analysis.

The GDNs have explained that competitive pressures may mean that they will lose some or all of their metering contracts, and this will increase the unproductive time of FCOs and therefore increase the costs of the emergency service. The cost impacts of a loss of meter work are discussed in Appendix 3. The impact of the loss of meterwork on our cost projections is considered as a specific cost in section 4.4.4.

Unit cost analysis

The benchmark costs obtained in this section are for meterwork being carried out by GDNs at the level pertaining in 2005/06.

The following table compares the unit costs obtained from the different analyses. The upper quartile unit cost is the cost for North West obtained from the regression analysis divided by the number of PREs in 2005/06.

Unit Cost (£/PRE)	2005/06
North West	71.1
Upper Quartile	66.5
Bottom up analysis	43.6

Table 4-4

This analysis suggests that North West's emergency costs are above the upper quartile level from the regression analysis and above the bottom-up assessment of unit costs.

4.4 FORECAST

4.4.1 INTRODUCTION

In this Section the Network's forecast for workload and costs are reviewed and proposed changes (and the reasons for them) are described. The benchmark analysis and a gap closure approach are used to derive the recommended allowances for the Network.

The impact of real price increases and specific additional costs (e.g. additional waiting time as a result of losing meterwork) are subsequently considered and, where appropriate, added to the recommended allowances.

4.4.2 COMPANY PROPOSALS

The following graph shows North West's forecasts of emergency service workload over the period 2006/07 to 2012/13.

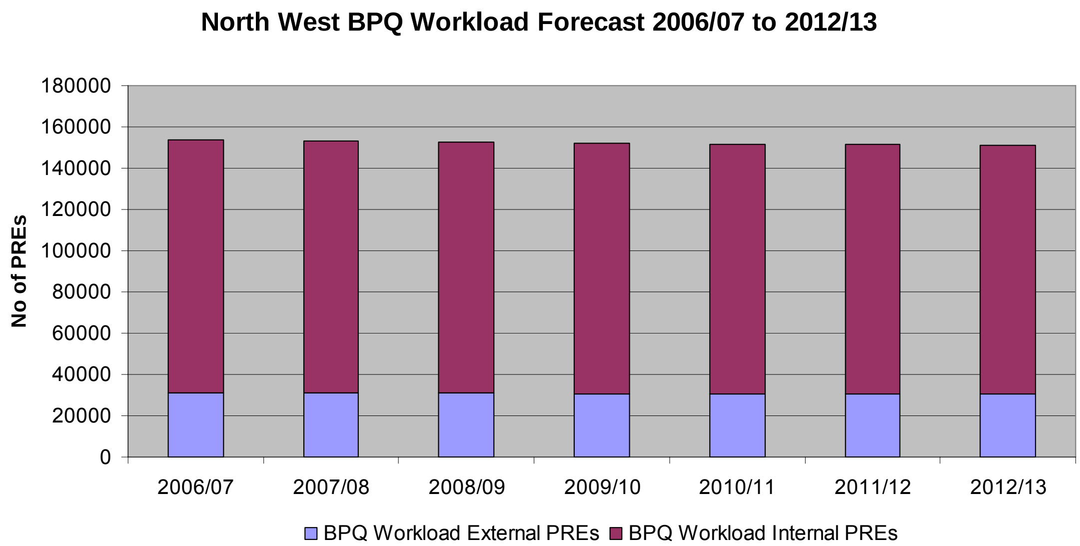

Figure 4-7

North West is forecasting a decreasing trend in both internal and external PREs.

The details are shown in the following table together with the figures for the average across all GDNs for comparison.

	North West	% change on 2005/06	Average GDN	% change on 2005/06
Internal PREs				
2005/06	122842	N/A	116823	N/A
2008/09	121849	-0.81%	117732	0.78%
2012/13	120539	-1.87%	118585	1.51%
External PREs				
2005/06	31042	N/A	27129	N/A
2008/09	30791	-0.81%	26741	-1.43%
2012/13	30460	-1.87%	26045	-4.00%
All PREs				
2005/06	153884	N/A	143952	N/A
2008/09	152640	-0.81%	144474	0.36%
2012/13	150999	-1.87%	144631	0.47%

Table 4-5

North West is forecasting annual reductions in workload, whereas across all GDNs total PRE workload is forecast to show a small overall increase over the period to 2012/13.

The following figure shows North West's forecast costs for the period 2006/07 to 2012/13. It shows that the forecasts are increasing over the period, despite significant reductions in workload forecast.

North West BPQ Controllable Emergency Opex by Category 2006/07 to 2012/13

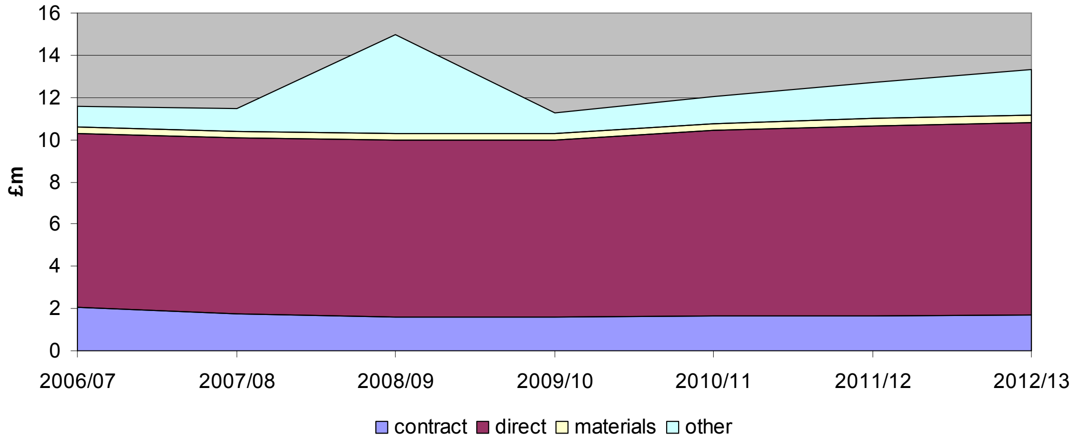

Figure 4-8

4.4.3 <u>PROPOSED PROJECTIONS</u>

This section contains our assumptions, proposed workload and cost trends and reasons for any adjustments to the Networks proposals.

Internal PREs

Network projections for Internal PRE workload range from slightly increasing through level to slightly reducing trends.

Networks have expressed the view that increasing housing stocks and additional public concern about CO risks have the potential to generate additional Internal PREs. No evidence (other than anecdotal) has been found in the BPQ submissions to enable these factors to be quantified. However about 200,000 new houses are built each year nationally and with a national housing stock around 25 million houses this amounts to an increase of approximately 0.8%/yr. On this basis internal PREs might be expected to increase by the same amount. In addition there are two other factors which tend to drive up the volume of Internal PREs. These are the ageing of internal pipe work and of appliances in existing houses and increasing public concern about the risk of CO poisoning. In practice it is very difficult to predict Internal PRE trends but historically numbers in the Network have been falling. Consequently a neutral stance has been adopted. Our assumption is that the level of Internal PREs will remain constant throughout the plan.

External PREs

Although no precise relationship between the level of External PREs and mains replacement activity has been found in the BPQ submissions, it is assumed that replacing old iron pipe systems with new PE systems will reduce External PREs.

The following graph shows that there is a reasonable relationship between the number of repairs and the km of non-PE main, and that the falling number of repairs as the volume of PE main increases will also be expressed through a falling number of external PREs.

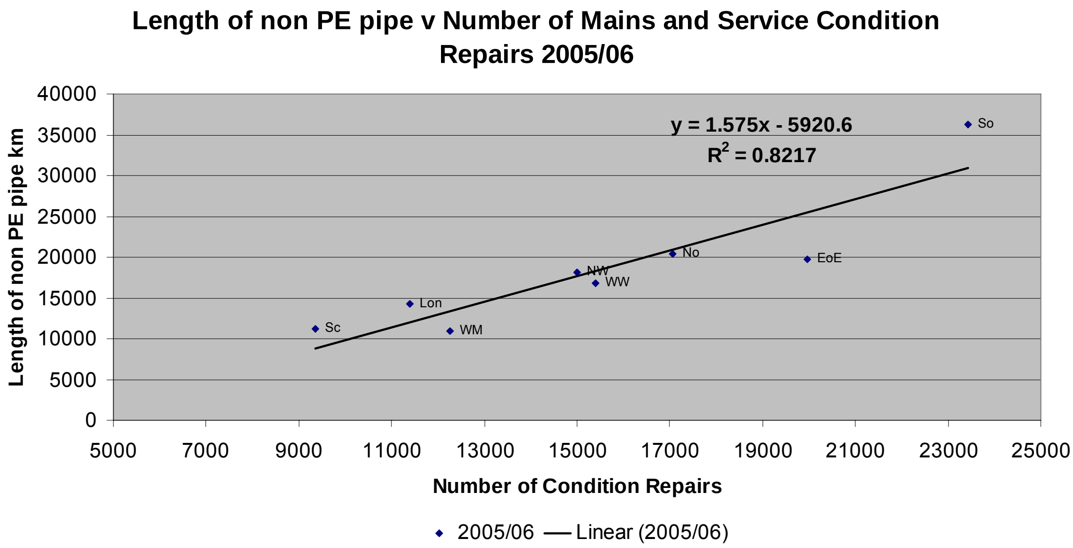

Figure 4-9

External PREs can arise because of the condition of the main or service, interference damage, and in a significant proportion of cases no gas escape is found.

Based on the historical experience of GDNs, the following assumptions have been made regarding the proportion of external PREs by cause in 2005/06.

External PREs	Percentage of PREs
Condition	66%
Interference damage	12%
No-trace	22%
Total	100%

Table 4-6

We have assumed that the mains replacement programme will remove 4.0% per annum of the iron system and that this will remove 3.0% per annum of the condition based External PREs. We have also assumed that the proportion of External PREs that arise from Interference Damage will reduce by 1% per annum and that the proportion of External PREs that cannot be traced (No-Traces) remains constant.

The overall impact will be to reduce total External PREs by 2.1% per annum throughout the plan period.

Asset ageing may affect the level of external PREs. Where pipes are in corrosive environments, typically clay, then the corrosion process will continue to generate escapes. Pipes in environments that have changed considerably since they were installed can experience additional strain from increasing traffic volumes and axle weights leading to pipe movement and ultimately joint leakage or fracture. We have assumed that appropriate levels of gas conditioning will continue so as to mitigate joint leakage. We do not consider ageing to be a significant factor affecting changes in PREs, but recommend that the impact of these effects on the trend in external PRE numbers is re-examined as part of the 2006/07 update..

The following table summarises our workload assumptions and their impact on the total PRE workload.

	PB Power proposed workloads	% change on 2005/06
Internal PREs		
2005/06	122842	N/A
2008/09	122842	0.00%
2012/13	122842	0.00%
External PREs		
2005/06	31042	N/A
2008/09	29127	-6.17%
2012/13	26756	-13.81%
All PREs		
2005/06	153884	N/A
2008/09	151969	-1.24%
2012/13	149598	-2.78%

Table 4-7

The following graph shows our workload assumptions for each year.

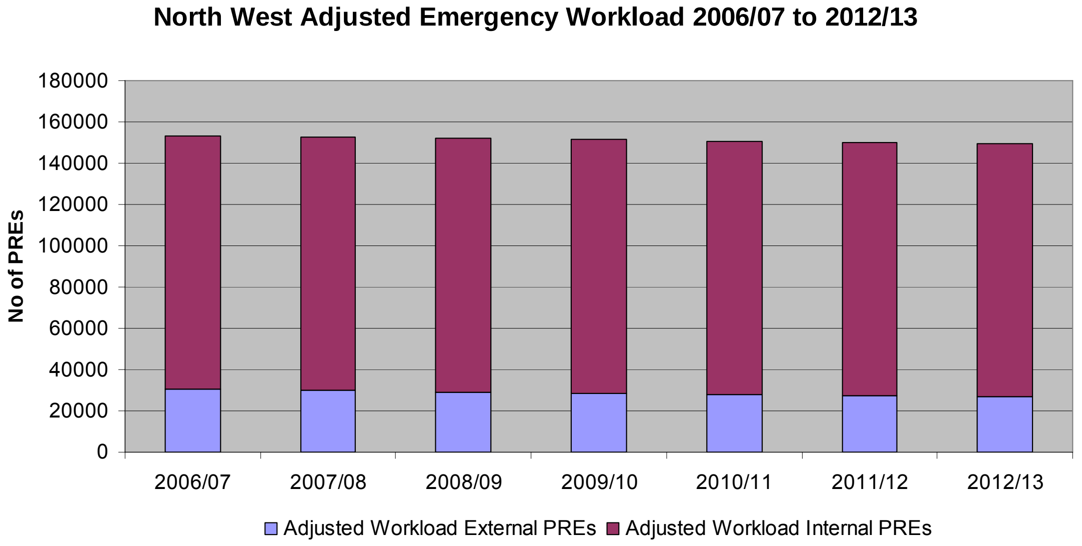

Figure 4-10

Figure 4-10 shows the gradually reducing trend in total PREs, largely as a result of the impact of the Networks mains replacement programme on External PREs.

4.4.3.1 PB Power Costs Projections

Applying the upper quartile unit costs (Table 4-4) to the workload projections shown in Figure 4-10 gives the recommended operating expenditure allowance shown in Figure 4.11. This assumes no loss of meterwork throughout the plan period.

In making these projections we have assumed that management initiatives (e.g. better incentive schemes and smarter ways of working) should produce productivity gains above those assumed by the Network. These will result in reduced working hours for direct labour and in a reduction in the number of contract labour operatives employed.

Overall this is included in our projections as an assumed productivity improvement of 1% per annum.

The implications of the potential loss of meterwork are considered in section 4.4.4.

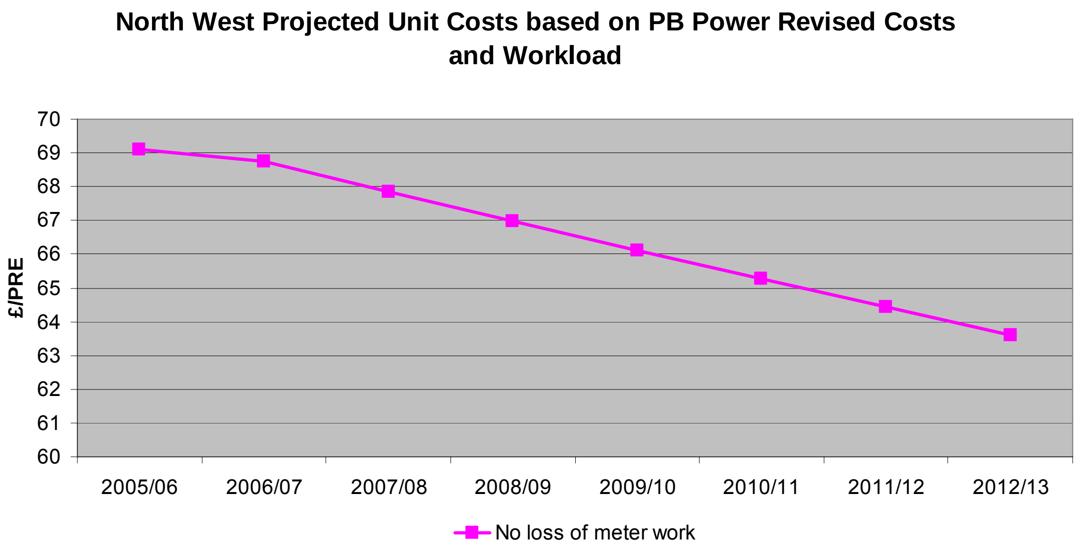

Figure 4-11

4.4.4 SPECIFIC COST AREAS

Loss of meterwork

To meet its PRE standards of service the Network has to deploy sufficient FCOs to deal with peak workload levels. Emergency workload tends to peak in the morning and evening, leaving potentially unproductive time (i.e. waiting time) in the middle of the day. During this time FCOs are utilised for meterwork and other maintenance work. Meterwork is available via contracts with third party meter asset owners such as Onstream and NGG Metering.

Some GDNs have explained that their cost structures, which are driven by the requirement to meet the emergency service standards of performance, will mean that they will be unable compete with new dedicated meter replacement companies and so will lose their meterwork contracts.

Taking into account that emergency workload is unpredictable and subject to both seasonal and within day variations, NGG says that it maximises the productivity of emergency employees by providing alternative planned work such as cathodic protection surveys, post emergency meterwork (for other GT's), leakage surveys, LP regulator checks and GSMR surveys.

However, NGG says that the majority of fill-in work is at present meter work and that the development of competition in metering and new technology will result in a significant reduction in its workload in this area. NGG say the effect on emergency costs will be mitigated up until 2008/09 by releasing contractors.

For North West, NGG is predicting that its meter workload will reduce to about 25% of its 2005/06 level by 2009/10, and that consequently, the costs of its emergency activity will increase. North West' BPQ includes costs which start to reflect the loss of meterwork from 2008/09, and increase to £0.3m pa by 2012/13.

We believe that generally a proportion of meter contracts will be lost and that this will increase the cost of the emergency service as discussed in Appendix 3.

In Appendix 3 we propose that the networks will retain, as a minimum, 33% of the 2005/06 meter workload and our assumption for cost projection purposes is that 45% of the 2005/06 meterwork will be retained across the period 2008/09 to 2012/13. We recognise that different market conditions will apply in different GDN areas, but we are not in a position to assess these conditions and have therefore applied this percentage of retained meter workload on a common basis across all GDNs.

Based on our calculations in Appendix 3, the loss of metering could increase the benchmark unit cost by £5.4/PRE. We have applied this as an allowed adjustment after calculating the recommended costs which assume that the 2005/06 volumes of meterwork are retained.

The following table shows the allowed cost for North West for the loss of meterwork.

	2008/09	2009/10	2010/11	2011/12	2012/13
PRE workload	151969	151357	150759	150172	149598
Cost of Meterwork loss £m	0.8	0.8	0.8	0.8	0.8

Table 4-8

Early Retirement Policy

We have considered the Network's proposal but have concluded that a business case for early retirement should not rely on specific additional funding. If the business case is sound on that basis then the Network is at liberty to introduce the policy but we have made no allowance for these costs in our forecast.

4.4.5 REAL PRICE INCREASES

Section 2.7 of this report sets out the real price effects assumed by NGG in their BPQ proposals and also the real price effects proposed by PB Power.

The Network costs have been normalised by adjustments to remove the Network real price effects and the PB Power real price effect assumptions have subsequently been added in as part of the process used to derive the recommended allowances.

4.4.6 RECOMMENDATIONS

Proposed allowances

The proposed workloads and allowances are shown in the following table.

	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**13.0**	**9.2**	**9.8**	**10.5**	**11.0**
Normalised Adjustments	**-1.9**	**1.8**	**1.5**	**1.0**	**0.5**
Normalised Submission	**11.1**	**11.0**	**11.3**	**11.4**	**11.5**
Composite Regression Driver	**1.030**	**1.021**	**1.013**	**1.005**	**0.997**
Benchmark (Ex RF RPE)	9.6	9.4	9.2	9.0	8.8
Baseline (Ex RF RPE)	10.3	10.1	9.9	9.7	9.5
Gap	0.7	0.7	0.6	0.6	0.6
Convergence	0.5	0.4	0.3	0.3	0.2
Recommended (Ex RF and RPE)	10.1	9.8	9.6	9.3	9.0
Recommended (Inc RF and RPE)	10.2	10.0	9.8	9.7	9.5
Allowed Adjustments	0.8	0.8	0.8	0.8	0.8
Recommended (Inc RPE)	**11.0**	**10.8**	**10.7**	**10.5**	**10.3**

Table 4-9

This table and Figure 4-12 shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- For each year in the period 2008/09 to 2012/13, the values of the workload driver and the benchmark unit cost are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The GDNs are not expected to close any gap immediately. The convergence adjustment provides a glide path of cost to the Benchmark performance. The gap is reduced to 30% in 2012/13.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommended cost (Inc RPE).

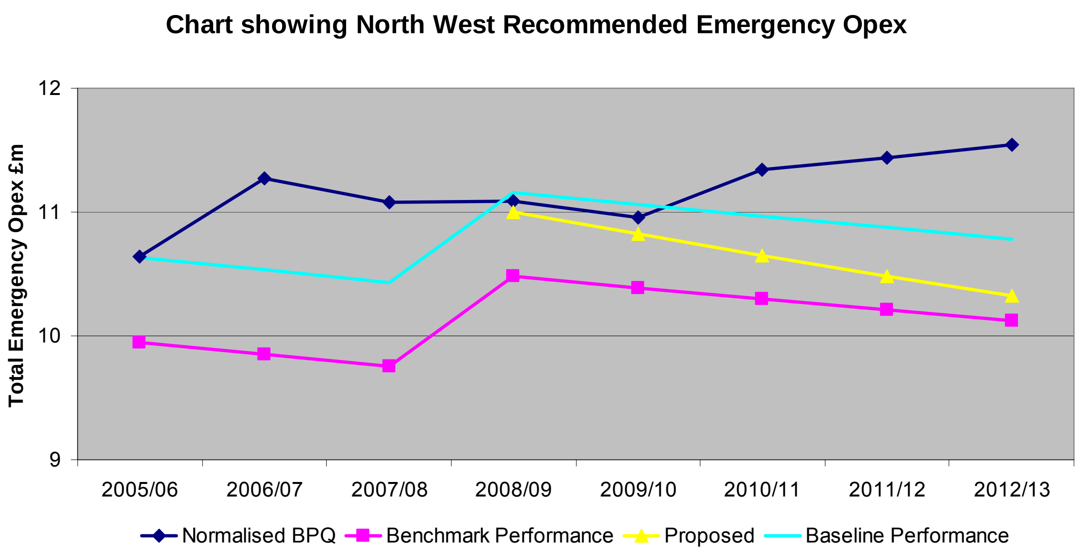

Figure 4-12

Note: the Benchmark and Baseline Performance lines include Adjustments

5 REPAIR

5.1 SUMMARY

Net Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission						
Repairs	10.7	10.8	10.9	10.9	11.4	**54.7**
Total	**10.7**	**10.8**	**10.9**	**10.9**	**11.4**	**54.7**
Normalisation Adjustments						
Adjustments	-0.2	-0.2	-0.2	-0.2	-0.1	**-0.8**
Removed Costs	-0.7	-0.9	-1.0	-0.9	-1.6	**-5.1**
Total	**-0.9**	**-1.1**	**-1.2**	**-1.1**	**-1.7**	**-5.9**
Normalised BPQ						
Repairs	9.8	9.8	9.7	9.8	9.7	**48.8**
Total	**9.8**	**9.8**	**9.7**	**9.8**	**9.7**	**48.8**
Adjustments						
Allowed Costs	0.0	0.0	0.0	0.0	0.0	**0.0**
Workload Adjustment	-0.4	-0.5	-0.6	-0.8	-0.9	**-3.2**
Efficiency Adjustments	-0.3	-0.3	-0.3	-0.4	-0.4	**-1.8**
Total	**-0.7**	**-0.8**	**-1.0**	**-1.2**	**-1.3**	**-5.0**
Proposed						
Repairs	9.1	8.9	8.8	8.6	8.4	43.8
Total Net	**9.1**	**8.9**	**8.8**	**8.6**	**8.4**	**43.8**

Table 5-1

5.2 POLICIES & PROCEDURES

North West policy T/PL/EM1, Policy for Dealing with Escapes and other Emergencies, covers the management of actual and suspected gas escapes and other emergencies. These include the emission of fumes from gas appliances, fires or explosions where gas is thought to be the cause, and loss of supply. Procedure T/PR/EM/74 covers work procedures for locating and repairing gas escapes on the network and T/PR/LC/22 describes the approved methods of repair for mains, services and risers.

Appendix 1 reviews the financial and technical framework under which the Network operates, the structure it utilises to manage its assets effectively and the key policies it adopts to ensure it meets its statutory and licence obligations and other regulatory requirements.

The T/PL/EM1 policy is applicable to the Network's obligations as a Gas Transporter, an Emergency Service Provider and the Network Emergency Co-ordinator. It also applies in instances where the Network has entered into commercial arrangements to operate as an Emergency Service Provider for a third party e.g. another Gas Transporter.

The cost of implementing this policy is influenced by obligations under the Gas Safety (Management) Regulations which state "...where any gas escapes from a network the person conveying gas in the part of the network from which the gas has escaped shall, as soon as is reasonably practicable after being so informed of the escape, attend the place where the gas is escaping, and within 12 hours of being so informed of the escape, he shall prevent the gas escaping". In practice the Network undertakes risk assessments and when appropriate re-programmes to prioritise the work, minimise nuisance and improve efficiency. If the Network is tasked with increasing the proportion of repairs currently being completed within 12 hours this would have adverse cost implications.

5.3 HISTORICAL PERFORMANCE

5.3.1 INTRODUCTION

The requirement to undertake repairs in response to Public Reported Escapes (PREs) is fundamental to the safe operation of the Network. The repair process, in common with Emergency, operates 24 hours a day & 365 days a year although most of the work is within normal working hours. Whilst safety is the always the primary concern, the managers of the process must also concern themselves with the prioritisation of the repairs, ensuring that they have adequate resources and that these are efficiently employed. Matching the available resource with the workload is a key factor in the efficiency of the process. Over-resourcing will achieve prompt repairs, but at the risk of the teams being under-employed should the workload decline. Under-resourcing will delay repairs and generate additional site monitoring costs where permanent repair is pending. In addition to this key relationship, managers will be monitoring a range of other issues; team availability for the next urgent repair, the type and quality of the repairs made, highway occupation and maintenance of road-signs, barriers and lamps around excavations, over-long working hours and customer issues such as access, and disconnection where a service pipe is found to be leaking.

5.3.2 DEFINITION OF ACTIVITY

The Repair activity is the process set up to repair gas escapes from gas distribution assets[3] upstream of (and including) the emergency control valve. The activity is distinct from Emergency, which provides the first response to a PRE and which is focused primarily on safety, with investigation and monitoring as important, but secondary activities. In some cases, usually service escapes, replacement, rather than repair is the preferred option and the Repair activity stops at the point when the gas escape is stopped and the site made safe.

The total number of repairs is split into four categories:

Mains – condition

Mains - interference repairs

Services – condition

Services - interference repairs

Condition repairs typically arise as a result of pipe corrosion or leaking joints and interference repairs arise as a result of damage to the Network's assets caused by third party activities usually in the course of street-works by other utilities.

Workload details are reported in section C18 of the Network BPQ workbook and repair costs reported in section B1 of the Financial and Opex tables.

[3] Mains, services and associated equipment operating at pressures up to 7bar.

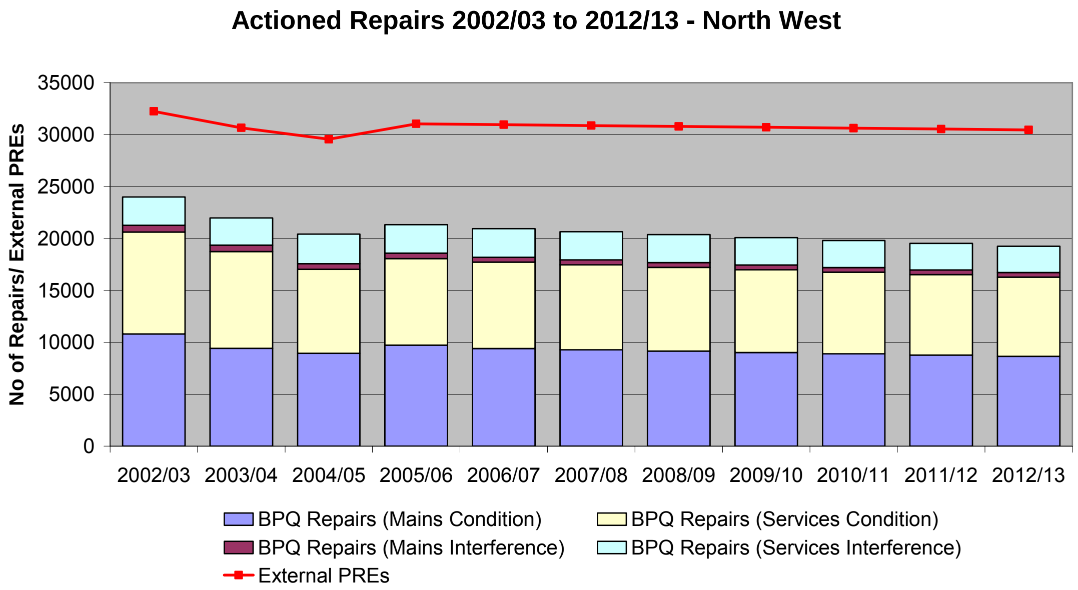

Figure 5-1

External PRE - workload

External PREs are a sub-set of the uncontrolled PREs described in section 4.3.2 above. Almost all confirmed external PREs are escapes upstream of the emergency control valve, and not able to be isolated by closing a valve.

Two successive annual declines in workload are followed by an increase in 2005/06. Volumes will vary in response to external factors as these PREs are weather sensitive and a cold winter will generate higher levels of reports through raised pressures. Ground movement from drying, or frost heave, will also increase the number of PREs as will public awareness following an incident. Not all PREs result in a repair and approximately one quarter are classified as “no escape found”

Repairs - workload

Generally, the number of repairs can be expected to follow the number of confirmed external PREs (total external PREs less those where no escape is found) although this is partially offset by sites where it is necessary to repair more than one escape. For example, in some instances more than one mains joint repair may be required to clear the site of gas.

Condition Repairs

Condition repairs to mains and services form the major workload. Typically repairs are to the metallic (cast iron, spun iron, ductile iron mains and steel mains and services) parts of the system with mains joints and fractures, and corroded steel services being the most common types of failure.

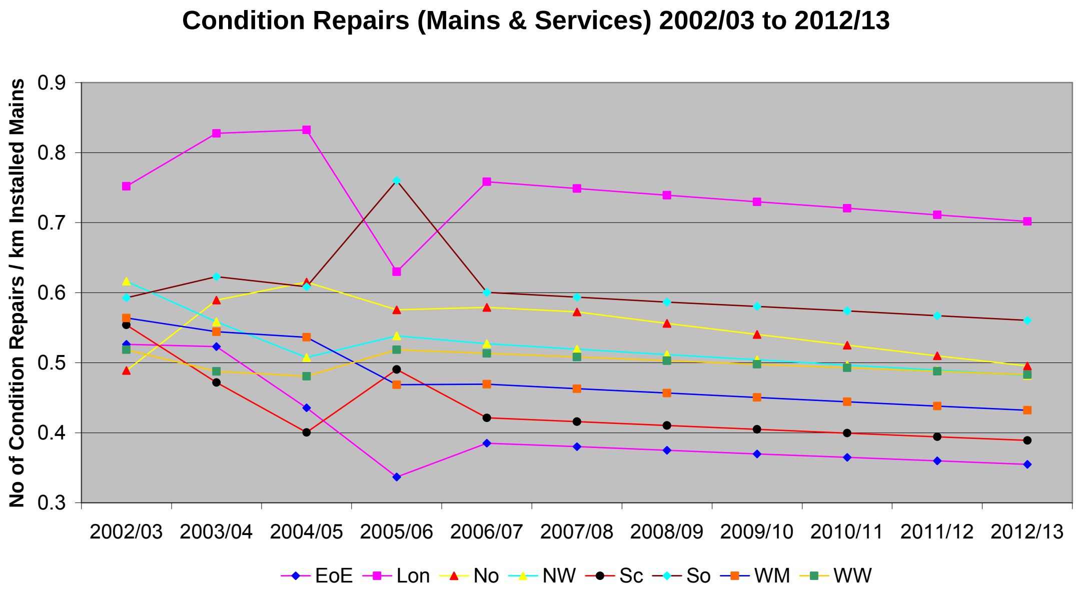

Figure 5-2

The chart shows that repairs/km of main in service is trending downwards in all Networks. The effect of the replacement programme[4] is significant and the chart below shows how the proportion of iron and steel (non-PE) mains is falling as de-commissioning reaches (in 2007/08 for most Networks) the level to be maintained over the next 25 years.

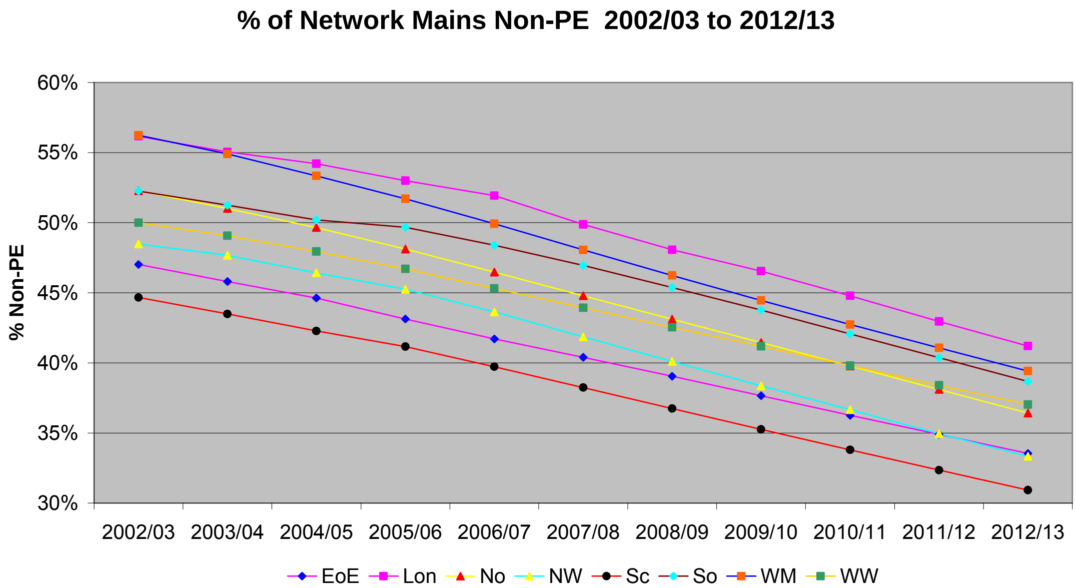

Figure 5-3

Average system pressure has been maintained at a relatively low level within the Network; a contributory factor to the level of external PREs and condition repairs.

[4] See Section 8 of our report on Capex and Repex

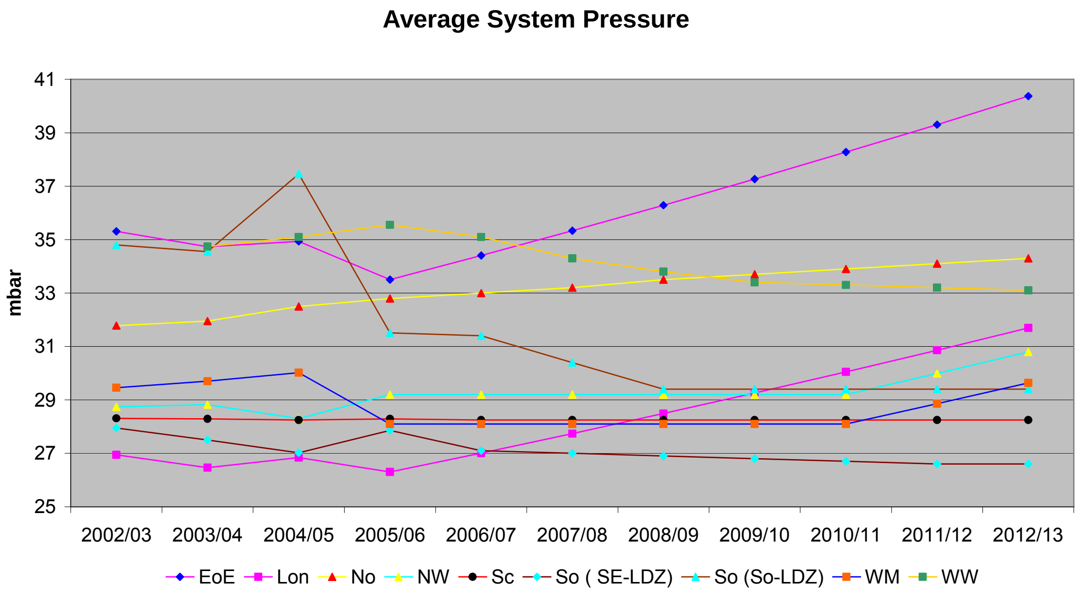

Figure 5-4

Interference Repairs

Interference repairs form about 15% of the repair workload, the majority of repairs being to services which are shallower and have less mechanical strength than mains.

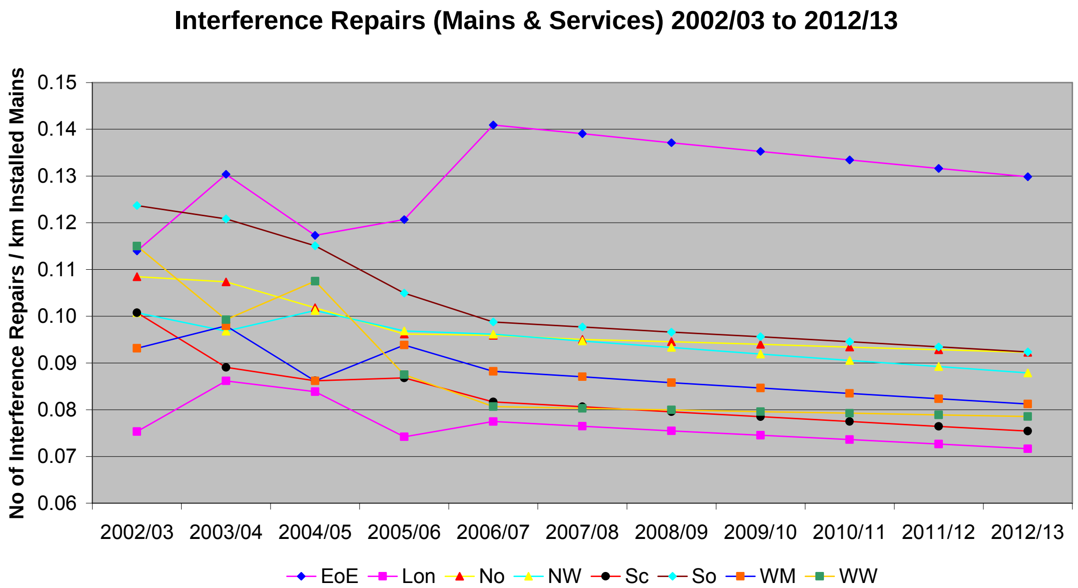

Figure 5-5

The Network reports a mid-range level of interference damage. A further downward trend can be achieved by communicating with those most likely to cause damage: other utilities and their contractors, highway authorities, builders and developers etc. all of which are required to employ safe systems of work and to identify damage to underground plant as a potential hazard. The accuracy of records supplied and attendance on site will help to maintain a downwards trend.

5.3.3 APPROACH TO THE ASSESSMENT OF EFFICIENCY

In assessing the efficiency of investment (2005/06 onwards) we have examined the Network's 2005/06 costs and compared these with the seven other Networks taking into account, as far as is possible, differences such as numbers of mains and services repairs, the proportions of direct and contract labour, and regional cost differences as derived from indices published by BCIS (The Building Cost Information Service a subsidiary of the Royal Institution of Chartered Surveyors) and DTI – Annual Survey of Hours and Earnings (ASHE).

We have chosen a regression approach as it avoids the direct comparison of unit costs for different disaggregated cost categories, which we regard as unreliable given differences in cost allocation at a disaggregated level. This enables us to compare the Networks' costs and efficiency on a consistent basis

As discussed in section 2, the starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2005/06). The regression calculation determines a relationship between the costs and the workload driver. The regression line is shown in black on the graphs. As discussed in section 2 we have then adjusted the regression line to give the upper quartile regression line which is the target which all under performing GDNs should move towards. This is shown in pink on the charts.

High performing networks will be expected to continue to improve their performance over the period to 2012/13. The resulting target costs for 2012/13 are shown in yellow on the charts.

A number of regression options have been explored in analysing repair costs, including a number of different explanatory variables.

Repairs comprise four main work elements:

mains condition repairs

services condition repairs

mains interference repairs

services interference repairs.

The workloads for each of these elements have different forecast trends in each of the networks. We have therefore constructed an explanatory variable which is a composite single variable (CSV) based on the proportion of costs attributable to each of these elements in the base year, as the basis for our cost analysis.

$CSV = \sum U_n * V_n / 1000$

where U is the representational unit costs for the each repair types/pipe size and

V is the corresponding actual volumes.

The same representative unit costs have been used each Network and have been chosen by reference to contract rates for the four repair types; these are shown in the table below.

CSV Calculation (North West 2005/06)	Volume (Repairs)	Unit Cost (£/Repair)	Total (£000s)
Repairs to Mains (Condition </=3")	858	554	475
Repairs to Mains (Condition 4-5")	4172	595	2481
Repairs to Mains (Condition 6-7")	2068	688	1422
Repairs to Mains (Condition 8-9")	904	1130	1021
Repairs to Mains (Condition 10-12")	896	1130	1012
Repairs to Mains (Condition >12-18")	582	1856	1081
Repairs to Mains (Condition >18-24")	193	1889	364
Repairs to Mains (Condition >24")	50	3846	192
Repairs to Mains (Interference)	506	326	165
Repairs to Services (Condition)	8352	250	2088
Repairs to Services (Interference)	2745	202	553
CSV			10853

Table 5-2

5.3.4 <u>ESTABLISH UNDERLYING COSTS</u>

Cost normalisation

Section 2.5.1 gives details of the generic normalisation adjustments which have been carried out. For Repairs, the principal normalisation adjustments are outlined below.

- **Cost transfer** – there are no cost transfers associated with Repair
- **GDN reallocation** – the outcome of reallocation process in which NGG identified the changes to the allocation of costs to reflect our proposed allocation of sub-activities[5].
- **Accounting adjustments** – which have been provided by Ofgem
- **Pensions adjustments** – these adjustments are the net adjustments between NGG's reported pension costs and the standard pension costs used by PB Power
- **Removed costs** – special costs associated with early retirement and waste management have been removed prior to the comparative analysis, more detail is provided later at Section 5.4.4

The detail of the adjustments to the BPQ costs submitted by the Network is given in the following table.

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDN reallocation	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Ofgem Accounting Adjustments	-0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4
Pension Adjustments	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-1.9
Removed costs	0.0	0.0	-0.6	-0.7	-0.9	-1.0	-0.9	-1.6	-5.7
Early Retirement	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1	-0.8	
Waste management	0.0	0.0	-0.6	-0.7	-0.7	-0.8	-0.8	-0.8	
Total	**-0.6**	**-0.2**	**-0.8**	**-0.9**	**-1.1**	**-1.2**	**-1.1**	**-1.7**	**-7.5**

Table 5-3

[5] Full details of the GDN reallocation are given in Appendix 6

Historical costs

The table below shows a split of repair costs by expense type over the three years 2004/05 – 2006/07.

Expenditure Breakdown £ m 2005/06 Prices	2004/05	2005/06	2006/07
Contract	2.1	4.8	4.5
Direct	4.6	4.6	5.1
Materials	0.8	0.8	0.8
Other	0.5	0.8	0.9
Gross Cost	7.9	11.0	11.3
Income	-0.6	-0.8	-0.8
Net Cost	7.3	10.2	10.5

Table 5-4

Changes in cost over the three years to 2006/07 look out of proportion to the changes in reported workload (Figure 5-1) although the cost/workload relationship is influenced by the work mix, in particular the diameter of mains repaired and their location in verge, footway or carriageway. The cost of the Repair activity can also be influenced by peaks in workload and subsequent deferral of repairs. This enables the Network to re-schedule the work required to complete repairs but means that they incur monitoring costs in the interim.

5.3.5 TABLE OF ADJUSTMENTS TO THE BASE YEAR (2005/06)

We have carefully examined the base year volumes and costs since it is this year that establishes the relative position of the Network and the potential efficiency savings available.

Base Year (2005/06) Assumptions and Adjustments

Repairs Volumes (2005/06)	BPQ Submission
Repairs to mains (condition)	9722
Repairs to mains (interference)	506
Repairs to services (condition)	8352
Repairs to services (interference)	2745
Total	21325

Table 5-5

The number of repairs recorded (Figure 5-1) was slightly more than in the preceding year but we have made no adjustment to 2005/06 volumes.

Base Year (2005/06) Assumptions and Adjustments

Expense Categories £m	BPQ	Normalised
Contract	4.8	4.8
Direct	4.6	4.5
Materials	0.8	0.6
Other	0.8	0.6
Gross Cost	11.0	10.4
Income	-0.8	-0.8
Net Cost	10.2	9.6

Table 5-6

Normalisation adjustments are detailed in Table 5-3 above.

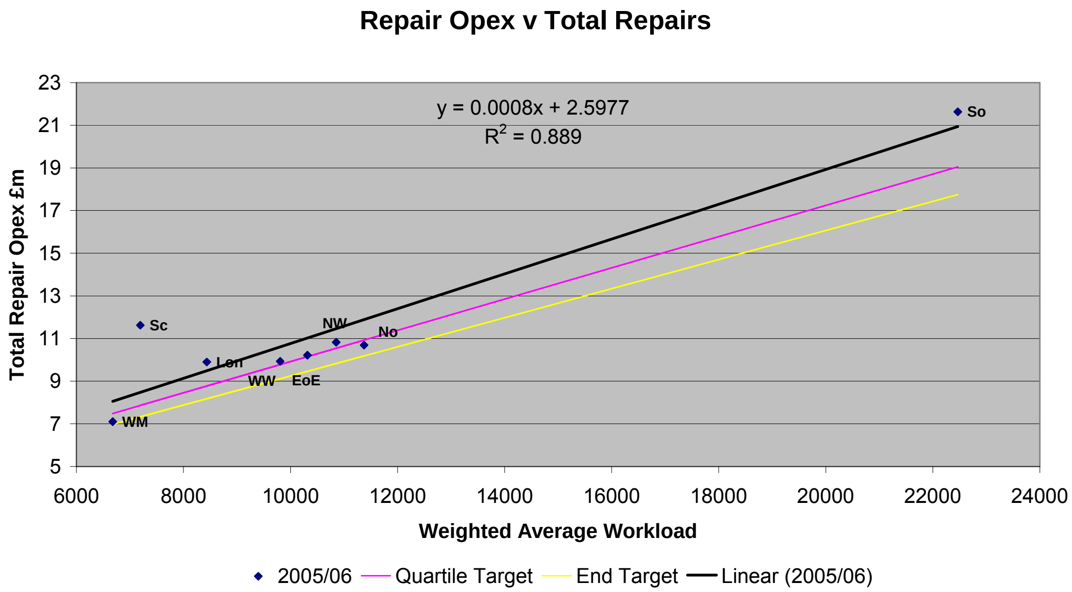

Figure 5-6

In the chart above (2005/06) North West is just behind the upper quartile and is the fifth most efficient Network.

5.4 FORECAST

5.4.1 INTRODUCTION

We have reviewed the process used by the Network to generate its forecast. We found that the Network takes into consideration relevant factors that influence the forecast; the change in population (and thus repairs) arising from its mains and services replacement programmes and ageing of the remaining population, the effect of gas conditioning, the effect of pressure management systems, average system pressure and the overall level of emissions from the network.

Overall we found the Network's forecasting process to be reasonable but we have made some adjustments after reviewing the Network's assumptions.

5.4.2 NETWORK PROPOSALS

The Network forecast is generated in four work categories – mains and services; condition and interference repairs.

Workload Assumptions

The network has assumed that the Repair workload will reduce by 1.4% per annum in each of the four categories.

Costs Assumptions

Company workload and cost trend lines as proposed by GDN for 2006/07 to 2012/13

GDN Proposed Volumes	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Repairs to mains (condition)	9408	9277	9148	9021	8895	8771	8649
Repairs to mains (interference)	478	471	465	458	452	446	439
Repairs to services (condition)	8305	8189	8076	7963	7852	7743	7635
Repairs to services (interference)	2752	2714	2676	2639	2602	2566	2530
Total	20943	20651	20365	20081	19801	19526	19253

Table 5-7

GDN cost projections 2006/07 – 2012/13

GDN Proposals £ m 2005/06 Prices	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Contract	4.5	4.5	4.5	4.4	4.5	4.5	4.5
Direct	5.1	4.9	4.7	4.6	4.7	4.6	4.6
Materials	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Other	0.9	1.5	1.5	1.7	1.7	1.7	2.3
Gross Cost	11.3	11.6	11.4	11.5	11.6	11.6	12.1
Income	-0.8	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Net Cost	10.5	10.9	10.7	10.8	10.9	10.9	11.4

Table 5-8

5.4.3 PB POWER PROJECTIONS

Proposed Workloads

Condition Repairs

We have carefully considered the likely level of condition repairs and compared this with other Networks, taking into account influencing factors such as the mains population, forecast average system pressure and emissions.

The Network's forecast is that condition repairs will fall by approximately 1.4% per year despite the effect of the mains replacement programme that will be removing approximately 4% of the metallic network each year. Taking into account that all components of the network are ageing, that some condition repairs are to the PE part of the network, and a modest increase in average system pressure, we have assumed a 3% year on year reduction in condition repairs.

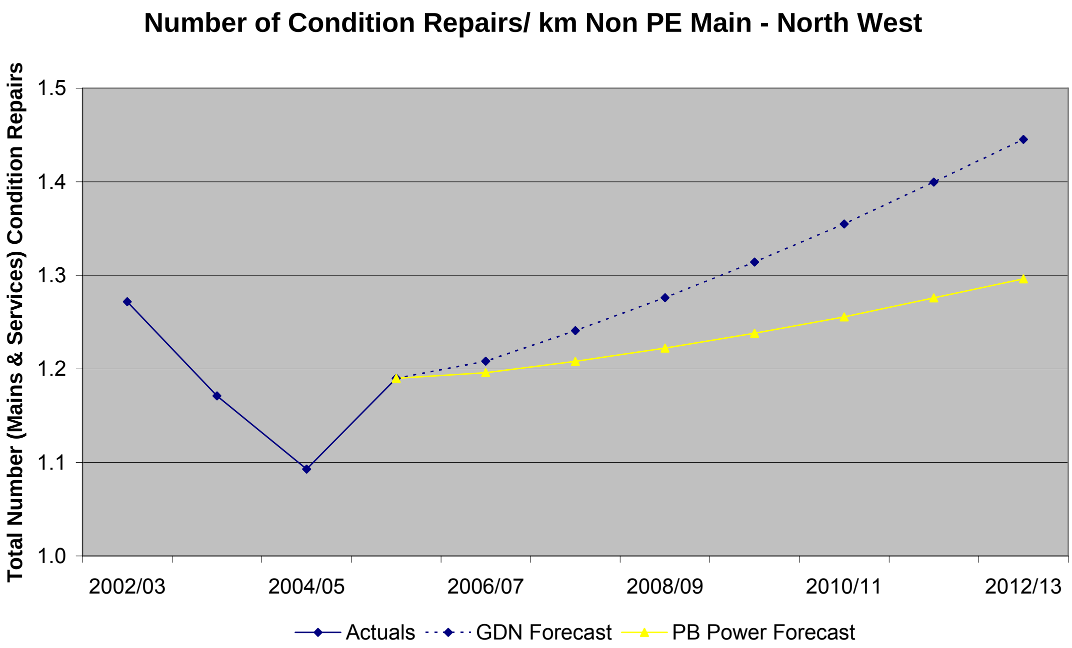

Figure 5-7

<u>Interference Repairs</u>

The Network has forecast a reduction in interference repairs to mains and services of 1.4 per year.

Interference repairs are driven by the amount of construction activity within the Network, but this can be influenced through improved and focussed communication with those undertaking the work. We think a 1.4% per annum improvement to mains and services repairs is realistic and achievable and we accept the Network's forecast.

Adjusted GDN volumes 2006/07 – 2012/13

PB Power Forecast Repair Volumes	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Repairs to mains (condition)	9430	9147	8873	8607	8349	8098	7855
Repairs to mains (interference)	478	471	465	458	452	446	439
Repairs to services (condition)	8101	7858	7623	7394	7172	6957	6748
Repairs to services (interference)	2752	2714	2676	2639	2602	2566	2530
Total	20762	20191	19637	19098	18575	18067	17572

Table 5-9

Proposed Costs

In section 5.3.3 above we explained how we established the relative position of each Network, the upper quartile and the Network with the lowest unit costs overall.

We expect Networks behind the upper quartile to improve and close the gap and we have set the Network the target of closing 70% of the cost gap to the upper quartile over the five years to 2012/13.

Networks that are underperforming relative to the benchmark will be expected to catch up with benchmark costs over the period and achieve some ongoing improvement. Networks that are outperforming are assumed to get an initial reward for outperformance but will be expected to achieve ongoing improvement over time. We have assumed a 1% per annum ongoing efficiency improvement.

On-going efficiency improvements

As part of our review we have considered how these efficiencies may be achieved.

The Network is able to influence the workload through measures such as improved pressure management and gas conditioning. The repair process itself is complex and labour intensive and productivity improvements are likely to be achieved by a chain of small initiatives.

We are aware of Network initiatives for:

- Coaching for Excellence - to deliver improvements in performance, quality, standards of service and costs using a structured approach to the management and improvement of performance, with benefits flowing through to unit costs.
- Workout - a mechanism for implementing change in relation to everyday blockages and errors, doing so quickly and typically within 90 days.
- Last Mile Logistics – optimises travel by extending the supply chain to the site.
- Operations Engineer Performance - one-to-one performance discussions with the operative.

And we are also aware of other significant advances that are in day to day use:

- Field force work management system (QB5) - enables data collection in the field, thus reducing hand-offs and the potential for error.
- Escape Decision Tool - facilitates a consistent and compliant approach to the programming of outside gas escapes.
- Vehicle Safety and Security (VeSaS) - improves employee safety and operational fleet management.
- ‘No-dig’ service replacement - minimises disruption to consumers and the public.
- Ground Penetrating Radar - enables the determination of pipeline routes and record validation without excavation.

We believe that through a programme of continuous improvement our recommended expenditure is achievable.

5.4.4 SPECIFIC COST AREAS

Gas Safety (Management) Regulations - Re-programming Repair Work.

We have assumed that there is no change to the Network's practice (2005/06) on re-programming repair work.

Impact of Waste Management Regulations - Landfill Directive & Landfill Tax

The Network will be exposed to cost increases arising directly from the Landfill Regulations and Landfill Taxes. It will also incur other costs to optimise overall expenditure in this area and minimise waste to landfill.

Improved waste segregation will be required to prevent more of its waste being classified under the Landfill Regulations as “non-hazardous” rather than “inert” as at present. The shift from inert to non-hazardous status is primarily driven by the volume of bituminous materials to be disposed of, either directly, or where inert material has become contaminated with bituminous material making the whole of the contaminated waste non-hazardous and subject to higher disposal charges. In addition, the Environment Agency is becoming more active in enforcing the Landfill Regulations and Landfill Operators are becoming more cautious in accepting material as “inert”, causing it to be disposed of as “non-hazardous” at higher cost.

As well as disposal charges, the Landfill Tax charge is currently levied at £2/tonne for inert/inactive waste, with a standard rate of £21/tonne charged for all other waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3[6] annually to a rate of £35 in 2010.

[6] Revised to £8 each year to 2011 in the recent Budget statement.

The Network has included these higher tax costs within its forecast together with associated costs related to the improved segregation of materials and increases in tipping charges.

There is considerable uncertainty around the likely change in disposal and tax charges going forward. Variables are:

- The volume of waste and the proportion of inert and non-hazardous (and small volumes of hazardous) material for disposal.
- The marginal costs of waste segregation and the level, and cost, of recycling achieved.
- The cost of testing to establish the status of waste for disposal.
- The rate of Landfill Tax due on the waste for disposal.

The Landfill Tax charge in our base year was £18/tonne (Standard Rate) and our analysis has made no specific allowance for the proposed increases in subsequent years. Nor has any allowance been made for possible changes in the enforcement of the Landfill Regulations.

We therefore recommend that this is treated as an uncertain cost and that an adjustment is made following further assessment.

Early Retirement Policy

We have considered the Network's proposal but have concluded that a business case for early retirement should not rely on specific additional funding and the proposed costs have been removed from the Network's forecast. If the business case is sound on a non-funded basis then the Network is at liberty to introduce the policy, but we have made no allowance for these costs in our forecast.

5.4.5 REAL PRICE EFFECTS

We consider that real growth in wages and contractor rates will be lower than GDN assumptions. We have assumed RPI +2.25% (contractors) and RPI + 1% (direct labour and materials) each year. This has to be considered in conjunction with our overall productivity assumption for Repair of a 1% year on year gain, making our view more optimistic overall.

5.4.6 RECOMMENDATIONS

The proposed adjustments are shown in the following table.

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission (Gross)	11.4	11.5	11.6	11.6	12.1
Normalised Adjustments	-0.9	-1.1	-1.2	-1.1	-1.7
Normalised Submission (Gross)	10.5	10.5	10.4	10.5	10.4
Regression Driver	9941	9654	9375	9105	8842
Benchmark Performance	9.6	9.3	9.0	8.7	8.5
Baseline Performance	9.8	9.5	9.2	8.9	8.7
Gap	0.2	0.2	0.2	0.2	0.2
Convergence	0.2	0.2	0.1	0.1	0.1
Recommended (Ex RF & RPE)	9.8	9.4	9.1	8.8	8.5
Recommended (Inc RF & RPE)	9.8	9.6	9.4	9.3	9.1
Allowed Adjustments	0.0	0.0	0.0	0.0	0.0
Proposed Gross	9.8	9.6	9.4	9.3	9.1
Proposed Income	-0.7	-0.7	-0.7	-0.7	-0.7
Proposed Net	9.1	8.9	8.8	8.6	8.4

Table 5-10

Recommended Efficient Expenditure

Proposed £m	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Actioned Repairs to mains (condition)	7.3	7.1	7.0	6.8	6.7	34.8
Actioned Repairs to services (condition)	1.9	1.8	1.8	1.8	1.7	9.0
Actioned Repairs to mains (interference)	0.1	0.1	0.1	0.1	0.1	0.7
Actioned Repairs to services (interference)	0.5	0.5	0.5	0.5	0.5	2.6
Gross Total	9.8	9.6	9.4	9.3	9.1	47.2
Income	-0.7	-0.7	-0.7	-0.7	-0.7	-3.4
Net Total	9.1	8.9	8.8	8.6	8.4	43.8

Table 5-11

This table shows the costs reported by the Network in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the workload driver over the period 2008/09 to 2012/13 and the benchmark unit costs which are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the Network's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The GDNs are not expected to close any gap immediately. The convergence adjustment provides a glide path of cost to the Benchmark performance. The gap is reduced to 30% in 2012/13.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommend cost (Inc RPE).

The comparison between the normalised BPQ forecast, the target and recommended expenditure is shown in the following figure:

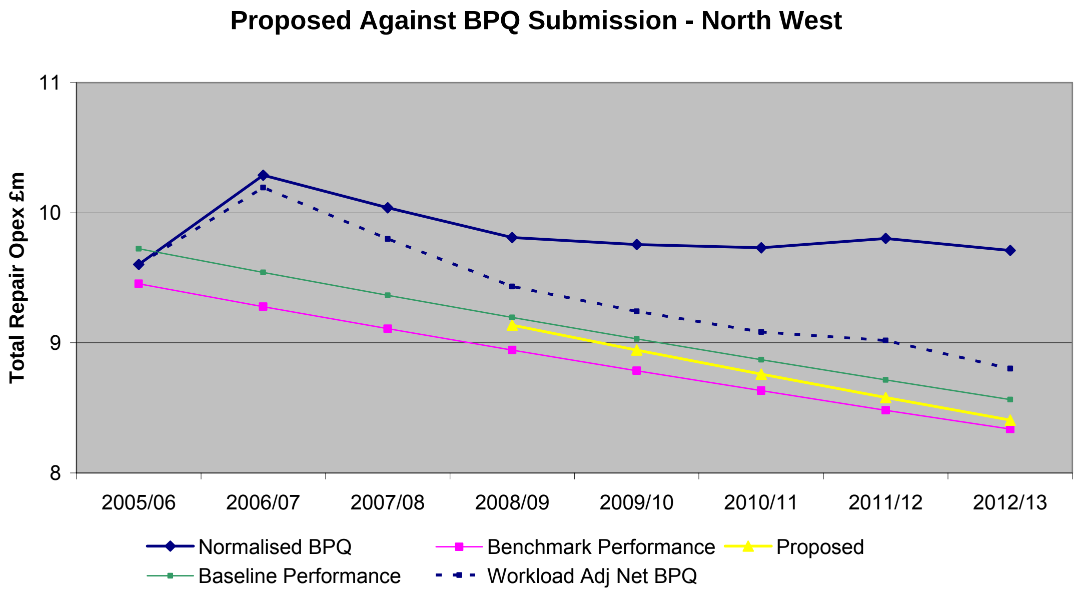

Figure 5-8

Note: the Benchmark and Baseline Performance lines include Adjustments

6 MAINTENANCE

6.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	13.9	13.5	14.4	13.4	14.6	**69.9**
Normalisation Adjustments	-1.7	-0.8	-1.5	-0.4	-0.6	**-5.0**
Normalised BPQ	12.2	12.7	13.0	13.0	14.0	**64.8**
Adjustments	-0.9	-1.9	-2.6	-2.9	-4.6	**-12.9**
Proposed	11.3	10.8	10.4	10.1	9.4	**51.9**

Table 6-1

6.2 POLICIES & PROCEDURES

6.2.1 INTRODUCTION

NGG North West has a clear route of governance by which policies and procedures are formed, approved, and implemented. North West shares common policies and procedures which operate across all NGG Networks. Within the Network Strategy directorate of NGG, the Engineering Policy group identifies the need for new or reviewed documents brought about by legislation, regulations or internal company requirements. Appendix 1 reviews the financial and technical framework under which North West operates, the structure they utilise to manage their assets effectively and the key policies they adopt to ensure they meet their statutory and licence obligations and other regulatory requirements.

This section reviews the various statements made by NGG in support of their planning and decision-making processes, which drives their maintenance expenditure.

Maintenance covers:

- LTS maintenance
- Storage
- Maintenance Other

Governance of policies and procedures for these activities ensures the safe and efficient operation of plant, and safe and efficient maintenance tasks undertaken upon them, by North West network staff, and service providers.

6.2.2 SCOPE OF POLICES AND PROCEDURES

The current suite of policies and procedures used by NGG have been developed over the last 8 years, with some having older origins under the previous Gas Business structure. Their content and scope reflect growing knowledge and experience gained in operating a gas distribution system in the current environment.

6.2.3 REVIEW AND UPDATE PROCESS

NGG's Engineering Policy Committee receives, reviews and approves all new or amended policies and procedures. The Engineering Policy Group manages the production of draft documents, to be reviewed by a peer group, before being submitted for approval. Input to the drafting process may be provided by NGG staff, service providers and specialist consultants. Governance responsibility for all documents is held by NGG. When new documents are approved, briefings and/or detailed training is given to those affected.

Between October 2005 and February 2006, a general editorial update was carried out to all policies and procedures rebranding them from Transco to National Grid. This did not involve a change of guidance or direction to the technical content.

The review and update procedure is discussed in Appendix 1.

NGG documents contain records of their update status, and the minute reference of their approving authority. This provides confirmation of the validity of the current policies and procedures in accordance with the NGG governance process for such documents.

6.2.4 EFFICIENCY AND PRODUCTIVITY

We have not carried out detailed audits of the degree of compliance within North West network to the stated policies and procedures. However, within the Maintenance category, we can say from the evidence offered within the BPQ responses, that there are no indications that the policies and procedures are not being followed. There is no evidence of systematic failures of equipment, which could indicate lack of compliance. Similarly, within safety related statistics, such as lost time accidents, there is no evidence of unsafe practices being employed, which could be used as an indicator of the lack of compliance with documented policies and procedures.

6.3 HISTORICAL PERFORMANCE

6.3.1 INTRODUCTION

We would expect to test historical cost performance against workload data drawn from the company's management information system. This historical performance data could be helpful in developing trends of workload, costs, and unit costs, which could be then used to make comparisons year to year, and also to make comparisons with other GDNs' performance.

We understand that for this activity, historical management and cost information, pre 2005/06 is of limited value due to the reorganisations which have occurred within NGG and its predecessor, Transco. Allocations from the centre for shared services prior to 2005/06 were carried out by mechanisms not reflective of workloads in certain areas.

NGG said that the costs for 2005/06 to 2013/14 had been allocated out to networks based on key driver workloads for each of the departments within Distribution Centre and Shared Services such as supply points, consistent with the agreed allocation methodology for NGG support services.

Therefore, robust year on year and inter-GDN comparisons cannot be carried out for the years prior to 2005/06. The impact of inaccurate allocations of central recharges on a relatively low cost activity (£10m per annum, say) would lead to wide variations.

The historical initiatives and factors influencing forecast costs are the following:

Labour

The use of contract or direct labour to carry out maintenance activities has a significant influence on the costs. We understand that the majority of work undertaken by NGG in this area is carried out by direct labour, with a small exposure to specialist contractors for some communications, instrumentation and electrical maintenance.

Some of the activities within this area involve surveys, or collection of readings. NGG reports that the cross-skilling of staff, and the introduction of `single person working`, are playing a part in minimising costs, and maximising productivity, for example by utilising what would otherwise be unproductive time for emergency FCOs.

NGG had an initiative called Coaching for Excellence (C4E). For Maintenance, this has resulted in an increased number of jobs completed per day. Roll-out was completed by late spring 2005, and initial indications point to a 1% productivity coupled with a reduction in lost time accidents, as a result of the C4E analysis of work actions with field staff.

Legacy assets

NGG reports that some equipment used within the pressure control and instrumentation activities is such dated technology, that maintenance is becoming difficult and costly, because the skilled resources and spares items are either unavailable, or only available at high cost. Soft spares are uneconomic to produce, at the prices the industry can afford, and suppliers are more interested in growing markets in the Far East and China, than in the mature UK market. As equipment is being replaced, the opportunity is being taken to standardise, thus improving the effectiveness of purchasing contracts, logistics, and staff training.

6.3.2 DEFINITION OF ACTIVITY

Maintenance covers 3 areas:

LTS maintenance comprising the following main activities

- Cathodic Protection
- Pipeline monitoring
- Repairs – investigations and repairs arising from the pipeline monitoring
- Aerial surveys - Each pipeline is over flown by helicopter every two weeks
- TD1 surveys. Each pipeline is surveyed every four years.
- AGI maintenance
- AGI painting

Storage comprising the following main activities

- LP holder routine inspections and maintenance
- LP holder Non Routine Maintenance (NRM) which includes holder painting and repairs and work to meet legislative and regulatory changes
- HP bullet routine maintenance, inspections and painting.

Maintenance Other comprising the following main activities:

- Other Leakage Control e.g. mains surveys, gas conditioning, pressure profiling
- Distribution Mains and Services – mains and service repair and maintenance
- Instrumentation – repair and maintenance
- District Governors

6.3.3 ESTABLISH UNDERLYING COSTS

Cost normalisation

Section 2.5.1 gives details of the generic normalisation adjustments which have been carried out. For each type of Maintenance activity, the principal normalisation adjustments are outlined below.

- Cost transfer – the only transfer involves Storage where costs for holder handrail work have been transferred from Capex
- GDN reallocation – the outcome of reallocation process in which NGG identified the changes to the allocation of costs to reflect our proposed allocation of sub-activities[7].
- Accounting adjustments – which have been provided by Ofgem
- Pensions adjustments – these adjustments are the net adjustments between NGG's reported pension costs and the standard pension costs used by PB Power
- Removed costs – in each of the 3 maintenance activities, special costs have been removed prior to the comparative analysis, details of these are provided within the specific sections on each activity.

[7] Full details of the GDN reallocation are given in Appendix 6

The detail of the adjustments to the BPQ costs submitted by NGG for North West network is given in the following tables.

LTS maintenance

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDN reallocation	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	3.2
Ofgem Accounting Adjustments	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3
Pension Adjustments	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.5
Removed costs	0.0	0.0	-1.6	0.0	0.0	-0.1	-0.1	-0.1	-1.9
[redacted]									

Table 6-2

Storage maintenance

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	0.0	0.0	0.4	0.2	0.1	0.0	0.0	0.0	0.7
Holder handrails transfer from Capex	0.0	0.0	0.4	0.2	0.1	0.0	0.0	0.0	
GDN reallocation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
Ofgem Accounting Adjustments	-0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.3
Pension Adjustments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Removed costs	-0.7	-1.5	-2.1	-3.0	-2.1	-2.5	-1.5	-1.9	-15.3
Holder handrails	0.0	0.0	-0.4	-0.2	-0.1	0.0	0.0	0.0	
Holder painting	-0.7	-1.5	-1.7	-2.4	-0.9	-1.8	-0.8	-1.5	
Holder decommissioning/demolition	0.0	0.0	0.0	0.0	-0.8	-0.4	-0.4	-0.4	
HP Storage Revalidation	0.0	0.0	0.0	-0.4	-0.4	-0.4	-0.4	0.0	
Total	**-1.1**	**-1.5**	**-1.7**	**-2.8**	**-2.0**	**-2.5**	**-1.5**	**-1.8**	**-15.0**

Table 6-3

Maintenance Other

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDN reallocation	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	7.5
Ofgem Accounting Adjustments	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.2
Pension Adjustments	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.8
Removed costs	0.0	-2.2	0.0	0.0	0.0	0.0	0.0	0.0	-2.2
GSMR Cut offs	0.0	-2.2	0.0	0.0	0.0	0.0	0.0	0.0	
Total	**0.6**	**-1.4**	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**	**0.9**	**4.4**

Table 6-4

In this section, all the costs analysed are on a normalised basis as described above, however where we are presenting GDN reported costs, the removed cost adjustment, which is made for analysis purposes, has not been included.

2005/06 and 2006/07 costs

Consideration of the Network expenditures for 2005/06 and 2006/07 for each of the maintenance activities shows that increases in LTS maintenance and Storage maintenance costs increasing by £5.3m from 2005/06 to 2006/07. This comprises increased non-routine maintenance work of £3.2m and GSMR cut-offs (£2.1m).

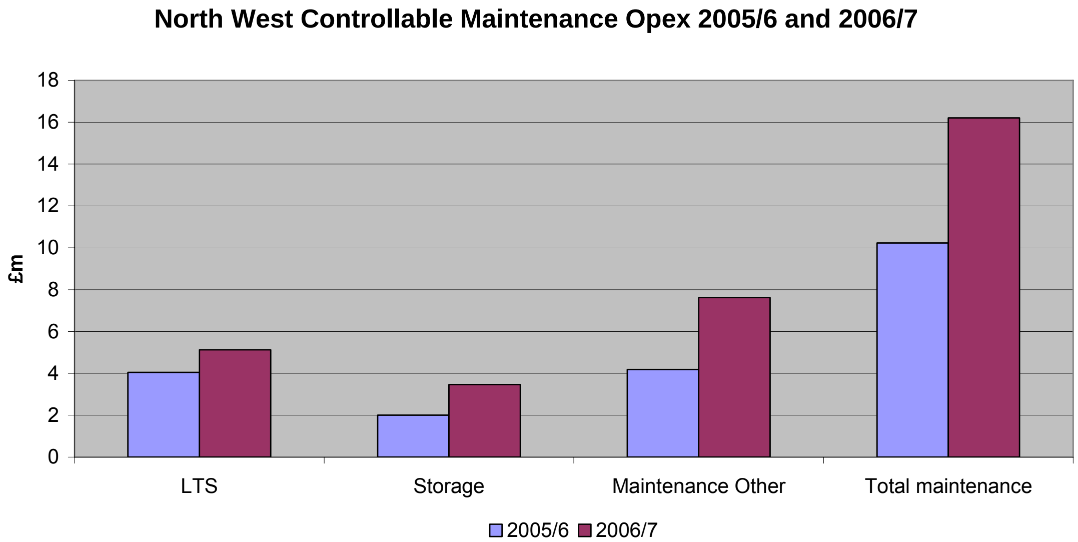

Figure 6-1

We have compared North West's unit costs for the three maintenance activities against the average unit costs across all GDNs (see chart below). We believe that costs of the different maintenance activities are driven by different workload drivers:

- LTS: Number of PRSs
- Storage: number of holders – volume of holders is also used in the analysis.
- Maintenance Other: different drivers apply to each of the main sub-activities. For the purposes of a high level comparison of unit costs here, the length of < 7bar main is used.

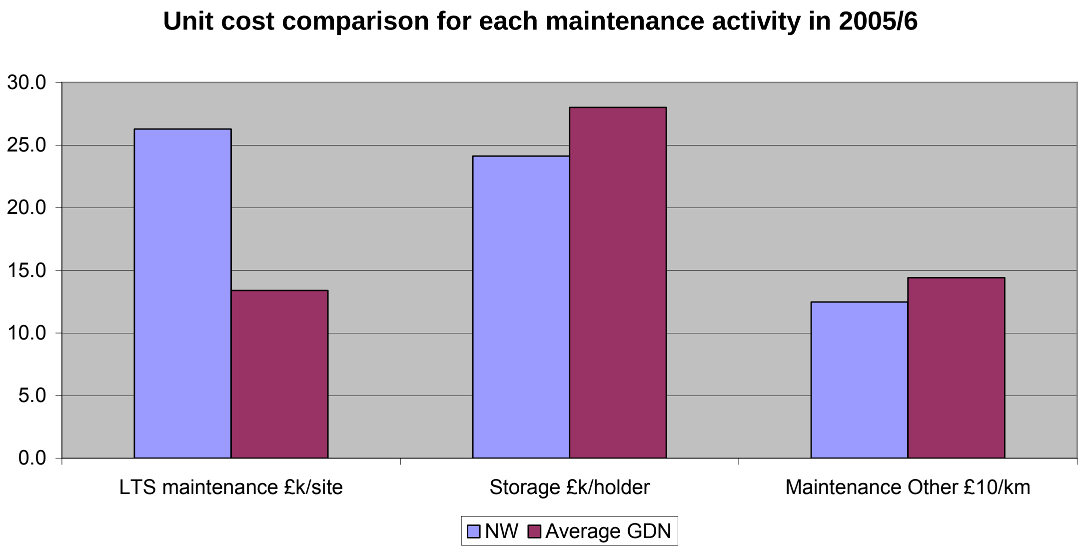

Figure 6-2

The chart shows that Storage and Maintenance Other unit costs are below average with LTS maintenance unit costs significantly higher than those of the average GDN.

The selection of these drivers is discussed in more detail below. For the main analysis set out below, the driver of Maintenance Other costs is modified to include specific drivers of cost for each of the three main categories of maintenance included under that heading.

The proposed efficient levels of unit costs are developed below.

6.3.4 PROPOSE EFFICIENT LEVEL OF COSTS

The volume of assets covered by North West maintenance activities had remained broadly flat through the period 2002/03 to 2005/06, as shown in the table below.

Maintenance activity	Main workload driver	Volume of assets 2002/03	Volume of assets 2005/06	% change
LTS maintenance	No of Sites	154	154	0.00%
Storage	No. of holders	84	83	-1.19%
Maintenance Other	km of < 7 bar main	33448	33569	0.36%

Table 6-5

It is assumed that reductions in the required maintenance of newly installed capital and replacement assets will be offset by the ageing population of remaining assets, and their associated levels of maintenance.

We have not been provided with a breakdown of direct activity costs to maintenance activities for the years prior to 2005/06. The 2005/06 costs therefore provide a baseline for developing our cost projections.

6.4 FORECAST

6.4.1 INTRODUCTION

Analysing maintenance costs projections provided by all GDNs shows rising unit costs for LTS and storage maintenance from 2005/06 to 2012/13 (over 70% increases in unit costs for LTS and over 100% for storage), and smaller increases in unit costs for Maintenance Other (around 10% over the period).

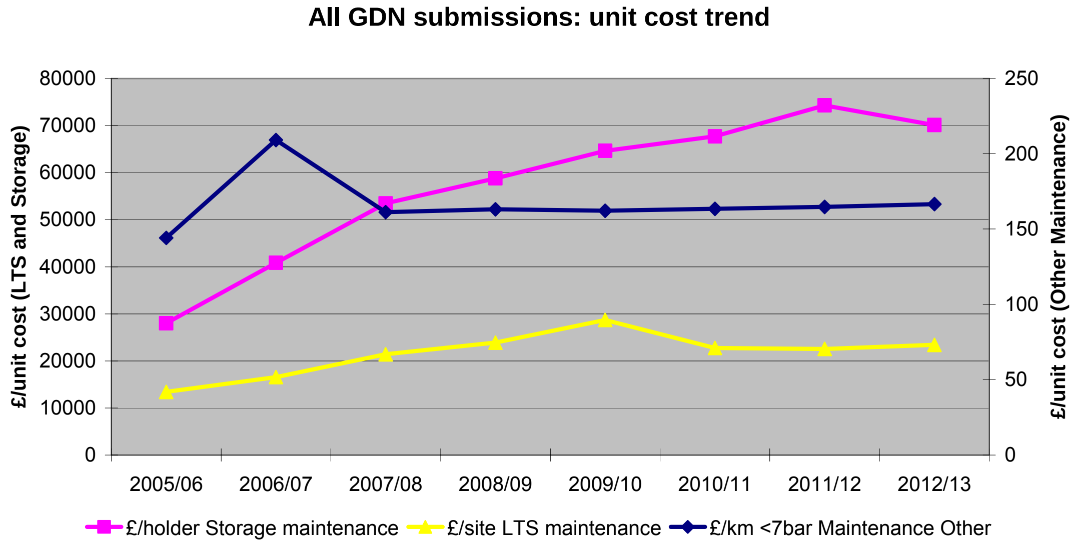

Figure 6-3

The rising costs for storage maintenance through to 2011/12 reflect holder painting programmes and the cost associated with the working at heights regulations with a fall in 2012/13 as these costs reduce.

6.4.2 COMPANY PROPOSALS

NW shows trends in unit costs similar to those for GDNs as a whole over the period to 2012/13. The spike in LTS maintenance costs is due to [redacted] in 2007/08.

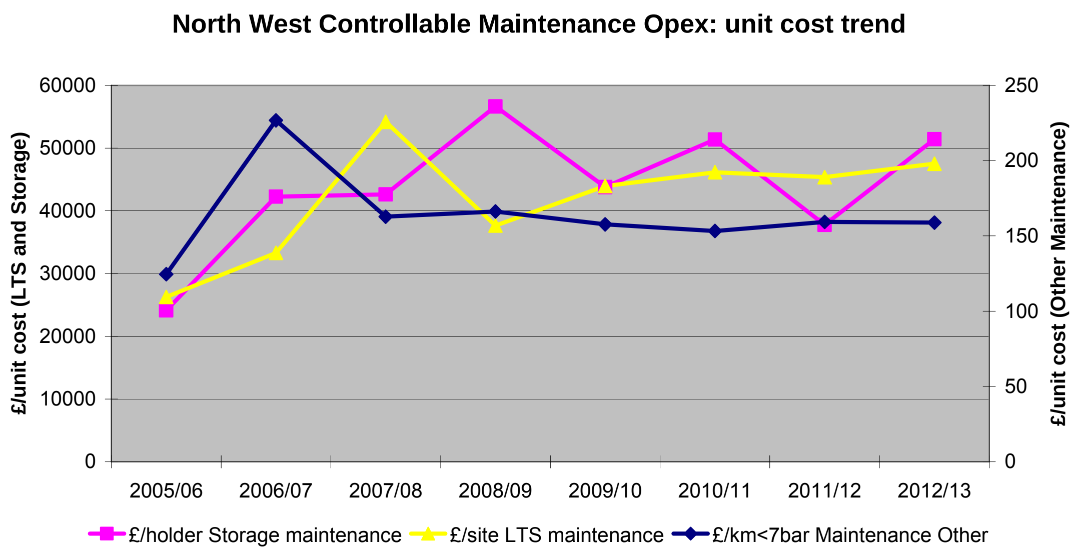

Figure 6-4

6.4.3 PROPOSED PROJECTIONS

Section 2 sets out the approach we use to set benchmark costs. The following techniques are used:

- Bottom-up analysis.
- Regression analysis
- Unit cost analysis

To use these techniques we need to establish a cost driver or explanatory variable.

The proposed maintenance costs are developed for LTS, Storage and Maintenance Other in turn[8].

6.4.3.1 LTS maintenance

Definition of activity

The maintenance activities covered by this activity include:

- Cathodic Protection
- Pipeline monitoring
- Aerial and vantage point surveys
- TD1 surveys
- Marker post maintenance
- AGI routine maintenance and repairs
- AGI painting

Underlying costs

The volume of maintenance activities are related to the length of network and the number of AGIs. The chart below shows that in 2005/06 NW has a lower proportion of >600 mm diameter (and therefore lower unit construction cost) pipelines than the average GDN, and against this criteria should have unit costs below the average. In 2005/06 NW had 154 PRSs (including NTS offtakes).

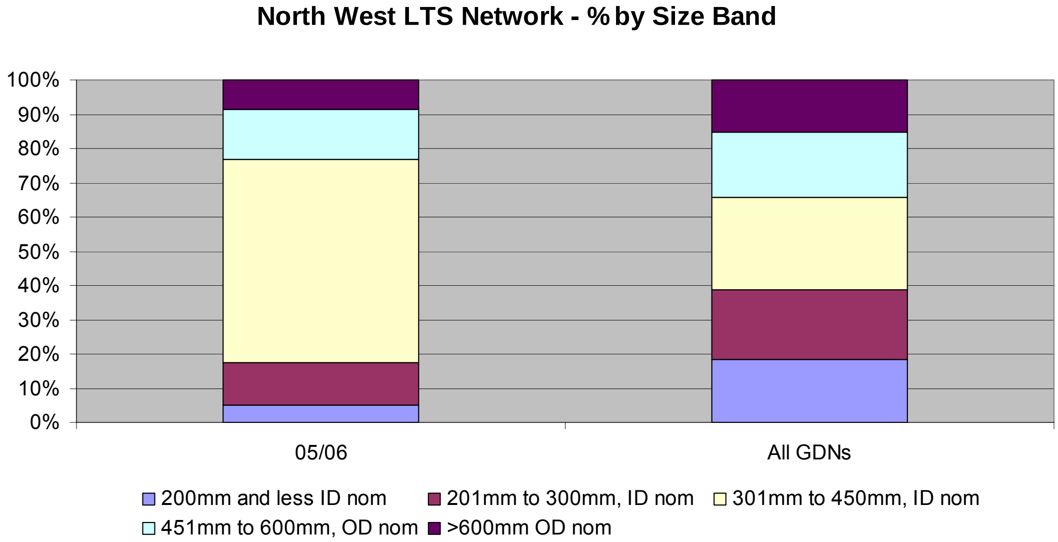

Figure 6-5

[8] Additional information, which became available during March 2007, led to a review of the supporting analysis. At the time of this report, insufficient detail was available to fully evaluate any potential impact from this new information.

The following figure shows that North West's costs are forecast to nearly double over the period to 2012/13.

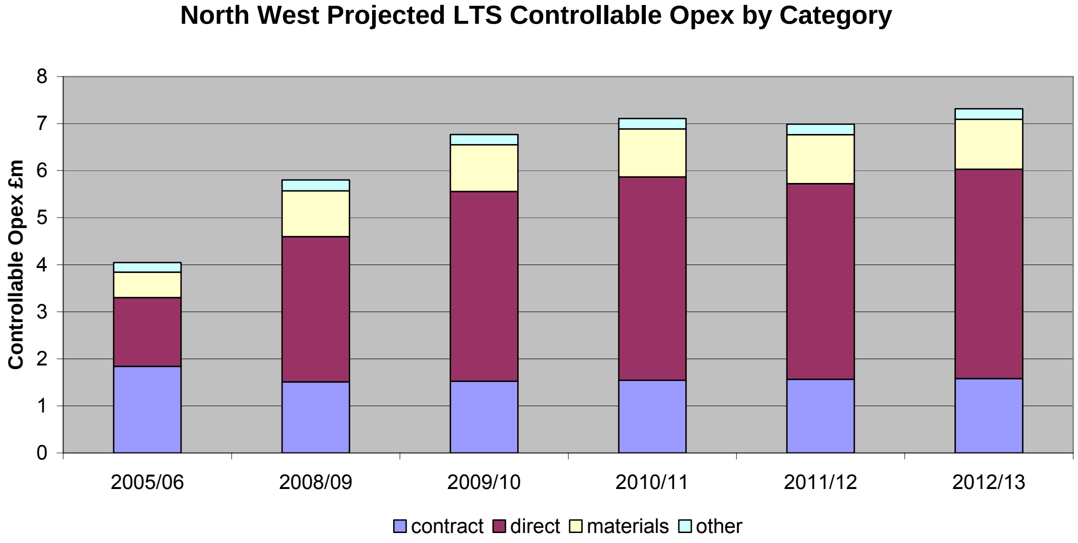

Figure 6-6

Bottom-up analysis

Some 49km (5% of the Network's LTS pipelines) are of diameters 200mm and below (see chart below). These pipelines are non-piggable (ie not capable of internal OLI) due to their diameter. Other reasons why internal OLI cannot be used is because of design, spurs into AGIs and gas operating constraints.

In total 214km (22%) of North West's pipelines are non-piggable.

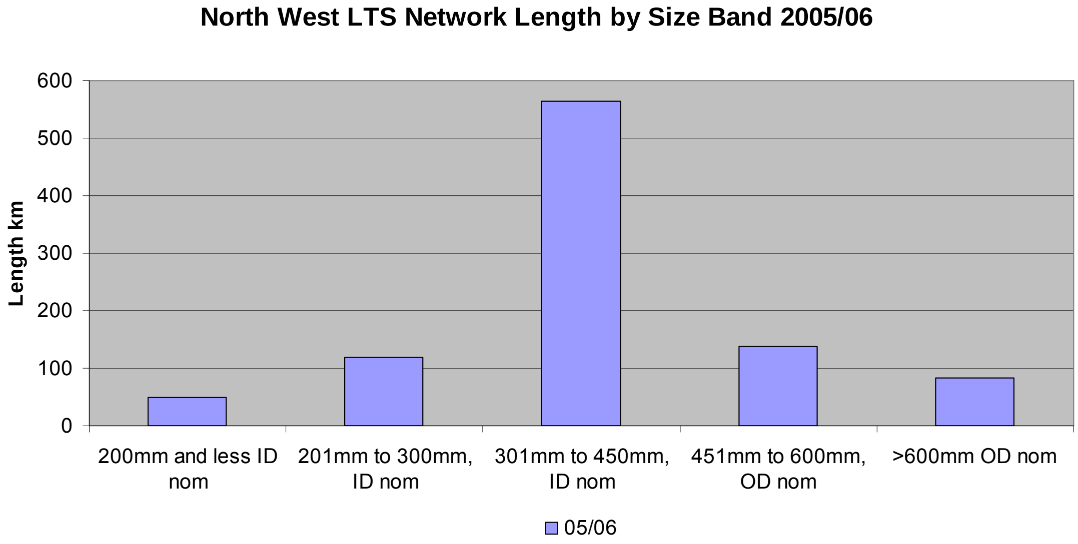

Figure 6-7

In 2005/6, the average GDN carried out five OLI runs.

Whilst some pipeline maintenance costs (eg OLI runs, repair costs) are diameter related, other costs (eg TD1 surveys, marker post maintenance) are largely independent of pipeline diameter, and therefore our proposals are developed assuming the average pipeline diameter mix across all GDNs. Also, as discussed below, the majority of LTS maintenance costs relate to PRS assets.

The benchmark maintenance costs were initially assessed by consideration of the replacement asset value of the LTS pipeline network to derive an indicative maintenance cost.

The total replacement cost of all 8 GDN LTS networks was estimated based on notional average unit costs (£0.6m/km for pipelines and £2m per PRS). These costs have been derived using the LTS pipeline unit costs reported in our Capex reports Appendix 6. The PRS cost is an average cost across LTS PRSs and NTS offtakes, with LTS PRSs estimated to comprise two thirds of the relevant total asset value and therefore of the associated annual maintenance cost and NTS offtakes one third.

Applying our estimated maintenance cost percentages for pipelines and PRSs, gives an annual total maintenance cost across all GDN of £20m per annum, equating approximately to the total LTS maintenance cost across all GDNs.

2005/06	All GDNs	All GDNs (Notional replacement values)	Assumed annual maintenance cost as % of asset value (All GDNs)	Estimated LTS maintenance cost per year (All GDNs)
Pipeline assets	11712km	£7000m	0.05%	£3.5m
PRS assets	1656 PRSs	£3300m	0.50%	£16.5m
Total		£10300m		£20.0m
No. of PRSs				1656
Cost per PRS				£12000/PRS

Table 6-6

Allocating this to GDNs by number of PRSs gives a cost for North West with 154 PRSs of £1.8m pa.

The above approach is only indicative since it uses no information on maintenance activities at the local level or individual years but does provide a general guide to further analysis, particularly in comparative analysis between GDNs.

North West' BPQ submission (normalised) for LTS maintenance amounts to £4.0m in 2005/06 compared to the figure derived above of £1.8m.

We have analysed the relationship between LTS maintenance costs and length of network and between LTS maintenance costs and number of PRSs. Our view is that the dominant cost driver is the number of PRSs.

Comparison with NTS costs

The NTS transports gas over greater distances than the LTS and therefore for the NTS length is a more appropriate cost driver than the number of AGIs.

The TPA report[9] prepared for the transmission price control review concluded that the efficient level of maintenance costs for the NTS was £552/km (2004/05 prices - £566/km at 2005/06 prices).

The NTS has 6877km of pipeline and 278 AGIs/PRSs (or 1 AGI per 25km). The total length of the LTS across all GDNs 11712km and includes 1656 PRSs (or 1 PRS per 7km), and the BPQ submissions amount to £20m across all GDNs which gives a unit cost of £1708/km. This is approximately three times the unit costs for the NTS shown above.

However, we do not believe that the unit cost per km measure is an appropriate measure for comparing the maintenance cost of the NTS and LTS networks. This is because AGIs/PRSs are 3.6 times more frequent per km on the LTS than are AGIs on the NTS, and AGIs/PRSs consume the majority of maintenance expenditure. Also, some higher costs are incurred with

9 Transmission Price Control Review 2007-2011, Efficiency Study and Forecast Opex, 29th September 2006, TPA Solutions, published by Ofgem

the smaller lengths of pipeline generally in the LTS networks. These smaller lengths increase total setup costs for some activities such as pigging.

We have therefore used the information in Table 6-6 to determine costs which can be compared to NTS costs.

The assumption from Table 6-6 is that the maintenance costs associated with the pipelines themselves account for 18% of LTS maintenance costs and that 82% of LTS maintenance costs are associated with AGIs/PRSs. Evidence from GDNs suggests that the proportion of cost associated with pipelines is around 20% of costs.

We have applied the costs shown in Table 6-6 pro-rata to length and number of AGIs respectively to the NTS as shown in the following table.

Maintenance cost pa	LTS	NTS
Pipelines	11712	6877
AGIs/PRSs	1656	278
LTS pipeline cost	£3.5m	
Pro rata NTS pipeline cost		£2.1m
LTS AGIs/PRSs cost	£16.5m	
Pro rata NTS cost		£2.8m
Total	£20.0m	£4.9m

Table 6-7

This gives an annual maintenance cost for the NTS of £4.9m or £712 per km.

This unit cost is somewhat higher than the £566/km obtained elsewhere for the NTS but the difference could be due to the PRSs attached to the LTS being more complex in maintenance terms than the AGIs associated with the NTS, which often do not have pressure reduction equipment. We also believe that the £566/km figure does not include cathodic protection maintenance and remediation costs (about £100/km). We therefore consider that the unit cost obtained above for LTS maintenance (£12,000 per PRS) is reasonable and generally consistent with the maintenance costs for the NTS.

Unit cost analysis

We have examined the possible relationships between LTS maintenance costs as reported by the GDNs against a number of cost drivers and concluded that regression analysis does not give robust results.

We have therefore examined unit costs between the network expressed in terms of £ per PRS. As part of this process significant repair costs incurred were removed. There were no atypical repair costs for North West in 2005/06.

The following figure shows the unit costs for 2005/06 for all GDNs.

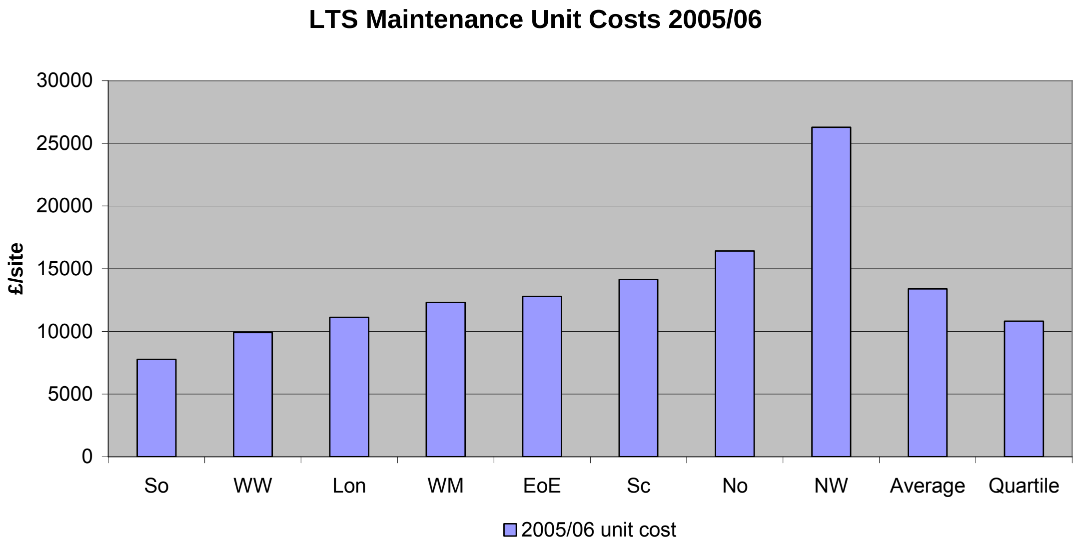

Figure 6-8

This chart shows that the average unit cost across all GDNs in 2005/06 was £13,400 per PRS and that North West had above average unit costs. The median unit cost was £12,500 per PRS

Benchmark costs

We have determined a benchmark unit cost of £12,000 per PRS based on the bottom-up and comparative analysis.

This benchmark value represents the average annual cost across the period, recognising that because of the pattern of lumpy items such as OLI runs the actual expenditure in some years will be higher and in some years lower than the allowances proposed.

The benchmark cost applied above does not take into account the balance of pipeline, LTS PRS and NTS offtakes assets within the asset mix of North West. Using unit maintenance costs for each of these asset types from Table 6-6 (£300/km for pipelines, £7000/LTS PRS, £48000/NTS offtake), we have calculated a maintenance cost for North West of £1.8m pa, compared to the benchmark cost of £1.8m pa. The benchmark cost therefore allows for the network asset mix in North West.

However, across all networks the network specific costs amount to £480 per PRS, which gives an adjusted benchmark cost across all GDNs of £12480 per PRS, very close to the median unit cost from Figure 6-8.

Other costs

The amounts allowed for specific network costs are shown against the allowed adjustments line in the summary table.

NGG have requested a specific allowance for a programme of AGI painting to prevent installations being taken off-line due to corrosion failure and consequential capacity shortfalls. We would expect remedial work to be carried out at all installations to reduce the risk of corrosion as part of the normal maintenance expenditure. NGG say that entire site painting gives assurance of high quality standards of preparation and that the life of the protective coating is considerably extended. We have included £0.4m pa for this painting subject to a cost/benefit analysis for each AGI (or group of AGIs) and the reporting of the cost benefits over the next control period.

NGG have also requested a specific allowance of £0.1m pa for plans agreed with the HSE for remediation of vibration at AGIs, with an additional £0.1m in 2008/09 and 2009/10 to address pressing issues. We have included these allowances and, since vibration is a site specific phenomenon, we would expect to see a site by site costed programme to support the expenditure plans as part of the 2006 update.

Repair costs

Whilst there are cyclic costs in LTS maintenance activities such as OLI runs which follow a prescribed frequency, we consider that the above benchmark cost allows for such variations over a 5 year period.

However we do not considered the benchmark cost allows for the atypical costs of repairs resulting from the OLI analysis or which may otherwise be necessary. Recognising that not all OLI runs will lead to the need for excavation and/or repair, we believe that an average cost for repairs of £20,000 per OLI run is reasonable across the control period. We also recognized that the timing of repairs may be programmed for a convenient time after the OLI run is carried out. The proposed allowances have therefore been calculated on an average year basis, and individual year allowances should be considered over the 5 year period recognizing that in some years the expenditure will be higher and in some years lower than the allowances proposed. The number of OLI runs used to drive the repair cost is the average number over runs per annum over the period 2006 to 2012 derived from information provided by the GDN and shown in the table below.

OLI runs	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Average per annum
No. of OLI runs	[redacted]							

Table 6-8

[redacted]

Proposed allowances

The proposed workloads and allowances are shown in the following table. A 1% per annum reduction in the benchmark costs is included to reflect an assumed level of on-going productivity improvements.

Controllable Opex (£m)	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**5.3**	**6.3**	**6.6**	**6.5**	**6.7**
Normalised Adjustments	**0.3**	**0.3**	**0.2**	**0.2**	**0.3**
Normalised Submission	**5.6**	**6.6**	**6.8**	**6.7**	**7.0**
Unit Cost Driver	**154**	**154**	**154**	**154**	**154**
Benchmark Unit Cost	**11644**	**11527**	**11412**	**11298**	**11185**
Benchmark (Ex RF RPE)	1.8	1.8	1.8	1.7	1.7
Baseline (Ex RF RPE)	3.9	3.9	3.8	3.8	3.8
Gap	2.1	2.1	2.1	2.1	2.0
Convergence	1.6	1.4	1.1	0.9	0.6
Recommended (Ex RF and RPE)	3.4	3.1	2.9	2.6	2.3
Recommended (Inc RF and RPE)	3.4	3.2	3.0	2.7	2.5
Allowed Adjustments	0.7	0.7	0.6	0.6	0.6
Recommended (Inc RPE)	**4.1**	**3.9**	**3.6**	**3.3**	**3.1**

Table 6-9

This table shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the workload driver over the period 2008/09 to 2012/13 and the benchmark unit costs which are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The GDNs are not expected to close any gap immediately. The convergence adjustment provides a glide path of cost to the Benchmark performance. The gap is reduced to 30% in 2012/13.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommended cost (Inc RPE).

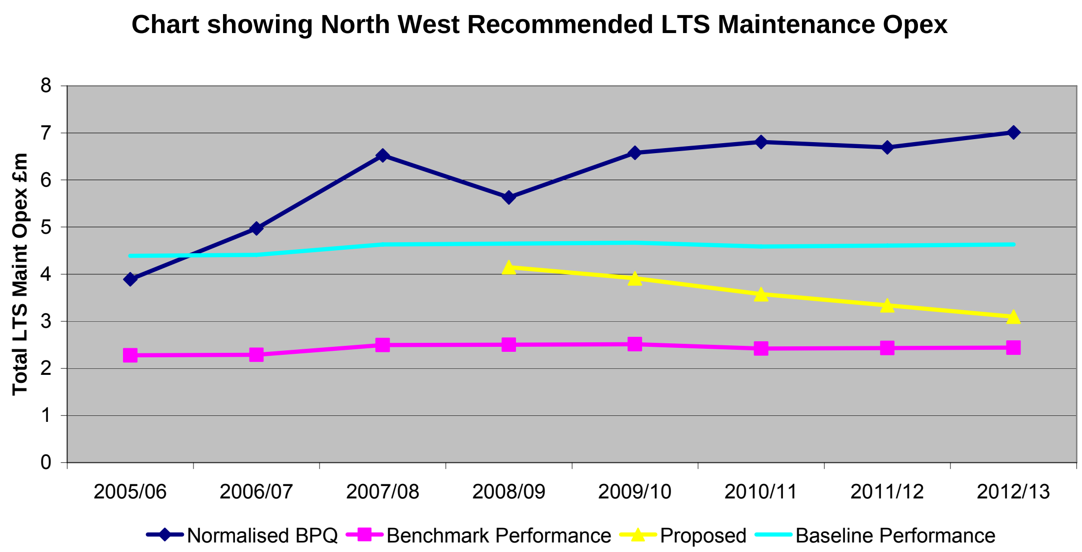

Figure 6-9

Note: the Benchmark and Baseline Performance lines include Adjustments

6.4.3.2 Storage maintenance

North West operates 82 Low Pressure (LP) holders and 22 High Pressure bullet storage vessels. The following chart shows North West has more LP holders than the average GDN and that, on average, each of North West's holders is smaller in volume than holders across all GDNs

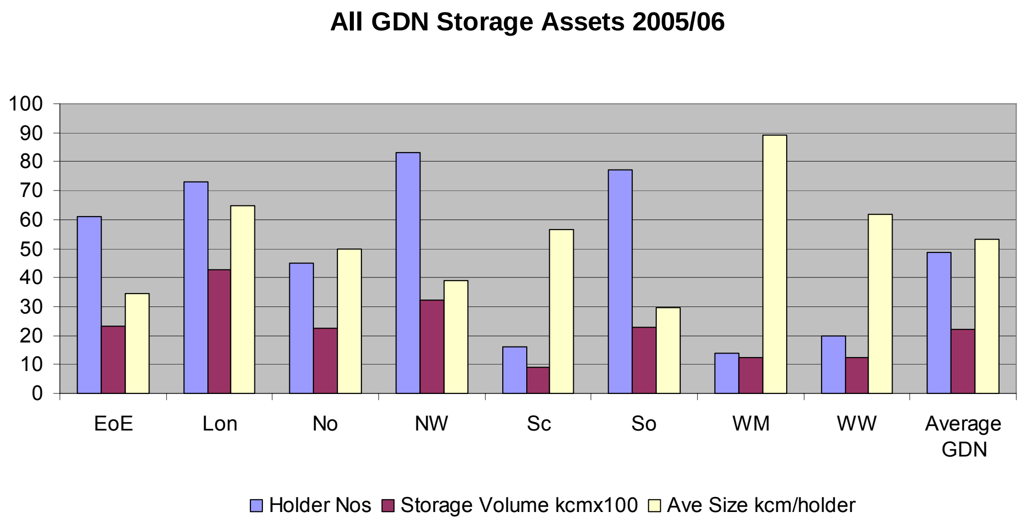

Figure 6-10

Major maintenance associated with High Pressure storage occurs infrequently. Work is planned to take place within the control period and expenditure is identified towards the end of this section. It has not been included in our assessment.

High Pressure Routine Maintenance costs are included as part of maintenance and repair costs. They are believed to be very small making little or no difference to the outcome of our analysis. Not all GDNs have been able to separate these costs.

Storage maintenance costs are considered under the following headings:

- Maintenance and repair
- Specific costs (removed and considered separately)
    - Painting
    - Demolition
    - Working at heights regulation

Maintenance & Repair

North West has proposed the maintenance and repair costs shown in the following table:

2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13
Forecast number of Holders	78	76	76	76	76
Projected costs £m	1.4	1.2	1.4	1.3	2.0

Table 6-10

The network has projected the loss of 4 holders prior to 2008/09. The further loss of 2 holders indicated above is, we believe, broadly consistent with Capex projections and the loss of 0.23 mcm of low pressure storage.

Our work has shown that regression analysis is not a suitable tool for assessing storage maintenance repair costs. We have therefore used unit cost and bottom-up analysis methods.

Based on our analysis of holder maintenance and repair costs across all the GDNs we believe that holder numbers is the most appropriate single driver of storage maintenance and repair costs.

Very little information has been provided about Routine Maintenance associated with High Pressure Storage and whilst we believe this to be relatively small we recommend that this area is reconsidered as part of the 2006 update.

Unit cost analysis

Maintenance & Repair covers:

- Routine Maintenance
- Inspections
- Gasholder Repairs e.g. holder valve repairs, guide roller repairs, booster overhaul etc.

An assessment of costs for Maintenance & Repairs across all GDNs has provided the basis for identification of an efficient cost level for these activities. We have considered how best to set a unit cost and have found that costs are not significantly affected by holder size, and have therefore chosen to use cost per holder as opposed to cost per thousand cubic meters (Thcm).

The following table shows the Maintenance and Repair costs per holder in 2005/06.

EoE	Lon	No	NW	Sc	So	WM	WW	Average across all GDNs
14262	11986	30089	15687	51688	22519	22500	49800	21267

Table 6-11

Bottom-up analysis

The GDN's reported costs differ widely and our analysis has failed to uncover any issues with cost allocations. Given the spread of data we have chosen to use bottom up analysis to identify a suitable benchmark.

We have referred to T/PM/MAINT/3 (Management Procedure for the maintenance of Low Pressure Storage Installations) and considered the various routine maintenance tasks detailed within the procedure. We have looked at the work required to undertake the necessary maintenance and developed manpower estimates for each of the tasks. In addition we have developed an estimate of the manpower required for repairs, which we believe to be relatively small. Manpower costs identified from storage FTE labour costs supplied by the GDNs have been applied to these estimates and this together with the average 2005/06 material costs per holder provide a maintenance and repair cost per holder as follows.

Weekly inspection and maintenance tasks	26m/d/yr
Quarterly inspection and maintenance tasks	2m/d/yr
Annual inspection and maintenance tasks	3m/d/yr
Bi-annual inspection and maintenance task (external consultancy fees allocated to MO)	1m/d/yr
5 Yearly inspection and maintenance tasks (little extra to annual)	
10 Yearly inspection and maintenance tasks	3m/d/yr
Repairs	1m/d/yr
Total	36m/d/yr @ £210/day = £7500
Materials	£11,000
Total	£18,500
*(assumption; FTE cost - £210/day gross)	

Table 6-12

* Based on average GDNs' storage costs of £49000/FTE and an estimate of 230 working days.

We note that there could be other costs but consider that these will be small and have little effect on the results of our analysis and benchmark costs of £19000/holder.

We believe that staff utilisation can be improved particularly as monitoring systems become more prevalent and this will lead to a 1% per annum productivity improvement.

Benchmark costs

The total benchmark costs for North West have been calculated by applying the benchmark maintenance and repair cost per holder to the number of holders for each year of the control period. The benchmark costs for North West are shown in the following table.

2005/06 prices (excluding RPEs)	2008/09	2009/10	2010/11	2011/12	2012/13
Forecast number of Holders	78	76	76	76	76
Benchmark costs	1.5	1.4	1.4	1.4	1.4

Table 6-13

Specific costs

The amounts allowed for specific costs are shown against the allowed adjustments line in the summary table.

Gasholder Painting

North West has proposed the painting costs shown in the following table:

2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13
Storage volume (Thcm)	3173	2951	2951	2951	2951
Projected costs £m	2.4	0.9	1.8	0.8	1.5

Table 6-14

Storage volumes are based on the declared 2005/06 LP holder volume. This has been adjusted to mirror the reported available storage profile and holders demolished over the period.

Gasholder painting, which can account for more than 25% of the total maintenance costs, was considered on a national basis prior to GDN sales and some GDNs have reported that the process for prioritising work was in need of review. We believe that this may have resulted in differing volumes of work being carried out across the GDNs prior to sale and in 2005/06. All GDNs now have the basis of a painting programme in place together with a process for prioritising work for their networks. Generally they consider that gasholders will require repainting every 10 – 15 years.

Clearly the volume of work can and will vary from year to year. We have therefore, looked at the total cost of gasholder painting from 2005/06 to 2012/13 for all GDNs and the following analysis of the average annual cost against the number of holders installed gives a unit cost of £15,400 per annum per installed holder.

We believe that regression analysis provides a good analysis tool for the assessment of holder painting costs and since linear regression provides a significantly better fit to the data sets, this technique has been used in preference to logarithmic linear regression.

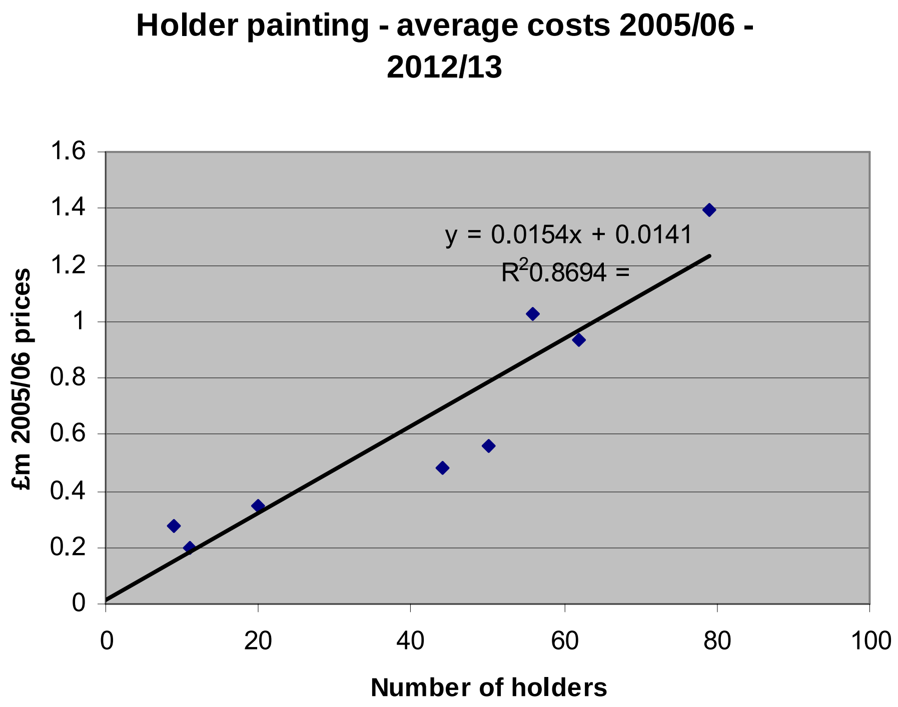

Figure 6-11

We consider that generally a 15 year painting cycle is adequate, but recognise that there will be occasions where adverse conditions require some holders to be painted more frequently. Therefore, for the purpose of assessment we have used a repainting cycle of 13 years. This equates to an average unit cost of £200,000 (£15,400x13) per holder painted, equivalent to £3360 per Thcm of storage.

The following chart indicates the repainting cycle that GDNs appear to be adopting based on their projected 5 year costs and the average unit costs identified above. This suggests that North West are forecasting expenditure at a rate that will repaint their holders approximately every 7 years.

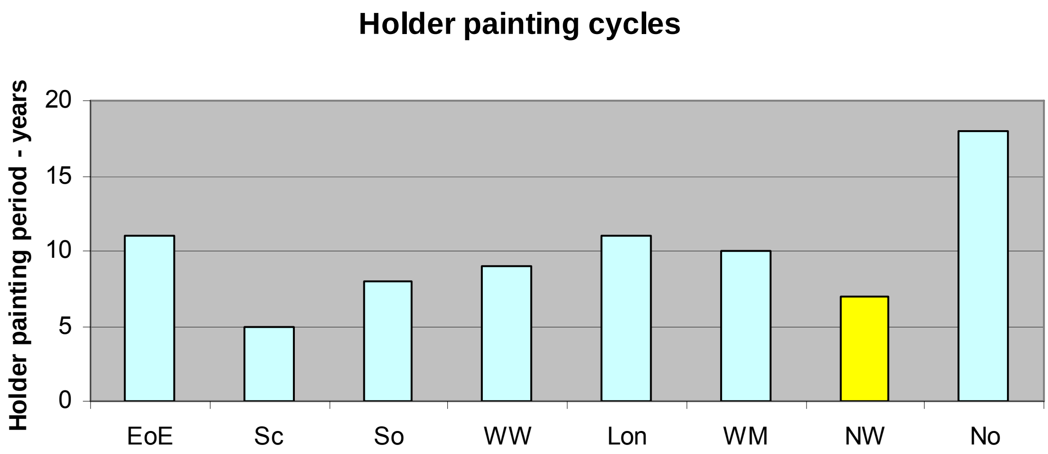

Figure 6-12

Whilst we have not carried out bottom-up or separate unit cost analysis, we have carried out additional regression analysis and consideration has been given to type and size of holder. It has been assumed that there will be an average mix of holders with above/below ground tanks but this has not been explicitly considered in developing our costs. We have taken account of spiral and column guided holders, which have a greater surface area to be painted. From detailed information supplied by the GDNs, we have analysed tendered and estimated costs for the painting of specific holders.

We have carried out regression analysis of these detailed painting costs for the two main types of holders. This analysis, gives a unit cost of [redacted] for spiral built holders and for column built holders (see charts below). It can be seen from the charts that any element of fixed costs is small. Given the many differences between holders and an estimated 60/40 (spiral/column) split in holders across all GDNs we have adjusted the unit cost to (spiral) and [redacted] (column) to give an average combined unit cost of [redacted]. This is in line with the average cost analysis above (£3360/Thcm) and we have used these adjusted unit costs for spiral and column guided holders as our benchmark unit costs.

[Chart redacted]

Figure 6-13

[Chart redacted]

Figure 6-14

From the information provided by North West (SQ NGG130) we have estimated a 60 / 40 (spiral / column) split in the type of holders in North West's network and this gives a combined unit cost of [redacted]. These costs, together with a 13 year repainting cycle and the appropriate storage volume provide the benchmark gasholder painting costs shown in the following table. The benchmark costs are not intended to give an actual spend profile but should be viewed as a total sum of money available to be spent over the control period. Given careful condition monitoring, "patch painting" may well produce some savings against our proposed costs.

2005/06 prices	2008/09	2009/10	2010/11	2011/12	2012/13
Storage volume (Thcm)	3173	2951	2951	2951	2751
13yr cycle Benchmark costs £m	0.8	0.8	0.8	0.8	0.8

Table 6-15

Working at Heights Regulations

Modification to holder handrails and fall arrest systems etc. are necessary to comply with the Working at Heights Regulations. Different assumptions have been made by the GDNs regarding the classification of this expenditure as Capex or Opex. North West classifies this expenditure as Capex (LTS & Storage), but to ensure comparability for the purpose of this assessment, we have treated these costs as Opex.

£m	2008/09	2009/10	2010/11	2011/12	2012/13
	0.4	0.2	0.1	0.0	0.0

Table 6-16

The following chart indicates that North West's costs are below the average of costs across all GDNs for these works.

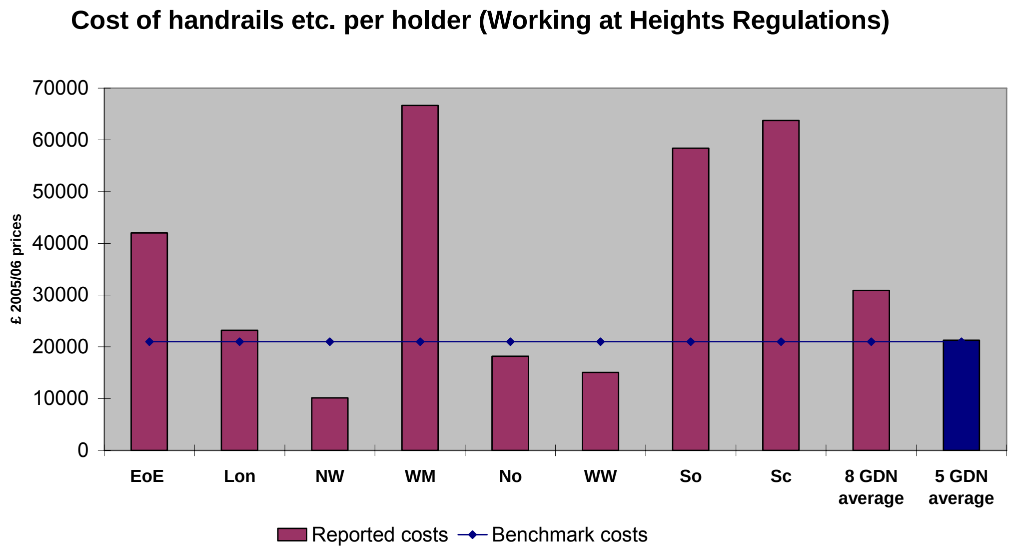

Figure 6-15

GDN costs for these modifications vary widely and analysis has failed to clearly identify a benchmark. Comparing GDN costs per holder or costs per Thcm of storage makes little or no difference. It is our view that costs should be directly related to holder numbers.

We believe that the outlying GDNs indicated above have significantly over estimated the costs for these works and note that they have yet to undertake any of this work. We have looked more closely at GDNs where work has been started and we believe that the overall GDN average cost is high. We have therefore applied the average cost/holder of the remaining 5 GDNs (£21000/holder) as the benchmark unit cost.

For North West, the total costs for modifications to handrail and fall arrest system etc. are estimated as follows:

2005/06 prices (£m)	
Average No. of holders (control period)	76
Benchmark costs (No. of holders x £21,000)	1.6

Table 6-17

Taking into account proposed expenditure by the GDN prior to 2008/09, the proposed allowance for these modifications in the control period is as follows:

2005/06 prices excluding RPEs	Prior to 2008/09	2008/09	2009/10	2010/11	2011/12	2012/13
	0.5	0.2	0.2	0.2	0.2	0.2

Table 6-18

Demolition

Given the ever increasing value of land we agree with the assumption made by some GDNs that any holder demolition will be funded by land sales.

North West has included the following amounts for holder demolition.

BPQ costs £m (2005-06 prices)	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
	0.0	0.0	0.8	0.4	0.4	0.4

Table 6-19

Any expenditure associated with holder demolition and included within forecasts would require exceptional justification. No evidence of any such justification has been identified within the North West's submission and the demolition expenditure has therefore been removed.

High Pressure Storage

Major maintenance associated with high pressure storage bullet vessels occurs infrequently (10 – 20 year cycle). North West plan to carry out revalidation works at two sites and propose the following expenditure. Due to the infrequent nature of these works it has not been feasible to make comparisons with other GDNs or to carry out meaningful analysis. The expenditure has been treated as "one off costs".

2005/06 prices (excluding RPEs)	2008/09	2009/10	2010/11	2011/12	2012/13
	0.4	0.4	0.4	0.4	0.0

Table 6-20

Summary

The following table summarises our proposed costs for storage maintenance.

We have assumed productivity improvements of 1% per annum.

Controllable Opex (£m)	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**4.1**	**3.1**	**3.8**	**2.8**	**3.7**
Normalised Adjustments	**-2.8**	**-2.0**	**-2.5**	**-1.5**	**-1.8**
Normalised Submission	**1.3**	**1.1**	**1.3**	**1.2**	**1.9**
Unit Cost Driver	**78**	**76**	**76**	**76**	**76**
Benchmark Unit Cost	**18436**	**18251**	**18069**	**17888**	**17709**
Benchmark (Ex RF RPE)	1.4	1.4	1.4	1.4	1.3
Baseline (Ex RF RPE)	1.3	1.3	1.2	1.2	1.2
Gap	-0.2	-0.1	-0.1	-0.1	-0.1
Convergence	-0.1	-0.1	-0.1	-0.1	-0.1
Recommended (Ex RF and RPE)	1.3	1.3	1.3	1.2	1.2
Recommended (Inc RF and RPE)	1.4	1.3	1.3	1.3	1.3
Allowed Adjustments	1.5	1.4	1.4	1.4	1.0
Recommended (Inc RPE)	**2.8**	**2.7**	**2.7**	**2.7**	**2.3**

Table 6-21

This table shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the workload driver over the period 2008/09 to 2012/13 and the benchmark unit costs which are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The convergence adjustment provides a glide path of cost to the 2012/13 Baseline performance.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommended cost (Inc RPE).

Chart showing North West Recommended Storage Maintenance Opex

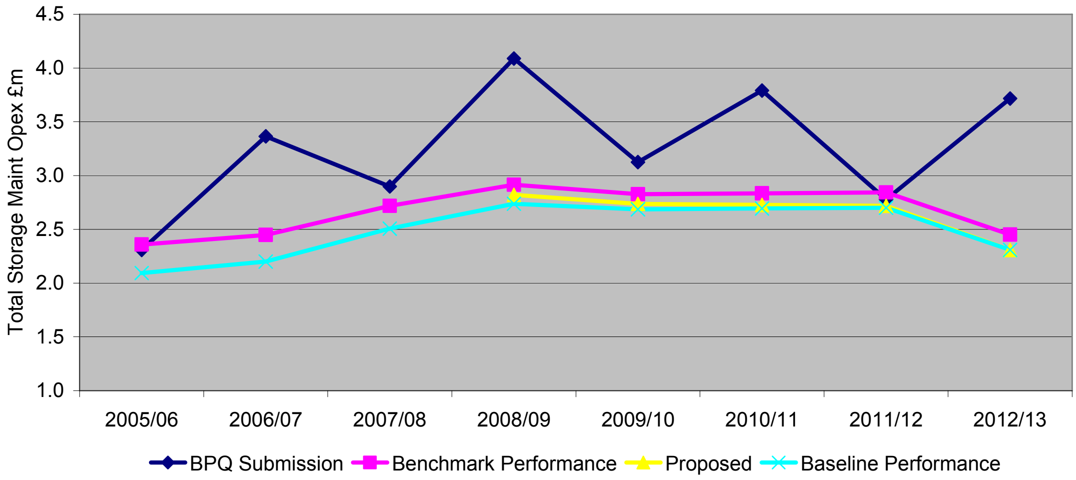

Figure 6-16

Note: the Benchmark and Baseline Performance lines include Adjustments

6.4.3.3 Maintenance other

Company projections

North West Network's projections of expenditure for the period to 2012/13 are shown in the figure below.

North West Other Maintenance Controllable Opex 2005/06 to 2012/13

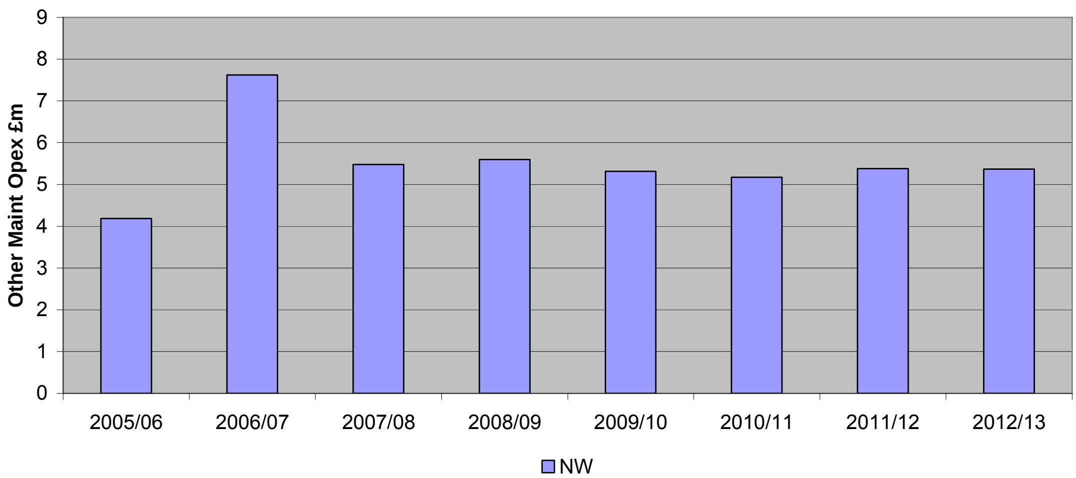

Figure 6-17

Benchmark costs

As discussed earlier in this section, we have carried out work to bring costs onto a consistent basis. Nevertheless there is no clear relationship between these costs and network length, throughput or other drivers.

In order to understand the wide differences in their reported costs, GDNs were requested to allocate their projected costs into the following four principal activities as defined in the BPQ Guidance Notes, these are:

- Other Leakage Control
- Distribution Mains and Services R & M
- Instrumentation R & M
- District Governors

Only two GDNs were able to respond as requested, the remainder included other costs, which they were unable to apportion to the four categories, These additional costs included, staff costs, non staff costs, transport, and `other`. However, by allocating these additional costs in proportion to the costs returned for the four principal activities by the 6 GDNs, assumed costs have been derived to enable cost analyses and comparisons to be made. We have calculated an average split across each of these activities and also provided the range across GDNs in the table below.

Activity	Percent of Maintenance Other Average %	Range %
Leakage Control	15	6 - 31
M & S Repairs and Maintenance	43	32 - 58
Instrumentation	15	5 - 29
District Governors	27	19 - 38

Table 6-22

We therefore propose to establish benchmark costs by bottom-up analysis.

The following chart shows the reported costs for all GDNs, expressed as costs/km and the average and quartile values.

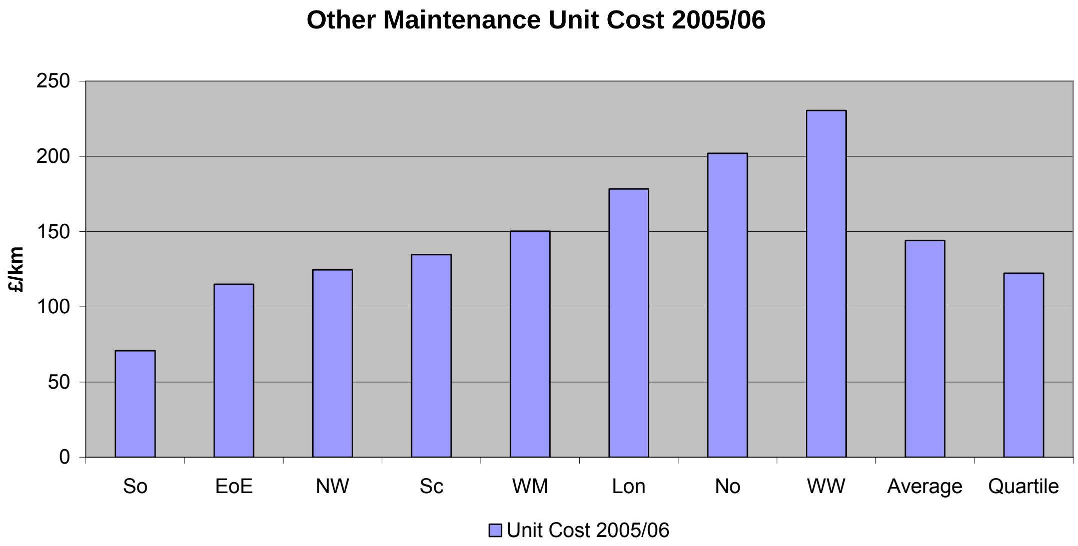

Figure 6-18

It would be reasonable to expect some minor economies of scale to be reflected in the costs, but for the most expensive to exceed the lowest unit cost more than threefold is not credible. We can only surmise that there may be coding errors between these activities, and also with other activities such as Emergency and Repairs. We have explored relationships with a range of drivers which we believe could be relevant, and we can find no evidence which points to any specific factors which explains the differences.

Unit costs for North West, at £125/km, are near the Quartile and below the average unit cost derived from the normalised submitted data.

6.4.3.4 Bottom Up Analysis

Benchmark costs are developed for each of these activities in turn. Instrumentation and district governor costs are considered together.

Mains and Services R & M

What is clear from the table 6-19, is that that Distribution Mains and Service (M & S) repair and maintenance cost is the largest of the four cost elements of Maintenance Other, and in that respect, the primary driver of cost was assumed to be related to network size.

However, regression analysis has been unable to reveal a robust relationship from the GDN data points for 2005/06 or 2006/07.

In addition to network length we have reviewed other cost drivers including non-PE pipe length, which is assumed to require more maintenance than PE pipe, energy throughput, service population, and emergency repairs numbers. We did recognise a relationship with emergency repairs, which infers that these costs are driven by the general condition of the pipe network.

To assess base costs, we have assumed that mains R & M work is identified as a consequence of carrying out a repair arising from an external PRE, and are generated in about 10% of such cases. We also assume that the average number of service R & M jobs is similar to the number of mains jobs.

We assume that the cost of an average mains R & M job is similar to the cost of an average repair job. This because the type and scale of tasks involved in the repair of mains are similar whether the repair arises because of a PRE or because of a condition assessment. We have therefore assumed that the cost of an average mains R&M job is £470 and of an average service R & M job is £235 (see Table 5-2 adjusted for efficiencies arising from programmed works).

For North West there were 21325 PRE related repairs in 2005/06. On the above assumptions this would give 2132 mains repairs and 2132 service repair jobs per year, and using the unit cost assumed above would give a total R&M cost of £1.5 m for 2005/06.

District Governor and Instrumentation Maintenance

After exploring potential relationships for unit costs covering the Instrumentation and District Governor maintenance areas, it was found that combining the two types of maintenance, gave the best results, albeit still not ideal plots because of one outlier.

In carrying out the regression analysis, we have excluded the outlier (shown as a yellow point on the graph) because we consider that there could be costs inconsistent with our cost allocation assumptions included in that networks costs. We have been unable to identify the inconsistency.

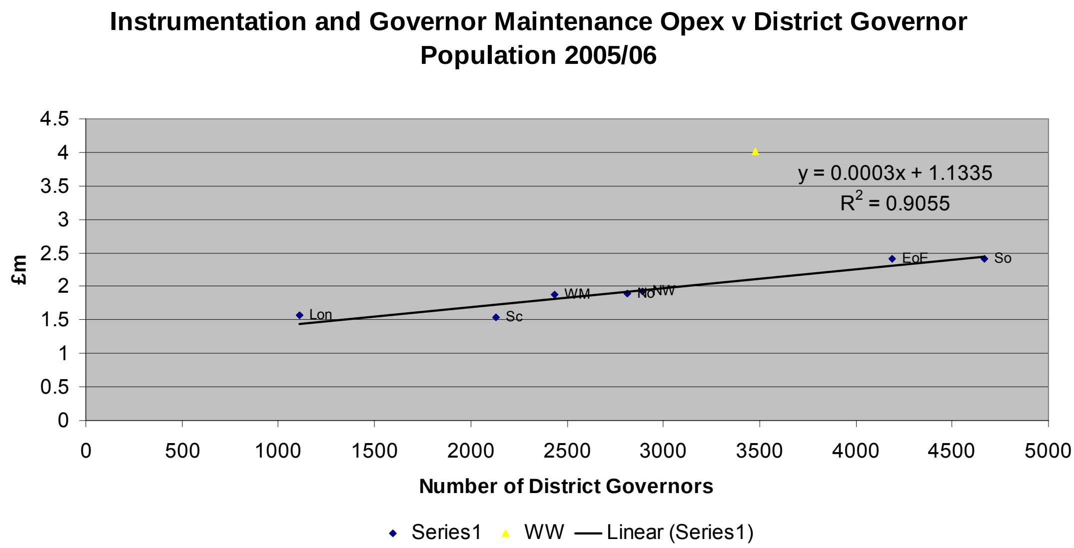

Figure 6-19

Using the district governor population as the driver for these costs provided the best data fit using linear regression. Because we have included only 7 points we believe it is appropriate to use the regression line as the benchmark cost line rather than upper quartile line.

This gives a unit cost of £281 per district governor for Instrumentation and Governor maintenance, plus a fixed cost of £1.1m per GDN.

DSEAR costs

A forecast of DSEAR costs associated with Governor installations has been included as an `allowed` cost of £1.7m phased between 2006/07 and 2012/13. The costs within the review period total £1.3m, and are shown listed as `allowed adjustments` in Table 6-19.

Other Leakage Control

This activity is different from the remainder, in that it is almost wholly elective. A GDN can elect to spend little on this activity, in the belief that it will save money and the additional leakage related costs for shrinkage, PREs and repairs, will be more than offset by the savings in the leakage control programme.

North West have stated that they do not intend to install new gas conditioning units, and review the operation of existing units every 3 years, or when maintenance is required.

The use of pressure management systems is reviewed for those networks without automated demand led pressure management, and potential projects are prioritised, their economic viability assessed, taking PREs and leakage costs into account.

There was a wide range of costs returned for this sub-activity, reflecting different choices by the GDNs.

The other factors to consider are that the replacement programme will reduce the length of pipe susceptible to joint and corrosion leakage and the responsibility of, where possible, reducing the volume of methane released into the natural environment.

We are also aware that we have adjusted work volumes in both emergency and repair activities in the expectation that this will drive a higher spend on preventative measures in order to achieve the reductions in work volumes that we forecast.

The range of expenditure for this activity submitted by the GDNs is from £75per km of non PE main, down to £35 per km.

For this review period, we recommend that expenditure is set based upon the lower end of the range, and propose that the rate is set at £35 per km of non-PE mains (2005/06 prices).

Although our proposals are for £35/km of expenditure, we believe that there will be operational cost savings if NORTH WEST made expenditures up to £75/km of non-PE main which could be self financing.

Summary of costs

The above analysis has established the efficient level of cost for Maintenance Other activities. The following table shows the build up of the frontier costs that would apply in 2005/06 to NW network.

Activity	Cost Driver	Unit Cost (£)	Cost (£m)
Leakage Control	Length of non-PE main km 14991	35	0.5
Mains and Services Repairs & Maintenance	No of Repairs 21325	70.5	1.5
District Governors and Instrumentation	Total governors 2890	281	0.8
	Fixed cost		1.1
Total			3.9

Table 6-23

We recognise that in deriving this cost we have made a number of assumptions. The proposed total benchmark expenditure in 2005/06 of £3.9m is equivalent to £116/network km compared to the average cost reported by GDNs of £144/km and NW reported cost of £125/km (see Figure 6-17). We believe that this confirms that our approach to setting expenditure for Maintenance Other is reasonable.

Given the divergent data which has been supplied, and upon which this report is based, we believe that our approach to setting expenditure for Maintenance Other is reasonable, and the results, in the absence of more concrete alternatives, should be used as a basis for forecasting.

We have developed our recommended costs by taking the benchmark costs for 2005/06 and projecting this cost forward, which gives the following forecast:

6.4.4 PROPOSED PROJECTIONS

Projecting the efficient level of costs forward based on the 2005/06 base year, gives the following forecast:

Controllable Opex (£m)	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**4.5**	**4.1**	**4.0**	**4.2**	**4.2**
Normalised Adjustments	**0.8**	**0.9**	**0.9**	**0.9**	**0.9**
Normalised Submission	**5.3**	**5.0**	**4.9**	**5.1**	**5.1**
Benchmark (Ex RF RPE)	3.7	3.6	3.5	3.4	3.3
Baseline (Ex RF RPE)	4.1	4.0	4.0	3.9	3.9
Gap	0.4	0.4	0.5	0.5	0.6
Convergence	0.3	0.3	0.3	0.2	0.2
Recommended (Ex RF and RPE)	4.0	3.9	3.8	3.6	3.5
Recommended (Inc RF and RPE)	3.9	3.9	3.9	3.8	3.8
Allowed Adjustments	0.4	0.3	0.2	0.2	0.2
Recommended (Inc RPE)	**4.3**	**4.2**	**4.1**	**4.0**	**4.0**

Table 6-24

This table shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the workload driver over the period 2008/09 to 2012/13 and the benchmark unit costs which are multiplied to give the Benchmark performance. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The GDNs are not expected to close any gap immediately. The convergence adjustment provides a glide path of cost to the Benchmark performance. The gap is reduced to 30% in 2012/13.
- The sum of the Benchmark performance and the convergence gives the Recommended (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommended cost (Inc RPE).

The comparison between the normalised BPQ forecast, the target and recommended expenditure is shown in the following figure:

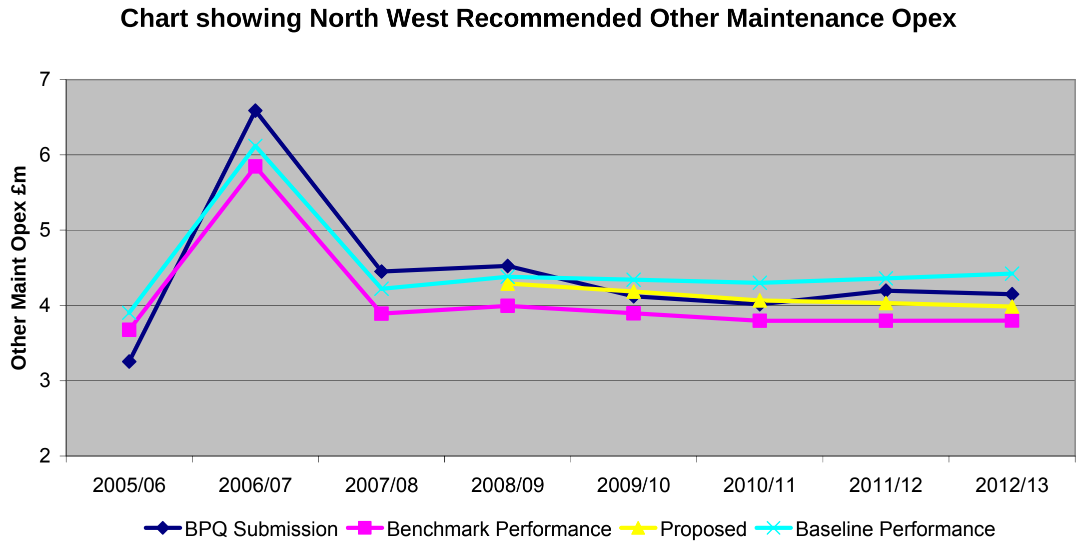

Figure 6-20

Note: the Benchmark and Baseline Performance lines include Adjustments

6.4.5 REAL PRICE INCREASES

Section 2.7 sets out the real price effects assumed by NW in their BPQ proposals and also the real price effects proposed by PB Power.

In addition to any efficiency adjustments, the Network costs have been normalised by adjustments to remove the GDN real price effects and the PB Power real price effect assumptions have subsequently been added in deriving the proposed allowances.

6.4.6 RECOMMENDATIONS

Table 6-1 shows the build-up of the recommended costs for the price control period (2008/09 to 2012/13) for Maintenance.

7 OTHER DIRECT

7.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	1.9	1.9	1.9	1.9	1.9	**9.6**
Normalisation Adjustments	-0.6	-0.6	-0.6	-0.6	-0.6	**-3.0**
Normalised BPQ	1.4	1.3	1.3	1.3	1.3	**6.6**
Adjustments	0.2	0.2	0.2	0.1	0.1	**0.7**
Proposed	**1.5**	**1.5**	**1.5**	**1.4**	**1.4**	**7.3**

Table 7-1

7.2 POLICIES & PROCEDURES

7.2.1 INTRODUCTION

The North West Network has a clear route of Governance by which Policies and Procedures are formed, approved, and implemented. North West shares common Policies and Procedures which operate across all NGG Networks. Within the Network Strategy Directorate of NGG, the Engineering Policy group identifies the need for new or reviewed documents brought about by legislation, regulations or internal company requirements. Changes in legislation are identified by NGG Public Affairs, and also by NGG staff contributions to IGEM and industry committees etc. Appendix 1 reviews the financial and technical framework under which North West operates, the structure they utilise to manage their assets effectively and the key policies they adopt to ensure they meet their statutory and licence obligations and other regulatory requirements.

The main areas covered by Other Direct Activities are:

- Tools and Equipment
- Consumables – used in conjunction with work not specific to individual jobs
- Other operational activities

Governance of policies and procedures for these activities must support the safe and efficient operation of plant and safe and efficient operational practice by Network staff, and service providers.

7.2.2 SCOPE OF POLICES AND PROCEDURES

NGG, as the previous owner of all 8 networks had in place a satisfactory and complete suite of policies and procedures. We have found no evidence that since the network sales, the NGG network policies and procedures have either been abandoned or relaxed in a significant way in the retained networks, leading to our conclusion that, from the evidence provided in BPQ responses, the scope of policies and procedures in use, including those relevant to Other Direct Activities, continue to be both satisfactory, and complete.

7.2.3 REVIEW AND UPDATE PROCESS

NGG's Engineering Policy Committee receives, reviews and approves all new or amended Policies and Procedures. The Engineering Policy Group manages the production of draft documents, to be reviewed by a representative peer group, before being submitted for approval. NGG staff, Service Providers and Specialist Consultants, may provide input to the drafting process. Governance responsibility for all documents is held by NGG. When new documents are approved, briefings and/or detailed training are given to those affected.

7.2.4 EFFICIENCY AND PRODUCTIVITY

We have not carried out detailed audits of the degree of compliance within the Network, to the stated Policies and Procedures. However, from the evidence offered within the BPQ responses, during the costs visit and within Supplementary Questions responses, there are no indications that they are not being followed in relation to Other Direct Activities. There is also no evidence of systemic failures of equipment, processes or systems, which could indicate lack of compliance. Similarly, within safety related statistics, such as lost time accidents, there is not evidence of unsafe practices being employed, which could be used as an indicator of the lack of compliance with documented Policies and Procedures.

We recommend that the current approach to Policies and Procedures is viewed as effective and as providing a satisfactory basis for forecast projections.

7.3 HISTORICAL PERFORMANCE

7.3.1 INTRODUCTION

We would expect the historical performance of Other Direct Activities to be represented by a combination of historical management, cost and performance information for these activities. This historical performance data would be helpful in developing trends of workload, costs, and unit costs, which could be then used as comparisons year to year, and also to make comparisons with other GDNs' performance.

However, in the years preceding 2005/06, Transco and latterly National Grid undertook a number of organisational restructures. During these periods, changes occurred in the way that costs were allocated across Networks and activities. Robust inter-year, and inter-Network comparisons on costs prior to 2005/06 are therefore not possible.

We have used cost data only for the years 2005/06, and 2006/07 to form historical trends. Whilst this is less than perfect, we believe that it represents the best current approach, although cost allocations for 2005/06 were affected by the network sale process.

7.3.2 DEFINITION OF ACTIVITY

The main areas covered by Other Direct Activities are:

- Tools and Equipment
- Consumables – used in conjunction with work not specific to individual jobs
- Odorant costs
- Legal costs associated with easements
- Compensation payments for supply interruptions
- Reinstatement inspections

7.3.3 ESTABLISH UNDERLYING COSTS

The following costs have been included within Other Direct Activities:

- Materials
- Net Staff Costs (including Agency Costs)
- Non salary staff costs (including T&S)
- Other
- Professional and Consultancy Fees
- Subcontractors
- Transport and Plant

Cost normalisation

Section 2.5.1 gives details of the generic normalisation adjustments which have been carried out. For Other Direct Activities, the principal normalisation adjustments are outlined below.

- Cost transfer – there are no cost transfers in the Other Direct Activities category.

- GDN reallocation – the outcome of reallocation process in which NGG identified the changes to the allocation of costs to reflect our proposed allocation of sub-activities[10].
- Accounting adjustments – which have been provided by Ofgem
- Pensions adjustments – these adjustments are the net adjustments between NGG's reported pension costs and the standard pension costs used by PB Power
- Removed costs – there are no removed costs in the Other Direct Activities category.

The detail of the adjustments to the BPQ costs submitted by NGG for North West network, is given in the following table.

Normalisation Adjustments	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Cost transfer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDN reallocation	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-1.8
Ofgem Accounting Adjustments	-1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.1
Pension Adjustments	0.1	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-2.5
Removed costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**-1.3**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-5.4**

Table 7-2

In their initial BPQ responses, only 6 networks reported costs in the range of categories identified for Other Direct Activities. In the case of the other 2 networks, the equivalent costs had been allocated to the other Opex activity areas. Responses to Supplementary Questions, which resulted in reallocation of costs across all Opex activities, have enabled comparable data for all 8 networks to be compiled.

The cost reallocation principally involves the transfer of costs for calorimeter calibration and loan cooking/heating equipment to Work Management for consistency purposes.

The 2005/06 and 2006/07 normalised BPQ data, adjusted for regional factors for all GDNs is shown in Table 7-3 below:

Controllable Other Direct Activities Opex adjusted for regional factors (£m)	2005/06	2006/07
East of England	3.4	2.6
London	1.3	1.4
Northern	4.4	1.5
North West	0.0	1.4
Scotland	1.1	1.1
Southern	3.1	3.1
West Midlands	1.2	1.2
Wales and West	4.2	2.0

Table 7-3

7.3.4 PROPOSE EFFICIENT LEVEL OF COSTS

Section 2 sets out the approach we use to set frontier costs. The following techniques are used:

- Bottom-up analysis.
- Regression analysis
- Unit cost analysis

[10] Full details of the GDN reallocation are given in Appendix 6

To use these techniques we need to establish a cost driver or explanatory variable.

There are a number of potential drivers for the components of Other Direct activities, all of which are related in some way to the size or scale of the network operation. The two key factors which have been examined are total network length (distribution above and below 7 bar plus LTS) and network throughput.

Bottom-up analysis is not used for the assessment of Other Direct activities due to the diverse nature of the activities involved.

As discussed in Section 2, the starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2005/06). The regression calculation determines a relationship between the costs and the workload driver. The regression line is shown in black on the graphs.

A number of regression options have been explored for Other Direct Opex, and we consider that logarithmic linear regression provides the best fit to the data set.

As discussed in Section 2 we have then adjusted the regression line to give the upper quartile regression line which is the target which all under performing GDNs should move towards. This is shown in pink on the charts.

High performing networks will be expected to continue to improve their performance over the period to 2012/13. The resulting target costs for 2012/13 are shown in yellow on the charts.

Most networks have reported substantial changes between 2005/06 Other Direct Activity costs and their forecast for 2006/07, in many cases related to transitional effects following the network sale process. We have therefore examined the costs for both years to establish the most suitable data set to use for our base year analysis.

The regressions for 2005/06 Other Direct Activity expenditure and for the 2006/07 forecast expenditure have been investigated using total network length and separately throughput as explanatory variables. This analysis has shown that total network length provides a better basis for comparison between networks. In addition, the 2006/07 GDN expenditure forecasts when compared against total network length on a logarithmic linear basis provide a robust distribution with a good fit, on which to identify frontier and upper quartile performance, as demonstrated in Figure 7-1. North West's performance is 2nd best after allowing for regional factors.

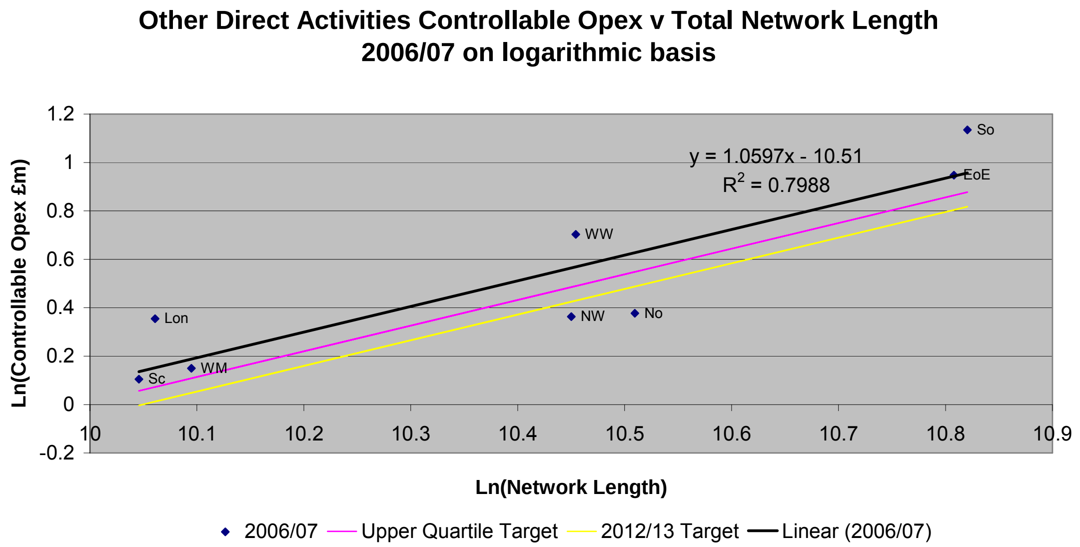

Figure 7-1

This relationship between network length and cost shown on the graph is used to determine our cost projections for future years with network length as the cost driver.

We consider that the regression fit is sufficiently good not to carry out a separate unit cost analysis.

7.4 FORECAST

7.4.1 INTRODUCTION

The conclusions of the policy review are that NGG has in place appropriate policies and procedures and a robust governance regime to review these, and to propose new policies and procedures, to meet external and internal drivers. The approach is viewed as efficient and providing a satisfactory basis for forecast projections.

The general factors affecting forecast costs are the inflationary pressures on Contractor, Staff and Material costs. NGG has used their own assumptions on these to prepare their company proposals.

7.4.2 COMPANY PROPOSALS

The company cost trend lines for 2006/07 to 2012/13 as proposed by NGG for North West, together with the other networks, are shown in Figure 7.2:

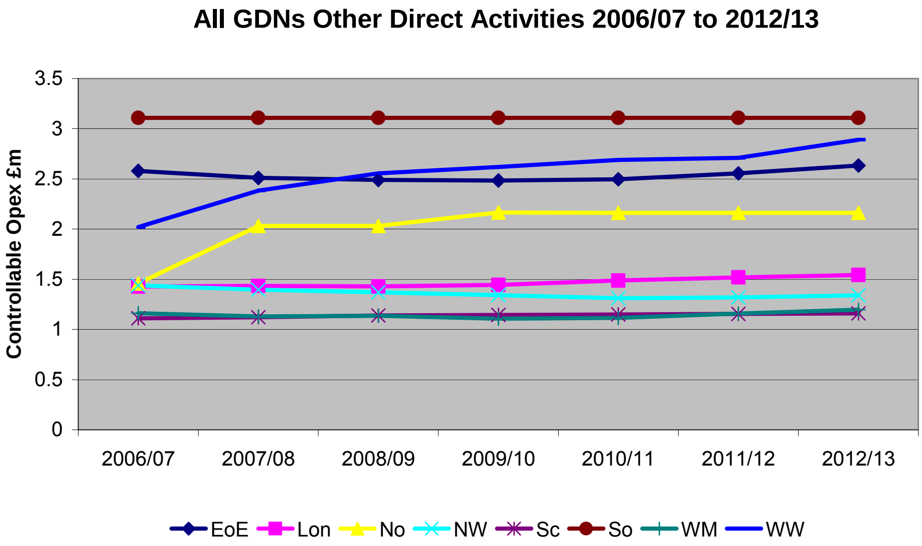

Figure 7-2

7.4.3 PROPOSED PROJECTIONS

The regression analysis based on 2006/07 forecast costs and network length, the results of which are represented in Figure 7-1, identifies the upper quartile performance level, which has been used as the benchmark which GDNs should move toward during the period.

In order to form a view of the speed at which the GDN should be expected to move towards this benchmark performance, extrapolation of the base year performance has also been carried out for the whole period using our assumptions for productivity improvement.

NGG has not quantified a level of efficiency improvement for Other Direct Activities. However, we are of the opinion that there is scope for improvement driven by optimised management of operations and contractual arrangements across the range of activities. We have therefore assumed and applied a 1% year on year improvement in productivity for the Other Direct Activities area.

Figure 7-3 shows North West expenditure projections for Other Direct Activities over the period 2005/06 to 2012/13. North West's baseline performance out performs the benchmark target over the period of the forecast. Therefore, our expenditure projection is reduced to be in line with baseline performance in 2012/13.

7.4.4 SPECIFIC COST AREAS

There are no specific high cost `spikes` in expenditure in this area of activity during the period 2006/07 to 2012/13.

7.4.5 REAL PRICE INCREASES

Section 2.7 sets out the approach to real price effects proposed by PB Power.

In addition to any efficiency adjustments, the Network costs have been normalised by adjustments to remove the GDN real price effects and the PB Power real price effects have subsequently been added in deriving the proposed allowances.

The following table sets out the principal results of the analysis:

Controllable Opex (£m)	2008/09	2009/10	2010/11	2011/12	2012/13
GDN BPQ Submission	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**
Normalised Adjustments	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**
Normalised Submission	**1.4**	**1.3**	**1.3**	**1.3**	**1.3**
Regression Driver km	**34678**	**34711**	**34745**	**34794**	**34826**
Benchmark (Ex RF RPE)	1.6	1.6	1.6	1.6	1.5
Baseline (Ex RF RPE)	1.4	1.4	1.4	1.4	1.4
Gap	-0.2	-0.2	-0.2	-0.2	-0.2
Convergence	-0.1	-0.1	-0.1	-0.2	-0.2
Recommended (Ex RF and RPE)	1.5	1.5	1.4	1.4	1.4
Recommended (Inc RF and RPE)	1.5	1.5	1.5	1.4	1.4
Allowed Adjustments	0.0	0.0	0.0	0.0	0.0
Recommended (Inc RPE)	**1.5**	**1.5**	**1.5**	**1.4**	**1.4**

Table 7-4

This table shows the costs reported by the GDN in their BPQ submission and these costs adjusted by our normalisation process.

It then shows the build-up of our recommended costs as follows:

- The values of the regression driver over the period 2008/09 to 2012/13 and the benchmark performance from the analysis. The Benchmark unit costs include PB Power's expected productivity improvements.
- Baseline performance: This is the GDN's BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements.
- The Gap, which is the difference between the Baseline performance and the Benchmark performance.
- Convergence: The convergence adjustment provides a glide path of cost to the 2012/13 Baseline performance.
- The sum of the Benchmark performance and the convergence gives the Recommend (Ex RF and RPE) cost.
- These costs are then adjusted for our Regional Factors (RF) and our Real Price Effects (RPE)
- The allowed adjustments for specific cost areas are then added to give the Recommend cost (Inc RPE).

The comparison between the normalised BPQ forecast, the target and recommended expenditure is shown in the following figure:

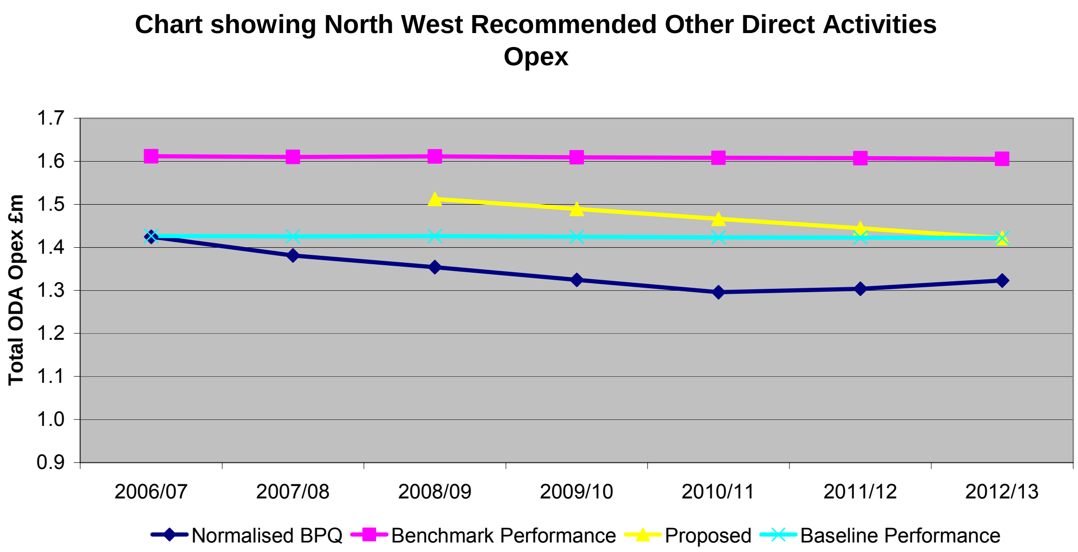

Figure 7-3

Note: the Benchmark and Baseline Performance lines include Adjustments

7.4.6 RECOMMENDATIONS

The recommended final allowances for the review period are summarised in Table 7-1 at the start of this Section.

8 SHRINKAGE

8.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	0.0	0.0	0.0	0.0	0.0	**0.0**
Normalisation Adjustments	10.1	9.8	9.6	9.2	8.7	**47.3**
Normalised BPQ	10.1	9.8	9.6	9.2	8.7	**47.3**
Adjustments	0.0	0.0	0.0	0.0	0.0	**0.0**
Proposed	**10.1**	**9.8**	**9.6**	**9.2**	**8.7**	**47.3**

Table 8-1

The normalisation adjustments refer to the transfer of Shrinkage data from work management to a separate category.

8.2 POLICIES & PROCEDURES

Analysis work has been undertaken to understand and comment upon the shrinkage factor, and associated components, for NGG's North West Network.

Shrinkage comprises gas lost due to leakage, own use gas and that lost due to theft. The combined total is divided by gas throughput to obtain the shrinkage factor, which is calculated annually for each gas year commencing October 1st. Table 8.2 shows the range of values for the period 2005/06 to 2012/13.

Factor	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Leakage factor (%)	0.566	0.606	0.599	0.584	0.568	0.553	0.538	0.523
Own Use factor (%)	0.043	0.019	0.012	0.012	0.012	0.012	0.012	0.012
Theft (%)	0.023	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Shrinkage factor (%)	0.631	0.645	0.631	0.616	0.600	0.585	0.570	0.555

Table 8-2

Own use gas (OUG) is almost exclusively for preheating and is under management control; theft is a minor component, agreed annually with shippers. The data indicates that distribution network leakage is the major component at approximately 94% of shrinkage over the review period and this component is the focus of our review.

There are a number of interactive factors that influence network shrinkage performance, specifically:

- The Network's policy on average system pressures. Increasing or decreasing pressures impacts leakage performance.
- Gas conditioning by injection of mono ethylene glycol (MEG) into gas supply systems to maintain the condition of CI mains lead yarn joints and minimise leakage.
- The impact of the mains replacement programme, including the methodologies adopted and their effects, on system capacity. Insertion methods may reduce transportation capacity and necessitate reinforcement or pressure increase to ensure the required minimum pressure is maintained throughout the network.
- System reinforcement activity which may lead to reductions in average pressures.
- The drive to reduce methane emissions for environmental reasons.

Network leakage is the calculated loss from the network and is modelled using the National Leakage Reduction Management Model (NLRMM). The model is based on the mains and services leakage rates determined by the 2002 National Leakage Survey.

8.3 HISTORICAL PERFORMANCE

Leakage rates for LP systems, MP systems and above ground installations are calculated based on variables such as:

- Pipe materials
- MEG saturation levels
- Average system pressures
- Customer numbers
- An allowance for gas lost due to interference damage.

Within the model there is no recognition of any relationship between leakage and public reported escapes as modelling has failed to establish any such linkage.

Average system pressure (ASP) is calculated using standard Network analysis tools and the process is similar for all GDNs. Fig 8.1 shows the ASPs for all networks.

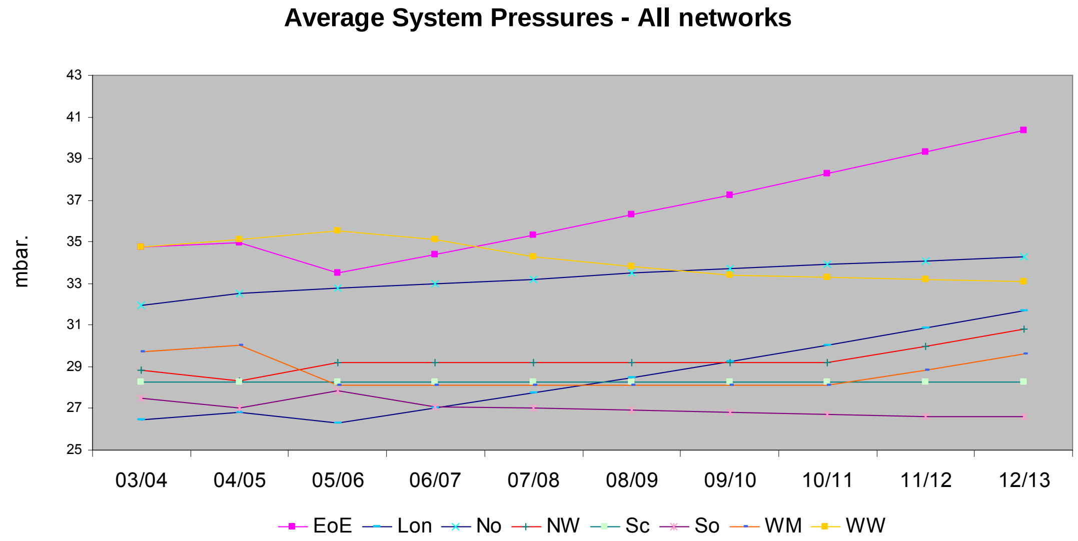

Figure 8-1

8.4 FORECAST

8.4.1 INTRODUCTION

It is to be expected that annual reductions in leakage should be a direct result of the replacement of older, mainly ferrous, mains with PE in distribution networks. Generally, the PE mains leakage rate is much lower than other materials, particularly cast iron. For North West, using supplied data, system leakage over the review period is forecast to be broadly flat for both MP and LP systems combined. There is an increasing proportion of PE mains over the period, due to mains replacement, and an increase of 1.6mbar in the average system pressure. This increase reflects NGG's policy to raise pressures to defer reinforcement if it is economic to do so. The overall effect may be to offset improved system integrity by increased leakage in the non PE mains asset inventory, but this is not conclusive.

Fig 8.2 shows North West's trends in gas lost due to leakage (GWh), average system pressures and the proportion of PE mains in the distribution system.

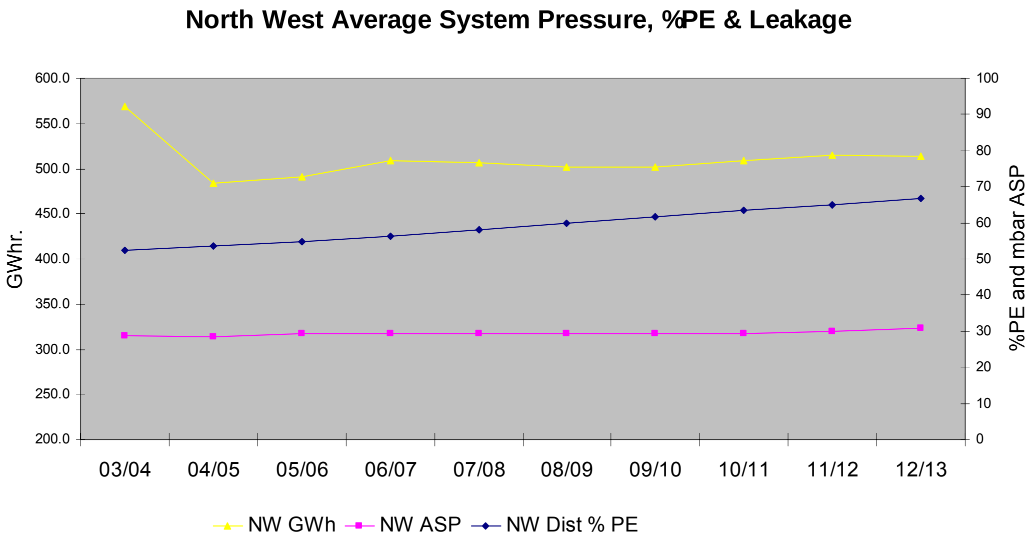

Figure 8-2

Whilst aiming to minimise the average system pressures at which the North West's networks operate NGG are increasing investment in pressure management and profiling systems compared to the past. North West has used a combination of seasonal pressure adjustment and clock control in respect of their non-profiled mixed material networks. When questioned, NGG replied that they expect to have further opportunities for optimising pressures via the identification of efficient pressure management schemes and the installation of profilers at key points.

Set against this background the moderate increase in average system pressures reflects cost effective capacity provision. Changes to the physical network and the continuing load growth maintain leakage volumes at broadly flat levels.

The factor used by NGG to determine OUG on the LTS has been agreed with shippers and is based on LDZ throughput. North West Network has a sensible programme to update and replace water bath heaters (the main demand for OUG) and associated controls, based on asset condition. This programme will ensure improved efficiency in the use of gas over the coming years, which represents good housekeeping and environmental control. The cost of this work is forecast at £5.8m over five years and is included in LTS Capex - PRS work less than £0.5m.

8.4.2 COMPANY PROPOSALS

North West's shrinkage factor forecasts for the review period range from 0.616% of throughput in 2008/09 to 0.555% in 2012/13 , as confirmed by the BPQ submission and summarised in Table 8.2.

8.4.3 PROPOSED PROJECTIONS

We have reviewed NGG's processes for assessing leakage performance and the leakage forecasts for North West network based on the BPQ narrative response, answers to supplementary questions and numerical analysis. The mains replacement programme results in reduced leakage but this reduction is offset by increased average system pressure. Leakage is forecast to increase marginally over the review period.

We have not identified any significant issues and are satisfied that NGG's forecast shrinkage levels for the North West network are realistic.

8.5 RECOMMENDATION

We recommend that NGG's forecast for shrinkage levels for the North West network is accepted.

9 XOSERVE

9.1 SUMMARY

Controllable Opex £m (2005/06 prices)	2008/09	2009/10	2010/11	2011/12	2012/13	Total
BPQ Submission	0.0	0.0	0.0	0.0	0.0	**0.0**
Normalisation Adjustments	3.5	3.5	3.5	3.4	3.4	**17.3**
Normalised BPQ	3.5	3.5	3.5	3.4	3.4	**17.3**
Adjustments	0.0	0.0	0.0	0.0	0.0	**0.0**
Proposed	**3.5**	**3.5**	**3.5**	**3.4**	**3.4**	**17.3**

Table 9-1

9.2 BACKGROUND

xoserve is a separate business which started trading on 1st May 2005 as a wholly owned subsidiary of National Grid Group. On 1st June it became multi-owned by the GDN's and National Grid UK Transmission. The shareholding is split amongst National Grid NTS (11%) and all the GDNs in proportion to the number of supply points in March 2005.

xoserve provides transactional services primarily through UK LINK, as well as IS Support and Change Management to the GDNs under an Agency Services Agreement (ASA).

The staffing of xoserve has been drawn mainly from staff transferred from the National Grid Gas business at the time of the creation of xoserve. The company has a board of six directors drawn from five owners.

xoserve claims to draw benefit from its close association with National Grid, using the main National Grid contracts where this is deemed to provide benefit to the business. A major part of this relationship is the provision of IS services via the Computer Sciences Corporation (CSC) contract which runs National Grid's mainframe, application server, desktop, help desk and telecommunications services.

9.3 KEY CHALLENGES

xoserve is planning a series of significant capital development projects in the next period, including a rewrite of UK-LINK. These projects are fundamental to the successful delivery of the xoserve services which in turn are supporting the competitive gas market. Xoserve have had comprehensive studies on the feasibility and analysis of these projects. We do not challenge the need or approach to these projects.

Project based work during the next formula period will be a major influence on the activities of xoserve and its management team. They estimate 60 of their staff will be deployed on these projects. It is clear that while the systems are operating satisfactorily at present, the xoserve are concerned that this project is delivered within these timescales to eliminate potential risks associated with the performance of the current systems.

The first of these major projects will be the replacement of the technology on which the UK-Link application runs, and is planned during 2007-2008. The second and larger project is the rewrite of the UK-Link systems planned for activity 2009-2013.

9.4 NORMAL OPERATIONS

In addition to supporting the IS application systems such as UK-Link xoserve also provide day-to-day clerical support activities on behalf of the GDNs, primarily to Shipper companies. Whilst some of these activities are provided in-house by xoserve, others such as the M-Number bureau are sub-contracted back to National Grid.

From the information presented in the BPQ and subsequently in the visit, we believe that the current management team are actively managing the contracts with all there suppliers (including National Grid) in order to maximise delivery and minimise cost.

Whilst this situation is currently commendable we would expect to see more formal targets to reduce costs and increase performance directly introduced from the xoserve board over the longer period of the price control. We are not suggesting such targets should be more onerous than those currently being applied, rather that the targets such be set on a more formal basis.

Further, more mechanisms must be considered which encourages the xoserve team to put forward innovative options to reduce costs. An example of this evidenced in the study was minimising the number of M-number calls the operation must deal with by making information available to the appropriate audience (for example by the internet) and thus reducing the number of calls for this service. These initiatives and opportunities are more likely to be spotted from within xoserve than from the GDNs and there must be rewards to xoserve for identifying and promoting such savings.

9.5 ONGOING COSTS

Table 9.1 summarises the situation with North West xoserve Opex costs, which were submitted as part of the work management submission and have been moved into a separate category.

xoserve has until now charged depreciation on its Capex costs to the GDNs.

PB Power understands that xoserve is now proposing to recover the cost of capital expenditure from the GDNs in the year in which it is incurred. To date the GDNs have treated xoserve charges as Opex – although some (NG and WWU) have submitted elements of Capex in their forecast costs. PB Power are therefore reviewing and, where necessary, adjusting the Opex/Capex split for each DN.

NGG has submitted a significant level of xoserve Capex for its networks, with minimal Opex.

They are piloting a six sigma quality programme for the next level of improvement this programme is aimed specifically at improving the quality of the service rather than cost reduction.

xoserve has restructured itself since its establishment into Service Development, Service Operations and Planning. They do expect some efficiency to be gained as a result. They have forecast a reduction in there total headcount of from 267 in 2005/06 to 216 in 2012/13 a 19.1% reduction (18.8% if agency staff are taken into account).

There is a step change in the cost forecasts for 2006/07 compared with 2005/06 actual expenditure as xoserve state the 2005/06 figure where atypical due to the nature of the formation of the business. We believe the opportunity to review the 2006/07 actual expenditure will provide more robust basis for assessing the ongoing costs. We note that the forecast used by xoserve assumes staff costs rising by 2% compared to the 1% we have used in our review. However we note that such an adjustment would be less 0.1% of the total expenditure and therefore we have not at this stage (prior to the 2006/07 actual expenditure being available) made any adjustment.

APPENDIX 1 FINANCIAL & ENGINEERING POLICIES

A1.1 INTRODUCTION

This appendix summarises our investigations of the financial and technical framework under which National Grid Gas Networks operates the Network. It considers the structure it utilises to effectively manage the network assets and the key policies it adopts to ensure it meets its Statutory Licence obligations and other legislative requirements.

A1.2 APPROACH

The key policies used by the Network have been reviewed and where appropriate comments are made on our findings.

Our analysis has been to consider key polices under the following headings:

Purpose -- context of the Policy, how it fits with legal requirements and its financial impact

Appropriateness -- does it deliver the required outcomes, are financial and/or technical risks adequately managed and does it fit with the Statutory and legal requirements of the Network owner/operator

Safety and Environment – are the safety and environmental risks appropriately managed, and are they clearly understood and documented

Omissions and Improvements – have any improvements or omissions been identified preventing achievement of the declared objectives

Implementation – have any issues relating to clarity of understanding and consistency of implementation been identified

This review of Policies and Procedures does not comprise a full and comprehensive approval process designed to ensure compliance with all policy requirements and statutes which could only be achieved with a properly conducted and structured audit programme. The objective is to consider whether the high level objectives of the policy are met and that the content is appropriate for the purpose intended.

A1.3 FINANCIAL AND TECHNICAL FRAMEWORK

National Grid Gas (Distribution) own and operate four gas distribution networks which are;

- London
- West Midlands
- East of England
- North West

NGG has largely completed a restructure of its business, using a centralised Asset Management model. This restructure was undertaken prior to, during and post completion of the sale of four of its Networks in 2005.

The model, which operates on a functional basis, consists of the following;

- Network Strategy
- Operations
- Construction
- Distribution Support
- Commercial
- Support Services Provision

The terms of the Licence held by NGG under the Gas Act requires them to;

- have a network code which sets out the transportation arrangements between NGG, the NTS, other DN’s and gas shippers for connection to and use of its pipeline system; and

- maintain security standards for system development. This standard stipulates that the pipeline system must be capable of meeting peak aggregate daily demand that is only likely to be exceeded (whether on one or more days) in 1 year out of 20 years

The Gas Safety (Management) Regulations 1996 require NGG to prepare a Safety Case for acceptance by the Health and Safety Executive. Compliance with the Safety Case is mandatory and the NGG Gas Requirements Manual (GRM) is a depository of the policies and procedures that ensure NGG fulfils its Safety Case obligations and meets the requirements of the Transporter Licence.

An overview of the financial and technical framework within the Network is shown in the table below.

A1.3.1 FINANCIAL AND TECHNICAL FRAMEWORK

Board Level	
Statutory, legal and regulatory requirements	
Financial	Technical
Investment Guidelines	
Budgeting process	Safety Case
Project definition, alternatives etc.	Gas Requirements Manual
Levels of authority	Safety & Technical Competence
Monitoring & control	Policies and Procedures
Re-authorisation of over/underspends	Change Process & authorisation
Project completion	Compliance Audit
PIAs	

The key requirement of this framework is that the Board of NGG structures and operates the business to ensure compliance with the statutory, legal and regulatory obligations placed upon them.

A1.3.2 TECHNICAL POLICY FRAMEWORK

The Gas Requirements Manual (GRM) defines the policies associated with engineering of the Network assets, protection of the public, the well being of the workforce and contractors and the protection of the environment. The GRM is the central policy document that governs all other SHE and Engineering documents. It summarises the high-level arrangements for key gas activities, provides links to other documents for full details in specific subject areas and is regarded as the key document referenced by managers and staff involved in gas engineering activities. The GRM, in conjunction with the Safety Case, describes what they do and how they operate to achieve a safe and reliable gas transportation network.

The GRM covers the following areas:

1. Legislative Compliance	12. Gas Quality
2. Risk Management	13. Metering
3. Control of Documents	14. Incident Reporting and Investigation
4. Change Management	15. Network Planning Analysis
5. Technical Authority Levels: Competence and Behaviour	16. Records Data Management
6. Safe Working Practices and Safe Control of Operations	17. Network Asset Integrity
7. Environment	18. Distribution Pipe Replacement
8. Occupational Health	19. LNG
9. Use of Contractors	20. Audit
10. Gas Escapes	21. Security
11. Gas Supply Emergencies	22. Telemetry

A1.4 POLICY DEVELOPMENT AND CONTROL

Within NGG, engineering and SHE documents are developed and approved within a governance framework which is headed by the Gas Safety and Engineering Committee (GSEC).

The detailed arrangements for the control of these documents are contained in T/PM/GR/2: Management Procedure for the Control of SHE and Engineering Documents.

A summary of the arrangements is given below:

- The Gas Safety and Engineering Committee (GSEC), the UK Distribution Executive Safety Health and Environment Committee (DSHE) form an integral part of the company's governance process.
- The primary body is the Transco Board which is supported by executive committees.
- The Gas Safety and Engineering Committee (GSEC) reports to the Board and is responsible for safety and engineering issues, and for ensuring consistency across the company with regard to health, safety, environment and engineering.

NGG have appointed Policy Managers for each of the major disciplines reporting to the Director of Network Strategy.

A1.4.1 FINANCIAL POLICY FRAMEWORK

Under Section 9 of the 1986 Gas Act, National Grid Gas has a general duty to develop and maintain an efficient and economical system of gas distribution, to comply with any reasonable requests for connections (provided economic) and to facilitate competition in the supply of gas. The successful management of major investment projects is central to ensuring that National Grid Gas complies with these duties.

The investment management strategy is supported by Distribution Investment Guidelines [v8.5 March 06] which are designed to ensure that all project expenditure can be justified on safety, business, technical and / or economic grounds and is properly controlled.

Most expenditure is authorised by the Distribution Project Sanctioning Committee [DPSC]. The DPSC is a sub-committee of the Distribution Executive Committee. DPSC receives business case submissions for authorisation and, where appropriate, re-sanctions capital and revenue expenditure and special revenue expenditure within its current delegated authority level. It also supports and recommends for approval submissions that are above its delegated authority for authorisation to the National Grid Group Executive or Board as appropriate.

The membership of the DPSC is given as;

- Chief Operating Officer
- Finance Director
- Director of Network Strategy, Distribution
- Director of Construction
- National Operations Director
- Director of Safety, Health and Environment
- Commercial Director
- Distribution Regulation Manager
- General Counsel
- General Procurement and Logistics Manager

Terms of reference for the DPSC are given in Appendix 1 of NGG's Investment Guidelines document.

Levels of delegated authority are set within the financial policy framework of NGG consisting of primary, secondary, tertiary and lower delegations. Primary delegations set the authority at the highest level for the NG Group Board, NG Group Executive and the Executive Group Directors. Secondary delegations represent the limits for Subsidiary (or business) Boards. Tertiary delegations are the authorities given to Executive Teams and any direct reports to Directors. Beyond this are lower delegations that flow directly from tertiary delegations.

The returns made by NGG indicate that control over expenditure is maintained via the implemented policies and investment control bodies and a process for post investment reviews/appraisals (PIR/A) is in place.

A1.5 FINDINGS

A1.5.1 ENGINEERING AND SAFETY POLICY DOCUMENTS

The various levels of engineering and safety documents together with the associated governance arrangements have been reviewed and no issues found.

A1.5.2 TECHNICAL FRAMEWORK

The Technical governance process within NGG is clear and well formulated. Mandatory change control processes are in place to ensure proper document control and policy governance. Directors and Senior Managers are involved in the major governance groups reviewing and authorising safety, health, environmental and engineering policies. Arrangements are in place to review the impact of changes to legislative requirements and, importantly, to learn lessons from incidents or near misses should they occur.

A1.5.3 FINANCIAL FRAMEWORK

The documents reviewed show a clear process for budget formulation and approval, financial control and monitoring of investment expenditure. The Distribution Investment Guidelines were clear and precise and contained good advice and examples which we feel would create consistently high standards of project submission when followed.

APPENDIX 2 PROCUREMENT & LOGISTICS

A2.1 INTRODUCTION

Following on from the one year review a further review and assessment of the procurement and logistics operation within NGG has been completed to ascertain whether or not the strategic approach and process is robust and effective in managing costs whilst maintaining security of supply.

Since the sell off of the Networks by National Grid, the new networks including NGG have a different market place in which to procure goods, services and works to support their business. There is no longer the advantage of large volume and single buyer status, so it is therefore crucial for the Network Companies to look for ways through procurement and logistics to obtain the best market solution possible for their particular needs and minimize costs.

A2.2 SOURCING STRATEGY

NGG do their procurement and logistics in-house and have a robust well established process.

A2.3 STRATEGIC PURCHASES

A2.3.1 MAINS AND SERVICE LAYING

NGG have put in place both alliance and term contracts. The spend for these contracts for the year to 31st March 2006 was £195m. The procurement process followed for these contracts was thorough and will have tested the market and the suppliers who tendered. As this is a very high spend strategic purchase, management of and the relationships in the contract are key to its success.

The one year review stated that after the first year (to 31st March 2006) the alliances were in gain share and that NGG has seen a 6 to 10% saving on previous EPC costs. The five year review has indicated that there has been a step change in costs of +25% for Repex services. Some of these costs may be due to market forces but NGG need to ensure that the contract is being effective and that cost reductions and continuous improvements are being implemented to minimize the unavoidable cost increases.

A2.3.2 CONNECTIONS

NGG is currently evaluating its options for the provision of New Housing and Non-Domestic connections following the expiry (30th June 2007) of the current SPC with Fulcrum connections.

The two options being considered are:

- A fully competitive tender in the open market or
- Full insourcing

NGG have demonstrated that they are considering how to address issues from the previous contract arrangements and have already tried to address under-recovery by introducing prospective pricing (effective 1st July 2006) and have made changes to Siteworks terms (effective 1st April 2006), these changes will be embedded within any future arrangements.

A2.3.3 BULK PURCHASES

NGG's overall strategy in the procurement of bulk purchases, specifically commercial vehicles, telecoms, office furniture and tools & equipment is to use their group leverage by consolidating their requirements across both Gas and Electricity. Most of these categories have been competitively tendered using group leverage and therefore they should have achieved the best market costs for their requirements.

They have also competitively tendered their PE pipe and fittings requirements and have contracts in place with two suppliers. The contracts are proactive in product development and continuous improvement providing a positive approach to reducing costs and minimising the impact of unavoidable cost increases.

A2.3.4 SECURITY OF SUPPLY

NGG employ two strategies to ensure security of supply. They hold stock within their supply chain and secondly have multi-sourcing arrangements for strategic purchases e.g. PE pipe and fittings, where contracts are held with two suppliers who are capable of meeting their requirements.

A2.4 LABOUR SHORTAGES

Security of supply for Labour is primarily provided through the use of Alliance, Term and Agency contracts which enable flexible access to skilled resources within the competitive constructor market. NGG also plans to recruit apprentices and adult recruits. In 2007 they also plan to establish two Competence and Assessment Centres for new and existing employees. This will mean an initial investment of £5m and an annual operating cost of £450k.

The number of apprentices planned is 300 from 2007 to 2013 taking on 50 per year. Adult recruits are planned to be a total of 500 during the same period with varying numbers each year.

These plans show a positive approach to increasing the skilled labour in the industry.

A2.5 SUMMARY

NGG have a strong well established procurement process. The evidence provided has demonstrated their ability to test the market and implement new and innovative ways of reducing costs through effective procurement.

Where possible they have stated that they are using their group purchasing power to gain benefits. In other areas where they were once in a very powerful position as the only buyer, they now have to look for other ways to encourage continuous improvement and cost reduction. This has been demonstrated by the contracts they have in place for mains & service laying and PE pipe & fittings.

APPENDIX 3 EMERGENCY SERVICE COSTS AND THE IMPACT OF THE LOSS OF METERWORK

[Appendix redacted]

APPENDIX 4 GTMS/SOMSA EXIT PLANS

A4.1 INTRODUCTION

In February 2003, NG announced a 2-year program of Gas Distribution Control centralisation from 4 centres into a single UK control centre at Hinckley. The activity was to be carried out as part of the Control Centre Development Project (CCDP) an encompassing program that moved the gas national control centre to a new purpose built facility in Warwick.

The Distribution National Control Centre (DNCC) was opened in summer 2005 with full UK gas distribution control undertaken from Hinckley.

The Gas Transportation Management System (GTMS) is the Supervisory Control & Data Acquisition (SCADA) System that Controls the combined UK Distribution Networks. Originally, the System was to be replaced as a part of the roll out of the Transmission Control System; the iGMS project. However, a new iGMS for Distribution Control was removed from the program. The logic of the curtailment was entirely due to a change in focus of the NG business. Originally seen as a fully integrated system involving UK gas control, the company faced business separation issues as a result of Network sales, which rendered iGMS, for distribution, as an unfeasible option.

Given the backdrop of the issues of business separation the decision was then taken to alter the business ownership of DNCC moving management responsibility to Distribution, Network Strategy. The function of Distribution control is performed from Hinckley, which is wholly owned and operated by National Grid, with an agreement to operationally service all independent networks under a contract. That contract, known as SOMSA – System Operation Managed Service Agreement – is for all Operating services required for any given network.

A4.2 GMTS REPLACEMENT

GTMS is old technology based upon a Logica system dating from the mid 1980’s. The System has been enhanced in house by NG over the years since its inception and has been used in its current form since 1996. However, one of the drivers for iGMS was the age of the GTMS product. GTMS spares availability is limited and there are issues of unsupported software by the manufacturer. NG undertook and completed work to establish the viability of continued running & support; the outcome was that it was considered unsustainable beyond 2009 and that a new System must be sought as a matter of some urgency. Investigation was undertaken into the possibly of moving the system to new computer hardware. Unfortunately, GTMS programmes are also embedded into the Operating System; a system that is not supported by the manufacturer.

A project was therefore established to keep GTMS functioning until 2009, the Prolonged Active Life (PAL) and a second project to replace GTMS was given approval in autumn 2005. Work was undertaken to provide a replacement specification on a modern platform, put the specification to market and engage a suitable contractor. After some 10 months of work SERCK controls was chosen from a shortlist of 4 companies.

The Distribution National Control System (DNCS) Project aims to replace GTMS with a like for like System but on a modern and sustainable platform and at the least possible cost to the industry as a whole.

A4.3 NETWORK SALES

The sale of distribution networks had a profound effect on gas distribution control for all parties, Distribution Networks and Control staff.

It was clear at the outset that given the safety elements associated with gas control and the difficulties to unpick control operations that handling distribution control for the newly formed businesses would be extremely difficult. An agreement (contract) was developed, referred to earlier as SOMSA. A team was established at Hinckley who constructed, trained staff on and issued industry standard procedures for use by Network and control staff alike. The agreements were established between NGG and all other network owners. However, the SOMSA has always had a finite lifespan and a clear condition of the sale was that control should pass to the new owners. The costs associated with this transfer being factored into the sales process. To allow for the planning of the transfer post sales, Ofgem allowed a relinquishment of operational control for an initial period until March 2008, with the possibility of an extension beyond this stage subject to clear exit planning.

The agreement includes the provision of data and access to Systems to facilitate the transfer of control; however, it specifically excludes the provision of a SCADA System.

A4.4 AGREEMENT TO WORK TOGETHER

Following sales all owners reviewed the options for the provision of a new SCADA system to enable control to be passed back to the new owners. The owners all came to the conclusion that a collaborative approach to replacing the GTMS was the best way forward. Having considered the options available we would support this approach, although risk management is essential to ensure such a collaborative approach does not have difficulties in management and decision-making. It can be stated that we feel some of the risk factors are mitigated by a like for like arrangement in that the specification will be clear.

The approach was to replace the system, initially at Hinckley, and once proved robust further phases would establish the same system at the new owner locations and transfer from Hinckley would then be made.

A governance process has been adopted with an overarching program board to cover all activities associated with SOMSA exit of which GTMS replacement was one of several activities and has it's own project board and governance.

It is clear from the governance structure that SOMSA Exit is the goal with GTMS replacement as an enabler.

Network Owners need to provide their own project management delivery organisation to dovetail into the collaborative project.

Each owner has expressed a wish to exit. Early indications are a timetable as follows:

- Summer 2008 SGN
- Spring 2009 NGN
- Autumn 2009 WWU

However, there are no detailed transfer plans in place with NG for the transfer of operation. The owners continue to jointly work together to identify and understand the exact extent of the activities that would have to be completed by all participants.

APPENDIX 5 REGIONAL FACTORS

A5.1 BCIS REGIONAL & COUNTY FACTORS

The Regional and County Factors is published by BCIS, a trading Division of the Royal Institute of Chartered Surveyors (RICS). The figures published in October 2006 have been adapted in order to generate a suitable regional factor index for each GDN for comparison purposes for the review.

The county indices have been modified to remove Orkney Islands Area, Shetland Islands, Northern Ireland and the Channel Islands from the figures. Counties have been allocated to GDNs and where they fall between two GDNs and estimate of the spilt between the GDNs has been made.

The table below lists the Counties which have been split between GDNs and the allocation which has been assumed for each GDN.

COUNTY	WW	No	So	EoE	Lon	NW	WM
Cumbria		70%				30%	
South Yorkshire		50%		50%			
Essex				70%	30%		
Hertfordshire				90%	10%		
Berkshire			75%		25%		
Buckinghamshire			75%		25%		
London Postal Districts			50%		50%		
Outer London			35%	30%	35%		
Hereford and Worcester	20%						80%
Cheshire						80%	20%

Table A5 - 1

The regional factor for the GDN is calculated as a weighted average of the total county factors based on the sample sizes. The BCIS data includes a sample size for each county together with the factor for that county. Where the Counties are considered to fall into one or more GDN footprint we have estimated the proportion of the County sample which should be allocated to each GDN. (For example the sample size for London Postal Districts in the BCIS data is 528, we have estimate that this County should be split 50% to each of London and Southern GDNs, therefore sample sizes of 264 have been allocated to each GDN)

For each GDN a weighted average factor is then calculated. The resulting tables used to produce the GDN indices are given below.

Wales & West	Network/ County Factor	Sample Size
Avon	1.02	92.0
Cornwall	0.99	103.0
Devon	0.99	163.0
Gloucestershire	1.02	73.0
Somerset	0.99	74.0
Hereford and Worcester	0.94	23.8
Clwyd	0.87	50.0
Dyfed	0.94	36.0
Gwent	0.92	52.0
Gwynedd	0.89	23.0
Mid Glamorgan	0.91	54.0
POWYS	0.90	23.0
South Glamorgan	0.93	46.0
West Glamorgan	0.89	31.0
Network Value	**0.96**	**843.8**

Table A5 - 2

Northern	Network/ County Factor	Sample Size
Cleveland	1.02	62.0
Cumbria	1.05	44.1
Durham	1.01	113.0
Northumberland	1.04	46.0
Tyne Wear	1.01	172.0
Humberside	1.00	104.0
North Yorkshire	1.03	92.0
South Yorkshire	1.01	63.5
West Yorkshire	1.00	212.0
Network Value	**1.01**	**908.6**

Table A5 - 3

Scotland	Network/ County Factor	Sample Size
Borders Scotland	0.99	18.0
Central Scotland	0.98	32.0
Dumfries & Galloway	0.93	23.0
Fife	0.96	62.0
Grampian	0.90	134.0
Highland	0.93	42.0
Lothian	1.02	131.0
Strathclyde	1.03	363.0
Tayside	0.98	85.0
Network Value	**0.99**	**890.0**

Table A5 - 4

Southern	Network/ County Factor	Sample Size
Kent	1.05	215.0
Surrey	1.10	151.0
East Sussex	1.05	119.0
West Sussex	1.04	118.0
Berkshire	1.04	100.5
Buckinghamshire	1.03	135.8
Hampshire	1.01	293.0
Isle of Wight	1.00	18.0
Oxfordshire	0.99	104.0
London Postal Districts	1.18	264.0
Outer London	1.10	112.0
Dorset	1.02	96.0
Wiltshire	1.01	94.0
Network Value	**1.06**	**1820.3**

Table A5 - 5

East of England	Network/ County Factor	Sample Size
South Yorkshire	1.01	63.5
Derbyshlre	0.94	120.0
Leicestershire	0.94	92.0
Lincolnshire	0.94	81.0
Northamptonshire	1.00	123.0
Nottinghamshire	0.93	135.0
Cambridgeshire	1.04	185.0
Norfolk	0.98	102.0
Suffolk	1.01	109.0
Bedfordshire	1.02	71.0
Essex	1.02	152.6
Hertfordshire	1.06	117.0
Outer London	1.10	96.0
Network Value	**1.00**	**1447.1**

Table A5 - 6

London	Network/ County Factor	Sample Size
Essex	1.02	65.4
Hertfordshire	1.06	13.0
Berkshire	1.04	33.5
Buckinghamshire	1.03	45.3
London Postal Districts	1.18	264.0
Outer London	1.10	112.0
Network Value	**1.11**	**533.2**

Table A5 - 7

North West	Network/ County Factor	Sample Size
Cumbria	1.05	18.9
Cheshire	0.92	127.2
Greater Manchester	0.93	297.0
Lancashire	0.93	167.0
Merseyside	0.94	175.0
Network Value	**0.93**	**785.1**

Table A5 - 8

West Midlands	Network/ County Factor	Sample Size
Hereford and Worcester	0.94	95.2
Shropshire	0.93	79.0
Staffordshire	0.91	133.0
Warwickshire	0.96	96.0
West Midlands	0.94	318.0
Cheshire	0.92	31.8
Network Value	**0.94**	**753.0**

Table A5 - 9

APPENDIX 6 RE-ALLOCATIONS

A6.1 INTRODUCTION

In late January 2007, following our initial work to normalise and then analyse GDNs' cost data it became apparent from the analysis that there was still a considerable amount of inconsistent cost allocation issues for direct Opex activities which needed to be resolved. We requested further detail from the networks to enable us to ensure consistency between the submissions and to assist Ofgem in refining the guidance for the update BPQ that is due to be issued to capture 2006-07 actual expenditure and revised forecasts.

This was completed as a two stage process which helped minimise the volume of data required to be submitted. The first stage involved the completion of a workbook which broke down the key direct Opex activities within the 7 areas of expenditure. For each of the 7 areas the network was asked to select where each expense item/sub-activity had been allocated.

Following these initial replies further details were requested in the areas where inconsistent allocation had been identified. The results of this re-allocation, details of which are set out in Table 6-A-1 were used for our analysis at the time. Additional information became available in March 2007, which has been incorporated into the most recent analysis presented in this report.

NGG has also recently provided additional information on maintenance related staff resources coded to the Work Management activity. This was not provided at the time of the GDN reallocation and although the data has been included in the normalisation tables for Work Management and Maintenance, it is not included in this Appendix and we have not had the opportunity to analyse this information in detail.

A6.2 RE-ALLOCATION RESULTS

The table below documents the information passed back from NGG as a result of the reallocation process.

North West Network Re-allocation details £m 2005/06 prices	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
Work Management	**3.22**	**4.52**	**3.31**	**2.91**	**2.31**	**2.01**	**1.92**	**1.92**	**22.12**
Loan of cooking/heating costs	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.91
NRSWA penalties	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	1.48
Calorimeter calibration (NSA for some GDNs)	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.20	1.46
Requests Connections Quotations (Other PGTs) - domestic	0.17	0.17	0.18	0.18	0.18	0.18	0.19	0.19	1.43
Reinstatement (staff costs)	-0.22	-0.23	-0.24	-0.25	-0.26	-0.26	-0.26	-0.26	-1.97
Indirect Non Formula Overheads	2.80	4.10	2.90	2.50	1.90	1.60	1.50	1.50	18.80
Repair	**0.03**	**0.04**	**0.05**	**0.07**	**0.07**	**0.07**	**0.08**	**0.08**	**0.49**
Repair NRSWA Costs	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-1.48
Reinstatement (staff costs)	0.22	0.23	0.24	0.25	0.26	0.26	0.26	0.26	1.97
Emergency	**-0.08**	**-0.08**	**-0.08**	**-0.08**	**-0.08**	**-0.08**	**-0.08**	**-0.08**	**-0.61**
Loan of cooking/heating costs	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.61
Maintenance Storage	**-0.03**	**-0.03**	**-0.03**	**-0.03**	**-0.03**	**-0.03**	**-0.03**	**-0.03**	**-0.25**
Insurance Inspection (Consultancy Fees)	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03	-0.25
Maintenance Other	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.25**
Insurance Inspection (Consultancy Fees)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.25
Other Direct	**-0.21**	**-0.21**	**-0.21**	**-0.22**	**-0.22**	**-0.23**	**-0.23**	**-0.24**	**-1.77**
Loan of cooking/heating costs	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.30
Calorimeter calibration (NSA for some GDNs)	-0.17	-0.17	-0.18	-0.18	-0.18	-0.19	-0.19	-0.20	-1.46
Transfer to/from Indirect	**-2.97**	**-4.27**	**-3.08**	**-2.68**	**-2.08**	**-1.78**	**-1.69**	**-1.69**	**-20.23**
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Table 6A - 1

APPENDIX 7 DATA TABLES & REGRESSION

A7.1 INTRODUCTION

Much of the data entered into the BPQs submitted in October 2006 has been transferred to a database format within Microsoft Excel.

The format allows the data to be manipulated in a number of ways to enable PB Power to determine the appropriate analysis mechanism for each activity.

The sections below give explanations and worked examples of the data calculations use on our analysis.

A7.1.1 ANALYSIS USED

There are three principal forms of analysis which have been carried out to make the projections for our proposals.

The first uses regression analysis to carry out comparisons between the costs and workloads of each GDN. The projection is based on a base year of either 2005/06 or 2006/07 using drivers to project our proposals for the full control period. The GDN's own proposals are used as a test against our own projections.

The second makes use of the GDN's own proposals across the whole period. In order to use the GDN's proposals we first remove the GDN's own assumptions for RPEs. PB Power's assumptions for RPE are then applied to create the final proposal.

Finally PB Power has also made use of bottom-up analysis where regression was not appropriate or to support the use of regressions.

A7.1.2 REGIONAL FACTORS

Regional factors have been considered to impact the costs of activities carried out in the network, unless specifically stated otherwise. Costs are disaggregated into the four categories of Contractors, Direct Staff/Overheads, Materials and Other. Regional factors have been applied to Contractor and Direct Staff costs. No regional factors have been applied to materials or other expenditure.

A7.1.3 RPE ADJUSTMENTS

NGG's assumptions for RPEs used in the analysis are shown in the table below.

<table>
<tr><th>GDN</th><th>Activity</th><th>Contractors</th><th>Direct Staff</th><th>Materials</th><th>Other</th></tr>
<tr><td rowspan="2">London</td><td>LTS</td><td rowspan="2">3.75%</td><td rowspan="4">2.00%</td><td>1.64%</td><td rowspan="4">0.00%</td></tr>
<tr><td>Other</td><td>2.20%</td></tr>
<tr><td rowspan="2">Others</td><td>LTS</td><td rowspan="2">2.20%</td><td>1.64%</td></tr>
<tr><td>Other</td><td>2.20%</td></tr>
</table>

Table 7A - 1

PB Power assumptions for RPEs used in the analysis are shown in the table below

Contractors	Direct Staff	Materials	Other
2.25%	1.00%	1.00%	0.00%

Table 7A - 2

A7.1.4 EXPENDITURE CATEGORIES

A number of different expenditure categories are listed in the BPQ. Each category has been aligned to one of the four categories used within our analysis. The table below lists these allocations.

BPQ Category	Expenditure category
Accounting Control	other
Atypicals	other
Bad debt	other
Depreciation	other
Excluded Services	other
Formula rates	other
income	income
Materials	materials
misc expenditure	other
Net Staff Costs (including Agency Costs)	direct
Non salary staff costs (including T&S)	other
NSA's	other
Ofgem Licence	other
Other	other
Other	other
Pension deficit / surplus	other
PPF Levy	other
Professional and consultancy fees	contract
Profit/ loss on sale of fixed assets	other
Release of Customer Contributions	other
Rents and buildings	other
Road occupation cost	other
Shared services cost from table B2	other
Shared services cost from table B2	other
Shrinkage	other
Subcontractors	contract
Transport & plant	other
Wayleaves	other
Xoserve	other

Table 7A - 3

A7.2 WORKED EXAMPLE

A worked example is given below for the Repair work activity in East of England. Many of the principles of the data calculations are similar for other work activities, where different techniques are used these are detailed under the appropriate activity heading.

A7.2.1 EXPLANATION OF THE COSTS AND VOLUME INPUTS TO THE REGRESSION ANALYSIS.

For Repair the regression analysis has been carried out on the 2005/06 data although for some other activities 2006/07 has been used as the base year. Full details of the reasoning behind the choice of base year are given in the main report under each activity.

All regression calculations for repair are carried out using Gross costs.

Steps for tracking the data:

From the BPQ the Repair costs submitted have been taken as below

Category	Gross £m 2005/06
contract	4.52
direct	5.19
materials	1.06
other	0.55
Gross	**11.31**

Table 7A - 4

The BPQ costs have been normalized in 2 stages. The initial stage makes the Cost transfers, GDN reallocations accounting adjustments and pension adjustments. These adjustments are shown within the pivot tables as **Adjusted BPQ.**

The final stage of the normalization is the adjustments for Removed Costs. These final costs adjustments are made within the analysis sheets directly.

The table below listed the Adjusted BPQ figures.

Category	**Gross £m 2005/06**
contract	4.52
direct	4.51
materials	0.74
other	0.35
Gross	**10.12**

Table 7A - 5

There are no removed costs which feed into any of the regression calculations.

In order to calculate the National figures both contract costs and direct costs are divided by the appropriate regional factor to calculate the **RF Adjusted** figures.

GDN Regional Factor	**Contractor**	**Direct**
East of England	1.00	0.98

Table 7A - 6

Contract **4.52 / 1.00 = 4.52**
Direct **4.51 / 0.98 = 4.61**

Materials and other costs are not adjusted for regional factors.

Category	**£m 2005/06**
contract	4.52
direct	4.61
materials	0.74
other	0.35
Gross	**10.22**

Table 7A - 7

Total regionally adjusted costs into regression is **£10.22m**

This cost figure is used in the regression analysis along with the equivalent values for other GDNs.

A7.2.2 COST DRIVER

The workload is weighted by a standard monetary unit value for each activity. The workload id taken from the C18 Sheet supplied in the Capex/Repex PBQ submission.

Type of Repair	Number
Actioned Repairs to mains (condition)	10002
Actioned Repairs to mains (damage)	665
Actioned Repairs to services (condition)	5789
Actioned Repairs to services (damage)	4990
Total	**21446**

Table 7A - 8

The number of repairs to mains (condition) has been estimated against each pipe size according to the percentage population of pipes installed in the network.

Pipe Size	% Installed
</=3"	3%
4-5"	52%
6-7"	23%
8-9"	10%
10-12"	8%
>12-18"	2%
>18-24"	1%
>24"	0%

Table 7A - 9

The same representative unit costs have been used each Network and have been chosen by reference to contract rates for the four repair types; these are shown in the table below. The number of repairs of each type is multiplied by the appropriate unit cost and summed to calculate the total CSV for the repair activity.

Repair Type		Unit Cost £
Mains (Condition)	</=3"	554
	4-5"	595
	6-7"	688
	8-9"	1130
	10-12"	1130
	>12-18"	1856
	>18-24"	1889
	>24"	3846
Service (Condition)		250
Mains (Damage)		326
Service (Damage)		202

Table 7A - 10

Repair Type		Unit Cost £
Mains (Condition)	</=3"	150
	4-5"	3115
	6-7"	1558
	8-9"	1134
	10-12"	950
	>12-18"	432
	>18-24"	264
	>24"	41
Service (Condition)		1447
Mains (Damage)		217
Service (Damage)		1006
Total		**10314**

Table 7A - 11

For Repair activities the total CSV is 10314. This figure has been used in the regression analysis.

A7.2.3 REGRESSION TABLE

The complete Repair regression table is given below:

GDN	2005/06	
	Volume	Cost
EoE	10314	10.22
Lon	8435	9.90
No	11374	10.69
NW	10853	10.82
Sc	7194	11.62
So	22466	21.63
WM	6677	7.10
WW	9805	9.93

Table 7A - 12

On all regression charts the volume driver is plotted along the x-axis and cost against the y-axis.

From this regression table the regression line is obtained and an upper quartile benchmark calculated as the target.

The regression formula takes the form **Slope** x **(Volume)** + **Intercept** = **(Cost)**

Regression Formula 0.000816 x (Volume) + 2.59766 = (Cost)

Benchmark Formula 0.000732 x (Volume) + 2.59766 = (Cost)

A7.2.4 COST PROJECTIONS

Having calculated the benchmark regression formula for the base year, the ***slope*** and ***intercept*** of this formula is reduced each year by the PB Power assumptions for productivity improvements.

Year	Slope	Intercept
2005/06	0.000732	2.59766
2006/07	0.000725	2.57168
2007/08	0.000717	2.54597
2008/09	0.000710	2.52051
2009/10	0.000703	2.49530
2010/11	0.000696	2.47035
2011/12	0.000689	2.44565
2012/13	0.000682	2.42119

Table 7A - 13

The formula is then used each year, with the work driver, to calculate the regionally adjusted cost for the total workload. This total is broken back into the individual activities in proportion to the weighted workload driver for each activity.

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Weighted Workload	10314	10997	10280	9992	9712	9440	9177	8921
Benchmark	10.15	10.54	9.92	9.62	9.32	9.04	8.77	8.51
Baseline	10.22	10.62	9.99	9.68	9.39	9.10	8.83	8.57
Gap	0.07	0.08	0.07	0.07	0.06	0.06	0.06	0.06
Line A	30%	30%	42%	53%	65%	77%	88%	100%
Line B	100%	100%	88%	77%	65%	53%	42%	30%
Convergence	0.07	0.08	0.06	0.05	0.04	0.03	0.02	0.02
Proposed (Ex RPE & RF)	10.22	10.62	9.98	9.67	9.37	9.08	8.80	8.53

Table 7A - 14

In the example of Repair the 2005/06 benchmark calculation is performed as follows:

$$0.000732 \times (10314) + 2.59766 = (10.15)$$

A similar calculation is performed for each year and also for the baseline performance.

The gap between the baseline performance and the benchmark performance is calculated and a convergence is calculated using the percentages in either Line A or Line B in table 7A-14. If the gap figure is negative line A percentages are used if the gap figure is positive line B percentages are used. The convergence element is added to the benchmark figure to produce the proposed cost (prior to regional factors and RPE adjustments being applied).

In order to reapply regional factors and PB Power's assumptions for RPEs the average of 2nd and 3rd placed GDNs breakdown expenditure percentages for Contractors, Direct/Overheads, Materials and Other has been used.

A7.3 WORK MANAGEMENT

A7.3.1 ANALYSIS USED

Regression analysis has been used for Work Management. The regression has been carried out on a linear basis using a composite variable reflecting distribution system network length and the PB Power adjusted numbers of Public Reported Escapes (PREs) and Repairs. To calculate the composite variable, the numbers of PREs and repairs were normalised to the network length and were summed with the network length using the following weightings, 40% network length and 30% each for PREs and repairs. This composite variable was then compared in the regression analysis with the normalised work management Opex. The base year for Work Management is 2005/06.

A7.3.2 DATA USED IN THE ANALYSIS

The data provided in the BPQ, split the Work Management expenditure into various components, these were then aligned to the four components of Contractors, Direct/Overheads, Materials and Other. The term 'Sum other' is used in the data release workbooks to reflect the addition of any Income into the Other category.

A7.3.3 REGRESSION TABLE

Details are provided in the data release workbook.

A7.4 EMERGENCY

A7.4.1 ANALYSIS USED

Regression analysis has been used for Emergency. The regression as been carried out on a linear basis using a composite variable reflecting the PB Power adjusted numbers of PREs and Repairs. To calculate the composite variable, the numbers of PREs and repairs were adjusted into a weighted average using a weighting of 80% PREs and 20% repairs. This composite variable was then compared in the regression analysis with the normalised emergency Opex. The base year for Emergency is 2005/06.

A7.4.2 DATA USED IN THE ANALYSIS

The data provided in the BPQ, split the Emergency expenditure into various components, these were then aligned to the four components of Contractors, Direct/Overheads, Materials and Other. The term 'Sum other' is used in the data release workbooks to reflect the addition of any Income into the Other category.

A7.4.3 REGRESSION TABLE

Details are provided in the data release workbook.

A7.5 OTHER DIRECT ACTIVITIES

A7.5.1 ANALYSIS USED

Regression analysis has been used for Other Direct Activities. The regression as been carried out on a log linear basis using the driver of total network length (distribution above and below 2 bar and LTS) in km. The driver has been compared in the regression analysis with the normalised other direct activities Opex The base year for Other Direct Activities is 2006/07.

A7.5.2 DATA USED IN THE ANALYSIS

The data provided in the BPQ, split the Other Direct Activities expenditure into various components, these were then aligned to the four components of Contractors, Direct/Overheads, Materials and Other. The term 'Sum other' is used in the data release workbooks to reflect the addition of any Income into the Other category.

A7.5.3 REGRESSION TABLE

Details are provided in the data release workbook.