Detailed Analysis of Allocation of Unidentified Gas Statement for 2013/14

and Supporting Data

An assignment on behalf of ICoSS

by

Phidex Consulting Limited

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Contents

1. Executive Summary

Following an initial review of the Allocation of Unidentified Gas Statement (AUGS) for 2013/14 on behalf of I&C Shippers and Suppliers (ICoSS) Group, entitled "Review of Allocation of Unidentified Gas Statement for 2013/14 and Supporting Data" in February 2013, Phidex Consulting Ltd (Phidex) was requested to perform a further and more detailed review.

The purpose of this assignment was to provide added weight to the findings of the initial piece of work, which was not provided in the first instance due to the time limitation allocated.

Although the response by Allocation of Unidentified Gas Expert (AUGE) to this initial piece was not to dispute the findings raised, it was felt that to ensure the points highlighted were received with the gravity warranted and that the methodology and results of AUGS for 2013-14 were re-worked, additional actual examples of calculation errors should be made available.

The additional analysis carried out was performed on the same dataset provided for the first assignment. However where previously, due to time restrictions, only the data for the LDZ "NO" was used, this assignment was to include data for all LDZs.

The analytical work was to be focussed on the anomalies found in the initial assignment to identify actual amounts of mis-calculated energy rather than review the data for new root causes where error in the calculations could occur.

This document contains the methodology used by Phidex to identify actual cases of mis-calculated Unidentified Gas (UG), actual results of the analysis performed and, where appropriate, extrapolation through specified datasets to deliver expected amounts of similar cases to those actual cases found.

The entire dataset available for analysis was huge, numbering millions of rows of data; therefore a full granular analysis was not possible in the time allocated. The analysis was also limited to the root causes of error found previously; this was considered to be the most effective method of extracting mis-calculated energy quantities in the period available.

Phidex would like to thank Gareth Evans and the members of ICoSS for this assignment.

2. Summary of Key Findings and Recommendations

- Despite assurances from the AUGE that the data provided to them is the best available from Xoserve, Phidex firmly believes that this is not the case. The UK Gas Market is the most advanced deregulated gas market in the world, and the 20% error rate found by both AUGE and Phidex would not be deemed acceptable, if it were true. A sophisticated validation and reconciliation process exists between Xoserve, the Suppliers and all other parties with an interest in accurate data. The types of error identified by both Phidex and the AUGE are routinely corrected through these established processes.

- Many of the asset details provided in the supporting data and highlighted in this document do not exist. In other cases, the asset details provided for specific MPRs are highly dubious, where meter types typically associated with high consuming industrial sites are allocated to MPRs in the SSP sector in alarming regularity.

- Meter reads surrounding actual and cosmetic meter exchanges were not provided, indicating that not all meter read information available to Xoserve has been utilised in calculating metered consumption, or provided to the AUGE.

- Accurate energy determination is solely dependent on meter reads and asset information. The findings of Phidex have categorically shown that the supporting data provided by the AUGE contains significant and persistent errors. The impact of these errors is relayed in the variance between energy allocated to specific MPRs by the AUGE and that calculated by Phidex. The scale of these errors does not exist in the complex data supply chain and charging mechanism of the UK Gas Market which indicates that a different and unacceptable dataset has been used in this process.

- Phidex's calculations and refined extrapolation of results has identified a potential error quantity of 2.7 TW in the calculated energy value; therefore increasing the UG value by the same amount. The monetary value of this energy, at the forecasted rate of 2.34p/kWh for 2013 – 2014 is almost £65 million.

- Much of Phidex's findings have also been mentioned by the AUGE in its own statement, however the impact was not considered to carry sufficient gravity to insist a new and improved dataset was delivered. A much firmer approach should be adopted to guarantee only the most accurate data available is used for this process. The data for future AUG processes should align to the data used to reconcile the LSP shippers to their actual energy usage in each period.

- The AUG process is still largely un-audited. The supporting data is huge and in a format which is not easily accessible to organisations or departments with only modest IT capabilities. There is no independent review of the calculations performed on behalf of the AUGE before it is released for approval. Taking into consideration both these two points,

the work of the AUGE at a granular level will go largely un-checked, which is of concern when the value at risk is in the region of £140 million.

3. Introduction

Background to the Assignment
Phidex Consulting Limited was established in 2011 to provide operational and software consultancy to the Gas and Electricity Supply Industry. Previously engaged by ICoSS to analyse the supporting data for the AUGS for 2013/14, three clear messages were delivered:

- 1) The Data provided by Xoserve and used by the AUGE was not the best data available for this purpose. By its own admission, the AUGE noted that there was a very high error rate in the accuracy of the data (circa 20%) which meant that extensive additional work was required to generate a true reflection of actual consumption metered by SSP and LSP supplies.
- 2) The calculations provided by the AUGE were inaccurate and resulted in tables for UG which were highly likely to include under calculated consumption, therefore increasing the perceived UG value. In a relatively short period of time Phidex was able to identify 4 root causes of calculation error. It is thought that the effect of these root causes would significantly sway the UG value.
- 3) The AUGS process did not have a provision for independent and expert validation of the resulting tables. The supporting data published by the AUGE was not in a user friendly format, meaning it was difficult for an interested party (affected suppliers) to perform their own audit to, at the very least, sense check the output.

The above points meant that there was a very high likelihood that the resulting calculations, for which ICoSS members would have to pay their share, were inaccurate in the scale of many millions of pounds.

The initial findings of Phidex were combined with those of Waters Wye Associates (WWA) on 04 March 2013 and published for review. The response from the AUGE on 12 March 2013, whilst not disputing the points, did not embrace the issues raised and commit to a totally new review with a revised data source (from Xoserve) and including independent validation.

Because there is an enduring threat that the results of the AUGS for 2014/15 will be equally inaccurate, a follow up assignment has been agreed to show the scale of error within the AUGS for 2013/14 results.

Scope of the Assignment
The current assignment is to work the same supporting dataset of AUGS for 2013/14 and spend further time extracting worked examples from the tests of the initial piece.

The output is to find actual examples of understated energy quantities from the calculations performed by the AUGE by comparing the calculations of Phidex to those found in the AUGS supporting data. To deliver full transparency in our findings, Phidex will make available all specific MPRs analysed, along with the actual calculated energy quantities.

As the timescales available make a full granular review impossible, where it is appropriate, the actual results from a particular test dataset will be extrapolated through the remainder of the test to provide a forecasted value of deviation of AUGE calculated energy from actual energy.

In the time allocated, if new tests can be identified and performed, then this will be included also.

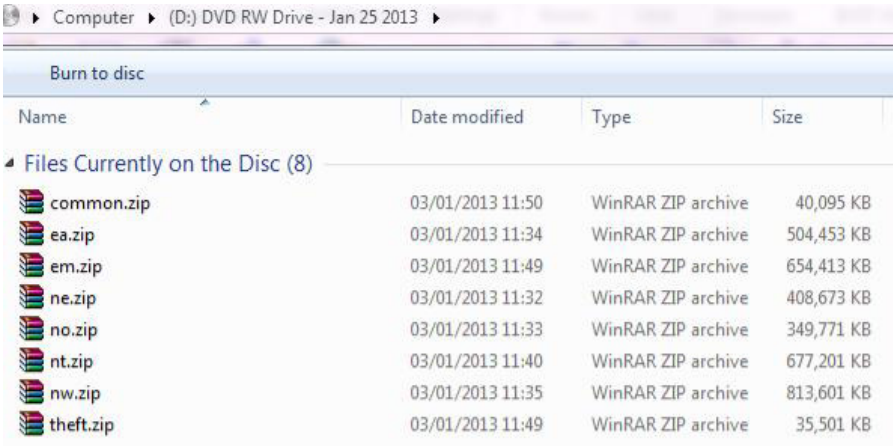
It is anticipated from the initial assignment that the actual results of this review will be sufficiently clear to highlight the significant scale of error within the AUGS for 2013/14 and ensure the 3 main requests are met:

- 1) Xoserve provide a dataset which contains fewer errors and is deemed the best available and fit for purpose.
- 2) A new methodology is implemented to ensure the calculation errors identified are removed.
- 3) An independent and sufficiently experienced organisation is included in the process to audit and validate the results on behalf of all affected parties.

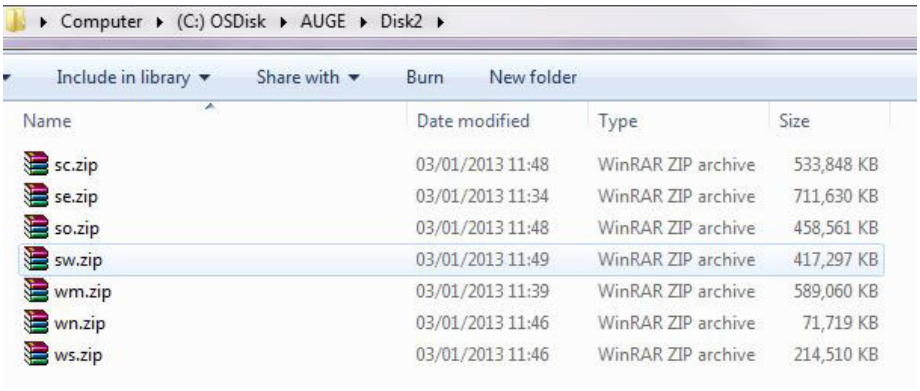
4. Data Processing

As a key element of Phidex's work was to analyse the data contained within the DVD, this section describes the steps taken to make that data available for analysis. Below are listed the Contents of the DVDs:-

The AUGE - Disk 1 – 11th Jan 2013

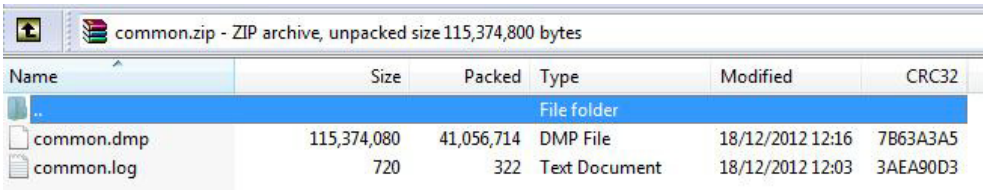


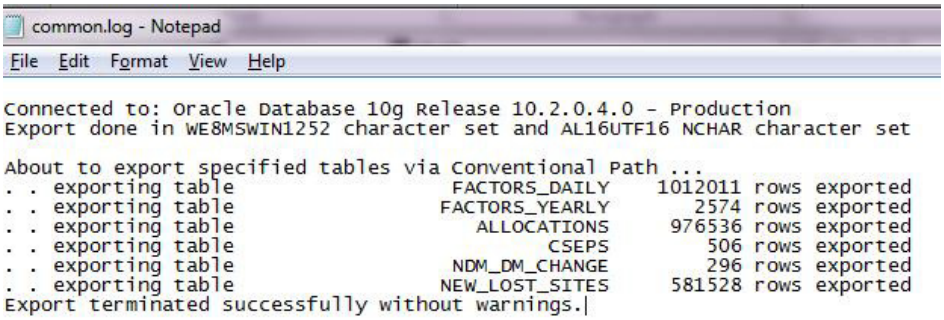
The AUGE - Disk 2 – 11th Jan 2013



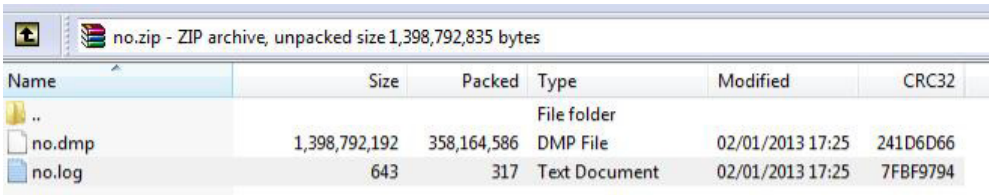
All .zip files were extracted, here are some example screenshots of the contents - the .log files here describe the Table names and number of rows contained within the Oracle dump files :-

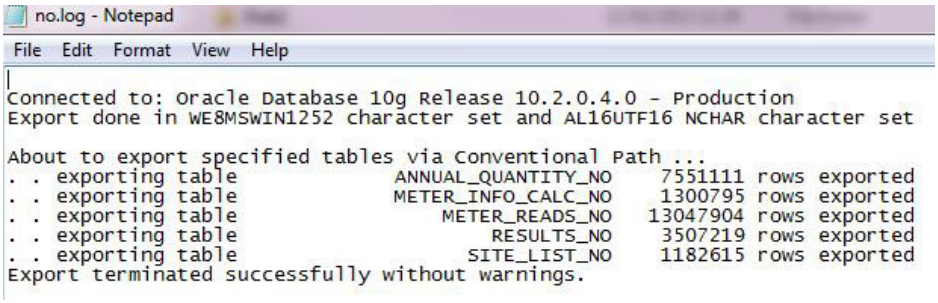
1. Common.zip :-





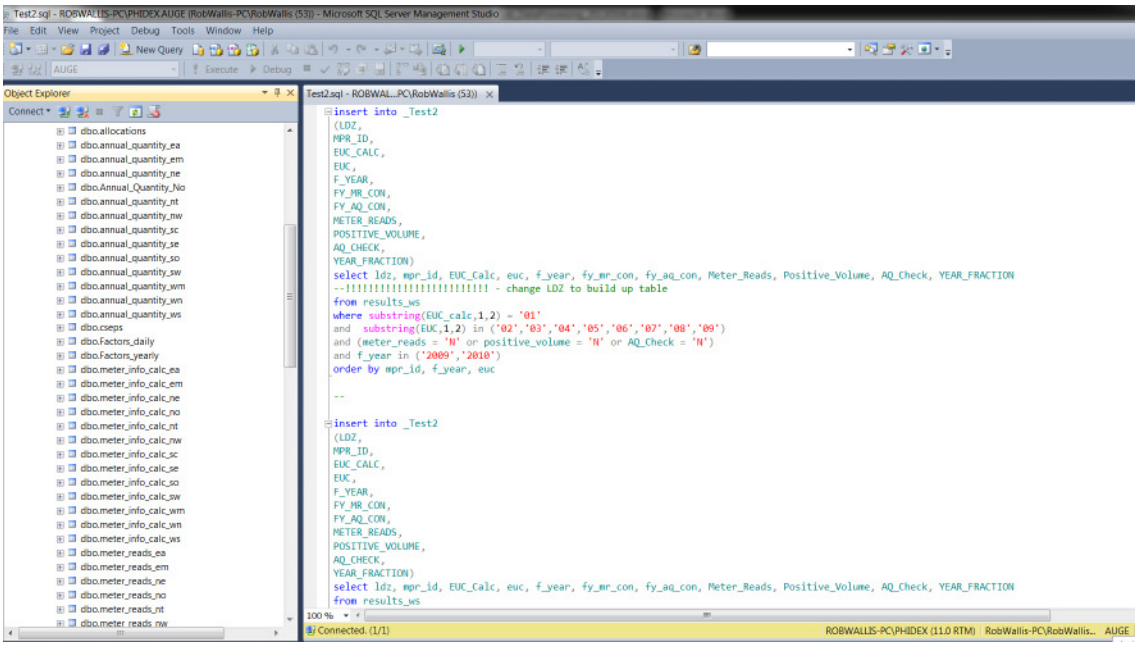
2. no.zip :-





Phidex's systems are based on MS SQL Server as opposed to Oracle, therefore third party software was utilised to convert the Oracle Dump files into a standard .CSV format ready for database import.

The 70 plus CSV flat files were then imported into a SQL Server database and the data for all LDZs thus made available to run queries – the code behind our Tests.



The SQL Server database utilises more than 40 Gb of diskspace.

The entire dataset from The AUGE is at this point available for further analysis.

Appendix B of the document – AUGS 2012 Version 2.0.pdf (Page 86) contains descriptions from The AUGE of the table and field structures.

Comments on Data format

The dataset format provided by The AUGE is fit for purpose, as long as the recipient runs an Oracle environment and has plenty of server disk space available to host the estimated 60 GB (uncompressed) of data. Only an Oracle environment is able to load and interpret the Oracle Dump files .dmp provided.

Bearing in mind it is likely a large number of recipients do not run Oracle; a more useful solution would have been for The AUGE to have exported the data into a .csv flat file format, perhaps providing the complete data file and a smaller sample file.

This would enable recipients to more easily load the data into their respective databases and environments, smaller sample files would have been able to be analysed using standard MS Office applications such as Access or Excel.

Overall figures

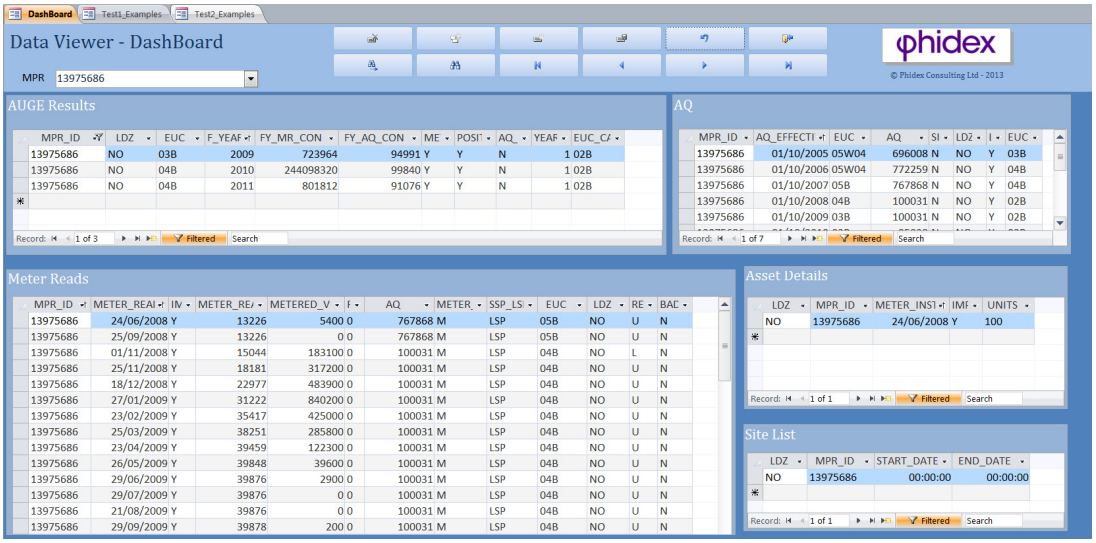
Here is a table illustrating the number of records and distinct Meter Points in the key tables used by The AUGE to aggregate the Metered consumption and derive the overall Unregistered Gas figures:-

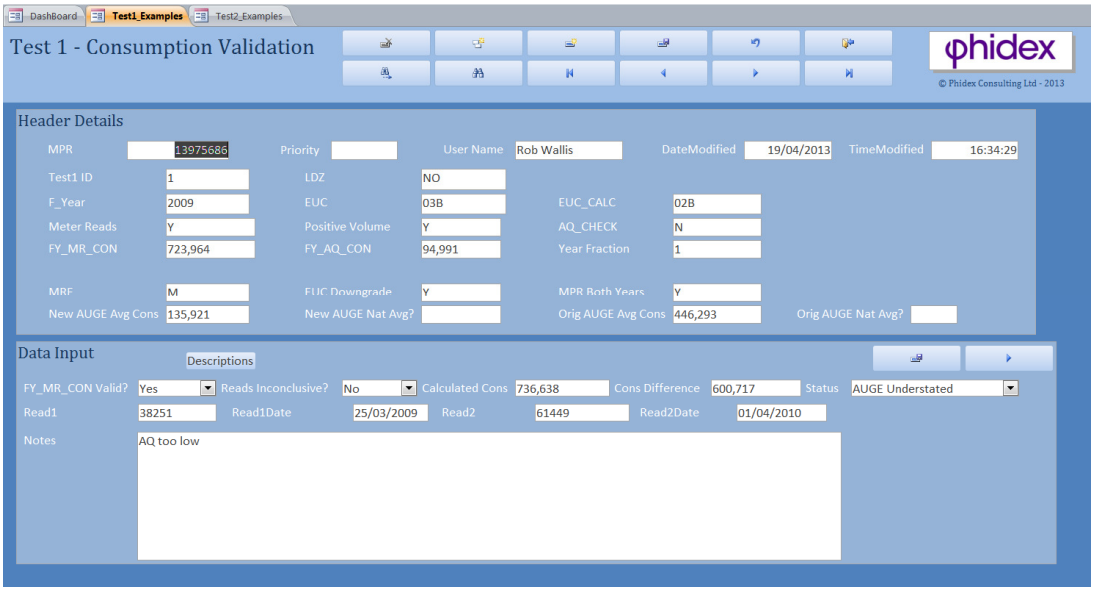
LDZ	Total number of MPRs in Results	Total Number of Results over 3 year period	Total Number of Meter Reads
EA	1,707,330	5,260,781	19,158,786
EM	2,129,992	6,634,675	23,981,102
NE	1,360,094	4,054,852	15,387,091
NO	1,177,156	3,507,219	13,047,904
NT	2,319,111	6,910,240	24,438,133
NW	2,706,276	8,068,394	29,458,678
SC	1,796,174	5,338,583	19,917,154
SE	2,509,233	7,480,438	25,831,833
SO	1,588,495	4,737,224	16,881,580
SW	1,424,211	4,238,493	15,530,865
WM	1,970,224	5,880,183	21,626,070
WN	242,859	722,793	2,730,611
WS	819,588	2,444,706	7,992,819
Totals:-	**21,750,743**	**65,278,581**	**235,982,626**

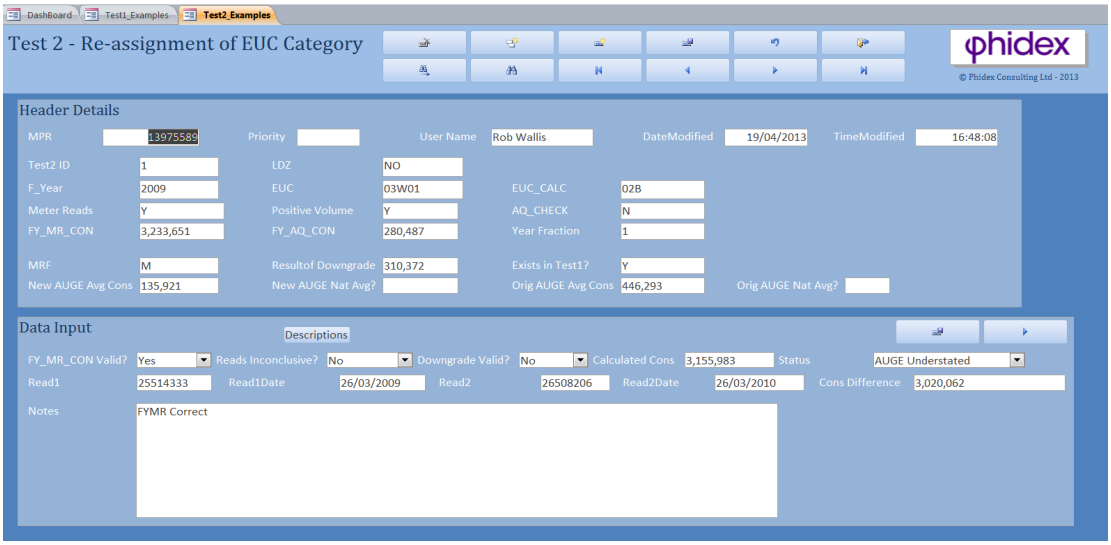
Data viewing and analysis capture Application

MS Access was chosen as the most suitable software to quickly create an application for our Analysts to view the results of the Tests alongside the required underlying data provided by The AUGE - combined with data input forms to capture the required data related to the Test 'cases' which required manual analysis.

Here are some screenshots of the application created:-







5. Testing Overview

The testing process for this assignment was to continue with the tests from the February 2013 assignment. These tests highlighted cases where the AUGE had understated the consumption quantities allocated at MPR level and therefore increased the UG value. Continuation of these tests may appear to sway the UG value in favour of the LSP sector, and those suppliers with a high percentage of LSP meters, however the message Phidex wants to deliver is that there are inaccuracies in the current methodology and calculations. There could be examples or trends where the AUGE had consistently overstated the quantity in a formula year for a MPR, going some way to balance out the cases Phidex has identified. This would only highlight further discrepancies in the AUGS, as it would be agreed that multiple anomalies in the methodology and calculations would not be considered an acceptable approach to fairly and accurately allocate the huge monetary values associated with UG and strengthen the argument that the current methodology should be revised.

The 4 tests were identified to highlight errors, as follows:

- Test 1 – In the LSP sector it was found that error occurred in the AUGE's calculations where a meter had failed one of the AUGE's own tests, in this case the test to see if the metered consumption was 5 times, or more, greater than the AQ. It was found that the AQ could often be incorrect and therefore a valid calculation of energy could be invalidated.
- Test 2 – In the LSP sector it was found that where a meter had failed the AUGE's own tests, the EUC band that it was found in was downgraded to a lower EUC band. As the energy applied to a meter which failed one of the AUGE's own tests was the average AQ for all meters in that band, a downgrading of the band meant the energy value attributed to the meter for the year was also downgraded. We found this to be erroneous in many cases and could not be balanced by the very few instances where the EUC band was upgraded to a higher band.
- Test 3 – It was identified that the AUGE performed manual check and calculations to generate an energy value for a formula year, however this was not clearly highlighted in the

supporting data. Manual validation of the AUGE's own calculations could not easily be performed, which was considered a risk to accurate results.

- Test 4 – In the SSP sector the calculated quantity for a formula year was taken from meter reads, rather than Xoserve provided metered volumes in the LSP sector. Numerous examples of the calculations being performed incorrectly were found, specifically where the metered quantities were understated by a factor of 100.

Further tests were performed for tests 1, 2 and 4. Because test 3 was identified as an area of risk and in-transparency, this was not analysed further during this assignment.

A sample list was produced by filtering the entire dataset. Each of the sites tested had its consumption for the given formula year calculated by a Phidex analyst. As well as calculating the actual consumption, a status was applied to each site tested. The below statuses were given to each of the cases analysed.

AUGE Understated
AUGE Overstated
AUGE Acceptable Tolerance
Insufficient Data

As well as identifying instances where the AUGE had understated energy in their analysis, and therefore increasing the UG value to be smeared across all suppliers, Phidex ensured that all cases where the AUGE had overstated the amounts were also included in the results. Phidex accepts that the tests were not specifically designed to identify these instances.

The quantity for a given formula year, if any one of the AUGE's tests failed, was based on the average AQ for the EUC band the MPR was given. It was therefore unlikely that the actual calculation would exactly match the quantity eventually allocated for that MPR. If the average AQ for the EUC band was within an acceptable tolerance from our calculations, then this was stated and the AUGE's provided value was accepted with zero deviation recorded.

We also accept that in many cases the meter reads from which consumption in a formula year is to be calculated, is either not present, ambiguous or clearly incorrect and an accurate calculation could not be carried out. Particularly in this area, Phidex does sympathise with the challenges the AUGE faces in delivering universally accurate results for each MPR.

With Phidex being mindful of the timescales for this project and an intention to provide results for as many actual cases where the AUGE's values differed from our own, we did not dwell too long on a single MPR trying to decipher the data available. If it was not clear, then a status of "Insufficient Data" was given, the AUGE's values were accepted and the analyst moved onto the next case.

It was not the objective of Phidex to measure the consumption value for each full formula year to the nearest kWh. By taking meter reads close to the start and end of the year and by applying standard correction factor (1.02264) and average CV (39.5) an energy value was calculated. It was this figure which was compared to the AUGE provided value for that period to see if it was in the same 'ball park'. Using different reads and dates and apportioning to a full formula year would account for a certain amount of acceptable deviation between Phidex's calculations and those of the AUGE. Only when a clear deviation through calculation error was identified, was this submitted as Understated or Overstated energy.

6. Testing Methodology

Test 1
Test 1 was looking for instances where the AQ test failed and the allocated AQ for the EUC band was lower than the actual energy calculated between reads, and deemed to be correct.

Here we filtered on all sites which failed the AQ test. To identify a better return, we then filtered on instances where the EUC band did not equal 01B and the FY_MR_CON value was greater than 200,000 kWh. As many of these instances also had a downgraded EUC band, which was a part of Test 2, we then filtered on sites which had not been downgraded.

This resulted in a sample set of 376 MPRs to analyse. All of these were analysed and results recorded. Extrapolation of these results to the rest of the dataset where the FY_MR_CON was less than 200,000 was not performed as the hit rate was likely to be much lower. Our limited time was better spent analysing filtered datasets where there was a much higher likelihood of identifying understated energy values.

Test 2
Test 2 was designed to identify instances where a downgraded EUC band resulted in understated energy. Here the dataset was filtered to identify all cases where one of the AUGE tests had failed (hence the average AQ for the EUC band will be used) and the EUC band had been downgraded. This delivered a sample dataset of over 28,000 MPRs. We believed that if the original EUC band was correct and the downgrade should not have happened, then the FY_MR_CON value should have been close to the average AQ of the initial EUC Band. Through highlighting MPRs in various FY_MR_CON ranges, the sample dataset was reduced to about 1,000 cases of which all were analysed.

As covered in the first piece of work carried out by Phidex, focussing on downgraded EUC bands was justified as there were negligible cases of EUC band being upgraded to balance our work off against.

Test 4
In the SSP sector, it was noticed that calculation errors existed in measuring the energy value between reads in a formula year. The examples first identified in February 2013 were all mis-calculated by a factor of 100.

To generate a sample for testing the SSP sector was filtered so that the AQ for the MPR in a particular formula year was roughly 100 times that of the value the AUGE had calculated for the same period. These sites were given a High, Medium and Low status according to our perceived likelihood of the error existing.

High:	AQ for formula year 95 – 105 times the FY_MR_CON	11,306 cases
Medium:	AQ for formula year 80 – 120 times the FY_MR_CON	10,035 cases
Low:	AQ for formula year significantly different to FY_MR_CON	51,100 cases

Note; duplicates were not allocated to more than one band.

Due to the large size of the sample set, not all 70,000 cases could be analysed individually. A sample from various ranges within each status set was analysed.

From these results, extrapolation throughout the remaining results was able to be done to provide an estimated value of incorrectly calculated energy which we could be reasonably confident in.

Test 5
During the analysis of Test 4, it became apparent that there were a number of cases where the assets in the associated tables were suspicious. Many examples of imperial meters reading in 10s cubic feet were noticed. From experience in dealing with gas meters and their assets, it is known that there are not huge numbers of these, and they would all be supplying large consuming sites and have no fewer than 6 dials.

The cases Phidex came across were for MPRs with low AQ and the reads were often in 4 dials. These meters do not exist in the UK Gas Network.

Without actual MPRs (remember all "MPRs" in the AUGE supporting data are dummy MPRs, generated for the purpose of maintaining commercial confidence) or meter serial numbers, the work carried out on Test 5 is just suspicion of the incorrect assets, and therefore incorrect calculations being used. Phidex's experience is such that we are beyond being reasonably confident that this is another root cause of mis-calculation causing understated energy.

The approach in this additional test was to identify all MPRs in the SSP sector which were used in Test 4 which had asset detail of imperial meters reading in tens of cubic feet. Even though these meters would have been included in the results for understated energy in the earlier test, it would be useful to highlight a second significant error in the energy determination process in this sector.

Further work will be required to extend the analysis of these meter types and other dubious asset details throughout the entire SSP and LSP dataset.

7. Results of Tests

The results of the above tests can be found in summary below and in full in Appendix 1.

Tests 1 and 2 contain no extrapolations, so only represent actual results. The only area of discussion could be surrounding where the lines of acceptability and error lies in the original calculations found in the AUGS and where there was insufficient data to form a firm view of actual energy taken. In most cases the view is clear-cut, where an anomaly exists, and there is an argument that had the actual energy quantity been calculated and used, then further tests would not be required and an alternative value (Average EUC Band AQ) be needed.

Test 4 contained actual results for the analysis performed. Extrapolation of these results were then applied to the various tests groups according to the FY_MR_CON Value provided.

For each Test 4 sub-group, the hit rate at finding error was applied to the rest of the dataset as was the factor which actual measured consumption deviation from the provided FY_MR_CON value. This deviation value was up to a maximum value of 'times 100'. We did not increase above this amount as the original thought was that the 'times 100' error was an issue with measuring units of 100s of cubic feet as units of single cubic feet.

In the "Low" section of Test 4 analysis, the results in the test groups "5 – 10K", "10 – 25K" and "25 – 73K" were not included in the final tables. Here the success rate of finding anomalies dropped below 50%, so would deliver a weaker statement to our results. Phidex was not intent in finding every single kWh of understated energy, just sufficient amount to convince a wider audience that a revised analysis is required for future AUGS tables and in sufficient numbers to warrant an independent and experienced auditor. We believe the figures as they stand meet that objective and therefore do not need to be bolstered by a more diluted set of results.

In each test the energy value of understated or overstated energy was given a monetary value by applying a unit price of 2.34p/kWh. This value was the rate published by AUGE as the Average SAP rate for the period April 2013 - March 2014. Clearly a unit rate for April 2014 – March 2015 will need to be generated to apply to future statements.

Table of Results (High level summary)

Overall Summary		
Test	Understated Energy	Value of Understated Energy
1	189,001,692	£ 4,422,640
2	398,499,105	£ 9,324,879
4 - High	657,493,937	£ 15,385,358
4 - Medium	604,026,185	£ 14,134,213
4 - Low > 1000	246,304,036	£ 5,763,514
4 - Low 1 - 5K	666,344,209	£ 15,592,454
Total	2,761,669,165	£ 64,623,058

Test 5 looked for instances where the metered units in the SSP tests were tens of cubic feet.

The actual MPRs affected can be found in Appendix 2 where the total incident count is 5,568 distinct MPRs.

The assets in this test result are only for units of 10s cubic feet in the SSP sample of circa 70,000 results. Appendix 3 lists all asset types found in the entire dataset. The high occurrence rates of particularly large meters (e.g. metric meters in 10s cubic meters and above and imperial meters in thousands of cubic feet and above) are all suspiciously high. Of more concern are asset details which are not thought to exist and therefore are assumed to be incorrect.

The below table shows the summary of all assets found across all LDZs in the AUGS supporting data.

N = Metric meters; Y = Imperial meters

Assets coloured blue are thought not to exist; Assets coloured amber do exist but are reserved to high consuming industrial supplies.

Table showing sum of all assets detailed in AUGS for 2013 – 14 supporting data

All LDZs		
Imp_Ind	Units	Instances
N	0.01	9,862
N	0.1	121,774
N	1	13,959,067
N	10	6,231
N	100	128,969
N	1000	30,312
N	10000	6,193
Y	0.01	88
Y	0.1	684
Y	1	22,365
Y	10	123,292
Y	100	11,444,919
Y	1000	16,532
Y	10000	38,319
		25,908,607

A full list of meter assets, containing units and number of dials, made available to the suppliers can be found in Appendix 4.

8. Summary of Findings by Phidex Consulting Ltd

A high level summary of Phidex's findings is that the results of these set of tests is in line with the initial expectations following the analysis of the same data set in February 2013; the data used has produced results which show clear and systematic understated energy has been calculated.

Data not fit-for-purpose
The over-riding factor of this analysis is that the data used to perform the calculations on is not fit-for-purpose. Previous examples shown by Phidex, and regularly commented on by the AUGE, highlight the unacceptably high error rate in the data provided by Xoserve. Due to the validation checks and tolerances applied by Xoserve themselves, this level of error simply does not exist in the final charges calculated and submitted to the shippers who supply the meters. It is accepted that a totally cleansed dataset is unlikely due to the many millions of meters and reads required to calculate the energy usage in the UK Gas Market, however there is a view that the final chargeable data to the LSP sector has undergone sufficient validation to be accepted and paid by the relevant shippers, then it should be acceptable for this purpose also. An ongoing reconciliation process of up to 5 years (to be reduced to a maximum back-stop of 4 years on 01 April 2014) will ensure that any further error which is identified is reconciled at a later stage and can be included in future AUG statements.

Asset Anomalies
The number of incorrect assets found in Appendix 3 highlight the extent of the erroneous data which has been provided on the supporting data for AUGS for 2013 – 14. Accurate asset details are

fundamental to the process of calculating energy. If the numbers of assets which are deemed not to exist in Appendix 3 were used for calculating energy, then calculations on over 300,000 sites were incorrect.

Test 5 showed over 5,500 MPRs in the SSP sector which had assets stated as being in tens of cubic feet. If this number is false, as Phidex believes it is, then the results show that even when the assets do exist, in a large number of instances the incorrect factors have been applied to generate an energy quantity. These examples were relatively straight forward to identify as the experience within the Phidex analysis team determined that these results would be unlikely. However, if a similar error exists in more common assets, then identifying such instances of mis-calculated energy would be more challenging.

Meter Exchanges

During the manual calculation phase of this assignment it was found that meter exchanges were being managed particularly poorly. Unless a seamless sequence of meter reads were available the metered volume would likely fail the AUGE's validation check. The lack of seamless sequences of meter reads over an actual or cosmetic meter exchange are common, meaning that where this occurred the less accurate method of using the average AQ for the EUC Band was applied. These reads are available to Xoserve and, although an area which is more prone to anomalies than others, is managed within the energy reconciliation process.

Methodology on incorrect dataset

Because the AUGE was not in receipt of a correct and accurate dataset it was required to perform lengthy and complicated calculations on the meter reads which were available. Had the correct data been available, this being the final charged amount to the shipper, along with the supporting data, then the calculations on the LSP sector would not be necessary. The quantities in this improved report would already have been accepted by the suppliers, or is in the process of being reconciled further, and it would therefore not be considered unreasonable to take at face value. The error rate, although not necessarily reducing to zero, would be a lot more acceptable than the circa 20% error rate in the current version.

Test Results

The manual test results performed by Phidex showed that over 0.5 TW of energy had been understated, increasing the total perceived value of UG by close to £14 million.

Extrapolating the results through Test 4 increased this value to over 2.7 TW with a value of £64m.

This value clearly has a huge impact on the total UG value published by AUGE in 2013 of 6 TW, worth £141 million. The Phidex exercise has shown potential to (almost) halve the UG value and the impact on the LSP sector.

9. Further Work

This assignment was limited to 20 days work, which included the initial task of importing the data from all the LDZs from Oracle dump files into a more manageable SQL database and MS Access User Interface. This meant that only about 14 days of analysis time could be spent on the data.

Where the exception reports were refined sufficiently well for the timescales available, further analysis outside these reports could have been performed to identify further mis-calculations in the AUGE data.

The scope for error due to erroneous assets has only been explored at a very low level. It is anticipated that asset details is the root cause of significant further error.

Unless a change to the methodology (provision of accurate data and validation of the output) is agreed in time for the next publication of results tables by the AUGE, which is agreed by all shippers, then further analysis on the results and supporting data would be necessary.