Evaluation of Algorithm Performance - 2005/06 Gas Year
Scaling Factor and Weather Correction Factor

The annual gas year algorithm performance evaluation normally considers three sources of information as follows:

- daily values of scaling factor (SF) and weather correction factor (WCF)
- reconciliation variance data for each EUC
- daily consumption data collected from the NDM sample

The material presented here refers only to SF and WCF data. The other strands of this evaluation will be available for consideration at a subsequent DESC meeting.

The SF and WCF-EWCF graphs this year range over two whole gas years 2004/05 and 2005/06. These graphs are presented in their now standard form for each LDZ, in Figures 1 to 13 of this note. Tables of average values of the SF and WCF-EWCF, for gas years 2004/05 and 2005/06, along with the differences in these averages between the two gas years, are presented in Tables 1 to 6. It should also be noted that SF and WCF values have been obtained for the period 1st to 10th October 2006 (the start of the new gas year 2006/07) and appended to the graphs of the previous two completed gas years.

Additionally, the root mean square deviation of SF from 1 has also been computed for each discrete month during the previous gas years 2004/05 and 2005/06, and the respective figures can be found in Tables 7 and 8. The differences in these RMS values between the two gas years are presented in Table 9. These figures provide a very useful additional measure of the variability of SFs about one (the ideal value).

These various graphs and tables indicate the following notable points:

- Examination of the average weekday and weekend day values of WCF-EWCF in Tables 4 and 5, indicates that WCF bias, as measured by the deviation of WCF from EWCF, appears to be worse in most instances to that over the equivalent periods of the previous gas year. Weekday (Monday to Thursday) WCF bias is a little better in only 1 LDZ (i.e. NW) and worse in 12 LDZs. WCF bias over the winter as a whole and over the summer as a whole has improved in only one LDZ, namely NW. Weekend WCF bias is also generally worse in every case except in NO LDZ, where it is better on Sundays.

  Thus, over gas year 2005/06, WCF bias has been consistently negative over all days of the week. The most likely cause of this is that NDM seasonal normal demand (SND) for gas year 2005/06 was too high. On the whole, winter 2005/06 was colder than recent years (although not particularly cold in comparison with long term weather extremes). Additionally the gas supply situation was generally tight during the winter immediately past. Against this background, it appears that weather corrected aggregate NDM demand was depressed (in other words the aggregate NDM SND estimates, made in spring 2005, were too high in comparison with the underlying level of demand experienced). The observed WCF bias is consistent with these circumstances.

  Tables 10 and 11 provide monthly values of weather corrected aggregate NDM demand as a percentage of aggregate NDM SND, for the previous gas year and for gas year 2005/06 respectively. Table 11 reveals that in gas year 2005/06 this measure has been less than 100% for most months and LDZs (146 of 156 cases), which is again consistent with a lower underlying level of NDM demand during gas year 2005/06 (i.e. aggregate NDM SND estimates for 2005/06 were too high).

- In gas year 2005/06, for the majority of LDZs, average values of SF generally (i.e. across most days of the week) appear to be a little closer to the ideal value of one than over equivalent periods of the previous gas year (2004/05).

- In 7 LDZs, weekday (Monday to Thursday) average SFs are closer to one in gas year 2005/06 in comparison with gas year 2004/05. For Fridays, Saturdays and Sundays, 9, 10 and 9 LDZs respectively, show improvements.

- The RMS deviation of SF from the ideal value of one provides a measure of the variability of SFs. Overall, in a majority of LDZs in each individual month, the variability of SFs also appears somewhat reduced in gas year 2005/06, than during the previous gas year.

- In general, weekend SF offsets (i.e. differences in the weekend value of SF from the Monday to Thursday weekday value) are a common occurrence in the SF patterns over both gas year 2005/06 and the previous gas year. Over gas year 2005/06, weekend scaling factor values appear to be closer to one (than in gas year 2004/05) in a majority of LDZs on each of Friday, Saturday and Sunday. There are nevertheless some exceptions to this: two LDZs, NW and NT, have increased SF values over Friday and Sunday; two other LDZs, NE and SE, have increased SF values over Saturday and Sunday; two LDZs, EM and EA, has worse Friday SF values.

- In broadly qualitative terms based on visual observation of Figures 1 to 13 and comparing gas year 2004/05 with gas year 2005/06, SF behaviour has improved in 2005/06 in the LDZs SC, NO, WM and WS. In LDZs EM, WN, NT, SE, SO and SW the SF behaviour appears to be slightly better (or at any rate no worse overall than in 2004/05). In three LDZs (namely NW, NE and EA), SF behaviour in 2005/06 appears to be worse than in 2004/05.

- However, the observed broad improvement in SF patterns during gas year 2005/06 is probably due to the net outcome of the effects of consistently negative WCF bias (*in the absence of which SF would tend to levels lower than observed*) and any prevailing excess in aggregate NDM AQ.

- In this context it is perhaps of some significance that aggregate NDM AQ levels on the Gemini system declined by 2.4% at the start of gas year 2006/07 (-3.5% to -1.3% range of change across LDZs, see Table 13). Moreover, values of SF over the first 10 days of October 2006 have been lower than one in most LDZs (WN LDZ excepted, where AQs are deficient due to supply points incorrectly assigned to adjacent LDZs).

- The first 10 days of October 2006 have been relatively mild, following on from one of the warmest extended summer periods on record (the Met Office having recently confirmed the warmest May to September period this year for the last 93 years). In the early days of the new gas year levels of aggregate NDM demand continue to be markedly depressed. Consequently, it is too early to assess WCF bias levels for the new gas year and the appropriateness of the reduced NDM SNDs adopted for 2006/07. Given the continuing depressed levels of NDM demand, it is possible that these reduced NDM SNDs applied to gas year 2006/07, instead of being too low, may actually still not be low enough.

It is customary in this note on WCF and SF values to identify and provide a commentary on any unusual occurrences of SF and WCF-EWCF values, in the most recent gas year (2005/06).

During gas year 2005/06 there have been some SF and/or WCF-EWCF patterns worth noting. Weekend effects are common across all LDZs and the Christmas/New Year and Easter holiday periods are indicated in many LDZs by some perturbation (usually small) from the more general pattern of weekday and weekend SF values. In addition, these further instances are noteworthy:

- In WN and SE LDZs the two spikes in SF during the month of May 2006 appear to be on the two bank holiday Mondays in that month. Also in SC LDZ a spike occurs on one of the two bank holiday Mondays in May 2006 and on the day of the English bank holiday in August 2006. These cases are probably attributable to the holiday factors applied to these days in the EUC demand models and the demand models for aggregate NDM demand in these LDZs. The increase in SF is consistent with the holiday demand reductions applied in the model having been too large.

- Also in WN LDZ on 11th October 2005 there is a sharp spike in WCF-EWCF (albeit without a corresponding noteworthy perturbation in SF). Examination of demands over the week including this date reveals that aggregate NDM demand was sharply reduced on 11th October 2005 relative to adjacent dates and the week as a whole. In WN LDZ, this was also the warmest day in that week (well above seasonal normal). Thus, although aggregate NDM demand was reduced it did not decline by as much as the warm weather on the day suggests it should have, leading therefore to the observed positive WCF bias (high WCF-EWCF value). This may have been because the aggregate DM demand on the day was incorrect (possibly due to a DM metering problem). The SF does not show much perturbation because aggregate NDM demand goes into the computation of both WCF and of SF. When aggregate NDM demand is too high WCF becomes too great which tends to force SF to be lower. However, the inflated aggregate NDM demand directly acts to increase SF. The two effects are in opposition resulting in very little change to SF from its level on adjacent days.

- During the last few days of May 2006, in some LDZs (e.g. EM, WM, WN, WS, NT, SE, SW) there are signs of a sharp falling away of WCF-EWCF. Most LDZs also show this increased negative WCF bias later on in the summer months (e.g. SC, NO, NW, NE, EM, WM, WN, EA, NT, SE, SO and SW). This increased negative WCF bias may again be indicative of depressed aggregate NDM demand levels (i.e. aggregate NDM SND estimates too high).

- The sharply negative spike in WCF-EWCF in WN LDZ on 24 July 2006 is due to an erroneous aggregate DM total on that day (which was too high by as much as ~ 3 GWh on the day due to an error associated with a single DM meter). This resulted in a depressed aggregate NDM value for the day and hence the sharply negative WCF bias observed. On this occasion, the artificially depressed aggregate NDM was so marked that there was also a corresponding effect on the scaling factor which dropped to a very low level. The underlying meter error amounted to more than half the usual level of aggregate NDM demand in WN LDZ at this time of year, which explains the severe effect on the resultant SF.

- An instance of a sharply negative spike in WCF-EWCF occurred in WM LDZ on 30th and 31st May 2006. On these days the weather was colder than seasonal normal although the days on either side had broadly warm weather above seasonal normal. On these days when it turned colder EWCF obviously increased (EWCF being based on a demand model derived aggregate NDM demand) but actual aggregate NDM demand and hence also WCF in the LDZ stayed at a depressed level typical of the warmer than average conditions that prevailed around the two anomalous days. Thus, with WCF remaining low and EWCF increasing, WCF-EWCF showed a sharp negative spike on each of these days. A corresponding increase in SF values also occurred to compensate for the negative WCF bias.

- Instances of sharply positive spikes in WCF-EWCF have also occurred during the summer months of gas year 2005/06. In particular, see NW LDZ on 22nd June 2006 and NO LDZ on 13th August 2006. These days were significantly colder than seasonal normal and actual aggregate NDM demand rose sharply on those days, more so than indicated by the applicable demand model for aggregate NDM, i.e. ECWF increased to a lesser extent than WCF. This, therefore, led to the positive spike in WCF-EWCF. However, there was little knock-on effect on the SF. The SF did not show much perturbation because aggregate NDM demand goes into the computation of both WCF and of SF. When aggregate NDM demand is too high WCF becomes too great which tends to force SF to be lower. However, the inflated aggregate NDM demand directly acts to increase SF. The two effects are in opposition, in this case resulting in very little change to SF from its level on adjacent days.

- Two instances of a positive spike in WCF-EWCF due to a high value of WCF occurred in WM LDZ on 24th July 2006 and WS LDZ on 20th July 2006. Both of these occurred during a hot spell of weather during which (in each of these two LDZs) the CWV was at its maximum value for the LDZ. In each case WCF was unusually high because aggregate NDM demand was unexpectedly high given the prevailing conditions. Investigations have not revealed any untoward reason for the observed NDM demand, such as (for example) DM or LDZ metering error. Aggregate DM demand did not appear to be correspondingly low, nor was there any indication of LDZ metering issues, in either instance.

- A further case of a positive spike in WCF-EWCF due to a high value of WCF occurred in WS LDZ on 2nd September 2006. The weather was warmer than seasonal normal, albeit that the CWV was not on this occasion at its maximum value for the LDZ. Once more, WCF was high because aggregate NDM demand was unexpectedly high given the prevailing conditions. For this case too, investigations have not revealed any untoward reason for the observed NDM demand, such as (for example) DM or LDZ metering error.

- In EA LDZ over the days 29th May to 1st July (at and just after the end of May bank holiday) there was a temporary uplift in SF values. On most of these days there were sharply lower (negative) values of WCF-EWCF. All these days were colder than seasonal normal and the sharply lower negative WCF-EWCF values appear to have been due to aggregate NDM demands not being as high as might have been expected for the prevailing weather. The SF uplift appears to have been a corresponding compensating response.

As a broad generalisation, scaling factor deviations from one (offsets from one and also day to day volatility) are related to the closeness of correspondence (or otherwise) between aggregate NDM seasonal normal demand on the day and the AQ weighted ALP on the day (in other words the (AQ*ALP/365) term in the NDM demand attribution formula summed across all EUCs in the LDZ). The ratio of aggregate NDM SND to AQ weighted ALP is broadly inversely related to the deviation of SF from the ideal value of one. However, the effect is more pronounced in summer than in winter, and moreover, the summer is also affected by warm weather cut-off and reduction effects in some EUC models.

Scaling factor volatility may be seen in a number of LDZs in the summer in both 2004/05 and 2005/06.

Warm weather cut-offs in EUC demand models give rise to summer scaling factor volatility by a mechanism involving the DAF parameter. If weather on a day in summer is significantly different from normal for that time of year, the DAF value that is applied on that day to EUCs with cut-offs may not be appropriate for the prevailing weather. Thus overall the (1 + WCF*DAF) terms may be either too low or too high and the scaling factor has to change abnormally to compensate.

There are also indications that EUC demand models with summer reductions also give rise to summer scaling factor volatility. Here, the mechanism involves the ALP parameter. If weather on a day in summer is much colder or warmer than normal for that time of year, the ALP value that is applied on that day to EUCs with summer reductions may not be appropriate for the prevailing weather. Thus, overall the (AQ*ALP/365) terms may be too low or too high and the scaling factor has to change abnormally to compensate.

An examination of average monthly value of WCF-EWCF and weather corrected aggregate NDM demand as a percentage of aggregate NDM SND allows an approximate assessment to be made of the “equilibrium level” of SF in each LDZ; that is to say the likely level of SF if any WCF bias is discounted. This assessment is an approximate one, best done over the winter period, and is based on identifying a period (of a month’s duration in this instance) over which WCF bias is small (at or near zero) and weather corrected aggregate NDM demand was close to (~100% of) aggregate NDM seasonal normal demand over the period, and then identifying the average value of SF that applied to the period. This coincidence of conditions cannot always be identified in a LDZ and in those circumstances it is not possible to assess the “equilibrium level” of SF. Additionally, on several occasions during winter 2005/06 there were occurrences of problems with data within the Gemini system. Although these would have been addressed in transportation charging terms using the mechanisms in place for such remedial action, the related SF and WCF values would not have been adjusted after a gas day closed-out. A further complication is that weather corrected aggregate NDM demand as a percentage of aggregate NDM seasonal normal demand would be biased lower (than the target 100%) if aggregate NDM SND is too high, as appears to have been the case during gas year 2005/06. Consequently, assessment of “equilibrium levels” of SF based on the SF patterns over winter 2005/06, was somewhat more problematic than usual.

If an “equilibrium level” of SF can be identified in a LDZ, it may then provide an approximate indication of the prevailing level of aggregate NDM AQ in the LDZ - for example an “equilibrium level” of SF above one suggests that aggregate NDM AQ is less than it should be and an “equilibrium level” of SF below one indicates that aggregate NDM AQ is greater than it should be.

Subject to the stated caveats about data quality and aggregate NDM SND, the assessment was attempted for the gas year 2005/06, concentrating in particular on the most recent winter period (October 2005 to March 2006). The resultant “equilibrium levels” of SF (where they can be assessed) were presented in Table A13.13 of the NDM report published in the spring (on 20th June 2006). This table is reproduced here as Table 12. The table also includes, for comparison, WCF bias (i.e. WCF-EWCF) and SF values for the winter period of gas year 2005/06 for all days and for Monday to Thursday weekdays. The inferences that may be drawn about the impact of WCF bias and the prevailing level of aggregate NDM AQs from a comparison of these values in each LDZ are also presented in Table 12.

On this occasion “equilibrium levels” of SF could not be determined for four LDZs, namely WM, EA, NT and SE. In these four LDZs the prevailing winter period SFs and WCF bias indirectly suggest that aggregate NDM AQs could be too high.

In six LDZs (SC, NO, NW, NE, EM and SO) the “equilibrium levels” of SF suggest that aggregate NDM AQ appears to be at or close to the right level (except that examination of winter WCF bias and its consequential impact on SFs conversely suggest that for SC, NW, NE, EM and SO LDZs aggregate NDM AQs could be a little too high).

In three LDZs (namely: WN, WS and SW) the prevailing levels of NDM AQs in aggregate appear to be too low on the basis of the assessed “equilibrium” SFs. However, for WS and SW LDZs examination of winter WCF bias and its consequential impact on SFs conversely suggest that aggregate NDM AQs could be too high. In WN LDZ, which is smaller in overall load size than adjacent LDZs, the prevailing level of NDM AQ appears to be too low. The principal cause of the NDM AQ deficiency in this LDZ has been known for some time to be due to supply points incorrectly assigned to adjacent LDZs.

Table 13 shows the percentage changes in aggregate NDM AQs at the start of gas year 2006/07 as observed on the Gemini system.

Figure 1

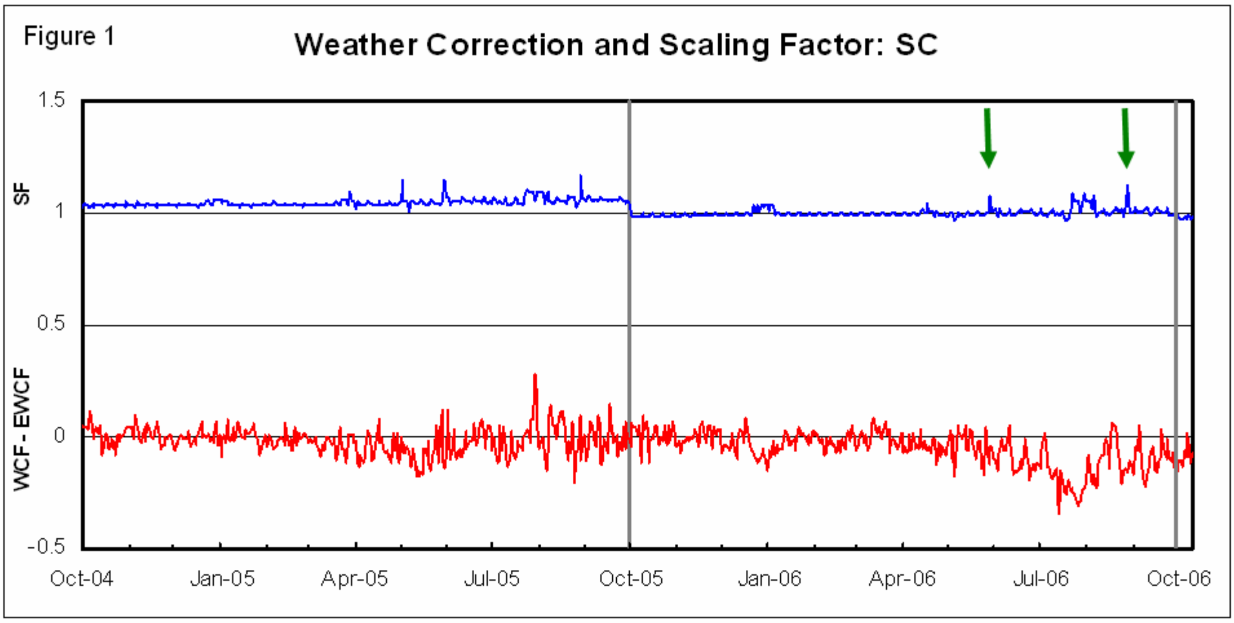


Figure 2

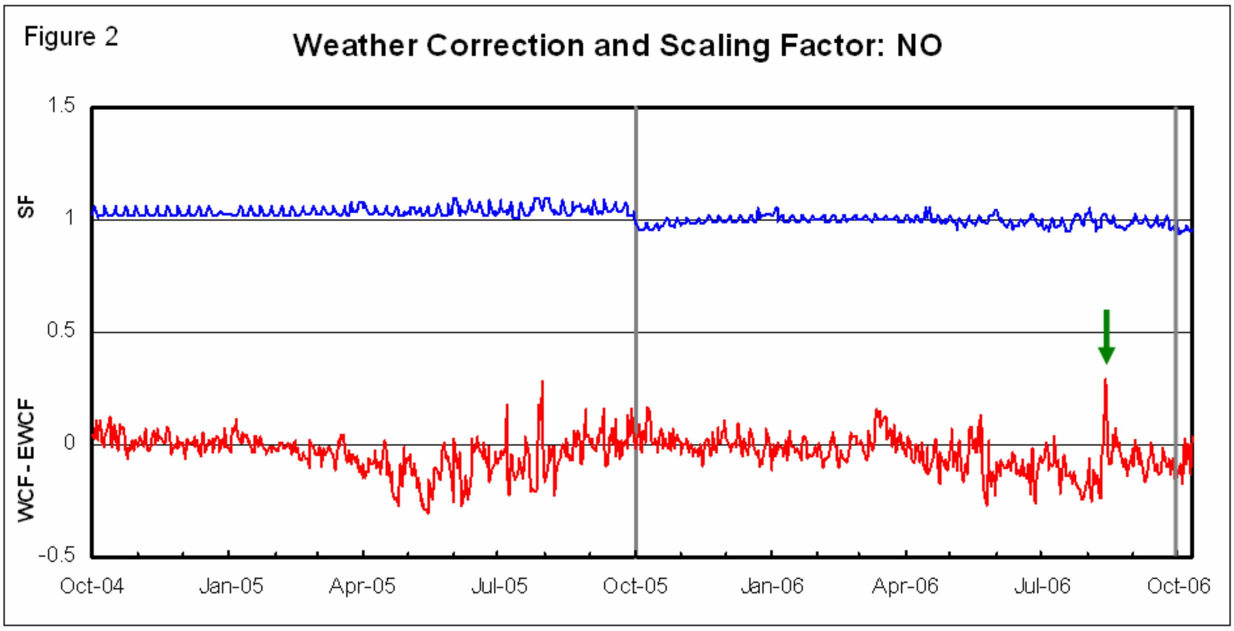


Figure 3

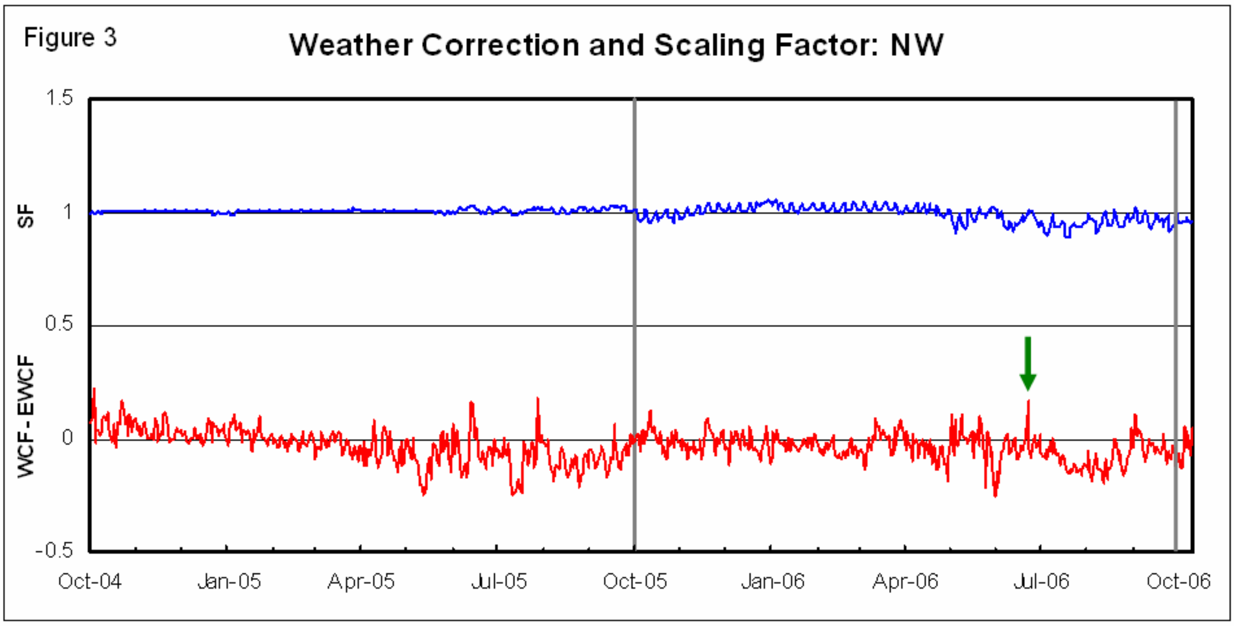


Figure 4

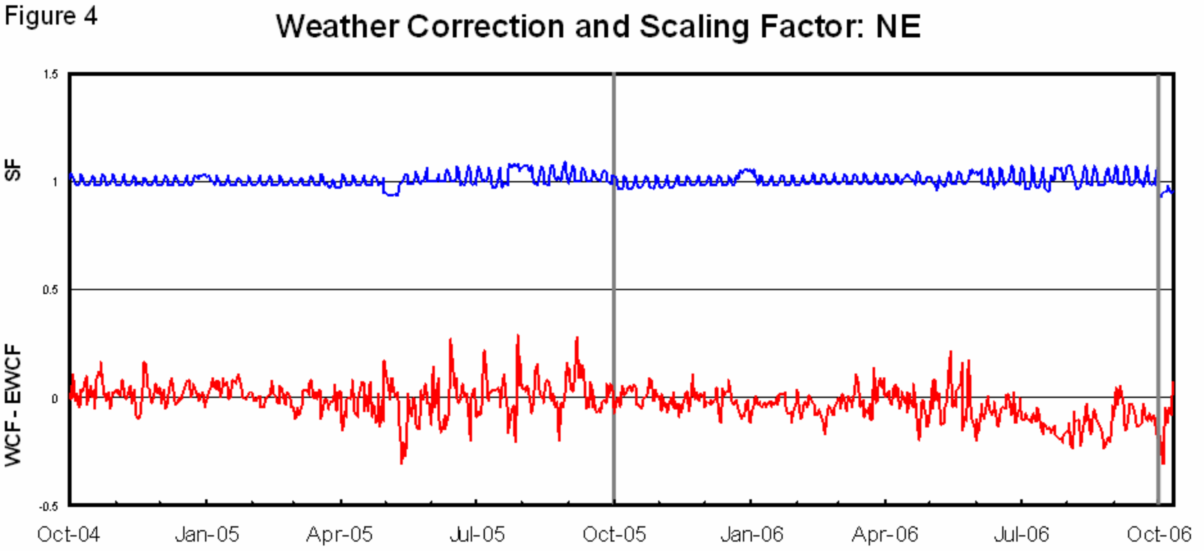


Figure 5

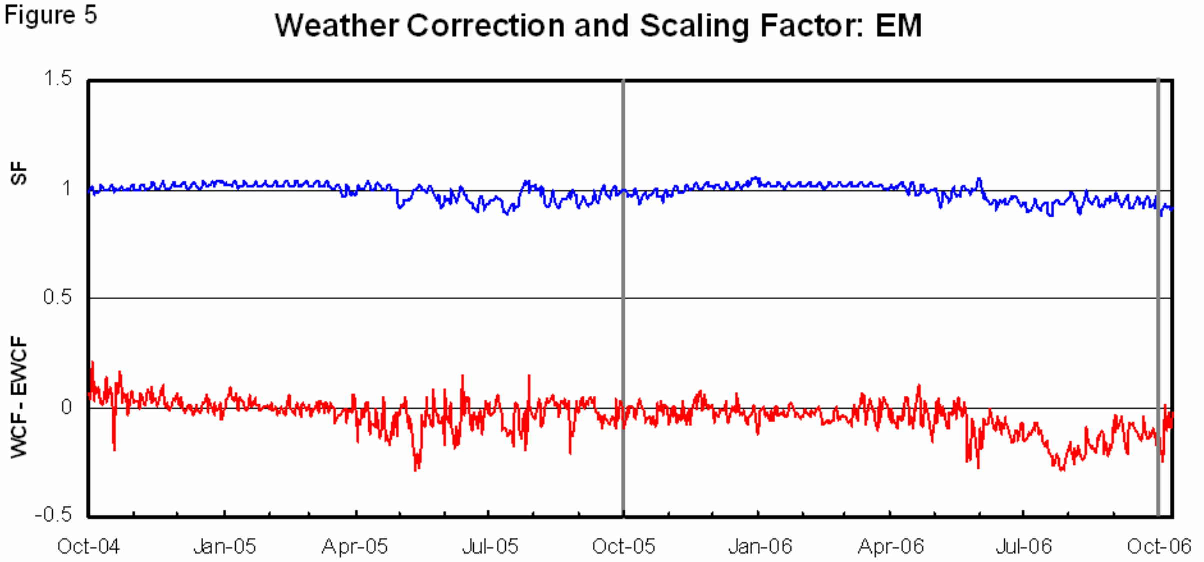


Figure 6

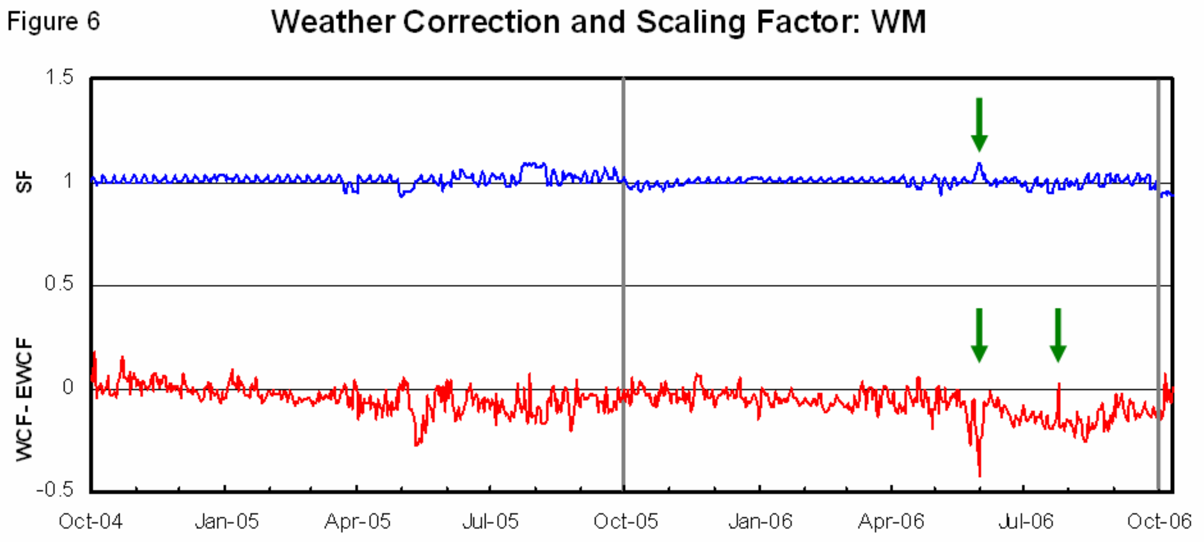


Figure 7

Weather Correction and Scaling Factor: WN

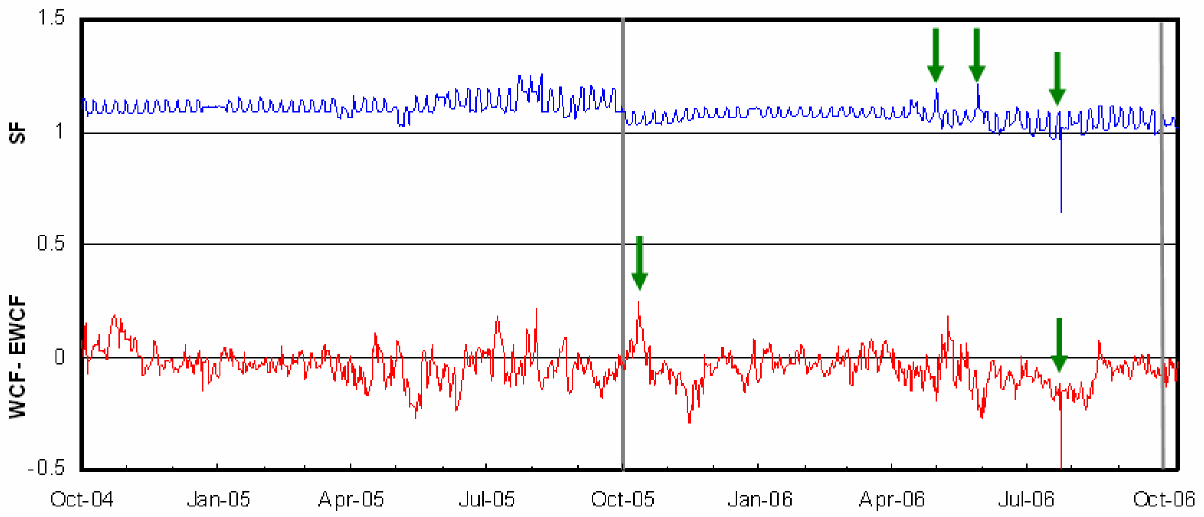


Figure 8

Weather Correction and Scaling Factor: WS

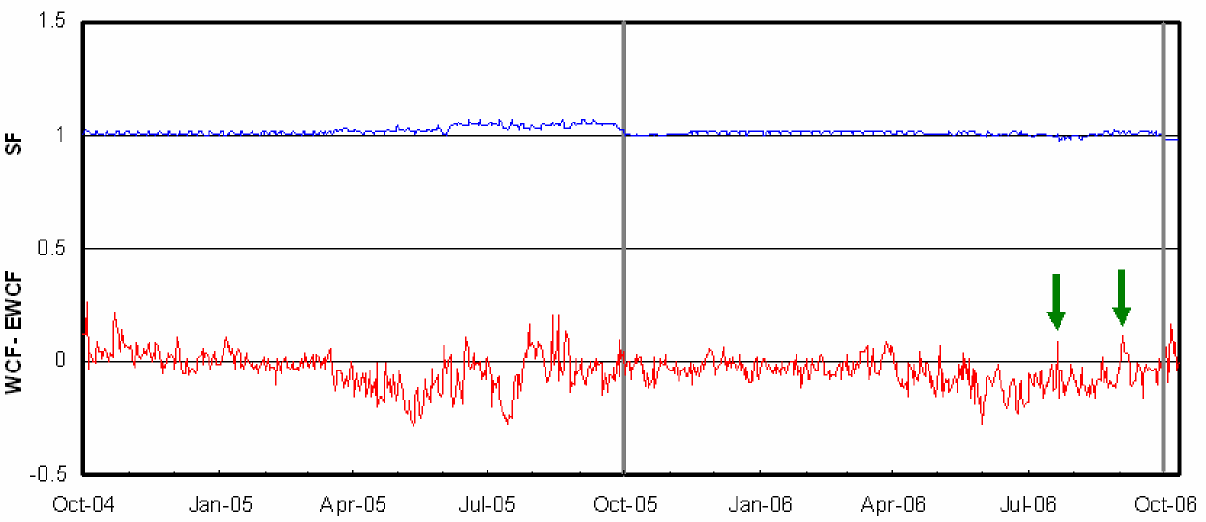
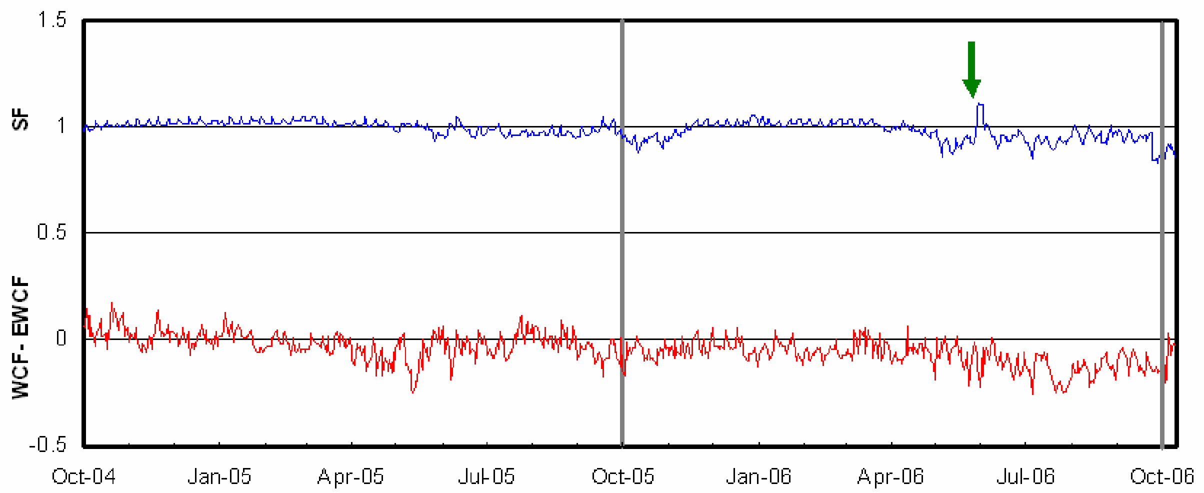


Figure 9

Weather Correction and Scaling Factor: EA



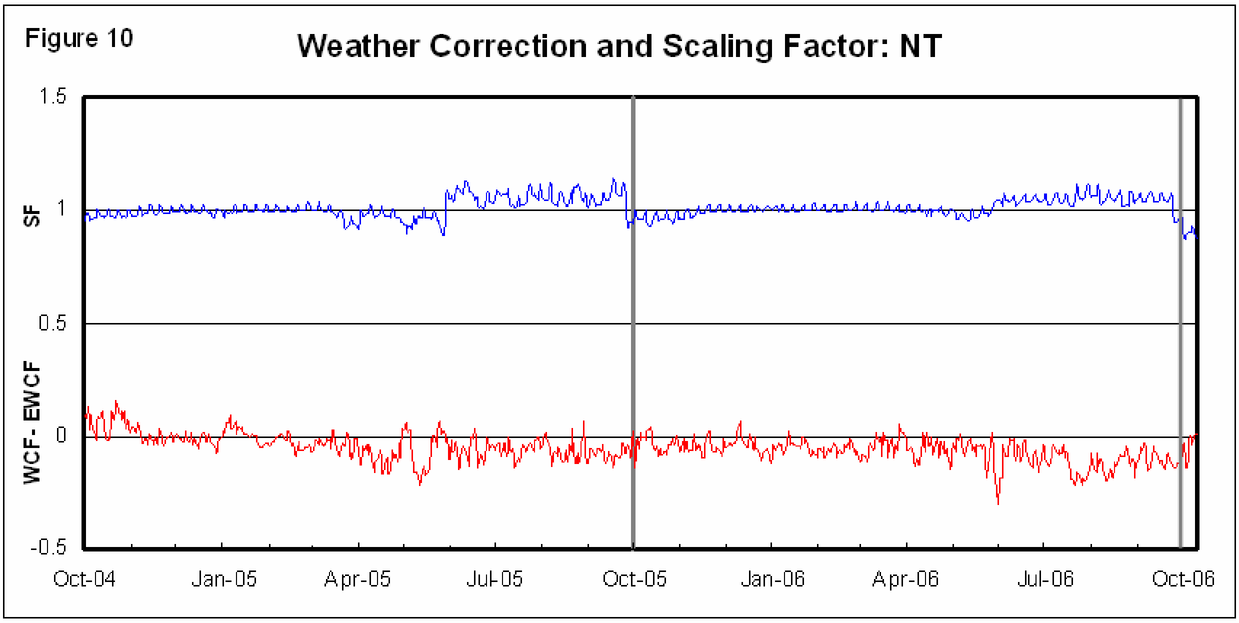


Figure 10
Weather Correction and Scaling Factor: NT
1.5
1
0.5
0
-0.5
SF
WCF - EWCF
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06

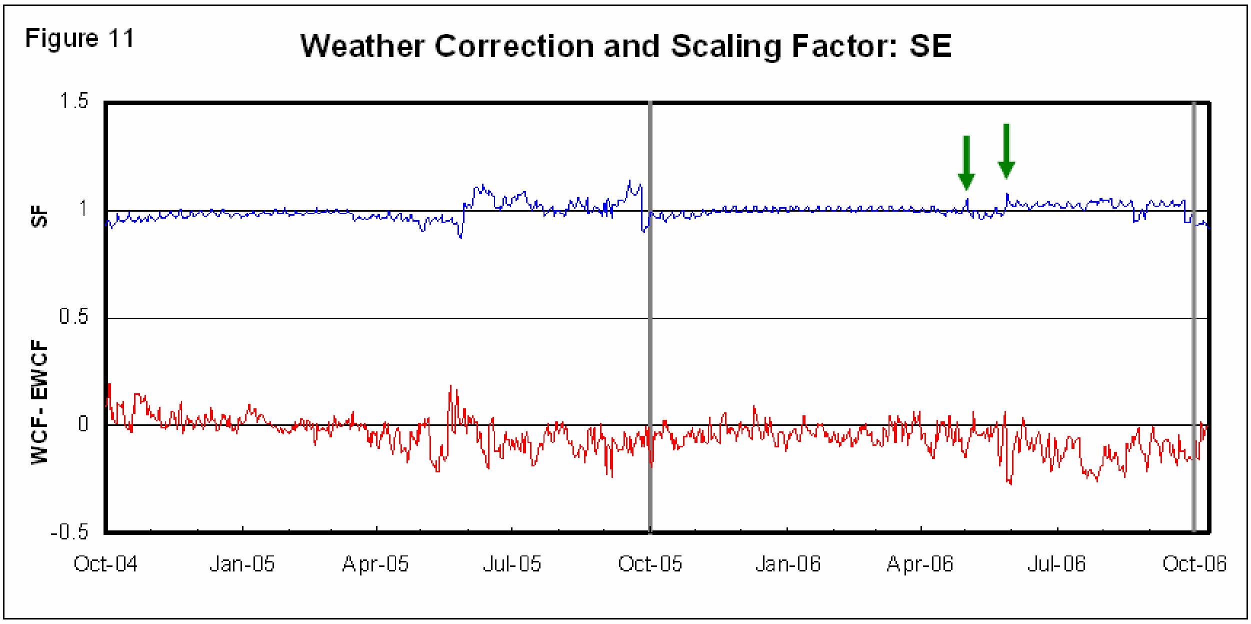


Figure 11
Weather Correction and Scaling Factor: SE
1.5
1
0.5
0
-0.5
SF
WCF - EWCF
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06

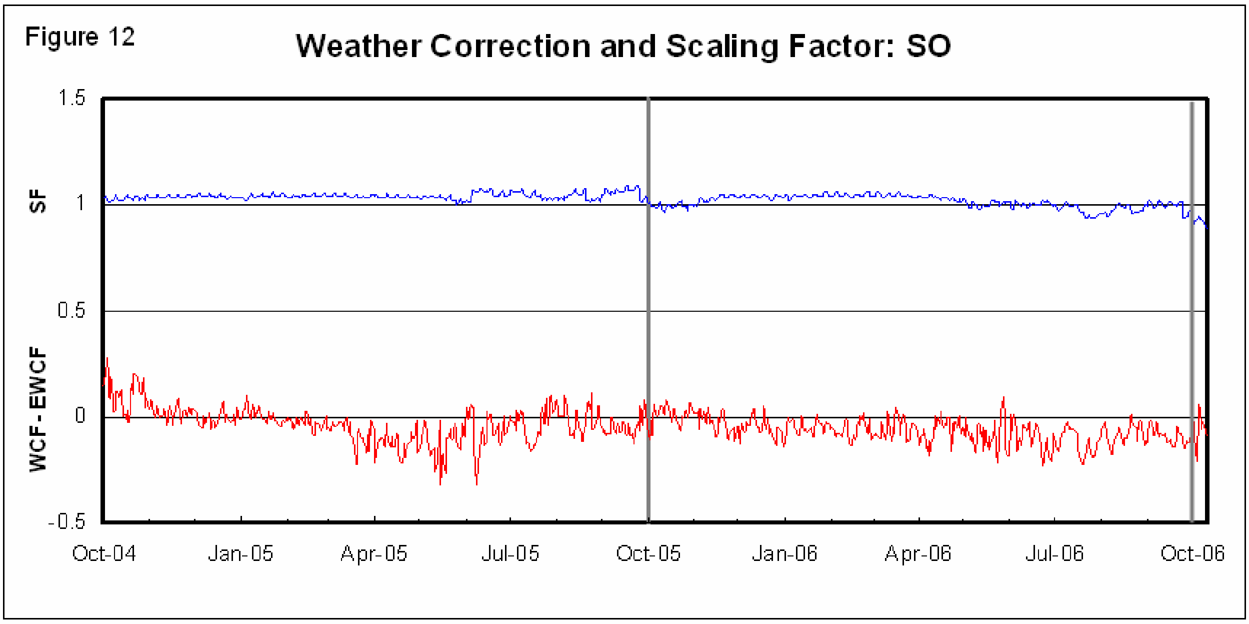


Figure 12
Weather Correction and Scaling Factor: SO
1.5
1
0.5
0
-0.5
SF
WCF - EWCF
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06

Figure 13

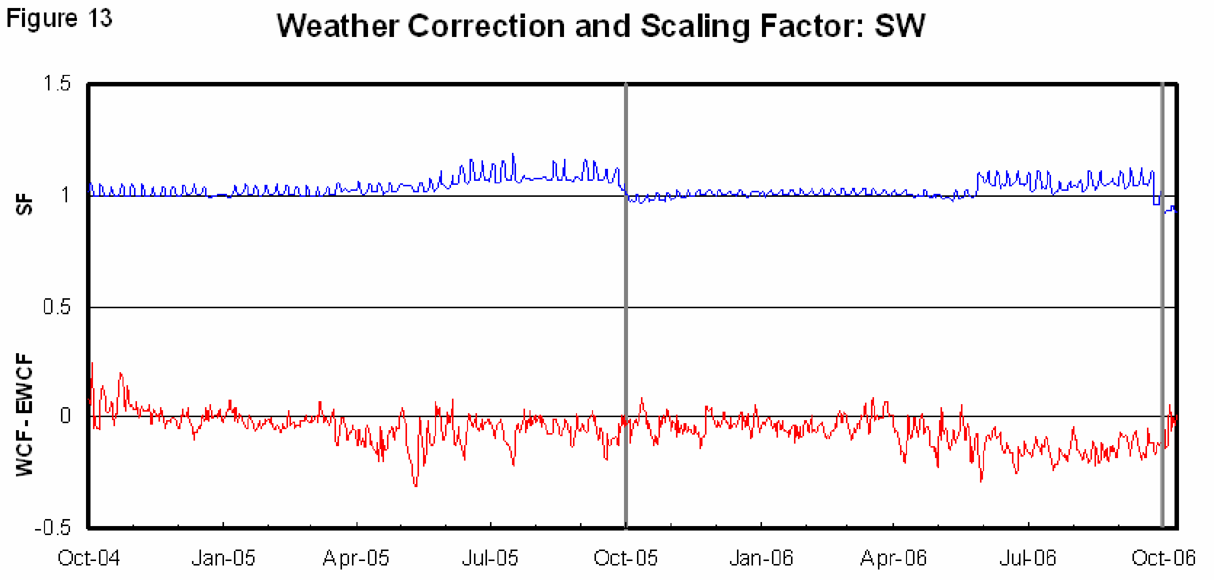

Weather Correction and Scaling Factor: SW
1.5
1
0.5
0
-0.5
SF
WCF - EWCF
Oct-04
Jan-05
Apr-05
Jul-05
Oct-05
Jan-06
Apr-06
Jul-06
Oct-06

Table 1

Average Values of Scaling Factor, Gas Year 2004/05

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	1.047	1.037	1.055	1.051	1.039	1.056
NO	1.029	1.036	1.061	1.044	1.031	1.042
NW	1.005	1.005	1.013	1.006	1.004	1.008
NE	0.992	1.010	1.037	1.023	0.998	1.012
EM	0.985	0.993	1.010	1.006	1.015	0.970
WM	1.004	1.017	1.035	1.026	1.010	1.017
WN	1.096	1.110	1.162	1.154	1.106	1.125
WS	1.021	1.015	1.030	1.030	1.010	1.036
EA	0.998	0.999	1.020	1.014	1.019	0.988
NT	1.002	0.999	1.036	1.030	0.992	1.028
SE	0.986	0.989	1.009	0.993	0.976	1.006
SO	1.036	1.048	1.053	1.039	1.037	1.044
SW	1.026	1.040	1.076	1.066	1.014	1.067
AVG	**1.017**	**1.023**	**1.046**	**1.037**	**1.019**	**1.031**

Table 2

Average Values of Scaling Factor, Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.998	0.998	1.002	1.011	0.996	1.006
NO	0.989	0.997	1.009	1.005	0.999	0.992
NW	0.981	0.992	1.013	1.011	1.013	0.970
NE	0.991	1.005	1.041	1.032	1.000	1.012
EM	0.977	0.986	1.000	1.000	1.011	0.960
WM	0.995	0.999	1.014	1.023	1.003	1.001
WN	1.046	1.059	1.102	1.098	1.076	1.051
WS	1.009	1.007	1.004	1.008	1.010	1.005
EA	0.971	0.973	0.984	0.994	1.000	0.953
NT	1.003	1.012	1.032	1.041	0.998	1.030
SE	0.998	1.004	1.018	1.019	0.998	1.011
SO	1.010	1.019	1.020	1.024	1.032	0.997
SW	1.012	1.022	1.044	1.045	1.007	1.038
AVG	**0.998**	**1.006**	**1.022**	**1.024**	**1.011**	**1.002**

Table 3

Difference between Average Values of Scaling Factor in Gas Year 2004/05 and Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	0.045	0.035	0.053	0.040	0.035	0.050
NO	0.018	0.033	0.052	0.039	0.030	0.034
NW	-0.014	-0.003	0.000	-0.005	-0.009	-0.022
NE	-0.001	0.005	-0.004	-0.009	0.002	0.000
EM	-0.008	-0.007	0.010	0.006	0.004	-0.010
WM	-0.001	0.016	0.021	0.003	0.007	0.016
WN	0.050	0.051	0.060	0.056	0.030	0.074
WS	0.012	0.008	0.026	0.022	0.000	0.031
EA	-0.027	-0.026	0.004	0.008	0.019	-0.035
NT	-0.001	-0.011	0.004	-0.011	0.006	-0.002
SE	0.012	0.007	-0.009	-0.012	0.022	-0.005
SO	0.026	0.029	0.033	0.015	0.005	0.041
SW	0.014	0.018	0.032	0.021	0.007	0.029

Table 4

Average Values of WCF - EWCF, Gas Year 2004/05

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.017	-0.017	-0.013	-0.009	-0.002	-0.028
NO	-0.036	-0.032	-0.032	-0.044	-0.002	-0.070
NW	-0.037	-0.025	-0.017	-0.018	0.019	-0.078
NE	0.010	0.008	0.008	-0.004	0.017	-0.002
EM	-0.008	-0.010	-0.018	-0.026	0.018	-0.043
WM	-0.045	-0.043	-0.040	-0.041	-0.007	-0.079
WN	-0.032	-0.019	-0.036	-0.031	-0.008	-0.053
WS	-0.035	-0.020	-0.028	-0.027	0.011	-0.072
EA	-0.019	-0.014	-0.011	-0.015	0.010	-0.043
NT	-0.039	-0.030	-0.027	-0.035	-0.002	-0.069
SE	-0.028	-0.026	-0.019	-0.023	0.019	-0.070
SO	-0.032	-0.038	-0.025	-0.021	0.006	-0.066
SW	-0.037	-0.034	-0.033	-0.028	0.000	-0.069
AVG	**-0.027**	**-0.023**	**-0.022**	**-0.025**	**0.006**	**-0.057**

Table 5

Average Values of WCF - EWCF, Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.052	-0.063	-0.056	-0.050	-0.012	-0.096
NO	-0.042	-0.048	-0.043	-0.033	0.002	-0.086
NW	-0.032	-0.046	-0.051	-0.038	-0.017	-0.058
NE	-0.044	-0.043	-0.053	-0.049	-0.019	-0.073
EM	-0.061	-0.072	-0.077	-0.067	-0.022	-0.109
WM	-0.077	-0.085	-0.084	-0.075	-0.041	-0.116
WN	-0.057	-0.054	-0.064	-0.055	-0.033	-0.081
WS	-0.051	-0.059	-0.054	-0.039	-0.023	-0.079
EA	-0.073	-0.078	-0.075	-0.076	-0.043	-0.105
NT	-0.073	-0.073	-0.061	-0.069	-0.045	-0.096
SE	-0.073	-0.067	-0.060	-0.064	-0.036	-0.102
SO	-0.069	-0.069	-0.052	-0.052	-0.039	-0.089
SW	-0.078	-0.081	-0.077	-0.072	-0.030	-0.125
AVG	**-0.060**	**-0.064**	**-0.062**	**-0.057**	**-0.027**	**-0.093**

Table 6

Difference between Average Values of WCF - EWCF in Gas Year 2004/05 and Gas Year 2005/06

LDZ	Mon-Thur	Friday	Saturday	Sunday	Winter	Summer
SC	-0.035	-0.046	-0.043	-0.041	-0.009	-0.068
NO	-0.006	-0.016	-0.011	0.011	-0.001	-0.016
NW	0.006	-0.021	-0.034	-0.021	0.001	0.020
NE	-0.034	-0.036	-0.046	-0.045	-0.002	-0.071
EM	-0.053	-0.062	-0.059	-0.042	-0.004	-0.066
WM	-0.032	-0.042	-0.044	-0.034	-0.034	-0.037
WN	-0.025	-0.035	-0.028	-0.024	-0.025	-0.028
WS	-0.016	-0.039	-0.026	-0.012	-0.012	-0.007
EA	-0.053	-0.063	-0.064	-0.061	-0.033	-0.062
NT	-0.034	-0.043	-0.034	-0.034	-0.043	-0.027
SE	-0.045	-0.041	-0.040	-0.042	-0.016	-0.031
SO	-0.037	-0.031	-0.028	-0.031	-0.033	-0.023
SW	-0.041	-0.047	-0.044	-0.045	-0.029	-0.056

Table 7

Root Mean Square Deviation of SF from 1, Gas Year 2004/05

LDZ	October	November	December	January	February	March	April	May	June	July	August	September
SC	0.0362	0.0363	0.0436	0.0398	0.0376	0.0460	0.0409	0.0602	0.0557	0.0645	0.0728	0.0586
NO	0.0321	0.0314	0.0312	0.0336	0.0351	0.0447	0.0365	0.0407	0.0515	0.0529	0.0555	0.0477
NW	0.0034	0.0045	0.0057	0.0068	0.0062	0.0079	0.0047	0.0044	0.0158	0.0140	0.0124	0.0182
NE	0.0195	0.0162	0.0188	0.0160	0.0161	0.0203	0.0208	0.0389	0.0286	0.0474	0.0478	0.0311
EM	0.0130	0.0181	0.0257	0.0248	0.0249	0.0224	0.0197	0.0419	0.0567	0.0610	0.0496	0.0407
WM	0.0153	0.0150	0.0203	0.0183	0.0181	0.0253	0.0224	0.0306	0.0287	0.0522	0.0442	0.0335
WN	0.1087	0.1057	0.1092	0.1123	0.1114	0.1046	0.1116	0.1076	0.1353	0.1591	0.1412	0.1373
WS	0.0115	0.0094	0.0082	0.0104	0.0107	0.0155	0.0157	0.0233	0.0453	0.0444	0.0433	0.0492
EA	0.0135	0.0208	0.0244	0.0267	0.0295	0.0236	0.0176	0.0231	0.0305	0.0289	0.0329	0.0254
NT	0.0275	0.0177	0.0149	0.0150	0.0146	0.0370	0.0285	0.0562	0.0709	0.0662	0.0676	0.0711
SE	0.0490	0.0287	0.0214	0.0193	0.0163	0.0274	0.0410	0.0623	0.0670	0.0437	0.0277	0.0718
SO	0.0307	0.0368	0.0390	0.0405	0.0420	0.0405	0.0376	0.0309	0.0563	0.0478	0.0436	0.0642
SW	0.0266	0.0207	0.0196	0.0231	0.0230	0.0254	0.0334	0.0457	0.0867	0.0971	0.0868	0.0901
AVG	**0.0298**	**0.0278**	**0.0294**	**0.0297**	**0.0296**	**0.0339**	**0.0331**	**0.0435**	**0.0561**	**0.0599**	**0.0558**	**0.0568**

Table 8

Root Mean Square Deviation of SF from 1, Gas Year 2005/06

LDZ	October	November	December	January	February	March	April	May	June	July	August	September
SC	0.0148	0.0097	0.0168	0.0119	0.0057	0.0055	0.0110	0.0177	0.0104	0.0356	0.0344	0.0110
NO	0.0291	0.0124	0.0178	0.0175	0.0106	0.0105	0.0170	0.0208	0.0209	0.0289	0.0289	0.0223
NW	0.0257	0.0202	0.0305	0.0283	0.0241	0.0239	0.0204	0.0381	0.0419	0.0695	0.0450	0.0430
NE	0.0276	0.0214	0.0305	0.0226	0.0184	0.0181	0.0208	0.0268	0.0329	0.0421	0.0382	0.0385
EM	0.0286	0.0171	0.0274	0.0229	0.0227	0.0210	0.0176	0.0307	0.0542	0.0775	0.0591	0.0592
WM	0.0231	0.0118	0.0130	0.0128	0.0132	0.0132	0.0192	0.0303	0.0230	0.0283	0.0222	0.0228
WN	0.0624	0.0734	0.0854	0.0846	0.0845	0.0823	0.0871	0.0846	0.0535	0.0836	0.0631	0.0607
WS	0.0022	0.0106	0.0131	0.0135	0.0140	0.0131	0.0107	0.0095	0.0081	0.0113	0.0110	0.0115
EA	0.0704	0.0264	0.0270	0.0243	0.0221	0.0214	0.0219	0.0836	0.0511	0.0781	0.0460	0.0798
NT	0.0384	0.0206	0.0142	0.0164	0.0165	0.0158	0.0143	0.0281	0.0483	0.0600	0.0607	0.0566
SE	0.0304	0.0144	0.0106	0.0115	0.0112	0.0106	0.0121	0.0296	0.0272	0.0295	0.0352	0.0355
SO	0.0141	0.0328	0.0397	0.0436	0.0466	0.0442	0.0319	0.0142	0.0117	0.0377	0.0297	0.0243
SW	0.0214	0.0136	0.0145	0.0168	0.0178	0.0169	0.0130	0.0361	0.0692	0.0557	0.0558	0.0701
AVG	**0.0299**	**0.0219**	**0.0262**	**0.0251**	**0.0236**	**0.0228**	**0.0228**	**0.0346**	**0.0348**	**0.0491**	**0.0407**	**0.0412**

Table 9

Difference between GY 2004/05 and GY 2005/06

LDZ	October	November	December	January	February	March	April	May	June	July	August	September
SC	0.0210	0.0260	0.0270	0.0280	0.0320	0.0410	0.0300	0.0420	0.0460	0.0290	0.0390	0.0480
NO	0.0030	0.0190	0.0130	0.0160	0.0240	0.0340	0.0200	0.0200	0.0300	0.0240	0.0270	0.0260
NW	-0.0230	-0.0160	-0.0240	-0.0210	-0.0180	-0.0160	-0.0150	-0.0340	-0.0260	-0.0560	-0.0330	-0.0250
NE	-0.0090	-0.0050	-0.0110	-0.0070	-0.0020	0.0020	0.0000	0.0120	-0.0040	0.0050	0.0100	-0.0080
EM	-0.0160	0.0010	-0.0010	0.0020	0.0020	0.0010	0.0020	0.0110	0.0030	-0.0160	-0.0090	-0.0180
WM	-0.0080	0.0030	0.0070	0.0050	0.0050	0.0120	0.0030	0.0010	0.0060	0.0240	0.0220	0.0110
WN	0.0470	0.0330	0.0240	0.0270	0.0260	0.0230	0.0250	0.0230	0.0820	0.0750	0.0780	0.0760
WS	0.0100	-0.0020	-0.0050	-0.0040	-0.0030	0.0030	0.0050	0.0140	0.0370	0.0330	0.0320	0.0380
EA	-0.0560	-0.0050	-0.0030	0.0030	0.0070	0.0030	-0.0040	-0.0610	-0.0210	-0.0490	-0.0130	-0.0550
NT	-0.0110	-0.0030	0.0010	-0.0010	-0.0020	0.0210	0.0140	0.0280	0.0230	0.0060	0.0070	0.0140
SE	0.0190	0.0150	0.0100	0.0070	0.0050	0.0160	0.0290	0.0320	0.0400	0.0140	-0.0070	0.0360
SO	0.0170	0.0040	-0.0010	-0.0030	-0.0050	-0.0030	0.0060	0.0170	0.0440	0.0100	0.0140	0.0400
SW	0.0060	0.0070	0.0060	0.0060	0.0050	0.0080	0.0200	0.0100	0.0180	0.0410	0.0310	0.0200
AVG	**0.0000**	**0.0059**	**0.0033**	**0.0045**	**0.0058**	**0.0112**	**0.0104**	**0.0088**	**0.0214**	**0.0108**	**0.0152**	**0.0156**

Table 10

NDM Weather Corrected Demand as % of NDM Seasonal Normal Demand, Gas Year 2004/05

LDZ	October	November	December	January	February	March	April	May	June	July	August	September
SC	100.58%	101.23%	99.75%	100.49%	98.74%	97.39%	94.53%	92.32%	99.00%	98.51%	99.36%	98.97%
NO	102.84%	101.51%	100.00%	101.18%	97.53%	95.42%	88.53%	85.03%	91.76%	93.53%	96.89%	102.37%
NW	106.69%	103.18%	102.12%	102.58%	98.71%	97.43%	94.69%	90.54%	94.72%	90.60%	89.25%	93.27%
NE	102.95%	102.23%	101.50%	104.27%	99.84%	99.21%	96.98%	94.95%	100.27%	101.08%	102.00%	102.77%
EM	105.42%	103.60%	100.08%	102.40%	99.58%	99.24%	93.21%	92.63%	95.36%	95.60%	98.82%	98.51%
WM	103.17%	101.94%	98.27%	99.61%	96.06%	96.42%	91.90%	90.08%	93.39%	90.81%	91.59%	94.18%
WN	107.27%	99.55%	96.34%	97.89%	97.46%	96.95%	93.68%	90.89%	93.98%	99.18%	96.46%	93.11%
WS	106.83%	102.75%	99.97%	101.15%	97.93%	97.65%	88.82%	84.24%	95.82%	90.33%	100.31%	96.15%
EA	105.64%	101.84%	100.26%	101.58%	98.28%	98.40%	91.14%	92.59%	95.92%	98.53%	100.36%	94.08%
NT	106.59%	99.52%	98.27%	100.83%	96.98%	96.48%	90.79%	92.99%	93.68%	93.90%	93.34%	93.19%
SE	107.20%	102.53%	101.52%	101.80%	98.91%	99.52%	93.32%	94.70%	93.56%	91.75%	92.56%	91.40%
SO	110.73%	102.63%	99.42%	100.42%	97.05%	93.16%	87.59%	87.39%	93.86%	96.68%	98.53%	95.61%
SW	106.28%	100.76%	99.11%	99.07%	97.36%	97.44%	89.95%	89.17%	95.70%	93.81%	95.20%	93.71%
AVG	**105.42%**	**101.97%**	**100.02%**	**101.30%**	**98.10%**	**97.39%**	**92.15%**	**91.10%**	**95.12%**	**94.46%**	**95.73%**	**95.79%**

Table 11

NDM Weather Corrected Demand as % of NDM Seasonal Normal Demand, Gas Year 2005/06

LDZ	October	November	December	January	February	March	April	May	June	July	August	September
SC	100.99%	100.47%	95.31%	97.88%	97.89%	100.30%	95.80%	96.33%	90.50%	81.03%	89.44%	90.68%
NO	102.90%	100.16%	99.15%	97.83%	97.61%	103.53%	94.70%	94.11%	88.89%	87.66%	92.93%	91.43%
NW	99.95%	99.01%	97.66%	98.19%	95.03%	99.38%	94.77%	98.49%	96.32%	90.41%	89.95%	95.90%
NE	101.19%	99.21%	97.50%	96.97%	94.53%	99.45%	97.79%	99.30%	94.26%	87.05%	85.92%	91.90%
EM	97.85%	99.29%	97.68%	97.50%	96.30%	98.23%	96.57%	94.51%	90.95%	82.69%	82.39%	88.97%
WM	97.62%	97.93%	95.81%	95.05%	93.18%	95.40%	93.58%	90.78%	88.80%	85.02%	83.52%	89.55%
WN	100.18%	88.14%	96.03%	98.84%	96.60%	99.53%	93.13%	96.26%	90.60%	86.64%	90.76%	95.22%
WS	96.75%	97.59%	97.40%	97.17%	96.59%	100.70%	93.61%	91.53%	88.04%	92.07%	91.12%	96.88%
EA	93.99%	96.68%	96.44%	95.62%	93.96%	97.44%	93.80%	93.00%	90.86%	84.49%	86.72%	88.63%
NT	96.40%	95.26%	95.96%	95.24%	93.86%	95.99%	93.47%	93.51%	91.37%	87.54%	87.37%	89.47%
SE	94.30%	96.96%	97.47%	96.89%	95.13%	97.66%	94.31%	93.91%	91.03%	84.53%	86.96%	88.57%
SO	100.65%	96.84%	94.92%	95.47%	94.03%	94.36%	93.74%	91.16%	90.96%	87.89%	92.14%	90.50%
SW	97.32%	95.63%	97.65%	95.60%	96.14%	99.59%	91.13%	90.68%	86.97%	84.55%	84.47%	87.98%
AVG	**98.21%**	**97.80%**	**96.83%**	**96.64%**	**95.19%**	**98.17%**	**94.51%**	**94.27%**	**91.17%**	**85.98%**	**87.48%**	**90.81%**

Table 12 – Equilibrium SFs

LDZ	Equilibrium SF		WCF bias and SF				Comments
	Month	SF value	Winter Only Mon-Thu Values		Winter Only All Days values		
			WCF bias	SF	WCF bias	SF	
SC	Nov, Mar	0.991(N) 0.996(M)	-0.013	0.993	-0.012	0.996	• WCF bias would usually tend to increase SF (by ~ 1 %pt.) from its equilibrium value; therefore AQs could be too high. • Observed winter SFs are very similar to equilibrium SF. • Equilibrium SF suggests AQs are okay.
NO	Nov	0.995	0.005	0.992	0.002	0.999	• Very little evidence of WCF bias. • Observed winter SFs are very similar to equilibrium SF. • Equilibrium SF suggests that AQs are okay.
NW	Oct, Mar	0.983(O) 1.019(M)	-0.012	1.002	-0.017	1.013	• Equilibrium SF value is not clear-cut : two possible cases lie either side of ideal value of 1. • WCF bias would usually tend to increase SF (by ~ 1-2 %pts.) from its equilibrium value. • On this basis AQs are probably okay or a little too high (perhaps by ~ 1%).
NE	Mar	1.002	-0.014	0.986	-0.019	1.000	• WCF bias would usually tend to increase SF (by ~ 2 %pts.) from its equilibrium value; therefore AQs could be too high. • Observed winter all-days SF is very similar to equilibrium SF. • Equilibrium SF suggests AQs are okay.
EM	Nov	1.004	-0.018	1.003	-0.022	1.011	• WCF bias would usually tend to increase SF (by ~ 2 %pts.) from its equilibrium value; therefore AQs could be too high. • Observed winter weekday SF is very similar to equilibrium SF. • Equilibrium SF suggests AQs are okay.
WM	-	cannot establish	-0.041	0.996	-0.041	1.003	• Unable to establish “equilibrium level” of SF (no winter month has appropriate combination of circumstances). • Observed winter SFs are close to 1. • WCF bias would usually tend to increase SF (by ~ 4 %pts.) from its equilibrium value. • On this basis AQs could be too high.
WN	Oct, Mar	1.057(O) 1.081(M)	-0.031	1.063	-0.033	1.076	• WCF bias would usually tend to increase SF (by ~ 3 %pts.) from its equilibrium value; this suggests AQs are too low by ~ 3-4%. • Equilibrium SF also indicates AQs are too low (but by 6-8%). • AQs are too low due to portfolio error - supply points incorrectly assigned to other adjacent LDZs.
WS	Mar	1.013	-0.022	1.011	-0.023	1.010	• WCF bias would usually tend to increase SF (by ~ 2 %pts.) from its equilibrium value; i.e. AQs could be a little too high. • Observed winter SFs are similar to equilibrium SF. • Equilibrium SF conversely indicates AQs are too low by ~1%.
EA	-	cannot establish	-0.041	0.993	-0.043	1.000	• Unable to establish “equilibrium level” of SF (no winter month has appropriate combination of circumstances). • Observed winter SFs are close to 1. • WCF bias would usually tend to increase SF (by ~ 4 %pts.) from its equilibrium value. • On this basis AQs could be too high.
NT	-	cannot establish	-0.044	0.988	-0.045	0.998	• Unable to establish “equilibrium level” of SF (no winter month has appropriate combination of circumstances) • Observed winter all-days SF is very close to 1. • WCF bias would usually tend to increase SF (by ~ 4 %pts.) from its equilibrium value. • On this basis AQs could be too high.
SE	-	cannot establish	-0.036	0.991	-0.036	0.998	• Unable to establish “equilibrium level” of SF (no winter month has appropriate combination of circumstances). • Observed winter SFs are close to 1. • WCF bias would usually tend to increase SF (by ~ 3-4 %pts.) from its equilibrium value. • On this basis AQs could be too high.
SO	Oct	0.995	-0.040	1.027	-0.039	1.032	• WCF bias would usually tend to increase SF (by ~ 4 %pts.) from its equilibrium value; AQs could therefore be too high. • Observed winter SFs are ~ 3 %pts. greater than equilibrium SF. • Equilibrium SF suggests that AQs are okay.
SW	Mar	1.014	-0.031	1.000	-0.030	1.007	• WCF bias would usually tend to increase SF (by ~ 3 %pts.) from its equilibrium value; AQs could therefore be too high. • Observed winter SFs are close to 1. • Equilibrium SF conversely suggests AQs are too low by ~1%.

Table 13 – Aggregate NDM AQs at Start of Gas Year 2006/07

(Based on data extracted from the Gemini system for gas days 27/09/2006 and 07/10/2006)

LDZ	% NDM AQ Change
SC	-3.1%
NO	-1.4%
NW	-2.1%
NE	-2.4%
EM	-1.9%
WM	-2.3%
WN	-3.5%
WS	-2.6%
EA	-3.2%
NT	-2.8%
SE	-2.5%
SO	-1.3%
SW	-2.4%
Overall	-2.4%