

Northern Ireland Water Ltd

Annual Information Return 2010

To the

Northern Ireland Authority for Utility Regulation



Public Domain Version

Part 3 of 8 containing:

Non-financial measures - commentaries for tables 7 to 16
(excluding table 10b)

Reporter's Submission

By

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The Halcrow logo, featuring a stylized blue 'H' followed by the word 'alcrow' in a blue sans-serif font.

Table 7 – Non financial measures – Water properties and population**Commentary by REPORTER****1. Background**

This table reports on the properties connected during the year, billing information and average report year population estimates.

2. Key Findings

- There are several key changes from AIR09 that have had an impact on the property information reported. Therefore a comparison between numbers reported in PC10 determination response rather than AIR09 provides a more valuable comparison.
- The Company provided a methodology statement used to derive the estimates reported in this table and using this statement we were able to reconcile the property numbers reported to the Rapid extract presented by NI Water.
- The Company has continued its non-household metering programme which has included surveying all unmeasured non household properties to determine if a meter could be installed on the premises. This has led to a significant decrease in the number of unmeasured non-household properties.

3. Audit Approach

The audit consisted of an interview with the NI Water system holder to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years.

4. Audit Findings**4.1 General**

The key source of information for the new connections and property data is the customer billing database, RapidXtra. This is an automated system where customer information is updated through various means including customer contact. The Company reports that data on property counts and classifications are reported monthly and reconciled with other data collection activities, such as the test metering project. During the audit we sought an update on various issues which had been raised in previous AIR and PC10 reviews. The following provides an overview of the discussions held with NI Water:

- Test Meters

NI Water outlined that their test meter project is ongoing with accounts being assessed and reclassified as appropriate. The Company advised that of the 11,500 accounts identified on the Rapid system, circa 1900 still need to be surveyed and 2,500 still require

investigation. The following provides a summary of the current status of the test meter project.

Reclassified to date		Desktop or survey still required		Total
Billed	1048			
Domestic	3074			
NIW meters	173			
Pass for billing	443			
Remove	203	Investigate	3158	
Retain for leakage	281	First Time Survey	2518	
Total No. of meters	5222		5676	10898

We also queried how test meters accounts had been treated in terms of reporting the number of properties in Table 7. NI Water advised that a contrasting approach has been adopted in reporting household and non-household property numbers, whereby 'test' meter numbers have been included in household property numbers but excluded from non-household numbers. This methodology is consistent with the Company approach in recent PC10 submissions but is different from the approach taken in AIR09 where an allowance for non domestic test meters was made.

- Site Meters

The Company explained that as part of their ongoing data checks the number of site metered properties (multiple properties being charged through a single meter) is currently being investigated and verified. To ensure these are not double counted the Company has excluded these meters from their Table 7 property counts. We understand this approach is consistent to that adopted in AIR09.

4.2 Properties

Line 1 – Household properties connected during the year

This line reports the number of new household properties added within the Company's area of supply. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note a significant decrease of 3,901 new connections when compared to the 08/09 Report Year. NI Water outline that they believe this reduction is associated with the economic downturn and the reduction in the number of new homes being built.

Line 2 – Non-household properties connected during the year

This line contains the number of new non-household properties added within the company's area of supply during the Report Year. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note that the number of non-household properties has approximately halved from that reported in 2008/09. The Company also outlined at they believe that this was associated with the impact of the economic downturn.

4.3 Billing

Line 3 – Households billed unmeasured water

We note a small increase of 8,006 reported in this line since 08/09. The Company was able to demonstrate the consistency of the number reported in this line to extracts from their property records on Rapid.

This line is calculated as the average of occupied domestic unmeasured plus the properties where a test meters has been identified.

Line 4 – Households billed measured water (external meter)

Whilst NI Water has been installing meters on all new household connections since April 2008, customers are not being charged on a measured basis. As such, all households properties should be reported as unmeasured.

We noted 522 properties were reported in this line for 09/10 and NI Water explained these are properties where a meter had been installed which would be billed upon if domestic charging was introduced. We believe, and the Company concurred, that these properties would be reported in line 3 household billed unmeasured water.

Line 5 – Households billed measured water (not external meter)

The number of billed measured households is again reported as zero. This remains unchanged from AIR08 as the Company do not install internal meters on household customers.

Line 6 – Households billed water

This is a calculated line, the sum of lines 3, 4 and 5. The figure reported represents the number of domestic properties that would have been billed had charges been introduced.

The increase observed is consistent with the rise in unmeasured household properties reported in line 3.

Line 7 – Household properties (water supply area)

We note that the number of household properties connected in the Company's water supply area has increased by circa 7,000 since 2008/09. The Company calculated this number as the total number of domestic connections (including voids) less those customers who are connected for sewerage only or receive water from well supplies.

Line 8 – Non-households billed unmeasured water

As expected we note that the number of non-households billed for unmeasured water within the supply area has decreased significantly during the year. The number of properties has decreased by circa 14,500 (50%) from that reported previously in AIR2009. NI Water explained that this was largely a result of amending their AIR methodology to report property numbers to align their approach taken in PC10 (previously NI Water had made off system adjustments to account for test meters and non-voids).

The decrease observed is also a result of the Company's non-household metering programme. We reviewed the Company's progress in delivering this programme and our commentary on this is provided in Table 8.

We asked the Company to provide an update on the comparison of the property numbers forecast within their PC10 Draft Determination response and the AIR10 reported number of non-household unmeasured properties. The Company forecast that 13,945 properties would be connected for water at the end of 09/10 and we confirm that 14,677 properties were reported as being connected. The latter value is not reported in the table as the Company reports average year data as requested by the Reporting Requirements.

Line 9 – Non-households billed measured water

We note that the number of non-households billed for measured water within the supply area has decreased by 9,750 properties since 2008/09. As the number of unmeasured properties has decreased we would have expected to observe a corresponding increase in the number of measured properties reported in this line as the Company's metering programme gains momentum. Following discussions with the Company we believe this increase is not evident because of the change in reporting approach between AIR09 and AIR10. Within their PC10 Draft Determination response the Company forecasted a 09/10 property estimate of 67,582 compared to the 68,666 reported in AIR10.

Line 10 – Non-households billed water

This is a calculated line and is the sum of lines 8 and 9.

We note that the number of non-households billed for water within the supply area has decreased by circa 24,000 (22%) since 2008/09. This decrease is explained by the changes highlighted above.

Line 11 – Non-household properties (water supply area)

We note that the average number of connected non-household properties within the water supply area, including void properties, has decreased by 13,613 from 08/09 which follows an increase of 32,733 properties between 07/08 and 08/09. Similarly to line 7, this number is calculated as the average of gross non-domestic, less those customers who

do not receive a water supply or are connected for sewerage only. As reporting methodologies become embedded over time we would expect the number of properties reported within this line to remain relatively consistent over time.

Line 12 – Void properties

The number reported in this line has remained relatively consistent from that reported previously in AIR09. NI Water defines properties within this line as those which are connected to the distribution system but do not receive a charge as there are no occupants.

The Company has calculated this line for AIR10 as the sum of domestic and non-domestic voids, less properties reported as not receiving a water supply and non domestic site meters and test meters.

4.4 Population

Total population is derived from 2008 based (published October 2009) population projections obtained from the Northern Ireland Statistics and Research Agency (NISRA), which are provided for the year ending 30th June. However, NI Water report a mid-year average population for Table 7. For AIR10, NI Water has extrapolated between the June 2009 and June 2010 estimate, in order to derive a September 2009 (mid year) estimate of 1,791,982. This population is then assigned to the various categories required for Table 10 using the approach outline below and summarised in Figure 1.

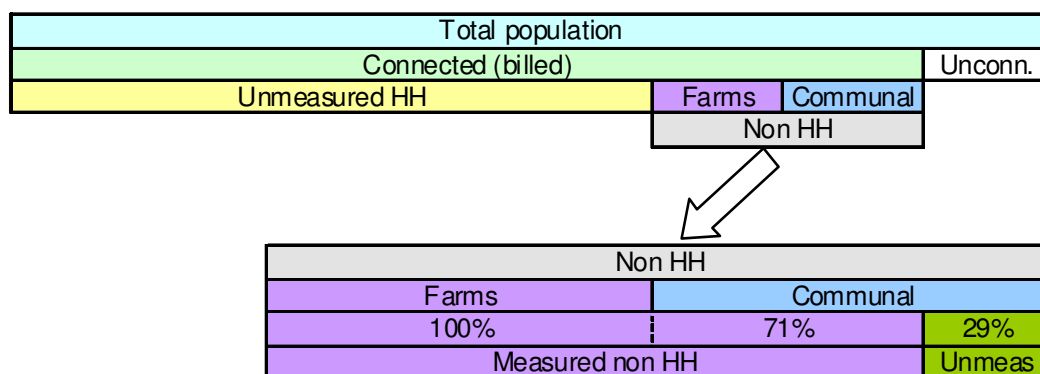


Figure 1 - Population Estimates

The Company advised that the total population (line 17) is adjusted to account for the number of properties within the province without a water connection. For 2009/10, the NIHE, through its Housing Condition Survey (completed in 2006) forecast that there were 6,270 unconnected properties in NI, with an average occupancy rate of 0.291. The occupancy rate was also based on NIHE survey results (as described in the Company commentary) with the exception of the 151 unconnected properties, where NIHE described the occupancy to be 'other'. NI Water has assumed an occupancy rate of six for these properties. Based on the above, an unconnected population of 1,824 has been

assumed for AIR10, which appears to be reasonable, resulting in a total population of 1,790,158. This represents a 0.85% increase from the value reported in AIR09, which is in-line with the projected growth rate seen in the NISRA projections.

When reviewing the source documents from NIHE there were conflicting values in the Report (Figure 5.9) indicating that there may be up to 18,500 unconnected properties. There are no other references to this value, as all other statements/tables in the report refer to 6,270 unconnected properties. This report is due to be revised during the current year; we recommend NI Water review the relevant sections and update the estimate for AIR11, and check if this inconsistency has been resolved.

Non-household population is based on the population associated with measured farms and the population in communal residence. The communal population (30,390) is based on the latest NISRA 2006 based (published March 2008) Census estimate, which shows a 16% increase from the estimate used in AIR09, which was based on the NISRA 2001 Census estimate. The communal population is split between unmeasured and measured on a pro-rata basis consistent with the measured non-household split reported in lines 8 and 9, after excluding farms. The split is 71%:29%, which results in 8,856 being assigned to unmeasured non households (line 15) and balance of 21,534 being added to the measured non-household. The unmeasured non-household population has increased by 2,200 (33%) from AIR09 due entirely to the revised NISRA projections.

The farm population is derived from the number of metered farms (29,637) and the average NI occupancy rate (2.5), giving a total 73,796. The total measured non-household population is the sum of communal measured population and the farm population giving at total of 95,330 (line 16). This value is slightly below (320 or 0.3% reduction) the value reported in AIR09

Unmeasured household population reported as the balance when the non-household population (farms and communal properties) is deducted from the total connected population, giving a value of 737,796 (line 13). This is a 0.79% increase from the AIR09 value, which is again in-line with the projected growth rate seen in the NISRA projections.

5. Confidence Grades

5.1 Properties

The Company has assigned a confidence grade of C3 to the property numbers reported in Table 7. For AIR10, the key source of information for the new connections and property data is the customer billing database, Rapid however there are a number of weaknesses identified within the Company's methodology. As a result we believe a C3 grade is reasonable.

5.2 Population

As we reported in AIR09 we do not consider it reasonable for NI Water to be required to provide confidence grades against population estimates as we do not feel this provides any discernable value to the Utility Regulator, as the data has been primarily sourced from the NISRA website. With the exception of a number of minor adjustments/assumptions made by NI Water the reported data is public domain information and NI Water has no influence on the methodology adopted by NISRA.

However, the Company has made a reasonable attempt at assigning confidence grades to this data. Based on their understanding of the NISRA methodology and the degree to which NI Water has allocated the total population between customer types, we consider the confidence grades are probably appropriate.

We recommend that NIAUR reconsider their requirement for NI Water to report confidence grades against population data. NI Water has no real influence over the derivation of this information, and unless they commission their own annual population survey it will be difficult for NI Water to improve this methodology and thus confidence grades in the future.

6. Consistency Checks

According to the Reporting Requirements, lines 3, 8, 13-16 and 17 should be copied from the sum of table 10B(i) lines 24, 30, 23, 26, 29, 31 and 33 respectively. However the Company does not report table 10B(i) for AIR10. Therefore, these lines in table 7 could not check its consistency.

Date: 30 July 2010

Prepared by: [x]

Table 8 – Non financial measures – Water Metering**Commentary by REPORTER****1. Background**

Table 8 is designed to track activity installing meters against planned activity. It also typically provides summary information on the demand of household customers after having a meter installed. This table should only include reporting of meter installation on existing household properties

2. Key Findings

- NI Water reports that meters have been installed on all new properties and that it has made good progress with metering of non-household customers.
- The Company has also made good progress in meeting the targets set out within Appendix 19 of their response to the draft determination. A total of 99 installations have been reported against a target of 100.
- As advised within our Principal Statement commentary, the Company have surveyed a number of properties and found a number where a meter has been previously installed but not reported on their billing system. NI Water advised that 705 meters were identified within this survey.

2.1 Key Recommendations

- Revisit the method for reporting non-household meter location to ensure that the split reconciles to the total number of installations reported.

3. Audit Approach

The audit consisted of an interview with the NIW system holder to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years.

4. Audit Findings

The Company confirmed its metering policy:

- Household: includes installing meters on all new connections as per the obligation associated with Article 81 of The Water and Sewerage Services (Northern Ireland) Order 2006.
- Non-household: metering of all non-household customers where possible.

NI Water has been increasing its meter penetration across its non-domestic customer base through selective metering or customer optants. The Company also reports that it has metered nearly all the large volume non-domestic customers as outlined for 09/10 in Appendix 19 of their response to the draft PC10 Determination. Further commentary on these installations is provided below.

4.1 Block A - Household Installations (lines 1 to 6)

Within line 1 of the table the Company have reported the number of meter installation at new domestic properties. The number of installations reported (3,945) is circa 11% less than the number of new domestic properties reported in Table 7. We believe this is potentially due to the significant time lags between carrying out metering activity and recording. The Company confirmed that all domestic meter installations are made within an existing boundary box.

4.2 Block B – Non-household installations (lines 7 to 12)

Line 7 – Selective Meters Installed

The Company report that 907 meters were installed under this category. This total is made up of essentially two components: new meters installations (202) and the results of the Town Surveys which were undertaken in the early part of the year. The latter refers to ‘new finds’ where no records of meters were previously reported on the Company’s database. NI Water advised that 705 meters were identified within this survey.

We found that a subset of the 202 ‘new’ meters installed relate to the properties identified with the Company’s Appendix 19 response to the PC10 Draft Determination. Within this submission NI Water committed to metering 100 large non-domestic properties before the end of FY10 and we challenged the Company whether they had achieved this target. In response NI Water were able to present an audit trail to show 99 properties had been metered.

Line 7a – Number of non-household meters renewed.

NI Water report that 779 meters were renewed during the Report Year and provided a copy of their audit trail to support this figure. We queried a number of points on the Company’s renewal policy which were answered to the Reporter’s satisfaction. We found that the Company currently assumes the lifespan of a meter to be circa 15 years and where a meter is removed for testing (and replaced with a new meter) then this would count as a renewal and reported within this line.

Line 8 – Meter Optants installed

The Company reports that 28 non-household customers opted to have a meter installed. During the audit we queried how the Company promotes the optant scheme to customers and NI Water advised that whilst there is no formal promotion campaign, agents should be aware of the scheme and be able to process applications if requested by the customer. NI Water also shared a copy of the process by which agents process an

application together with generic call scripts and letters which are given to call agents.

Line 9, 10 and 11 – Meter Location

Within these lines the Company report the location of the meters they have fitted. NI Water's preference is to fit meters externally where possible but a number of installations have been reported as internal fits. From discussion with the Company the majority of the internal installations relate to properties where the Company had surveyed and found that a meter had already fitted.

We challenged the Company why the total number of meter installations reported in line 7 and line 8 did not equal the number of meters reported in lines 9, 10 and 11. In response NI Water acknowledged that the data did not reconcile but as this was a new requirement they had attempted to provide information on meter location retrospectively on a best endeavours basis. Going forward we would expect the Company to be able to report a breakdown of the number of meters installed per location.

Line 12 – Meter installations requests outstanding greater than three months

In total the Company reports that 20 installation requests were outstanding for greater than 3 months. NI Water advised that a small number of requests may take an extended period of time due to the complexity or type of installation required. We queried the source of the 20 installations reported and the Company representative advised that the data was an estimate based on their own understanding of the metering programme rather than a documented evidence source. We would anticipate that NI Water will be able to improve this area of reporting in future years.

4.3 Water demand at recently metered properties

For the first time the Company has been able to complete this section of the table by providing a volume estimate for demand at selectively metered properties.

We met with the NI Water to discuss their methodology to report this volume and they were able to demonstrate how the figure reported had been derived. We found that using a report generated from Rapid the Company had extracted all recently metered property data where readings had been taken. Using data from 474 records the Company has taken the total consumption and calculated the volume reported. We have checked NI Water's calculation of this volume and confirm it is appears reasonable and is consistent with the audit trail supplied.

We also reviewed the Company's methodology and note they have excluded details of properties where the consumption was zero, meters which serve NI Water sites and the 'new find' meters (see above). We believe this is reasonable as the inclusion of any of the components would skew the estimate made.

5. Company Methodology

5.1 Meter Installations

We found the number of meters installed, and reported in Table 8, is derived from the Company's contractor's records. During the audit we discussed the process by which meter installations are requested and raised and the interaction between the Company's various systems and Directorates. The following provides an overview of these discussions:

- Customer driven new connections are processed through the Customer Services Directorate and a job request is raised on the Company's Work Management System and closed once the connection is complete.
- For new connections and selective metering, the Company raises an order with their metering contractor who surveys and installs the meter at the requested property.
- The contractors returns the results of the meters fitted and the Company checks 5% of the records for accuracy.
- Before uploading the details of the meter installation to the billing system the Company must obtain the co-ordinates of the meter installation. The Company advised that there is currently a minimum 4 week duration between installation and the co-ordinates of the meter being obtained. Only after this data has been obtained can the data be uploaded to the billing system.

NI Water provided a copy of the contractor's spreadsheet which contains a list of meters installed between from April 09 to March 10.

5.2 Water Demand at recently metered properties

The Company base their estimate on billing data held in Rapid. We reviewed the Company's audit trail and believe the methodology adopted is appropriate to meet the Reporting Requirements.

6. Assumptions

Except where noted above we do not believe there are any material assumptions to report.

7. Confidence Grades

During the audit we discussed the confidence grades assigned and the Company's rationale and in the majority of cases we concur with the grades assigned to each line. We did however discuss the confidence grade assigned to line 12 – installation requests outstanding for greater than 3 months and as the number reported is based on an estimate a C or D grade may be more appropriate.

8. Consistency Checks

The numbers reported in this table are not reported elsewhere.

Date: 30 July 2010
Prepared by: [x]

Table 9 – Water Quality**Commentary by REPORTER****1. Background**

This information (along with DWI reports) will be used to examine performance with quality standards, the outputs funded in price limits and the quality of the water received by customers.

2. Key Findings

- Some improvements in water quality, largely due to improvements through completion of PPP ‘Alpha’ works, although some apparent deterioration in OPI measure at customer taps.
- No new ‘Legal Instruments of Work’ or Authorised Departures for distribution input agreed this year.
- No significant change of approach to plumbosolvency.

3. Audit Approach

The audit consisted of an interview with the NI Water system holder and a review of relevant documentation, system methodologies and data used to compile Table 9. Spreadsheets behind the table numbers were also examined to verify calculated line totals. The audit also included a review and comparison of the Company’s commentary and table data with last year’s submission.

4. Audit Findings**4.1 General**

There have been no significant changes to methodologies or procedures this year and NI Water continues to utilise their DWI records as the primary source of data for Table 9. As the DWI requires calendar year reporting, the Company also continue to report Table 9 based on calendar year (which we note is still not explicit in the Company’s commentary). For calculation purposes, the total average daily input applied to the 2009 calendar year is 623.06Ml/d. We verified this and individual inputs against the source flow data.

The Company reports a significant improvement in Mean Zonal Compliance, boasting an impressive chart to indicate the performance improvements made at Castor Bay WTW, one of the 4 new PPP water treatment works. This is good evidence of real improvements being made to performance levels. The Company advised that a similarly marked change is also being observed at Seagahan WTW where works have recently been completed.

Despite this, there has been some decrease in the Operational Performance Index. We discussed this with the Company who informed us that there were a cluster of failures in January 2009 which failed multiple parameters and caused the index to drop. NI Water advised that investigations into these failures determined that the failing samples were quite scattered and have not been repeated since. We reviewed the resulting report which concluded that the failures may have been caused by the flushing of sediment from a pipe in the distribution system. Given the apparent spread and timescale, we consider this to be a reasonable explanation.

For the purposes of reporting in Table 9, the Company have retained a distribution input at Forked Bridge WTW even though it was 'mothballed' during the year with flows now being supplied via the new trunk main from Castor Bay WTW. NI Water confirmed that flows were not being double counted and acknowledge that the Forked Bridge site is effectively treated as a 'virtual' works as it still has a designated sampling point. Although causing apparent inconsistencies between data sets, our audit confirmed that this has no impact on the overall line totals and hence we have no real concerns with this approach.

As noted in their commentary, NI Water have re-zoned their Water Supply Zones (WSZs) this year with the resulting change in number to 60 from 61 in 2008.

We queried the driver for this change and understand that the previous zones were largely based on historical boundaries and were becoming outdated by changes to the system. NI Water advised that the new system provides a more logical breakdown of zones based on the current operational WTWs and defines more zones in the more densely populated areas. When challenged, NI Water accepted that these changes could in theory impact the line totals in Line 4 and 5. However, in practice, only two WSZs are included this year and neither have had any significant changes to their boundaries. We are therefore satisfied that this change has not materially altered the line totals this year.

Sites decommissioned during the year are not included, although we note that this has no impact on the line totals this year.

4.2 New Legal Instruments of Work and Work Programmes

The Company confirmed that they have not agreed to fulfil any new 'Legal Instruments of Work' or Authorised Departures for distribution input this report year. All Authorised Departures in place were issued prior to this Report Year.

No new legal instruments relating to turbidity, *Cryptosporidium* or plumbosolvency have been agreed within year.

4.3 Water Treatment and Distribution Inputs (Lines 1-3)

Through questioning and checks made on the Company's breakdown of undertakings from previous report years, the reported Line 1 total was confirmed as the correct

summation of the volumes of distributed water affected for all legal instruments still in place on 31st December 2009. As detailed in the Company's commentary, whilst NI Water had 8 Authorised Departures in place at the start of the Report Year, these all expired before the end of the 2009 with the exception of one affecting Lough Braden WTW. NI Water confirmed that there are no other legally binding instruments in place and hence the total for Line 1 comprises solely of the 8.32Ml/d distribution input from Lough Braden WTW covered by the Authorised Departure.

We requested and were provided with documentary evidence of the Authorised Departures at Lough Braden WTW and Altmore WTW and can confirm the relevant dates have been correctly reported.

We can confirm that the volume from each WTWs has only been counted once regardless of the number of parameters, which is in accordance with the Reporting Requirements.

We discussed the 7 Authorised Departures that expired during the year with NI Water to ascertain if the works were now meeting the required standards. Six related to THMs and 1 related to pesticides. Of the sites affected, we were informed that all issues have been resolved through the recent completion of the new PPP 'Alpha' treatment works with the exception of Seagahan and Altmore WTWs. NI Water advised that works at Seagahan WTW were finished in November 2009 and that no THM failures have occurred since this date. They are therefore confident that this issue has also been resolved. The Company admitted that some issues remained at Altmore WTW where THM failures were still occurring, but advised that the works is planned for closure in 2010/11 and hence further improvements are not planned.

In all cases, we remain satisfied that the Company appears to be taking timely and appropriate action to resolve the problems and that they are working in full co-operation with the DWI.

NI Water confirmed that no new Authorised Departures, Article 31s or other legal instruments have been agreed this year and hence there are no contributory sites to Line 2. The total is therefore correctly reported as zero.

The percentage total in Line 3 is based on comparison with actual flow data recorded at each WTW. The marked increase is in line with the expiry of the majority of Authorised Departures during the Report Year. We reviewed the calculation behind this total and can confirm that the workings appear correct and accurate.

4.4 Distribution Systems (Lines 4-5)

The totals in lines 4 and 5 are made up from the properties within WSZs affected by the any Authorised Departures applied to the distribution system and still in effect at year end. The two zones listed in the Company's commentary, Lough Bradan Drumquin and

Lough Macrory Killiclogher, are confirmed as being supplied by Lough Braden works (covered by the single remaining Authorised Departure relating to THMs) and hence correctly included. The significant reduction in the Line 4 total is therefore in line with our expectations.

There were no new legal instruments received this year and hence there are no contributory zones to Line 5. The total is therefore correctly reported as zero.

We viewed the spreadsheet behind the line totals and can confirm that the totals for lines 4 and 5 have been correctly calculated from the number of properties within the affected WSZs. In accordance with the guidelines, properties within each WSZ have been only counted once.

4.5 Nitrates and Pesticides (Line 6)

As detailed in the Company's commentary, the Authorised Departures at Altmore WTW and Lough Braden WTW relating to pesticides expired prior to the end of 2009 and hence the line total is correctly reported as zero.

We understand that recent improvements at Lough Braden WTW have subsequently brought levels to within the target level. The Company advised that an extension was applied for at Altmore WTW as the problems have not been fully resolved. We understand this was refused by the DWI. However, we note that PAC measures at Altmore are only temporary as the site is programmed for closure in the near future.

Line 6 is confirmed as being reported on the situation at calendar year end.

4.6 Plumbosolvency (Line 7)

As stated in their commentary, NI Water currently have a policy of Orthophosphoric acid dosing at its treatment works to control plumbosolvency in the distribution system. This affects almost all water entering supply with the exception of the small number of remaining boreholes which are largely programmed for abandonment. In total 99% of water entering supply is currently dosed. Dosing levels are based on compliance with the lead target of 10µg/l, although regulation is currently based on a 25µg/l limit. The dosing programme is optimised annually based on compliance with the 10µg/l standard. This year, NI Water have reduced the amount of dosing at 2 sites from levels in 2009 where the Company believed some rationalisation could be applied. Information supplied by the Company confirmed this. NI Water advised that these reductions have had no significant impact on the number of failures and that they remain committed to working with the DWI towards achieving the future lead target of <10µg/l in all zones by 2013.

We discussed the overall performance of the dosing with NI Water who informed us that they were not aware of any significant problems with lead levels in the distribution networks and that they continued to monitor, assess and agree dosing levels with the

DWI. Dosing is targeted locally based on 'lead zones' defined by the historic levels of lead pipework.

To illustrate the Company's overall improvement in lead over the last few years and put the changes into perspective, a chart tracking percentage lead failures is presented in Figure 4.1 below.

This year, the Company has not reported changes to existing measures at any site. Although Creightons Green was closed at the start of 2009 which will have affected the figures, the change in line total is largely due to fluctuations in average daily flow volumes rather than any related change. We reviewed the spreadsheet behind the line total and can confirm that the total is the correct summation of annual flow output volume from all WTWs with the exception of the Company's borehole sites where Orthophosphate dosing is not applied.

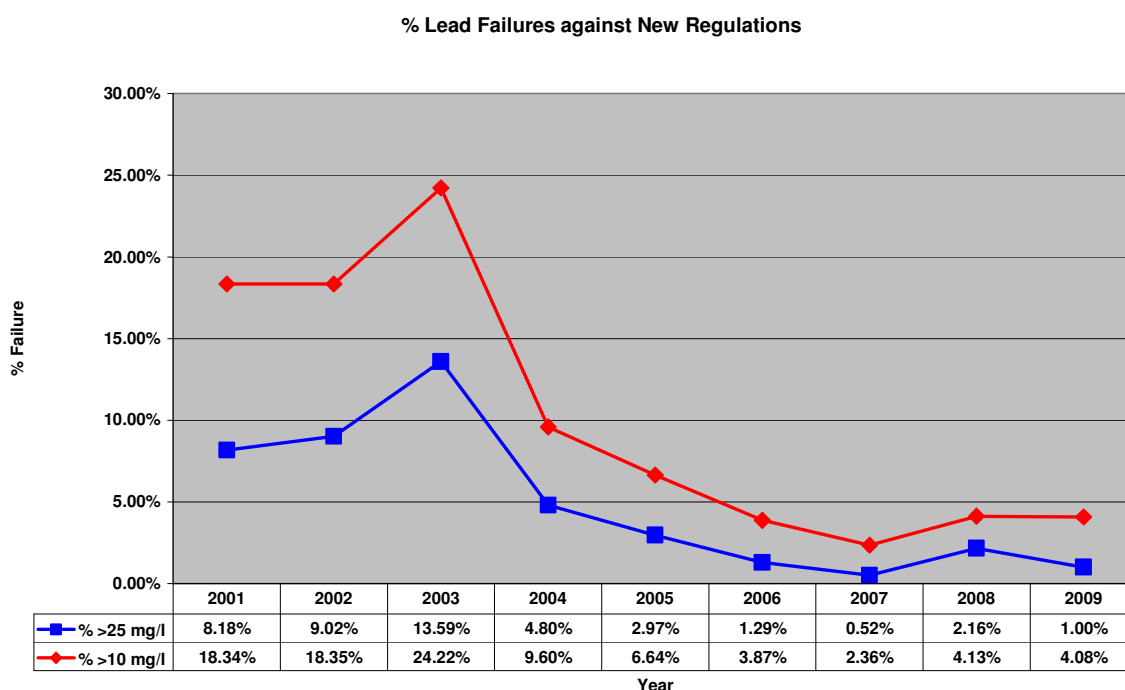


Figure 4.1 – Percentage lead failures

NI Water currently do not have a targeted lead replacement programme in place and replacements of lead communication pipes are done opportunistically through capital works and maintenance projects.

Line 7 is confirmed as being reported on the situation at calendar year end.

4.7 *Cryptosporidium* (Line 8)

Prior to 2009, NI Water included all distribution input in Line 8 where there was a need for a risk assessment as agreed with the DWI. In practice, this included all sites in the line total. As adopted last year and in line with the Reporting Requirements, and as no legal instruments relating to *Cryptosporidium* are actually in place at any site, the Company correctly report a zero total.

NI Water confirmed that the DWI risk assessments indicated that effective barriers are in place at all works and that the completion of the 'Alpha' projects will have since provided increased protection against *Cryptosporidium* risk.

There were no new legal instruments received this year. The Company confirmed that there are no Statements of Intent to include.

4.8 Other Parameters (Line 9)

There were no legal instruments in place not already included in Lines 6-8, and hence the line total is zero.

5. Company Methodology

The Company confirmed that there are no significant changes to their methodologies this year, although they have expanded and added detail in several sections.

Following its adoption in 2007, the Company continues to use actual flow data records taken over the year to produce an average daily flow volume for each WTW for the calendar year. These totals are used to calculate the figures in lines 1, 2 and 3.

Contributing volume from each works is calculated from the average of the daily flow inputs throughout the calendar year. In line with recent clarification from NIAUR, the Company do not include sites which have been taken offline part-way through a year although they provide full details in their commentary to ensure transparency. We previously questioned this approach and recommended adopting an annually averaged value for any site with active legal instruments still in place at year end. We note that due to the number of legal instruments still in place, this has no significant impact on the figures for this year.

The totals in Lines 4 and 5 relate to percentage population in WSZs and so are based on estimates of total number of people per WSZ from the Company's GIS systems. NI Water currently report a total population of 2,250,260 which is derived directly from the number of properties in each zone.

6. Company Assumptions

The Company make the following key assumptions:

- For Lines 1-5 and 6-9, the average daily flow volumes from WTWs are reliant on the accuracy of flow measurement devices at each site.
- For Lines 4 and 5, the volume of water input to a zone is proportional to the number of properties in the zone. It is possible that large non-domestic users could affect this. The Company also utilise a factor to estimate population from the property count based on external statistical data. This year a factor of 2.77 has been applied, although we understand that this figure is due to be revised to 2.52 for next year. As the calculation for the line total is based on proportions, this factor is largely irrelevant, although it can impact the zonal size limits and required sampling rates.
- A problem affecting part of a WSZ is deemed to affect it all.

7. Confidence Grades

The Company's confidence grades remain unchanged from last year, maintaining the policy of reporting A2 grades for all non-zero data and A1 for all zero entries. With no significant changes to the methodologies or data techniques and sources, the generally applied confidence grade of A2 is still considered reasonable given the potential for inaccuracies in estimating average flow and numbers of properties.

8. Consistency Checks

Following the initial audit, the Company provided additional data and clarification to confirm all issues raised within the audit. Cross checks on the final commentary highlighted an inconsistency between the table and the respective breakdown table in the submitted commentary following an earlier revision to the total in Line 7. We advised NIW who confirmed an updated commentary had been prepared. Cross checks were carried out against comparable data in Tables 11 and 11a to confirm consistency.

Date: 30 July 2010

Prepared by: [x]

Table 10 – Water Delivered**Commentary by REPORTER****1. Background**

The information in this table records the total volume of water delivered to measured and unmeasured households and non-households and the assumptions which companies have made in determining their overall water balance, including; per capita consumption, meter under-registration and unmeasured non-household use.

2. Key Findings

- We confirm that the Company has adopted the principles of NERA/UKWIR Demand Forecasting Methodology for estimating the components of the water balance.
- The Company highlighted the extreme weather conditions from December 2009 to January 2010 which has had a significant impact on reported leakage which it had calculated as 8.7 Ml/d. The Company also quote anecdotal evidence that the freezing weather led to increased customer usage (leaving taps running), however this cannot be distinguished from leakage using night-line analysis. We have reviewed the leakage trend through the Report Year and can confirm that, until November 2009 the company were on track to achieve a level of leakage below the target of 177 Ml/d. Our estimate is that the adverse winter weather contributed an additional 8 to 10 Ml/d to annual average leakage, and is therefore consistent with the company's estimate. We therefore conclude that the extreme weather was a major contributing factor to the reported increase in leakage of 5.93 Ml/d.
- For AIR10, NI Water has effectively completed an ambitious two-year programme to improve the robustness of most components of the water balance. Although there are still some elements that can not be fully implemented until new leakage management software is commissioned, there have been significant improvements to the water balance components over the last two years.
- During the year, NI Water undertook a major review of Average Zonal Night Pressures (AZNP), Hour to Day Factor and Household Night Use. These are important assumptions used when estimating leakage. However, the full benefits will not be realised until the company has commissioned its planned new leakage management software.
- We estimate the impact of the revised hour:day factor should increase the 2009/10 leakage target from 177 Ml/d to 179 Ml/d. We recommend the Company undertake a review of the impact that the revised assumptions will have on the current and future leakage targets during the current ELL re-assessment.

- The Company has provided a detailed commentary on the water balance for AIR10, with significant detail on the improvements to the water balance implemented during the year.
- Company specific estimates of MUR have been derived for household (PCC Monitor) and non-household meters, although these are still influenced by industry figures.
- For AIR10, the pre-MLE estimate of distribution input (625.41 Ml/d) exceeded the sum of the components of the water balance by 24.45 Ml/d (3.91%), which is within the 5% threshold set by the Utility Regulator, and an improvement from AIR09 (4.79%)
- We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, has resulted in a significant improvement in SOSI from -26 (AIR08), 45 (AIR09) to 88 (AIR10) for the dry year average planned Levels of Service (LoS) conditions.
- The SOSI has been calculated by reference to figures contained within the draft Water Resources Management Plan, which has not been audited. Full details on the changes in the SOSI base data from previous years, and the consistency with the dWRMP is presented in our Commentary on Table 10a.

3. Audit Approach

The audit consisted of an interview with the system holders and a review of documentation, systems and data used to generate the water balance for AIR10.

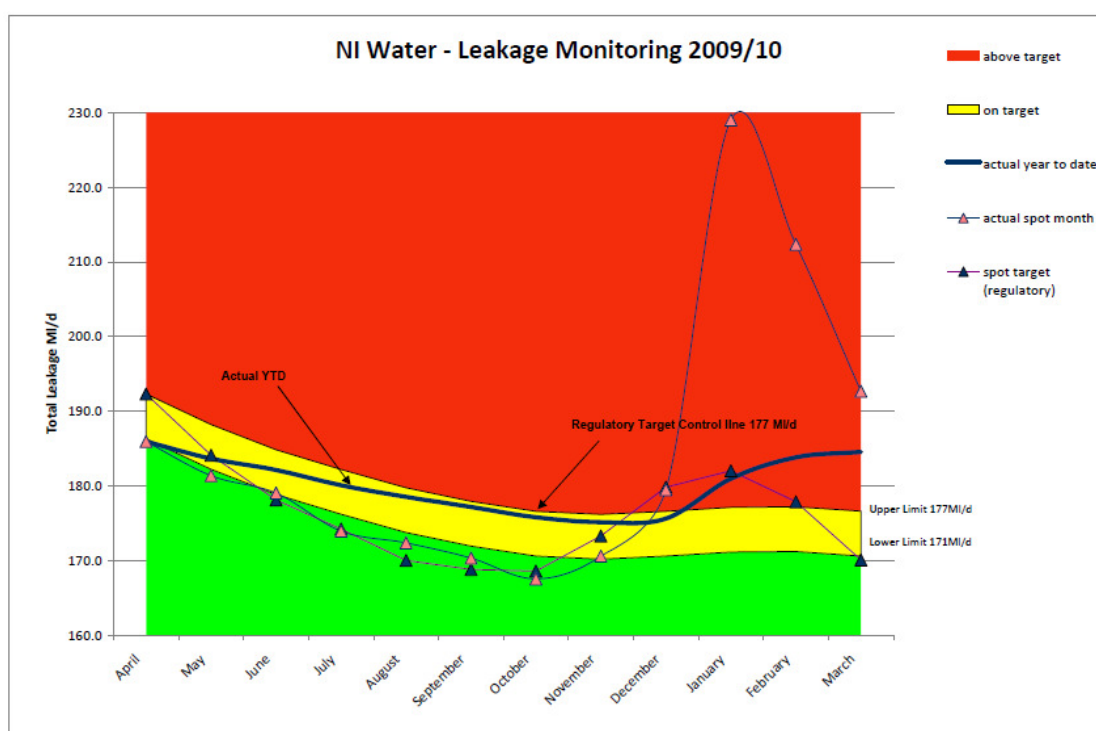
We also met with the Company's 'Leakage Management Services' consultants to review specific projects undertaken to improve the accuracy of individual components of the overall water balance.

4. Audit Findings

We confirm that the Company has adopted the principles of NERA/UKWIR Demand Forecasting Methodology for estimating the components of the water balance.

There was an extreme weather event during the Reporting Year. Between December 2009 and January 2010 the weather was extremely cold, which the Company has demonstrated was the second coldest winter period in the last 100 years and the coldest since 1963. During this same period there were 48.7 days of air frost which was the third highest in the last 100 years. We have reviewed the impact this event had on Distribution Input and Leakage, and on the actions taken during the period to maintain supplies and manage the increase in leakage. There is anecdotal evidence that customers ran taps to prevent their pipes freezing, which if true would have contributed to the Company's estimate of leakage as analysis of night-flows at DMA level cannot distinguish between constantly running taps and bursts.

We discussed the leakage trend through 2009/10 in detail, and can confirm that we concur with the Company that it was in track to achieve its leakage target until the unexpected increase in December 2009. As can be seen in the figure below (as provided by NI Water), it is the significant increase in January, February and March that has led to the rise in annual average leakage, after a downward trend in the first nine months of the year. We estimate that the winter peak in leakage contributed ca 9 Ml/d to reported annual average leakage.



During the Reporting Year NI Water has effectively completed a comprehensive two-year programme to improve the robustness of most components of the water balance. The Company has used results from reviews of AZNP, hour:day factor, night use (HH and nonHH) in completing this table. The full benefits of these studies will not be realised until the company implement its new leakage management software. We expect to see continued improvements in data quality of most components of the water balance as the time-period of available data increases.

4.1 Overview of Water Balance

NI Water has reported an annual average leakage of 186.86 Ml/d at year-end, a perceived increase of some 5.93 Ml/d from that reported for AIR09. We confirm that we have reviewed the trend in leakage through 2009/10 which shows that the Company was on-track to meet their target until November 2009. The severe weather during December 2009 to January 2010 caused a major incident, with numerous bursts throughout the network, causing leakage to rise to close to 220 Ml/d. We estimate this adverse weather

increased annual average leakage by circa 9 MI/d. The Company has since recovered, and by April 2010 had brought leakage back to approximately 170 MI/d.

The Company has therefore missed its leakage target of 177 MI/d by 9.86 MI/d. However, as the target was set using an hour:day factor of 22.5 we recommend it should be revised upward to reflect the current assessment of 22.8; this results in a revised target of 179 MI/d. Other changes made during the Report Year are also likely to impact on future targets – we recommend that NI Water review the leakage target using the latest assumptions during its ELL re-assessment that is currently underway and due for submission in March 2011.

All components of the water balance have been subject to significant review over the last two years in order to confirm and/or improve the methodologies applied to derive the overall water balance. This review has resulted in a number of changes to the overall water balance for AIR10, which has contributed to the overall increase in leakage reported during the year, the impact of which is summarised below.

In terms of the AIR10 water balance, we found that an adjustment had been applied to all components using the Maximum Likelihood Estimation (MLE) Method. For AIR10, the pre-MLE estimate of distribution input (625.41 MI/d) exceeded the sum of the components of the water balance by 24.45 MI/d (3.91%), which is within the 5% threshold set by the Utility Regulator, and an improvement from AIR09 (4.79%).

When compared to AIR09 there have been a small number of data movements which we have summarised in the table below. The most significant of which is the decrease in non-household consumption (7.03 MI/d and 9.42 MI/d for measured non-households and unmeasured non-households respectively) and the increase in reported total leakage (5.94 MI/d).

Component	AIR09			AIR10			Variance for the year (MI/d)
	Initial Estimate (MI/d)	Accuracy (%)	Final Estimate (MI/d)	Initial Estimate (MI/d)	Accuracy (%)	Final Estimate (MI/d)	
Measured Household Consumption	0.00	10	0.00	0.00	10	0.00	0.00
Measured Non-h'hold Consumption	131.37	10	134.05	125.11	10	127.02	-7.03
Unmeasured Household Consumption	297.34	10	311.07	299.12	10	310.06	-1.01
Unmeasured Non-h'hold Consumption	20.65	15	20.80	11.35	15	11.38	-9.42
SPL	49.44		49.44	46.31		46.31	-3.13
DSOU	4.70	25	4.72	4.78	25	4.80	+0.08
Water taken unbilled	29.73	25	30.58	28.79	25	29.43	-1.15
Top Down Leakage	201.21			202.57			

Component	AIR09			AIR10			Variance for the year (Ml/d)
	Initial Estimate (Ml/d)	Accuracy (%)	Final Estimate (Ml/d)	Initial Estimate (Ml/d)	Accuracy (%)	Final Estimate (Ml/d)	
Distribution Input	635.56	2	632.71	625.41	2	623.24	-9.47
Bottom Up Leakage	170.74	15	180.92	178.12	15	186.86	+5.94
Water Balance Variance	30.74			24.45			

We provide additional comment on the various components of the water balance and explanation for the above variances in Section 4.3 of our commentary below.

4.2 Water Delivered – Volumes

4.2.1 Measured Volumes

Line 1 represents the average volume of water delivered to households which is measured. Legislative changes and deferral of charging by the Northern Ireland Assembly in March in 2007 means that household customers are not issued with bills for water usage. Therefore no value is reported for billed measured households, which is consistent with AIR09.

Line 2 – Billed measured non-household, corresponds to the average volume of water delivered to non-households which is measured. These volumes are determined from the Company's Customer Billing System RAPID and do not include test meter volumes, trade effluent volumes, free supplies or NI Water supplies.

We note that the reported value for water delivered to measured non-households has decreased from 134.05 Ml/d to 127.02 Ml/d. The number of measured non-households has decreased by 9,750 (as reported in Table 7). The reduction in the consumption and number of non-household is consistent with the decline in the industrial sector across the UK.

In terms of supply pipe leakage, the Company has not added an allowance for this as all measured non-households are externally metered and the billed consumption would already include it. In terms of meter under-registration, following a NI Water project undertaken during the year, a Company specific value of 8.33% has been added.

The confidence limit of 10% on this component has not been changed and is considered to be appropriate.

4.2.2 Unmeasured Volumes

NI Water has calculated the volume of water delivered to unmeasured household properties by applying its estimates of unmeasured population, the regional average per capita consumption (adjusted for MUR) and supply pipe leakage for unmeasured

households. As we discuss in further detail below, the components used to derive unmeasured household volumes has been subject to significant review during the last two years, which has further improved the confidence of reported data.

NI Water has based the water delivered to unmeasured non-household properties on the actual consumption of comparable measured non-households, the number of connected unmeasured non-households (excluding voids) and MUR. To assess the consumption of unmeasured non-households, NI Water undertook an analysis of consumption at measured non-household properties and derived a weighted average consumption for property types matching unmeasured categories. Average consumption in each property category was then assessed, excluding the highest 10% and lowest 10% in each category (which excludes outliers from the analysis), and an average total consumption of 223.57 m³/yr (613 l/pr/d) was derived. This estimate is then multiplied by the total number of connected unmeasured non-households (excluding voids) and adjusted for MUR (8.33%) to derive a total volume of 11.38 Ml/d. We consider this to be an appropriate means of deriving unmeasured non-household consumption.

The per-property consumption is has decreased slightly (15%) from the value reported in AIR09 and consistent with the values reported by Water Companies in England & Wales.

4.3 Water Delivered Components

4.3.1 Unmeasured Water Delivered per Property

For AIR10, NI Water based the consumption of unmeasured non-households (UNHH) (Line 7) on the actual consumption of comparable measured non-households. We reviewed the analysis undertaken by the Company and note that the analysis derived an estimated average UNHH consumption of 223.57 m³/yr (~613 l/pr/d).

The estimated volume of water per unmeasured household (UHH) was based on estimates of unmeasured PCC, occupancy rate, SPL and the number of UHHs. We checked the basis of the calculations and for consistency between water delivered (line 5), the water delivered per unmeasured household (line 7) and the number of unmeasured non-households (Table 7, line 8) and found the results to be consistent.

4.3.2 Unmeasured per capita consumption

In order to derive a Company specific estimate of the per capita consumption for unmeasured household properties, NI Water maintains a domestic consumption monitor, comprising 113 discrete areas (predominantly cul-de-sacs of similar property types). During the Report Year, 14 areas have been removed from the monitor mainly due to unstable (i.e. variable/seasonal) populations and 11 new areas added. The areas were designed to predominantly contain a different property type, such that a representative sample of detached, semi-detached, terraced and apartment style housing is included. This approach is in line with the UKWIR report '*Best Practice for Unmeasured Per Capita Consumption Monitors*' (1999) and is consistent with NIAUR's definitions for a B

reliability grade.

Over the previous two years NI Water has undertaken significant investigation into the properties within the monitor sites, with 100% of the properties sent a questionnaire during 2008/09 and a further 30% during 2009/10 as part of an on-going programme to ensure the monitor remains up to date. Most customers within these areas are therefore acutely aware that their consumption is being monitored. The Company has therefore added 1.5% to the recorded consumption, to account for the 'Hawthorne Effect'. We consider this small adjustment appropriate.

The occupancy rate for the PCC monitor of 2.50 is consistent with that quoted by NISRA in its latest population update, which further confirms the validity and value of the work undertaken.

NI Water has sought to continue to improve the mix of property types within its PCC monitor, to ensure the mix is representative of the overall property mix in Northern Ireland.

We checked for consistency between the billed unmeasured HH water delivered (line 4) and the PCC (line 8) and found the calculations to be consistent.

In order to determine an overall average PCC value for the Region, NI Water has employed a multi-regression analysis. We believe this to be an effective technique that reduces the need to separate out property types within each area, and should simplify the process of adjusting the size of their domestic consumption monitor in the future, as areas will no longer need to be limited to containing just one property type. For AIR10, an unmeasured household PCC of 141.47 l/h/d (pre-MLE) was calculated.

For AIR10, NI Water has reported a post-MLE estimate for unmeasured PCC of 158.41 l/h/d, which includes an adjustment for meter under-registration. Whilst this represents a 1% reduction on that reported for AIR09 (158.97/h/d), the reported PCC is circa 3.5% higher than that reported by the WASCs in England and Wales (E&W), where an average unmeasured household PCC of 152.71/h/d was reported for 2008/09.

This is the first full year of operation of the new approach, and should therefore be considered a more robust result than that presented in AIR09.

4.3.3 Supply Pipe Leakage

For AIR09, NI Water re-assessed its supply pipe leakage using the latest best practice principles, described in UKWIR Report "Towards Best Practice for the Assessment of Supply Pipe Leakage". The same approach has been used for AIR10. More robust data was obtained for repair times and run times. The numbers of bursts was updated to the 2009/10 values. Company specific values were derived for AZNP and hour:day factor (see below). The estimate of supply pipe leakage for the AIR10 Water Balance is 46.31 MI/d.

Application of the UKWIR methodology to a combination of NI Water specific data and UKWIR default values resulted in an estimate of 62.02 l/pr/d for unmeasured households and 31.01 l/pr/d for other customer types.

We consider a sound approach has been adopted by the Company, based on best practice methodology, however, as for AIR09 we found that NI Water's estimates are in some cases, based on limited data and include a number of fundamental assumptions, as summarised below.

- The current estimate for supply pipe leakage is based on limited data on the number of bursts, which is partially due to NI Water not having a free supply pipe repair policy (unlike E&W water companies).
- The number of supply pipe bursts is based on the assumption that 65% are reported and 35% are unreported. NI Water also has no record of reported supply pipe bursts if a leak notice is not issued, and it is assumed that 5% of the 65% will be subject to a leak notice. As the number of supply pipe bursts is estimated from the number of leak notices, the overall estimate is sensitive to these assumptions.
- We note that the average supply pipe leakage flow rate, which has been derived from company specific data during the derivation of the natural rate of rise of leakage used, is 1000 l/hr which is significantly higher than the default from the UKWIR study of 293 l/hr. Furthermore, a leak repair time of 54 days has been assumed for NI Water (due to the need to issue leak notices) as opposed to a 13 day default from UKWIR. Application of this Company specific data (flow rate, burst frequency and flow duration) has facilitated a significantly higher estimate for unmeasured household supply pipe leakage (65.97 l/pr/d) than found at companies in E&W (40.8 l/pr/d).
- The average supply pipe length was derived from NI Water's GIS, and found to be 25.5m, which is more than double the typical length of 10m used by E&W water companies. Northern Ireland has a significantly lower population density at 122/km² than England (246/km²), Scotland (168/km²) and Wales (140/km²) so it would be expected that the supply pipe length would be higher.
- The majority of the other components use the UKWIR defaults, adjusted to NI Water circumstances where appropriate, such as meter reading frequency and ALC survey frequency.

Based on the above, whilst a sound approach using the best available data has been adopted to derive the estimate of supply pipe leakage for unmeasured households, some of the assumptions that underpin the estimate (such as leak size and leak run time) differ from E&W.

The estimate for other property types was purely based on an assumed ratio of 2:1 (unmeasured SPL : measured SPL)

4.3.4 Meter Under Registration (MUR)

The estimates of MUR for NI Water's household (PCC Monitor) and non-household meter stock have previously been based on industry average estimates. For AIR10, NI Water commissioned two reviews by WRc to determine a Company specific estimate of MUR for NI Water's stock of household and non-household meters, respectively.

Household PCC Monitor MUR

As domestic households are not metered in NI, the household MUR review was based on the unmeasured household PCC monitor meters. We found that the 115 PCC monitor meters ranged in size from 25mm to 100mm, with circa 90% less than 3 years old. In order to derive an estimate for MUR, WRc assessed NI Water's meter stock against meter type specific deterioration curves, generated through WRc's CP360 collaborative research project. To confirm that the meters from NI Water have similar accuracy characteristics to the meters within the WRc database a sample of 18 meters, across all sizes/types was removed for testing. WRc also adjusted the MUR estimate to include the impact of the 11 new pcc monitor areas that were added during the Report Year.

This generated an assessment for household MUR of 7.39%.

Non-household MUR

We found that the NI Water has a meter stock of 85,677 non-household meters used for billing purposes ranging in size from 25mm to 100mm. In order to derive an estimate for MUR, WRc assessed NI Water's meter stock against meter type specific deterioration curves, generated through WRc's CP360 collaborative research project. To derive a company specific MUR the analysis was based on specific NIW data including test results from 260 NIW meters, logged consumption data from a sample of NIW customers, and a survey of stopped meters in NIW. Where necessary, this data was supplemented by further test results and consumption data from WRc's database for meters of similar types, sizes and ages.

This generated an assessment for non-household MUR of 8.33%.

4.3.5 Distribution System Operational Use

As was the case for AIR09, NI Water has undertaken a comprehensive assessment of DSOU for AIR10. The assessment, which involved deriving volumes of water used for eight separate operational activities, was based primarily on the recommendations of the UK Water Industry Report D, Appendix F and supplemented using NI Water specific information.

The volume derived for AIR10 was 4.78Ml/d pre-MLE. The components, assumptions and approach are largely unchanged since AIR09 (when a value 4.80Ml/d pre MLE was derived) and are not considered to materially impact on the leakage estimate.

4.3.6 Water Taken Unbilled

Water taken legally and illegally unbilled was based on a variety of different components. We found that the assessment of unbilled consumption is broadly consistent with that used for AIR09, although the Company has continued to work to ensure all components of unbilled consumption are identified, which has resulted in a number of changes. The value reported for AIR10 (29.43 Ml/d post MLE) is circa 4% lower than the value reported for AIR09 (30.58 Ml/d post MLE).

NI Water has made a continuing effort to obtain a better understanding of all unbilled consumption components and has derived a relatively robust list of sources of unbilled consumption. During the current Report Year the Company improved its estimate of standpipe use. Although there is a level of uncertainty associated with the estimates of unbilled consumption (as is the case with most E&W companies), we do not consider this to be unreasonable for a relatively minor component of the overall leakage assessment.

4.3.7 Water Delivered (potable/non potable)

The total volume of potable water delivered is calculated as the sum of all measured and unmeasured consumption (Lines 3 and 6) and the total volume of unbilled water taken (Line 19).

NIW has 30 customers eligible for billing at non-standard rates; however, only 18 of these recorded consumption > 100,000m³ in 2009/10, and thus the 12.85 Ml/d reported in Line 22, reflects the consumption for these 18 customers (adjusted for meter under registration by 8.33% and MLE).

4.3.8 Total Leakage

Total leakage is determined from both the top down (as described above) and bottom up leakage estimates

Bottom up leakage is calculated using a minimum night flow (MNF) methodology. NI Water has an extensive network of DMA's (~1,070 in total) covering 99% of properties, from which MNFs are obtained to assess DMA leakage.

The estimate of bottom up leakage is derived from night-flows within DMAs, so require an estimate of night-use within the DMA. This is deducted from the night-flow to develop an estimate of leakage. NI Water estimate bottom up leakage on a monthly basis, by taking the 20th percentile of the daily minimum 15 minute flows into the DMA between 2.00am and 6:00am.

A revised estimate for household night use of 2.42 l/prop/hr has been used. This has been derived using the PCC monitor areas. This improved assessment builds on the interim assessment presented in AIR09 of 2.48 l/prop/hr. The Company has also revised its assessment of non-household night use, but this needs to be applied at the DMA level (based on the non-household types) and so can not be implemented until the new

leakage management software is commissioned.

An assessment of the Average Zonal Night Pressure (AZNP) has been made to replace the default value of 50m assumed for AIR09. The analysis is based on pressure logging undertaken on pressure managed areas (PMAs) for periods of approximately seven days. The AZNP is taken as the maximum pressure between midnight and 6:00am as this is likely to be coincident with the minimum night flows. The PMA logging exercise was prioritised to ensure that the PMAs with the largest property contribution were targeted first. Using this approach, out of the 833,964 properties that could be logged, 827,778 were. This equates to a 99.3% coverage rate. This study derived a property weighted AZNP of 46.36 m (between a minimum of 39.92m, which occurs in SE3 Lough Cowey and a maximum of 58.13m, which occurs in NW8 Killyhevlin).

Undertaken in parallel with the AZNP assessment the Company also updated its hour:day factor. For AIR09 an interim value of 22.5 was used, which replaced the previous default value of 20.0 (used in AIR08). The analysis undertaken in the Report Year has further refined the estimate to 22.8. The hour:day factor is a critical component for estimating the bottom-up level of leakage. Changes to the hour:day factor have an equivalent impact on the estimate of leakage; a 10% increase in the hour:day factor (from say 20 to 22) will lead to a 10% increase in leakage. Historically NI Water has used an hour:day factor of 20.0, which is significantly lower than most E&W water companies. Companies with high levels of pressure management, tend to have higher hour:day factors of 23 or higher. NI Water does not have continual pressure logging, so the analysis has relied on short periods (of approximately 7 days) at various points throughout the network. The revised estimate for the hour:day factor was undertaken in a study undertaken during the Report Year. It is our view that the approach used by NI Water makes reasonable use of the available data to provide a company specific assessment of the hour:day factor.

Like many of the E&W water companies the estimate of trunk mains and service reservoir leakage is significantly less robust than distribution leakage. The trunk mains leakage is estimated using the trunk mains length and a default leakage per length of mains per year of age. The leakage per length of mains per year of age was taken from Managing Leakage.

The service reservoir leakage is estimated using total volume of service reservoirs and a default level of losses (expressed as a percentage of service reservoir volume). The default level of losses was derived from Managing Leakage. Leakage from service reservoirs is also based on a default value. Most E&W water companies undertake periodic drop tests to quantify and identify service reservoir leakage. At AIR09 we recommend that NI Water implement a drop test programme as part of their periodic service reservoir maintenance programme. This has now been implemented and we reviewed the results of three drop-tests undertaken during the Report Year. This programme is ongoing, with an additional six tests undertaken during April 2010.

Trunk mains leakage remains one of the least robust components of leakage for all E&W water companies. A recent UKWIR report presented a range of options; best practice is considered to be the use of metering at both ends of lengths of trunk mains. However, many E&W water companies still rely on simple estimates, similar to that used by NI Water.

In our AIR09 commentary we recommended that NI Water investigate other approaches to validate their estimate of trunk mains leakage, using their available meters. During our AIR10 audit, progress was demonstrated on an approach that is effectively undertaking mini water balances across the network, including all trunk mains. We consider this a valuable exercise and agree that it will significantly improve the estimates of losses in future years.

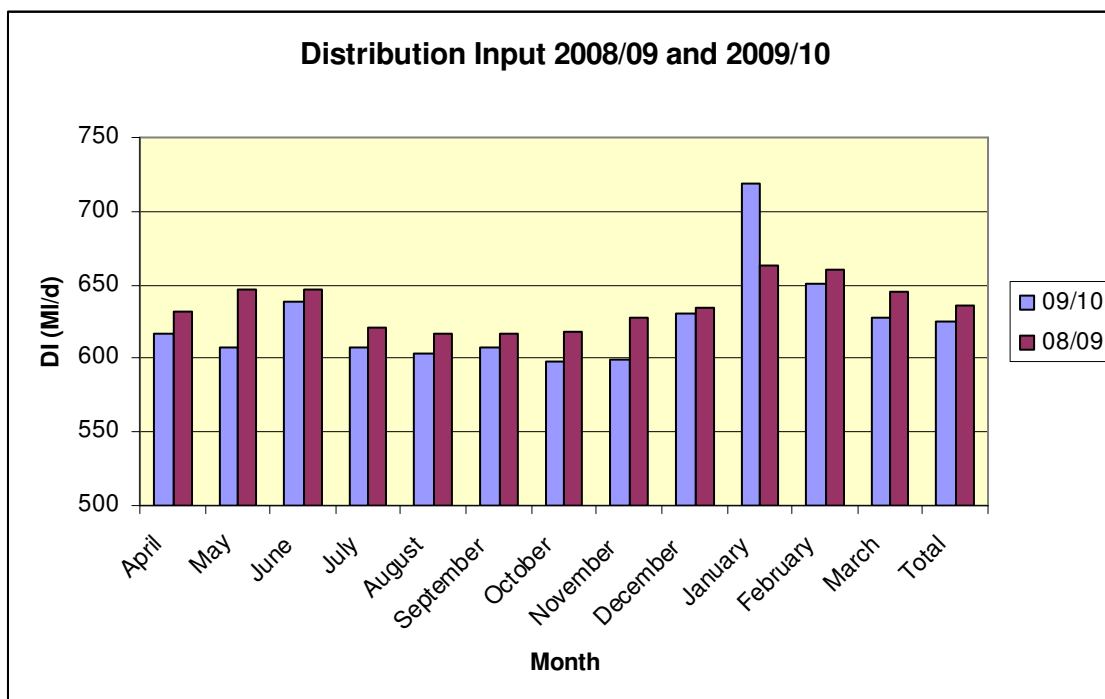
The analysis that is possible on night-lines using nonHH night use and DMA specific hour:day is very limited, due largely to the current leakage management software. NI Water are currently in the process of updating their leakage management software to allow more flexibility, although it is also possible this new software will result in further changes to bottom up leakage.

4.3.9 Distribution Input

For AIR10, NI Water has reported a pre-MLE DI of 625.41 Ml/d, some 10.15 Ml/d below the pre- MLE DI reported in AIR09 of 635.56 Ml/d. The company had undertaken a comprehensive review of Distribution Input (DI) across the region for AIR09.

We reviewed the DI profile for NI Water for the report year, which highlighted an unusual demand profile. For both years NI Water appeared to experience peaks in May/June and December/March rather than a summer peak in July/August as normally expected.

The peak in January 2010 due to the adverse weather can also be seen clearly.



4.3.10 Bulk Supply Imports/Exports

The small volume of reported exports relate to supplies to 72 individually metered NI Water customers, located in the ROI.

4.3.11 Water Balance by MLE

The Company has estimated total leakage using MNF Analysis and has reported a pre-reconciled total leakage figure of 178.12 MI/d for AIR10. The integrated flow method as applied by NI Water has produced an imbalance of 24.45 MI/d, resulting in a final reported leakage figure of 186.86 MI/d.

We note that the accuracy estimates applied to individual components used in the MLE are identical to AIR09.

Based on the understanding that industry best practice has been applied to the derivation of bottom up leakage; at AIR09 we challenged the application of an accuracy estimate of $\pm 15\%$, particularly when an accuracy estimate of $\pm 5\%$ was applied for AIR08, and the previous Reporter considered 'a higher accuracy would not be unreasonable'. The Company advised that their assessment of leakage uncertainty was based on:

- The limitations of the current leakage management software
- The fact that current MNF methodology applied in NI Water is not best practice and limited by current leakage software
- That the HH night use figure is an interim value and requires updating.
- That the NHH night use is based on a single default figure and is to be replaced with a night use model.

- That there was an issue with the DMA naming conventions that may have influenced the accuracy of the area's attribute data such as property counts and mains length.
- There are limited validity checks made on the leakage values produced, and
- The level of meter data available to inform the analysis

For AIR10 there is still a significant level of uncertainty, particularly since the planned new leakage management software has not been implemented (which has limited the improvements to the application of DMA based NHH night use, validity checks and availability of data).

As such, we agree that an accuracy estimate of $\pm 15\%$ to be appropriate for AIR10, with an expectation that this will be reduced to $\pm 10\%$ in the near future, when systems are further improved.

4.4 Security of Supply Index

Security of supply index – company's planned levels of service

The SOSI is a calculated column. We confirm that this calculation is correct and is consistent with that reported in Column 14 of Table 10a(i).

We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) for the dry year average planned Levels of Service (LoS) conditions. Changes primarily result from revisions made during the analysis to support the development of the Draft Water Resources Management Plan (dWRMP). We have checked for consistencies with the dWRMP, although we note that this has not been audited at this stage.

We are satisfied that the Company has followed the NIAUR guidelines for the preparation of this index for the planned levels of service for average demand in a dry year.

Security of supply index – reference levels of service

As discussed in our reporting for Table 10a(ii), the Company has not calculated SOSI for the reference levels of service and these are identical to the Table 10a(i) annual average data entries. These would be expected to be different when the Company's planned Levels of Service (LoS) frequency statements are compared with the Reference LoS definitions. The Company reports in its commentary that there has been no separate assessment for a reference level of service and that, as stated in the dWRMP, this is not appropriate for NI Water.

We therefore confirm that the value given here is consistent with that reported in Column 14 of Table 10a(ii).

5. Confidence Grades

NI Water reported a confidence grade of B4 for unmeasured non-household PPC. This is in line with NIAUR's guidance for a B, because the reported figure was based on the consumption of comparable measured non-household properties. Due to reduced uncertainty over the numbers of unmeasured non-households (UNHH) within the province we believe an accuracy band of 3 may be appropriate.

For unmeasured household PCC, NI Water has reported a confidence grade of B3. This conforms to NIAUR's definition for PCC reliability, grade B, as an area monitor of 115 dead-end sites are utilised and the monitor does not fully comply with the UKWIR report "Best Practice for unmeasured PCC monitors" 1999. With the recent improvements to the PCC monitor we consider a reliability grade A may be appropriate in the future

For AIR10, NI Water has reported a confidence grade of B4 for Total Leakage. We confirm that the Company estimate leakage using the Minimum Night Flow Method, using night line data that is estimated with Continual Night Flow Monitoring covering over 60% of properties, recorded in excess of 20 times a year, which supports a B confidence grade. Due to the MLE adjustment of 15% applied to bottom up leakage, NI Water has assumed a 4 accuracy band. We believe an accuracy band of 3 may be appropriate once NI Water commission its new leakage management software in the near future.

NI Water has assigned a confidence grade of B2 for Distribution Input. This is consistent with the Company's assessment of the MLE where the water balance reconciled to within 5% of Distribution Input.

NI Water has reported an improved confidence grade of B2 for the overall water balance for AIR10 (from B3 in AIR09). We believe this is appropriate; it is consistent with a water balance, where the components have been reconciled to within 5% of measured Distribution Input and reflects the significant improvements that have been implemented over the last two years.

Date: 30 July 2010

Prepared by: [x]

Table 10a – Non financial measures – Security of Supply Index**Commentary by REPORTER****1. Background**

Table 10a calculates the security of supply index for the company planned and reference levels of service for average demand in a dry year.

2. Key Findings

- The Company has completed the Security of Supply Index using data from the draft Water Resources Management Plan (dWRMP) currently being prepared. Commentary on individual column entries is given below. The dWRMP plan has not been audited.
- We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) for the dry year average planned Levels of Service (LoS) conditions. Changes primarily result from both the completion of the PPP activity and a reduction in the estimate of dry year distribution input.
- In preparing the dWRMP the Company has reduced the number of Water Resource Zones (WRZ) from 15 to 5 to more accurately reflect the transfers that are possible within the previous zonal structure.
- The Company do not feel it is appropriate to present scenarios based on “reference” or “planning” Level of Service as, unlike Water Companies in England & Wales it does not report its level of service in terms of return periods of hosepipe bans (or similar).

3. Audit Approach

The audit consisted of an interview with the NI Water system holder to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years.

We were provided with a copy of the draft Water Resources Management Plan, against which we compared entries used in the calculations for this table. Although we have checked for consistency with the dWRMP we have not undertaken an audit of the document.

4. Audit Findings

We confirm that the Company has submitted out-turn data reporting on Security of Supply for the (i) Planned Level of Service and (ii) Reference Level of Service for the 2009-10 reporting period. The Company does not report a Critical Period level of service.

We observed that, as for AIR08 and AIR09, Table 10a(ii) submissions are identical to the Table 10a(i) annual average data entries. These would be expected to be different when the Company's planned Levels of Service (LoS) frequency statements are compared with the Reference LoS definitions. The Company reports that this is not appropriate for its circumstances as it does not report a "Level of Service" with specific return periods for hosepipe bans for example. The company has therefore not undertaken separate analysis for "planned" or "reference" levels of service.

We note that there whilst has been no change in approach from AIR09 in the Company's calculation of SOSI for the dry year demand (Table 10a (i)-planned levels of service) the data has been updated based on the dWRMP and the current year.

4.1 General

The Company's recent focus has been on developing its WRMP and therefore for AIR09 the methodology remains unchanged from AIR08 and the data is of similar quality.

We identified that the significant changes to the parameters of the SOSI calculations, at Company level, since AIR09 may be summarised as follows:

- Column 2 – a decrease in WAFU of 385.42 Ml/d.
- Column 3 – an increase in Bulk Imports of 403.00 Ml/d
- A net increase in WAFU+BI of 17.58 Ml/d
- Column 5 – decrease in the dry year distribution input of 38.18 Ml/d.
- Column 6 – decrease in the reporting year distribution input of 7.65 Ml/d.
- Column 8 – a decrease in target headroom of 2.10 Ml/d.
- Column 11 – an increase in population of 16,530.

We identified that the changes to the parameters of the SOSI calculations, at Company level since AIR08, have resulted in a significant improvement in SOSI from -26 (AIR08) to 45 (AIR09) to 88 (AIR10) for the dry year average planned Levels of Service (LoS) conditions. This increase in SOSI has been driven by the net increase in water available (WAFU plus bulk imports) of 17.58 Ml/d and the lower dry year distribution input (a decrease of 38.18 Ml/d).

Our detailed commentaries on the Company's submissions are given in the following sections, for Table 10a (i). As Table 10a (ii) contains identical entries we do not provide line by line commentary.

5. Company Methodology

Column 1 – Water Resource Zone (Text)

The company has decreased the number of WRZs from 15 (used in AIR08 and AIR09) to 5 to be in-line with the dWRMP.

We have checked that the zonal names of water resource zones (WRZs) used in the reporting year are consistent with the Company's dWRMP, and cross-referenced these to those used in the AIR09 submissions.

Water Resource Zone (AIR09)	Water Resource Zone (AIR10)
Ballinrees	North
Altnahinch	North
Ballymena	East
Antrim/Larne	East
Magherafelt	Central
Dungannon	South
Craigavon	South
Newry	South
Lough Ross	South
Armagh	South
Eastern General /Greater Belfast	East
Lough Cowey	East
Faughan	North
Bradán	West
Killyhevlin	West
15No.	5No.

Column 2 – Water Available For Use (WAFU) (Ml/d)

Through our audits, we checked the differences between WAFU in this Reporting Year, AIR10 and the Company's previously reported values in AIR09 as highlighted in the table below. Positive difference values indicate an increase in WAFU from 2008-09.

For this Reporting Year the Company has assigned all deployable output from the PPP schemes as Bulk Imports (Column 3), whereas in AIR09 their deployable output was included within WAFU (Column 2). We agree with the assignment of the PPP as bulk imports, but to allow comparisons with previous year have compared the sum of columns 2 and 3.

Water Resource Zone		WAFU (Ml/d)		Bulk Imports (Ml/d)	Difference (Ml/d)
AIR09	AIR10	AIR09	AIR10	AIR10	
Ballinrees	North	25.90	55.08	50.00	+1.55
Altnahinch		17.83			
Faughan		59.80			
Ballymena	East	26.65	146.51	187.00	-46.54
Antrim/Larne		36.20			
Eastern General /Greater Belfast		313.50			
Lough Cowey		3.70			
Magherafelt	Central	29.90	11.86	19.00	+0.96
Dungannon	South	5.80	70.17	147.00	+48.97
Craigavon		77.60			
Newry		54.50			
Lough Ross		7.50			
Armagh		22.80			
Bradan	West	31.00	79.44	0.00	-12.64
Killyhevlin		35.80			
Total		748.48	363.06	403.00	+17.58

We note that there is an increase in WAFU of 17.58 Ml/d between AIR09 and AIR10. These changes are as a result of the revised assessments undertaken for the dWRMP and replace those in AIR09 which are now eight years out of date.

We also checked for consistency between the dWRMP and AIR10.

AIR10/dWRMP	AIR10	dWRMP			
Water Resource Zone	WAFU + BI (Ml/d)	DO (Ml/d)	Outage (Ml/d)	WAFU (Ml/d)	Difference (Ml/d)
North	105.08	106.2	-1.12	105.08	+0.00
East	333.51	329.5	-2.99	326.51	+7.00
Central	30.86	31.1	-0.24	30.86	+0.00
South	217.17	218.6	-1.43	217.17	+0.00
West	79.44	88.2	-1.76	86.44	-7.00
Total	766.06	773.60	-7.54	766.06	+0.00

We challenged the Company on the apparent discrepancies in the East WRZ and the West WRZ. The Company explained that the WAFU in the East WRZ is higher due to 7Ml/d being transferred from Lough Island Reavey. The West WRZ is 7Ml/d lower due to the removal of the Strule abstraction, as it is not due to come into service until 2011/12.

At the Company level these two adjustments cancel and WAFU is consistent with the dWRMP.

Column 3 – Bulk Imports (Ml/d) and Column 4 – Bulk Exports (Ml/d)

For the Report Year the Company has reported output from the PPP schemes as Bulk Imports (Column 3)

AIR10/dWRMP	AIR10	dWRMP		
Water Resource Zone	Bulk Import (Ml/d)	Bulk Import (Ml/d)	PPP Name	Difference (Ml/d)
North	50.00	50.0	Ballinrees	+0.00
East	187.00	180.0	Dunore Point	+7.00
Central	19.00	19.0	Moyola	+0.00
South	147.00	147.0	Castor Bay	+0.00
West	0.00	0.0	n/a	+0.00
Total	403.00	396.00		+7.00

We challenged the Company to explain the apparent discrepancy in the East WRZ. The company explained that the East WRZ is 7ml/d higher due to Lough Island Reavy being able to provide this into DI.

The Company reports no exports. This is consistent with the dWRMP.

Column 5 – Dry Year Distribution Input (Ml/d)

The Company's dry year average distribution input (DI) is 20.65 Ml/d higher than its AIR09 estimate at the Company level. The Company has calculated its dry year DI from the reporting year DI and the dry year distribution input adjustment factor. Detailed calculations were carried out as part of the dWRMP to derive these factors using the actual data for each WRZ. We confirm that the adjustment is consistent with the factors given in the dWRMP.

The dWRMP reports a very weak correlation between climate (temperature and rainfall) and DI. This is also evident in the dry year factors that have been used by NIW of 1.12 for households and 1.05 for non-households. These are typical of factors typically used by water companies in Northern England and in Scotland, but are much lower than used by water companies in Southern England.

Column 6 – Reporting Year Distribution Input (Ml/d)

We note that the Company reports that its Reporting Year distribution input (DI) is 7.65 Ml/d lower than its AIR09 estimate at the Company level.

We checked the Company's data and the reported difference between the Company wide AIR08, AIR09 and AIR10 numbers is summarised in the table below as on a WRZ basis. Positive numbers show an increase and negative numbers indicate a decrease.

Water Resource Zone		Reporting Year (Actual 2009-1) (Ml/d)	AIR09 (Actual 2008-09) (Ml/d)	AIR08 Actual for 2007-08 (Ml/d)	Difference (AIR09 to AIR10) (Ml/d)
North	Ballinrees	76.67	17.55	18.69	+0.62
	Altnahinch		13.64	13.35	
	Faughan		44.86	46.59	
East	Ballymena	309.16	24.22	24.67	-10.61
	Antrim/Larne		30.23	30.36	
	Eastern General /Greater Belfast		262.22	249.78	
	Lough Cowey		3.10	2.25	
Central	Magherafelt	26.85	26.59	26.36	+0.26
South	Dungannon	146.02	5.19	5.25	-1.98
	Craigavon		72.37	68.52	
	Newry		45.77	45.63	
	Lough Ross		6.41	6.01	
	Armagh		18.26	16.99	
West	Bradán	66.70	37.07	35.52	+4.06
	Killyhevlin		25.57	24.58	
Total		625.40	633.05	614.54	-7.65

The Company's methodology for measuring DI has been discussed as part of our audits on table 10. The Reporting Year DI is consistent with the pre-MLE DI value used for Table 10.

Column 7 – Dry Year Available Headroom (Ml/d)

Dry Year Available Headroom is a calculated column. We have confirmed that the correct formulas have been used within the Table 10a(i) to calculate this.

Column 8 –Target Headroom (Ml/d)

The Company reported that Target Headroom values used in Table 10a are consistent with an interpolation of the 2008 and 2012 values presented in the dWRMP. The Company calculated target headroom using the improved UKWIR methodology (02/WR/13/2). The aggregated values equate to 6.7%, which is consistent with the values used for AIR09 which were calculated using the previous UKWIR methodology ((98/WR/13/1). We have checked the interpolation of the values from the dWRMP.

Column 9 – Surplus/Deficit (Ml/d)

Surplus/Deficit is a calculated column. We have confirmed that the correct formulas have been used within Table 10a(i) to calculate the Surplus/Deficit.

Column 10 – Percentage Deficit (%)

Percentage Deficit is a calculated column. During our checking procedure, we have confirmed that the calculations are correct.

Column 11 – Zonal Population (000)

Total population is consistent with Table 7

Column 12 – Percentage of Total Population with Headroom Deficit (%)

Percentage of Total Population with Headroom Deficit is a calculated column. We have confirmed that the correct formula has been used by the Company to calculate the Percentage of Total Population with Headroom Deficit.

Column 13 – Zonal Index (nr)

Zonal Index is a calculated column. During our checking procedure, we have confirmed that the calculations are correct.

Column 14 – Security of Supply Index (nr)

The SOSI is a calculated column. We confirm that this calculation is correct. We have also confirmed that the SOSI is consistent with that reported in Line 31 of Table 10.

We are satisfied that the Company has followed the NIAUR guidelines for the preparation of this index for the planned levels of service for average demand in a dry year.

6. Assumptions

The Company's assumptions are consistent with those made in the dWRMP.

7. Confidence Grades

Confidence grades are not required for Table 10a.

8. Consistency Checks

We have checked for consistency with tables 7 and 10 (pre MLE).

Date: 30 July 2010
Prepared by: [x]

Table 11 – Water Service Activities**Commentary by REPORTER****1. Background**

Network activities provide a good measure of work achieved provided they can be related to associated investment. The investment breakdown included in these reporting requirements provide this linkage, with the separation of base service expenditure from that related to enhancements in Table 35.

2. Key Findings & Recommendations

- Results for this year still skewed by previous concerns regarding the reporting of upsized mains and exclusion of 31.6km of new mains for housing development, although advised that suitable changes are in place for reporting in AIR10.
- Further improvements in the coverage of zonal study models.
- Significant increase in the numbers of lead pipes encountered.
- Improvements in confidence grades considered largely justifiable due to removal of reliance on data extrapolation, although some concerns on increased gradings for communication pipes.
- Suggestion for more unified text to improve overall presentation and consistency.

3. Audit Approach

Our audit consisted of interviews with the relevant NI Water and PPP system holders, a review of the Company methodology, the commentary and the table entries. Table entries were reviewed for consistency with previously audited data and supporting data was audited for accuracy. Confidence grades were reviewed to ensure compatibility with the methodologies used.

4. Audit Findings

As explained in the Company's commentary, the methods for reporting the lengths of mains in lines 2, 3, 6 and 7 have not been changed from last year and hence our previous concerns regarding the possible double counting and inconsistencies in these line totals still remain. We therefore emphasise that the line totals reported this year are still subject to the same inaccuracies as previously advised. However, as the Company have confirmed that they have now enabled categorisation of upsizing for hydraulic purposes and amended their methods to be in line with our comments and recent NIAUR guidance, we do not feel it necessary to raise these issues again within the individual sections of this audit. Our comments should therefore be read with this in mind and with the proviso that this situation has now been rectified for future reporting.

For reference, we recommended that:

- To comply with the Reporting Requirements, except where the Company can demonstrate a replacement main driven by the need for additional hydraulic capacity, lengths contributing to Line 6 (new mains) should exclude all replacement main and pipe bursting operations which should be reported in Line 2 under mains renewals.
- To improve continuity and consistency, Line 7 should include a mains adjustment factor to ensure the calculation of Line 12 matches the total length extracted from GIS systems (this also provides a valuable check on the reported lengths between the project and GIS systems).

The Company have made significant improvements to both the commentary and methodologies this year, unifying the previously discrete documents and providing greater detail and explanation of areas of complexity. The commentary still segregates the inputs from Networks Water and Engineering and Procurement (EP). Whilst the current layout is clear and acceptable, we would question whether a better structured and more unified report would be achieved through combining the sections in a line by line basis.

4.1 Asset Balance at 1 April (Line 1)

This figure has been correctly carried forward from the total closing balance of last year's report.

4.2 Main renewal, relining and cleaning (Lines 2-6)

In line with the revised Reporting Requirements, the inputs into the line totals comprise input data from EP and Networks Water. Mains owned and operated by PPP (comprising 16.42km of 600mm diameter trunk main between Castor Bay and Forked Bridge) are correctly excluded from the line totals.

The Company has reported 172.2km in for mains renewals (Line 2) this year, of which the vast majority, 166.7km, were renewed under the water quality programme, the remaining 5.5km by Networks Water under maintenance programmes. There was no renewal of any length of trunk mains. Data provided by the Company validated these figures.

The Company acknowledge that the 172.2km represents a significant reduction in the length of mains renewals compared to the 288.6km in 08/09 and provide an explanation as to why expenditure has not similarly decreased. Based on our knowledge of the location of much of the new mains works around the more urbanised eastern areas (including Belfast), this appears a reasonable argument, although a more detailed assessment of relative expenditure would be required to fully appraise this.

As applied by other companies, slip-lining is generally considered to replace the existing main and therefore the majority of slip-lined mains are categorised as renewals and hence

included within Line 2. Where a lining is applied to the fabric of the existing pipe it is reported on Line 3. Historically, however, the Company has not employed this method and hence the Line 3 totals are zero.

Mains cleaning (Lines 4 & 5) is all undertaken by Networks Water and hence the EP input is zero. We assessed a monthly summary of cleaning activities from the Mobile Work Management system and can confirm that the numbers support the line totals. However, as NI Water only record the number of cleaning events and have no current system of recording or measuring the actual extent of any individual flushing event, they continue to log cleaning by number of events rather than by length. In order to report against the required units, they have therefore calculated and applied a fixed conversion factor of 0.156 to provide a length of mains flushed. The line total of 1487.6km is therefore based on 9536 flushing events.

In Line 5, a further 376.3km of mains are reported as having been cleaned under quality programmes, based on similar methods. Prior to AIR09, the Company did not record a breakdown of cleaning by driver and hence the Line 5 total was reported as zero. The significant increase in Line 5 is therefore more a reflection of improvements in the reporting systems rather than any direct increase in cleaning for quality activity.

We have previously assessed the application of the 0.156 factor and reviewed the defined line methodology with the Company. Whilst heavily reliant on assumed flushing volumes and pipe sizes, we consider it a logical and reasonable approach to enable them to report on total length as required. Provided the factor remains fixed, it also provides a stable benchmark around which to monitor performance.

The reported length of new mains (Line 6) installed has decreased from 354km last year to 298.9km of new mains installed within the Report Year. A similar justification to that already discussed for Line 2 is offered by the Company and we consider this reasonable. Of the total, the vast majority (298.3km) is reported by Engineering & Procurement (EP), which includes approximately 32.2km of trunk mains. Only 0.6km was reported by Networks Water under other schemes. Checks against the data confirmed that this was replacement by upsizing rather than a direct new lay. NI Water confirmed that mains for housing developments are laid directly by Networks Water and therefore the acquisition of private mains does not occur. Our checks on the source data indicated that 31.6km of mains were laid for new housing developments during the Report Year, although this has not been included in the line total. We understand that these mains are considered capital works by NI Water and hence not reported under Networks Water's figures. However, as with previous years we believe that this length is not included in the EP total either and hence does not contribute to the line total. On questioning, NI Water confirmed that they intend to correct this for AIR10, although confirmed it has not been included this year.

Engineering & Procurement provided a breakdown summary of their input data by zonal area which we reviewed with the Company. We subsequently requested and were provided

with detailed pipe laying records to support the reporting of four areas; Glenhordial, Lisburn Town Zone, Castor Bay to Dungannon and Munie Road, Glenarm; which we selected for sample.

In general, we found it difficult to relate the forms to the reported data due to the varying time periods, differing formats and hand-written data entries. We raised and discussed our concerns with NI Water over the possible scope for errors in transfer and interpretation of data from these forms. The Company pointed out that although the data is extracted directly from the forms, the information is always checked and updated against the final as-built records submitted at the end of the project. The monthly data collection is primarily used for monthly reporting and payments. Hence any errors are corrected through cross checks against the final logs and drawings and signed off by the contractor and project manager. This also explains why negative lengths are occasionally reported within monthly summaries as they represent data corrections from final records.

With reference to our comments last year regarding the collation of field data, we welcomed advice from NI Water that from 1st April 2010, the field data collation systems have been improved through the adoption of a standardised, electronic form which will remove many of the current irregularities and significantly improve the capture and transfer of monthly data. This includes improved coding to more accurately capture information to improve aspects such as clarification between mains or communication pipes replaced for quality and those replaced for maintenance reasons. We are therefore satisfied that the Company are making positive steps to improve their systems and that overall their systems are reasonably robust and reliable.

These improvements were not in place this year and hence reporting of the split between quality and maintenance relies on users clarifying this information on submitted forms. We therefore note that some significant variation in this split may occur next year once this data is more reliably captured.

As previously reported, we believe that NI Water's current methods result in the double counting of mains being replaced by upsized pipe bursting, distorting the total length of new mains being reported. Data provided by the Company indicates that a total 84.9km length of mains is categorised as having been upsized by pipe bursting and is hence currently being counted in both Line 2 and Line 6. Taking this into consideration, we estimate that the actual length of new mains included in Line 6 is nearer 214km.

4.3 Mains abandoned and other changes (Line 7)

The NI Water inputs comprise input data from both EP and Networks Water. The Company has reported a total of 325km of abandoned mains this year, of which all except 5.2km are reported by EP under the mains rehabilitation programme. Due to the way NI Water report abandoned mains, it is not clear from data provided by NI Water how much of this length was wholly abandoned and how much was through the process

of renewal. We hope that the Company will be able to provide this level of clarity with the improved reporting systems in future.

Our review of the source data supporting the line total concluded that the lengths of abandoned mains have been correctly extracted in accordance with the Reporting Requirements. The total includes mains replaced by slip-lining as per the Line 2 definition.

NI Water confirmed that no adjustment factor to account for the difference between the calculated Line 12 value and the value extracted from GIS systems has been applied this year. The Company advised that they are considering applying a factor next year.

This year, the discrepancy between the calculated (from Lines 1, 2, 6 & 7) and the measured total in Line 12 (from GIS) is -57.5km. This does not take into account any potential double counting in Lines 2 and 6 or the omission of the 31.6km of new mains on housing developments which we estimate would reduce the integer to less than 10. The difference is not unreasonable, and a significant adjustment factor is considered almost inevitable due to delays in the transferral of data between systems and the reconciliation of monthly reports against final data records. However, until the methodologies have been stabilised to align with our previous comments, it is probably difficult to draw any meaningful conclusions from this figure.

4.4 Communication pipes (Lines 8-10)

NI Water do not currently have a strategic lead replacement programme and old communication pipes (lead or otherwise) are replaced on an opportunistic basis when encountered through other capital or maintenance works.

The NI Water inputs comprise input data from both EP and Networks Water. The Company report a total number of lead communication pipes replaced during the year of 1,756 of which 385 were for quality reasons and 1,371 for maintenance. This represents a significant increase from the 168 and 385 respective values reported last year.

This compares against a reduction in the total number of non-lead communication pipes being replaced within the same period, down to 6,418 from 8,801 last year

We requested and reviewed the supporting data and discussed the reason behind these changes with NI Water. As investigated previously, lead is not as common in communication pipes as on mainland UK and tends to be clustered around the historic, urbanised areas such as Belfast and Omagh. Given that much of the work this year has been within these areas, we accept that the geographical change in focus to the more urbanised areas around Belfast and Lisburn has been a major factor in the change in totals. Our checks against the source data confirmed significant and concentrated clusters of lead pipes were encountered in Belfast City and Whiteabbey Lower as suggested.

4.5 Mains bursts per 1000km (Line 11)

There has been a minor change in the reported numbers of mains bursts per 1000km this year, increasing slightly from 141 to 147 bursts per 1000km. As explained in the Company's commentary, this figure is derived from the total number of recorded burst events, divided by the total length of mains. The calculation applies a total length of 26,626km which is greater than that reported in Line 12 as it includes 276km of compensatory mains. The number of bursts is calculated directly from data compiled and reported by field managers within the Leakage Function and Networks Water.

Following changes to the systems last year, all data is now stored and extracted from the Mobile Works Management system (MWM). We interviewed Company representatives from Networks Water and requested a breakdown of data from both Networks Water and Leakage Functions to support the figures.

We reviewed the monthly summary of burst events and concluded that the small increase can be largely attributed to a marked peak in burst activity January coinciding with the extreme cold weather experienced across the UK.

Check against the source data confirmed the contributing total 2,541 number of reported burst mains repairs by Networks Water. Of these, only a small percentage (<1.5%) resulted from waste detection.

The source data from Leakage Function confirmed the contributing total of 1,369 events reported by Leakage Function. This represents a reduction from 1,476 reported last year. However, although improvements are evident, we have some remaining concerns regarding the consistent collation and reporting of mains bursts. Our main findings are summarised as follows:

- The migration to MWM appears to have significantly improved the data capture and the totals are now based on actual numbers of logged mains bursts repairs (rather than the number of 'reported mains burst' as previously). This has theoretically removed a significant number (estimate around 20%) of previously duplicated event logs when entered for both the reported event and the actual repair.
- System changes mean that the data is no longer grouped by distinct geographical area. As such, it is less obvious whether the process is being applied equally effectively across all areas. However, there are no indications to suggest it is not.
- Although MWM reportedly has tighter control of work order entries and enforces work order closure by applying financial penalties, we found several occurrences of duplicated burst event logs. Typically, these comprised identical details being reported within a few minutes of each other or a slightly different operation being logged as a separate event (eg replaced coupling being logged separately as the burst repair at the same time and location). We estimate that these account for no more than 5% of the total events and arguably therefore within the accuracy grading. However, we would

encourage the Company to undertake a manual review of the data to remove any 'obvious' duplications which will assist in the accuracy of ongoing reporting.

- We note that the removal of the estimated 20% duplicated logs should logically have resulted in a similar decrease in the number of events being reported. The reported 8% reduction in contributing total from Leakage Function therefore needs to be viewed with this in mind and may therefore actually represent a slight increase in the number of recorded events.

On the whole, we are satisfied that the Company have resolved the main concerns raised last year through the adoption of the MWM system and that the data reported by Leakage Function is within the confidence grading being reported.

NI Water confirmed that any repairs to PPP mains are not included in the totals. The line total is confirmed as the correct summation of the data obtained from the two data sources divided by 1000km as required.

4.6 Asset Balance at 31 March (Line 12)

The total length of mains has increased by 86.2km this year to 26,435.45km, significantly less than the 241km reported last year. This figure has been taken directly from a query of its GIS system on 31/03/10. NI Water confirmed that this length excludes raw water, private mains, mains owned and operated by PPP, non-potable mains and all small diameter service pipes.

The total by the defined calculation method of mains changes in Lines 1, 2, 6 & 7 differs by 57.5km due to the difference in data sources. As explained in Section 4.3, this is considered a reasonable difference as defined by the adjustment factor.

4.7 Distribution Studies (Lines 13-17)

NI Water started zonal model development in 1999 leading to the adoption of a distribution zonal study programme in 2001. The Company aim to set up models to cover all 71 water supply zones and currently predict completion by 2011. NI Water report a cumulative total of 54 distribution zone studies completed since the start of the programme with a further 17 studies ongoing. This represents a continued and significant improvement from last year and increases the percentage population coverage to 72%. The Company provide a full breakdown of the data in their commentary (although slightly different from the recommended table layout) and our audit confirmed the entries for lines 13-15 appear to be an accurate reflection of their current position. The percentages in lines 16-17 have been correctly calculated based on numbers of properties and population extracted from their POINTER database.

We discussed the production of the zonal studies with the lead consultant and requested a copy of the full Options Report covering Breda North, Belfast East and Holywood to check the validity and level of detail of a typical study. In our opinion, the report was

clear and concise and contained the necessary aspects of investigation, analysis and consideration of design solutions and expenditure to qualify against the Reporting Requirements. We are therefore satisfied that the zonal study process being carried out is in line with the Reporting Requirements.

NI Water admit that many models have not been re-analysed since first completion and hence several studies are now over 8 years old (although the majority are less than 5 years old). Understandably, NI Water remain focused on the completion of zonal studies for the currently un-modelled zones, but plan to re-visit all models once all zones have been completed (probably in 2011). It is anticipated that zones in 'Phase 2' will be prioritised on the basis of operational reports and numbers of customer complaints. In this way NI Water are focussing on the zones that are most likely to require remedial or improvement works.

Currently, the construction and management of all models is undertaken by sub-consultants under the management of a lead consultant. NI Water provide strict guidelines for the development and operation of models to ensure consistency between sub-consultants. In addition, the Company carry out regular audits at various stages of model build, including cross-checks against GIS records and OS mapping to ensure the model accurately reflects the real network. In general, we understand this set up works well, although they admit that there have been some minor issues that have led to the delay of a small number of models. Going forward, we were advised that all projects are currently on time and due for completion as programmed.

No consolidation or amalgamation of zones has occurred this year, although NI Water expected some consolidation of zones to occur in the future. We were advised that population figures have been adjusted to be consistent with those reported elsewhere by Leakage Section.

4.8 Water Service Activities (Lines 18-27)

There are no current requirements for NI Water to report in this area.

5. Company Methodology

As in previous years, the majority of information in lines 2-10 is based on data extracted from the Company's centralised project database system entitled 'Captrax'. The database is a working record of all active capital works projects and is updated regularly with project information obtained directly from the relevant team. NI Water project managers are responsible for all inputs and updates on their projects based on forms submitted by site teams. All information is therefore reviewed and approved by the relevant project manager before being entered onto the database records.

We reviewed and discussed the use of Captrax with the Company and checked the transfer of data records and output of queries. We can confirm that the database appeared robust and checks against the source data supported the summary output data.

Following our queries last year on the speed and reliability of data transfer from contractors and site teams, NI Water advised that they have now improved this process by linking the system with financial process to incentivise contractors to provide complete and prompt record data. They are also confident that the new [x] frameworks will also significantly reduce the problem. Internal checks carried out by NI Water this year confirmed minor errors in less than 0.3% of the data cross-checked between the two systems which is well within the accuracy gradings. We understand that the Company intend to improve this checking process through more automated cross-checks next year.

Field data is compiled by field managers in a central Mobile Work Management system (MWM). Remote access for operatives is available via 'toughbooks'.

The Company do not declare any mains acquisitions as all water mains are installed by themselves and hence theoretically already included in their figures.

For this Report Year, the Company have not had a separate identification code to differentiate between work undertaken for quality and maintenance. Instead, they have relied on reports from field managers to provide the breakdown between the two. This current system is therefore reliant on the individual contractors and operations staff accurate categorisation of events. However, we understand that new codes are now in place that will enable this categorisation for future reporting.

Mains burst data for Line 11 is obtained from records compiled by the Leakage Function and Networks Water. The data is compiled by interrogation of the work order code and categorisation.

Fundamentally, Leakage Function are pro-active and use actual flow measurements to identify high-risk areas for further on-site investigation. All data within the Leakage Function is entered by field managers and contractors and stored within the Mobile Work Management system (MWM) with defined management and control of work order entries. Specifically, work orders are raised and logged in the system by a NI Water field operative before passing to a contractor for action. The contractor updates the log with progress on site and is responsible for closing out the work order when complete. By limiting contractors to only update and close out work orders, this reduces the potential for duplicated logs. Crucially, NI Water also apply financial penalties for failure to do this to reduce the numbers of unclosed work orders and enable links to other financial systems to assess physical progress against invoicing.

Networks Water are reactive and their work orders are largely in response to customer and third party calls. Networks Water is split into Repair & Maintenance and Distribution who

record and report on their specific areas. Systems utilise a simple logging and reporting system based on individual work orders. Each work order is assigned a unique reference number.

The Company does not include work on valve packing, hydrants, air valves, communication pipes or third party bursts which is in line with the Reporting Requirements.

The total length of mains in Line 12 is extracted from the Company's GIS database which is applied as the baseline figure for comparison against the other line totals. The systems are largely independent and are not updated with the same regularity. The GIS mapping system in particular requires regular updating to keep pace with new developments and other physical changes. As a result, there is invariably some difference between the totals reported on the two systems. To ensure continuity between totals, an adjustment factor can be applied in Line 7 which is considered the most suitable as it encompasses 'other changes'. The adjustment factor principally represents the difference in year end data stored on the Captrax and the GIS systems and hence some adjustment is considered inevitable. The figure is usually positive to reflect the delay in getting data from project records onto the GIS system, although the factor can be negative if the Company removes a back-log of data. At present, NI Water do not apply any factor, and hence the line totals are not wholly consistent.

The numbers of lead and other communication pipes replaced for quality, maintenance and other reasons are extracted directly from Captrax based on field records.

Distribution study models are focussed around the production of zonal models based around the Company's 71 water supply zones, with typically one model to cover each zone. Zones are interlinked by defined network nodes.

Zonal studies are divided into three phases; a needs phase, an options phase and a solutions phase. The completion of each zonal study therefore includes the completion of the physical network model, as well as analysis and production of a needs report to identify possible problems on the network. This is then assessed by NI Water staff at options phase for cost implications and used to create a programme of works. Solutions are presented and passed onto design consultants for action. Models are re-visited and updated after completion of the related works (which can be several years later once all planned works have been completed). These updates are then checked and verified against field survey data in the affected locations. This concurs with the line definitions and hence validates their inclusion in the line totals.

A study is defined as 'completed' once the draft options report has been formally submitted for review and action by Networks Water.

The models are built and maintained by sub-consultants based on a set of strict guidelines to ensure continuity. Models are based on a snapshot of the Company's GIS

system at time of development and are not typically re-visited to check for updates. This inevitably results in some models not being fully up to date with the current GIS system.

The GIS system was set up in 2001 and utilises an Oracle database with graphical front end and stores all infrastructure data. Data records prior to 2001 have been digitised and transferred into the database to include all existing assets. Each asset has its own unique ID reference and confidence grades are assigned to asset properties to guide to reliability. The system is updated via direct requests from water mains rehabilitation teams, new developments or engineering procurement (capital works) via a relevant manager for check and approval. All changes are undertaken centrally once approved. The Company aims to undertake all changes within 4 weeks, but acknowledges that they experience some delays, mainly attributable to the collation of information from site teams. All changes to the GIS system are subject to a peer review to provide a level of checking.

In general, we consider the methods listed by the Company to be largely robust and in accordance with the reporting guidelines.

6. Company Assumptions

The calculation for Line 4 is based on an assumed flushing rate based on typical hydrant flushing volumes.

Line 12 assumes that the GIS system is the most reliable source of information and hence supersedes the calculation from the individual lines.

For Line 11, the Company assume that the number of work orders relating to burst mains relates to a single burst event. Although unusual, it is possible that some work orders may cover the repair of multiple bursts.

7. Confidence Grades

The Company continue to report a B3 grade for its data from GIS systems. We consider this reasonable, but would still question whether B2 is now more appropriate given the theoretical accuracy of the GIS system.

The Company have generally applied average confidence grades for Lines 2-10 to reflect the two sources of information (EP and Networks Water).

All data provided by EP for Lines 2-10 is applied a confidence grade of A1 due to the detailed project records held and theoretical accuracy of the data. This is an increase from A2 last year. Given that there have been no real changes to methodologies this year, we are not certain of the justification behind this increase and that whilst it may be appropriate to changes in mains lengths, it seems optimistic for communications pipes given their reliance on translated field data and their assignment between quality and maintenance bands.

Data provided by Network Operations for Lines 2-10 is applied a general confidence grade of B3 due to the reliability on field data records. In general, records from Networks Water have improved from last year which previously involved some significant extrapolation of data. Data this year is based on complete records and hence the element of extrapolation has been removed. We therefore agree that a reasonable increase in confidence grades is justified.

For the purposes of commenting on confidence grades, we have ignored the quantifiable errors in numbers due to the deliberate assignment or omissions of lengths such as upsized mains and mains for housing developments.

Given the above, we therefore have the following comments:

- Given the relatively low inputs from Networks Water, the A2 confidence grade appears appropriate for Lines 2, 6 and 7.
- We agree that the A1 grade is appropriate for the zero value in Line 3.
- Given the removal of extrapolation from the calculations, but retention of the applied flushing factors, we agree an increase to B3 is appropriate for Lines 4 and 5.
- We recommend that B3 grades would be more appropriate for lines 8-10 given the current methods for breakdown between lead and non-lead communication pipes and the derivation of quality/maintenance drivers. This differs from the A2 and B2 reported by NI Water for lines 9 and 10.
- Following significant improvements to the source data this year, we are satisfied that the B3 confidence grade applied to Line 11 is appropriate.

Given the theoretical accuracy of the data, the A1 grades applied to Lines 13-17 appear reasonable.

8. Consistency Checks

The Company provided a revised data and commentary following our initial audit. Checks were made on the revised table and text to confirm that the changes made were appropriate and accurate.

Date: 30 July 2010

Prepared by: [x]

Table 11a – Water Service Activities**Commentary by REPORTER****1. Background**

This table provides information on turbidity at water treatment works and is required to enable NIAUR to identify trends, which may indicate declining asset condition at treatment works. Companies are required to analyse turbidity results for each operational water treatment works that produced water for drinking purposes in the calendar year and determine 95 percentile values. Companies should identify and report number of works and their aggregated output (Ml/d) over the calendar year where the 95 percentile is greater than or equal to 0.5 Nephelometric Turbidity Unit (NTU) and less than 0.5 NTU.

2. Key Findings & Recommendations

- A slight decline in the performance in turbidity levels at water treatment works from 98.6% to 97.5%, although this is believed to be largely due to the relative change in proportions following removal of the PPP sites from line totals rather than any significant deterioration in performance.
- Significant proportion of works at the 'borderline' 0.5NTU value, which are currently excluded.
- Several water treatment works have been taken out of service mid-year resulting in 6 excluded works.
- Suggested reduction in confidence grade to reflect uncertainty in 'borderline' cases.
- Mid term view to improve accuracy (2 decimal places) in turbidity readings.

3. Audit Approach

Our audit consisted of a direct interview with the NI Water system holder, a review of the Company methodology, the commentary and the table entries. Table entries were reviewed for consistency with previously audited data and supporting data was inspected for accuracy. Confidence grades were reviewed to ensure compatibility with the methodologies used.

4. Audit Findings**4.1 Block A – Water Treatment Works – Turbidity**

The Company has sustained its recent performance on turbidity levels, with the number of exceedences this year remaining largely static at 43, compared to 42, 50 and 114 in the respective previous years.

The improvements shown in recent years have been largely due to the commissioning of the new Alpha sites (now PPP owned and operated) and respective closure of a number of older and more frequently failing sites. Changes to WTWs this year have not substantially impacted turbidity performance.

This year, the number of WTWs with 95%ile above the 0.5NTU level has shown improvement with a drop from 5 to 3 in the number of failing works. Whilst, the overall performance relative to total output indicates a slight decline from 98.6% to 97.5%, this is due to the exclusion of the PPP sites rather than any actual change in levels of performance.

The removal of the PPP sites has also led to an apparent drop in the reported total output for calendar year. However, the combined total of NIW and PPP sites totals 623.07Ml/d which remains consistent with the 620.67Ml/d reported last year.

The Company's commentary refers to a fifth PPP site at Forked Bridge which appears to contradict other tables which only report 4 PPP WTWs. We confirmed with NIW that although the construction of a new Forked Bridge works was avoided by the construction of the new trunk main from Castor Bay WTW, the site continues to have turbidity monitoring as a distribution supply point from Castor Bay. On this basis, it is included for turbidity monitoring purposes as a 'virtual' WTW. We note that this has no impact on the line totals as PPP sites are not included in the calculations. Our commentary therefore refers to 5 PPP sites to align with this definition.

The total number of WTWs counted in lines 1-3 decreased further this year from 35 to 31 this year, largely due to the exclusion of the 5 sites operated by PPP (Moyola, Dunore Point, Ballinrees and Castor Bay and Forked Bridge). The total includes 6 sites in Line 3 that were excluded from the turbidity calculations as they were effectively abandoned during the Report Year.

The change in total number of WTWs does not initially appear to tally due to the temporary re-use and subsequent decommissioning of Drumabest borehole this year (included as one of the 6 sites where turbidity is not recorded). When this is taken into account, the overall reduction of 4 is validated by the addition of this site and removal of the 5 PPP sites. When differences in year are taken into account, these changes also concur with changes to the Company's works reported in other tables.

For clarification, NI Water confirmed that they don't have any sites classified as 'emergency' sites as the Company either have 'operational' or 'mothballed' sites. However, in effect sites such as Drumabest Borehole can be temporarily brought online to enhance supply. This raises a question as to the definition of 'mothballed' sites and whether some sites should actually be classified as 'emergency'. NI Water advised that they apply to NIEA to surrender the Abstraction Licences for sites taken out of supply and hence they are no longer operational. We also note that such categorisation has no tangible impact on this table.

The 5 sites operated by PPP are correctly excluded from the line totals but are included in the Company's commentary for information. All data has been correctly reported by calendar year.

4.1.1 Lines 1 and 2 – Turbidity Levels

We reviewed the 3 sites contributing to the Line 1 total. Of these sites, 1 (Camlough) was within the range 0.5-1.0 and 2 sites (Altmore and Gortlenaghan Borewell) had a 95 percentile NTU value >1. All 3 works have relatively low distribution outputs, totalling less than 2.5% of the total works output. We asked what measures the Company were taking to rectify the issues at each site. NI Water advised as follows:

- Gortlenaghan Borewell WTW – this is an exposed borehole site and hence considered a relatively high risk site. NI advised it is planned for closure in 2010/11 so there are no planned works to rectify.
- Altmore WTW – another borehole source, this site is planned for closure in 2011 now works at Castor Bay WTW have been completed.
- Camlough WTW – NIW advised that there are no plans to close this site and hence they are monitoring this site closely to consider if any remedial works are necessary. However, the failure at this site was marginal (95thile of 0.6NTU) and we reviewed the data with NIW which indicates no infringements at the site for the first half of 2010. It is therefore likely that the site will comply next year, although, it is unclear what caused the failure this year.

We noted that borehole sources appeared to be the most likely points of failure for turbidity and we discussed the Company's long term plans regarding borehole sites. We were informed that the long term plan is to close all borehole sites through upgrades to larger capital work programmes. The only exception to this is Rathlin Borehole which is likely to remain due to its geographical location on an island.

We noted that 4 sites (Killylane, Shanmoy Borehole, Carmoney and Killyhevlin) with a combined total output volume of 56.27Ml/d had 95 percentile values of exactly 0.5 and were excluded from Line 1. NI Water advised that at most sites, current monitoring is only sensitive to 1 decimal place (i.e. 0.1NTU) and hence it is not possible to determine the result any more accurately to confirm whether this value is actually above or below the line. Statistically, it is likely that at least one of the four sites is actually above or equal to 0.5NTU. However, to avoid subjectivity and the fact that the results are clearly borderline, we consider it a reasonable assumption to exclude them from Line 1.

However, whilst Shanmoy and Camlough do not indicate any significant change in performance compared to last year, the results at Killylane and Killyhevlin indicate a significant decline in performance from the 0.3NTU value reported last year. We requested feedback on these sites and were advised as follows:

- Shanmoy Borehole WTW – NI Water advised that they had experienced some issues due to the changeover in sampling point as noted in their commentary and that the site is planned for closure in 2010/11. No improvement works planned.
- Carmoney WTW – improvements works started in 2009/10 are still ongoing and the Company hope to be able to demonstrate improvements in performance next year.
- Killylane and Killyhevlin WTWs – NI Water advised the sampling point at Killylane was relocated in 2009 to more accurately reflect the water going into supply which may have impacted the readings. However, they were not aware of any changes at Killyhevlin that should have caused any deterioration in performance. No investigation or remedial works are currently proposed at either site. In order to assess whether the changes were symptomatic of a general decline in performance requiring action or just a natural fluctuation, we requested similar data for the first half of 2010 for comparison for both sites. The results indicated that both sites were currently reporting 95%ile values around 0.4NTU, with Killylane WTW recording no value above 0.5 NTU so far this year. This supports the conclusion that it is likely to be caused by a natural fluctuation in performance and we are satisfied with the Company's approach.

We subsequently reviewed the Company's methodology and spreadsheet calculations behind the line totals. We can confirm that the Company have correctly excluded the 6 sites listed in Line 3 on the basis of the gaps in the data being too long. The 5 PPP sites are also correctly excluded from their calculations.

In general, the methods used for excluding sites and the formulae used to analyse and calculate the line totals were found to be correct and in accordance with the Reporting Requirements. We undertook cross-checks with the source spreadsheet for a number of sites including Seagahan, Drumaroad Buckna Borehole and Killylane WTWs and can confirm that the relevant totals from the spreadsheet have been correctly transferred to the line totals.

4.1.2 Line 3 – Turbidity Not Recorded

Line 3 typically includes sites which are temporarily out of service for the majority or all of the year or sites which have been activated or abandoned during the Report Year. We note that the Company have adopted our recommendations made last year regarding the reporting of intermittent sites and include those sites which supply for part of a year, providing the defined criteria are met.

Our checks confirmed that all 6 sites reported in Line 3 are excluded on the basis of being abandoned during the Report Year. Analysis of the source data confirmed that although no site was in service at year end, the data gaps between samples did not always qualify for exclusion. Given the above, we challenged the Company regarding the exclusion of these sites on this basis and were informed that although they could arguably be included as intermittent sites under the Reporting Requirements, NI Water consider the definition to only apply to intermittent sites which are still in active service at the year end. Where sites such as these 6 are wholly abandoned during the year, NI Water exclude on the basis that they have been permanently removed from supply and are hence no longer reportable.

We feel this is a reasonable interpretation of the guidelines and we are satisfied that their reporting is now in line with the Reporting Requirements. However, in order to ascertain the potential impact of this interpretation, we analysed the data for the 6 excluded sites to calculate their equivalent 95%ile NTU value. Our results suggest that equivalent 95%ile NTU values at 2 of the 6 works (Drumabest and Brishey) were above 0.5 and hence would increase the total of Line 1 by +1.03Ml/d if included.

4.1.3 Line 4 – Total

The total number of WTWs operational during the calendar year and output for Calendar Year are confirmed as the correct summation of the individual totals in Lines 1-3. This appears to concur with information reported in Table 12, when accounting for the differences due to reporting years.

4.1.4 Other Performance Indicators

The Company continue to carry out similar monitoring of iron, manganese and aluminium levels within zones through sampling at customer taps. NI Water informed us that they have not identified any significant problems with these parameter during the Report Year. They also advised that enhanced monitoring is utilised installed where a possible problem is foreseen to ensure effective and proactive monitoring in key areas.

5. Company Methodology

The Company confirmed that its methodology remains fundamentally unchanged from the previous year, although they have expanded and added detail in several sections. Turbidity data is collated directly from field sample data and output data based on average daily flows into distribution. All data is collated and analysed by calendar year in accordance with the Reporting Requirements and as agreed with the DWI. The different timescale explains why the distribution data may differ from other tables.

Typically, samples are taken daily at each relevant WTW on the basis of output volume and can provide up to 365 days of data per site. The Company keeps a record of every sample taken and categorise it according to its purpose and by date. They can then accurately exclude all non-scheduled samples by category and assess relative gaps in data for exclusion against the criteria. The Company advised that as sampling is generally carried out daily at all monitored sites, there are typically no non-routine samples.

The 95 percentile figure is calculated using the standard Excel function rather than the pre-defined method in the Reporting Requirements. We have previously carried out a comparative calculation using the defined method and found the difference in predicted percentiles to be insignificant.

Our review of the Company's methodology confirmed that the Company have adopted methods that are compliant with the Reporting Requirements and have applied suitable criteria for excluding non-routine sampling and works with insufficient or long gaps in data.

The Company's internal monitoring of levels of aluminium, iron and manganese is based on data obtained through samples taken at customer taps.

6. Company Assumptions

The methods employed use accurately recorded and documented data obtained from flow meters and sampling methods. There are therefore few assumptions to be made other than the standard logic that the results obtained from sampling are true representation of the whole.

Where the accuracy of turbidity data is to only 1 decimal place, the Company assume that an overall 95 percentile value of 0.5 is below the threshold 0.5NTU limit. Where the level is below the level of detection (e.g. <0.1NTU) the Company assume a value of 0.05. As this only affects the very lowest values, this has no overall impact to the calculated 95 percentile values.

7. Confidence Grades

Given the accuracy of the NTU value to 1 decimal place, a significant scope for fluctuation in the line total exists depending on the exact allocation above or below the line of sites reporting 0.5NTU. Even one additional site qualifying to Line 1 from the 4 sites listed this year would swing the results in line 1 by between +20% and +280%. This level of uncertainty is clearly not reflected in the current A2 confidence grade for Lines 1 and 2. However, we also recognise that the uncertainty represents only marginal cases and that the Company's assumption is a reasonable compromise. We therefore recommend that the grade for Lines 1 and 2 is reduced to A3 to better reflect this situation. The A2 confidence grade remains appropriate for Lines 3 and 4.

We note that this uncertainty in Lines 1 and 2 would largely be removed if readings could be taken to 2 decimal places. We would therefore encourage the Company to improve the accuracy of turbidity sampling as and when opportunities arise.

8. Consistency Checks

We discussed our findings directly with the Company and cross-checked our results to ensure validity. Cross checks were also carried out against Tables 9 and 12 to confirm consistency.

Date: 30 July 2010

Prepared by: [x]

Table 12 – Water Explanatory Factors**Commentary by REPORTER****1. Background**

This table is used in water service operating efficiency studies. The information collected in this table is used in NIAUR's operating efficiency studies. It provides explanatory factors for the number of sources, proportion of supply by source type, amount of pumping required for treatment and distribution, and the relative complexity of a company's water treatment works. Changes in these factors can have a significant impact on a company's costs.

2. Key Findings & Recommendations

- Improvements in level of detail and clarity in reporting, including breakdown between NIW and PPP outputs.
- Further reduction in the total number of sources, particularly borehole sites, although relatively little change in overall percentage split of distribution inputs across source type.
- For future reporting, recommend better categorisation of inactive sites to improve clarity of sources taken in and out of service.
- No changes to treatment levels at existing works, all changes to line totals resulting from closures of works.
- Significant increase in the value of the calculated pumping head, primarily due to greater data coverage. Significant contribution of PPP works to total pump head.
- Recommended changes to confidence grades for Line 5.

3. Audit Approach

The audit comprised an interview with the relevant NI Water and PPP System Holders and deputies, a review of the Company methodology for data collection, an analysis of the source data and a comparison with last years table entries.

4. Audit Findings

The table is sub-divided into 3 sections relating to PPP only, NI Water only and the combined total outputs.

4.1 Block A - Lines 1 to 4 - Source Type

NI Water Inputs

The total number of sources has reduced significantly this year from 38 to 30 due to the closure of 8 sites last year. These comprised 3 No. WTW with impounding reservoir sources (made redundant by the new PPP 'Alpha' works) and the closure of 5 No. WTW with borehole sources. Following recommendations made last year, NI Water have provided a full and detailed breakdown of the changes to sources in sources in lines 1-4. We reviewed these with the Company and cross-checked against annual flow data and can confirm that they have been correctly assigned and reported. Grouped boreholes are correctly treated as a single source and no site has more than one reportable source. NI Water confirmed that they have no compensatory sources to consider. Lough Island Reavey is correctly excluded from the numbers of impounding reservoirs as it now supplies another source.

NIW advised that two further sites (Brishley and Stradreagh) were taken out of service during the year, but are correctly included in the calculation. Including the temporary use of Drumabest and Creightons Green, we therefore expect the number of sources to further reduce to around 26 next year.

Although the source numbers have changed significantly, the proportional split of distribution input remains fairly similar due to the already low proportion from borehole sources. We note that borehole sources now account for less than 3% of total distribution input, the vast majority (77.6%) from impounding reservoirs.

Whilst the NI Water provide a full and clear breakdown and explanation of the changes, we note that the Company continue to define sources as either 'active' or 'decommissioned', the latter being excluded from the reporting process on the basis that the site is no longer operational and the abstraction licence is no longer in place. However, we note that two sources, Drumabest and Creightons Green, which had been previously been reported as decommissioned and removed from the list of sources, were temporarily brought back into service during the year and hence reinserted into the list of active sources. The same situation occurred with two borehole sites at Kilwee and Bellsiz last year. The Company therefore clearly have the ability to re-activate and re-use some abandoned and disused sources.

Whilst we acknowledge that the addition and removal of sites is explicit in NI Water's commentary, we feel clarity and understanding would be improved if the Company clearly defined and listed the numbers of decommissioned sites that are either wholly abandoned or capable of being brought back into service at reasonable notice. We understand that the Company do not maintain assets or uphold the abstraction licence once decommissioned and hence the definition of an 'emergency operational' site may be not be black and white. However, we feel that even a simple count of the number of inactive sites still owned by NI Water would be beneficial.

We can confirm that the relevant distribution inputs have been correctly totalled for each line. The Company identify a small discrepancy between the relative distribution inputs used between lines 1-4 and Line 5 in their commentary and have provided a full and detailed explanation. We discussed this with the Company and agree that potential impact of this difference is negligible.

The Company confirmed that there have been no drought conditions experienced during the Report Year although we noted the extreme cold weather experienced in January 2010 caused a significant increase in flow input during the month (likely due to bursts).

PPP Inputs

PPP are responsible for the operation of 4 WTWs at Moyola, Dunore Point, Ballinrees and Castor Bay and have therefore reported on the basis of these 4 works.

There are no changes to the line totals this year (PPP did not report on distribution input last year). PPP continue to correctly treat the 2 additional sources from Altikeeragh IR and the River Bann for Ballinrees as chain sources and are hence excluded from the line totals.

PPP confirmed that abstractions from Lough Neagh are treated as individual river abstractions as confirmed with NIAUR.

Total

The total is the correct summation of the NI Water and PPP inputs. Checks against source data indicated that distribution inputs have been correctly assigned.

4.2 Block A - Line 5 – Average Pumping Head

This year, the Company have compiled flow and pressure data to cover 609.57Ml/d of the total 625.4Ml/d distribution input equating to approximately 96% of their total input. This compares with a coverage of only 66% last year and therefore represents a significant increase in coverage and improvement in accuracy. NI Water advised that there are only 2 zonal network studies left to complete (Dunore East and Killylane) and that they expect completion of all models by 2011.

The line total indicates a significant increase in the average pumping head from 113.67m to 138.6m.hd this year. We questioned this increase and were informed that the change is primarily due to the ongoing completion of zonal network models which has enabled the inclusion of more flow and head data. In particular, models have now been completed in the Belfast area covering some of the larger flow volumes which were not included in last year's calculations. We reviewed the impact of one such site, Dunore High Lift PS, where the pump head of this alone contributes about 10% of the total average pump head value. As this site was excluded last year (being a previously un-modelled zone), the relative increase in included pump head compared to the increase in total flow is

significant and accounts for the vast majority of the change. The company advised that they have not carried out any review or changes to the head lift data for sites included last year other than a correction to a pump set at Dorisland following update to a zonal study. Hence, the reported rise in pump head appears reasonable and we believe that this is more a reflection of improvements in data coverage rather than any significant change to the pumping regimes.

The Company provide a detailed and comprehensive explanation of the changes to modelled zones and the overall process and in their commentary.

The resultant average pumping head value in Line 5 is calculated from a single spreadsheet covering all relevant supply and distribution pumps in the Company's network. We reviewed the spreadsheet with the Company and undertook several spot checks on the calculations along sample rows. We can confirm that we found no errors and the spreadsheet appeared logical and robust. Our checks also confirmed that the Company have only calculated the total based on the 609.57Ml/d of distribution input where reasonable data is available and therefore have avoided estimating in areas of significant uncertainty. The Company are therefore assuming that the calculation based on this proportion of the flow is representative of the whole. Although there are still some zones only partially covered and 2 models incomplete, the exclusions are generally minor inputs and we hence consider this to be a reasonable assumption, particularly as this will effectively be resolved once the Company have completed all models, expected within the next report year.

The Company initially did not provide data for the NIW and PPP only tables on the basis of not being able to differentiate between the relative distribution inputs within the supply system. We reviewed the guidelines with the Company and agreed that this should not impact the calculation and that the line totals should be assessed proportional to the total flow amount as per the Reporting Requirements. NI Water agreed to update their tables accordingly and provided data for the NIW and PPP only tables. Subsequent review of these calculations confirmed they have correctly applied the requirements, although we are not clear why a significantly reduced confidence grade has been applied (refer to Section 7 – Confidence Grades).

This data indicates the large flow volumes handled by PPP works, which although accounting for less than 3% of the total number of pump sets, accounts for almost 38% of the total pump head.

The method for calculating pumping head is in accordance with the reporting guidance.

We discussed the derivation of the lift head for each site with the Company and requested documentary evidence to support the reported figures for newly included PPP pumps at Dunore WPS, Ballinrees and Castor Bay to Forked Bridge WPS for comparison against actual model data. PPP confirmed that the data was consistent with that used by NI Water in other tables. NI Water provided suitable evidence to support the lift at Ballinrees, but were unable to extract the relevant information for the other sites in time for our review. We did not have any specific concerns with this data, and so

propose to more fully assess the head data next year.

4.3 Block B - Lines 6 to 12 – Treatment Type

NI Water Inputs

The total number of water treatment works (WTWs) reported this year is 30, a net reduction of 8 from last year. This decrease is due to the removal of the 8 No. sites decommissioned during last year and now excluded as no longer in operation.

Cross-checks carried out against the source data confirmed the following breakdown:

- 26 sites were operational at year end
- 4 sites were decommissioned during the year and hence only operational for part of the year
- 1 site (Buckna) was not operational for the entire year
- PPP sites are not included

A detailed breakdown of the changes and status of sites is provided in the Company's Commentary. We checked the flow outputs of the decommissioned WTWs against the source data and can confirm that all 4 sites were non-operational at year end.

NI Water confirmed that there were no changes to treatment classification of the NI Water-owned WTWs this year. The changes are therefore purely due to recent closures. The reductions of -4 SD, -1 W2, -2 W3 and -1 W4 are in line with our expectations following the replacement of sites with the new PPP sites and closure of several low treatment level borehole sites.

PPP Inputs

All 4 works operated by PPP have ozone or GAC on site and are correctly classified as W4 level treatment.

Total

In total, 34 WTWs were operational during the Report Year. The line totals are confirmed as the correct summation of the NI Water and PPP inputs. Our checks against the source data confirmed the correct calculation and translation of data onto the table.

We reviewed the remaining works having a treatment below the W3 level. Whilst a significant number of works exist, the data indicates that all 9 WTWs in lines 6-8 are works with borehole sources, contributing only 1.5% of the Company's total distribution input. This is a significant reduction from 2.8% last year. It is noted that the majority of these sites have been or are due to be decommissioned and hence the proportion in these bands is expected to reduce still further next year.

The percentage of flow receiving W4 level treatment has correspondingly increased to 63.9% from 59.5% last year, reflecting the change in proportional split.

4.4 Line 13 – Potable Mains

NI Water Inputs

The total length of potable mains has increased from 26,349.2km to 26,435.45km largely in line with reported changes in new and abandoned mains. This is extracted directly from the Company's GIS systems and matches the total length of main reported in Table 11, Line 12. Our checks confirmed that the total excludes PPP-owned assets and 276km of compensatory and raw water mains. Checks were carried out against the source GIS system to confirm the reported lengths in size bands.

The Company have 112km of unknown diameter mains on their system records (reduced from 150km last year). As it is expected that the vast majority of these are minor, small diameter mains, NI Water have elected to include these mains in Band 1 which we consider a reasonable assumption. NI Water advise that the remaining mains have no documented size records and therefore are only likely to be confirmed if actually encountered in the field or removed through abandonment.

PPP Inputs

PPP report 16.42km of main in Band 3 which relates directly to the 600mm diameter trunk main from Castor Bay to Forked Bridge. No change from previous year.

Total

The total 26,451.87km is the correct summation of the NI Water and PPP inputs.

5. Company Methodology

The Company uses several spreadsheets to analyse and summarise the relevant data concerning sources, treatment works and pumping stations which is required for inclusion within Table 12. No significant changes to the methodologies have occurred this year, although the methodologies have been compiled into a more usable single document in line with our previous recommendations.

Distribution input is based on data obtained the Leakage Section as discussed in Table 10. The distribution output from the works and applied volume within the distribution network are therefore very similar. Where not available, NI Water may obtain data from other less reliable sources as explained in their commentary.

The methodologies and spreadsheets were reviewed against the Reporting Requirements and we can confirm that the Company has correctly excluded sources from which no water has been abstracted during the Report Year. The Company has also correctly excluded non-potable water volumes.

The Company does not generally fully abandon source sites which are retained and 'mothballed' for possible future use. Hence, the number of operational sites can fluctuate as sites are taken in and out of service (please refer our recommendations in Section 4.1 – Block A Source Types). There were no reported fully abandoned sites this year.

Calculations for Line 5 Average Pumping Head are primarily based on data and results obtained from network models. Flow data for distribution pumps are based on annually averaged flow measurements from works outputs. However, the majority of the data, including pressure heads and flow data for pumps within the distribution system are based on data from the network models. The calculation is therefore reliant on the condition and accuracy of the network models.

The Company are currently in the process of finalising the models for the remaining zones to complete the overall coverage of their supply area. NI Water advised that model coverage now includes all of the Northern, Southern and Western regions and the majority of the 30 Eastern DZS areas and expect full coverage by next year.

Currently NI Water rely on several sub-consultants to develop and manage their network models, although we understand there are plans to centralise the system once complete. NI Water issue a strict set of guidelines to ensure continuity between models. Each model is based on a comprehensive set of pressure and flow readings from a set of strategically positioned temporary loggers. Typically data is collated at 15min intervals for a full day which is then used to calibrate the model. Ground levels are based on information extracted from the Company's GIS systems.

Once the model is created, NI Water do not typically take further field measurements or re-visit the model to re-calibrate. As several models are now over 5 years old, NI Water recognise that there is an increasing risk that models are out-of-date and hence less reliable. However, we acknowledge that NI Water are currently focussed on completing the model rollout programme to cover all areas and that the overall impact of changes are likely to be small.

Where models are incomplete, NI Water look to obtain field data on pumps, but advised that such data is usually unavailable or not sufficiently unreliable and hence most data in these areas are omitted from the calculation. To avoid over or under estimating the total head, the calculations exclude the relevant proportion of contributing distribution input from any supply PS which supplies a booster PS where data is sufficient data is not available (i.e. it is in an area not covered by a network model). Our review suggested that these adjustments are logical and reasonable and we note that such adjustments will only be required until the Company completes its zonal model study programme.

The spreadsheet to calculate the pumping head is managed by a single document controller and updated each year via distribution of relevant sections to other sub-consultants. NI Water confirmed that the spreadsheet utilises unique ID codes to avoid duplication and that internal checks are carried out each year to assess any changes.

The Company provide a detailed and comprehensive explanation of their Line 5 methodology in their commentary, including comments on shortcomings and possible future improvements. Following our initial review, NI Water updated their approach to include calculations for NIW and PPP only pumping heads. Our checks on the final data confirmed that the calculations are now consistent with the NIAUR defined methodology.

The Company does not import or export any water.

The totals for Line 13 are taken directly from the Company's GIS system. Pipes that are unidentified (which account for approximately 0.5% of the total) are assigned to Band 1 as the most likely category to ensure the total matches the total length of mains reported in Table 11, Line 12.

6. Company Assumptions

For calculating average pump head, the Company makes several key assumptions:

- network models are accurate and up to date representations of the actual pipe network and pump condition
- ground levels are representative of the operational head level
- no leakage occurs in the system
- where data is not known, the Company exclude the pump from the calculation and hence base the calculation on a sample. The applied data is therefore assumed to be representative of the whole.

For Line 13, unidentified pipes are assumed to be included in size Band 1 as the most likely size category.

7. Confidence Grades

The assignment of B2 confidence grades to Lines 1-4 is considered appropriate on the basis of the reliability and accuracy in the calculation of proportional distribution input.

We note the Company have opted to increase the confidence grade of Line 5 from B4 to B3 for the Total table, but significantly reduced the grading to C5 for the NIW and PPP only tables. The Company have provided a detailed reasoning behind their selection of the B3 grade in their commentary.

On the basis of their explanation and our review of the source data, we believe that a B4 grade remains more appropriate for Line 5 on the basis that the accuracy of the final

number cannot be greater than the accuracy of any individual data source. Therefore, although the flow data may be relatively accurate (B2), the pump data is all listed as B4 or C4, and any errors will be compounded not averaged by these methods. Furthermore, we do not fully understand the logic of applying a reduced grade to the NIW and PPP only tables and believe that the B4 grade should be applied to all 3 tables as the data sources and methods are the same in all cases.

8. Consistency Checks

Following the initial audit, the Company made some amendments to their commentary and line totals to undertake corrections to calculations and take into account our recommendations. Checks were made on the revised text to confirm that the changes made were appropriate and accurate. PPP data was cross checked with Table 42.

Date: 30 July 2010
Prepared by: [x]

Table 13 – Non financial measures – Sewerage properties and population**Commentary by REPORTER****1. Background**

This table reports on the properties connected during the year, billing information and average report year population estimates for the sewerage service.

2. Key Findings

- There are several key changes from AIR09 that have had an impact on the property information reported. Therefore a comparison between numbers reported in PC10 determination response rather than AIR09 provides a more valuable comparison.
- The Company provided a methodology statement used to derive the estimates reported in this table and using this statement we were able to reconcile the property numbers reported to the Rapid extract presented by NI Water.
- The Company has continued its non-household metering programme which has included surveying all unmeasured non household properties to determine if a meter could be installed on the premises. This has led to a significant decrease in the number of unmeasured non-household properties.

3. Audit Approach

The audit consisted of an interview with the NI Water system holder to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years.

4. Audit Findings**4.1 General**

The key source of information for the new connections and property data is the customer billing database, RapidXtra. This is an automated system where customer information is updated through various means including customer contact. The Company reports that data on property counts and classifications are reported monthly and reconciled with other data collection activities, such as the test metering project. During the audit we sought an update on various issues which had been raised in previous AIR and PC10 reviews. The following provides an overview of the discussions held with NI Water:

- Test Meters

NI Water outlined that their test meter project is ongoing with accounts being assessed and reclassified as appropriate. The Company advised that of the 11,500 accounts identified on the Rapid system, circa 1900 still need to be surveyed and 2,500 still require

investigation. Our Table 7 commentaries provide a summary of the Company's test meter project.

- Site Meters

The Company explained that as part of their ongoing data checks the number of site metered properties (multiple properties being charged through a single meter) is currently being investigated and verified. To ensure these are not double counted the Company has excluded these meters from their Table 7 property counts. We understand this approach is consistent to that adopted in AIR09.

4.2 Properties

Line 1 – Household properties connected during the year

This line reports the number of new household properties added within the Company's area of supply. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note a significant decrease of 3,954 new connections when compared to the 08/09 Report Year. NI Water outline that they believe this reduction is associated with the economic downturn and the reduction in the number of new homes being built. We confirm that a similar decrease has been observed in the water service.

Line 2 – Non-household properties connected during the year

This line contains the number of new non-household properties added within the company's area of supply during the Report Year. We confirm the total number of connections reported in this line is consistent with the extract from Rapid provided by NI Water.

We note that the number of non-household properties has decreased significantly from that reported in 08/09. The Company also outlined at they believe that this was associated with the impact of the economic downturn.

4.3 Billing

Line 3 – Households billed unmeasured sewage

We note a small increase of 4,717 (0.8%) reported in this line since 08/09. The Company was able to demonstrate the consistency of the number reported in this line to extracts from their property records on Rapid.

This line is calculated as the average of occupied domestic unmeasured plus the occupied test meters plus those household properties which are connected for sewerage only.

Line 4 – Households billed measured sewage

Whilst NI Water has been installing meters on all new household connections since April 2008, customers are not being charged on a measured basis. As such, all households properties should be reported as unmeasured.

We noted 117 properties were reported in this line for 09/10 and NI Water explained these were wrongly classified on their billing system. We believe that these properties should be reported in line 3 household billed unmeasured water.

Line 5 – Households billed sewage

This is a calculated line, the sum of lines 3 and 4.

There has been an increase of 4,834 in the number of households billed for sewage by NI Water. The increase observed is consistent with the rise in unmeasured household properties reported in line 3.

Line 6 – Non-households billed unmeasured sewage

As expected we note that the number of non-households billed for unmeasured water within the supply area has decreased significantly during the year. The number of properties has decreased by circa 14,246 (51%) from that reported previously.

The Company explained that this was a result of their non-household metering programme. We reviewed the Company's progress in delivering this programme and our commentary on this is provided in Table 8.

We asked the Company to provide an update on the comparison of the property numbers forecast within their PC10 Draft Determination response and the AIR10 reported number of non-household unmeasured properties. The Company forecast that 11,520 properties would be connected for water at the end of 09/10 and we confirm that 12,330 properties were reported as being connected. The latter value is not reported in the table as the Company reports average year data as requested by the Reporting Requirements.

Line 7 – Non-households billed measured sewage

We note that the number of non-households billed for measured water within the supply area has decreased by 9,996 properties since 2008/09. As the number of unmeasured properties has decreased we would have expected to observe a corresponding increase in the number of measured properties reported in this line as the Company's metering programme gains momentum. Following discussions with the Company we believe this increase is not evident because of the change in reporting approach between AIR09 and AIR10. Within their PC10 Draft Determination response the Company forecasted a 09/10 property estimate of 20,411 compared to the 22,067 (average year) reported in AIR10.

Line 8 – Non-households billed sewage

This is a calculated line and is the sum of Lines 6 and 7.

Line 9 – Void properties

NI Water stated that they have interpreted this line as the average number of properties within their supply area which are connected to the sewerage system but do not receive a charge as there are no occupants. We found NI Water had taken the gross number of properties reported on Rapid (inclusive of measure household test meters) and subtracted the number of occupied properties reported in line 8 above.

In reviewing the Company's audit trail we noted a minor discrepancy in the number reported in the table and believe the figure reported should be 41,508 rather than 41,502.

4.4 Population

We found that the estimated population connected to the sewerage system is based on the percentage of sewerage properties (reported in Table 13) as a proportion of water properties (from Table 7).

For 2009/10, NI Water have reported a total population connected to the sewerage system of 1,452,894, which is circa 29k (2%) lower than that reported for AIR09 despite the number of properties reported increasing (it is worth noting that the AIR09 figure was corrected following submission of the Company's submission in July 2009 from 1,366,330 to 1,452,894).

Our review of the Company's methodology statement for table 13, line 10, indicates that for AIR10, the sewerage population equates to 81.16% of the water population. We found this proportion is based on the number of properties for sewerage and or water (646,096 sewerage properties and 796,035 water properties). We were unable to reconcile the derivation of the number of water properties to that reported elsewhere in the Return.

5. Confidence Grades

The Company has assigned a confidence grade of C3 to the property numbers reported in Table 7. For AIR10, the key source of information for the new connections and property data is the customer billing database, Rapid however there are a number of weaknesses identified within the Company's methodology. As a result we believe a C3 grade is reasonable.

Date: 30 July 2010

Prepared by: [x]

Table 14 – Non financial measures – Sewage collected**Commentary by REPORTER****1. Background**

This table records the sewage volumes collected from measured and unmeasured households and non-households, together with the volumes of trade effluent, cesspool and septic tank waste.

2. Key Findings

- There is a significant increase in trade effluent volumes compared to AIR09. The Company attribute this to around 150 newly consented standard strength traders such as car washes and nursing and residential homes, together with large volumes from the new consenting of major hospitals.
- In calculation the trade effluent volumes we noted that for Company's which operate only part of the year, the number of days discharged rather than using 365 days as a divisor. The impact of using this divisor has a material impact upon the volume reported (see Section 4.1)

2.1 Key Recommendations

- Based on our audit findings in respect of whether the calculation of annual trade effluent volumes are based on 'actual days discharged' or based on 365 days, we recommend that NIAUR and NI Water should review and agree the precise methodology for calculating this figure.

3. Audit Approach

The audit consisted of an interview with the NIW system holder to discuss the methodology and data that has been used to populate this table as well as plans for improving the data in future years.

4. Audit Findings**4.1 General***Line 1 – Volume unmeasured household sewage*

This line summarises the volume of water delivered to household properties billed for unmeasured water that is returned to the sewerage system.

We note a very small decrease in volume of 1.73 Ml/d or 0.7% reported in this line.

The Company has assumed that volumes returned to sewer are 95% of the volume of water delivered, factored by the percentage of the number of households billed for water against the number of households billed for sewerage services.

The Company calculates this number from the Billed unmeasured household supply volume (Table 10 line 4), the number of households billed for unmeasured sewage (Table 13 line 3) and the number of households billed for unmeasured water (Table 7 line 3) and we confirm that this calculation has been made correctly.

Line 2 – Volume unmeasured non-household sewage

This line summarises the volume of water delivered to non-household properties billed for unmeasured water that is returned to the sewerage system.

The Company informed us that this volume is calculated by assuming a 95% return to sewer of volume delivered to non-households factored by the percentage of the number of non-households billed for water against the number of non-households billed for sewerage services.

The Company calculates this number from the Billed unmeasured non-household supply volume (Table 10 line 5), the number of non-households billed for unmeasured sewage (Table 13 line 6) and the number of non-households billed for unmeasured water (Table 7 line 8) and we confirm that this calculation is correct.

We note that this has decreased significantly during the year and the volume has reduced by 8.9Ml/d which equates to a circa 50% decrease. This is consistent with the decreases observed in the unmeasured property base.

Line 3 – Volume unmeasured sewage

This line is derived by summing lines 1 and 2.

Line 4 – Volume measured household domestic sewage

This line summarises the volume of measured household domestic sewage effluent discharged to the sewerage area and billed. As customers are not being charged on a measured basis this line is reported as zero.

Line 5 – Volume measured non-household domestic sewage

This line summarises the volume of water delivered to measured non-households returned as domestic sewage (not trade effluent) to the sewer in the sewerage area and billed. We challenged the Company to provide an audit trail to substantiate the volume reported and the Company advised that this volume was based on their 'Dynamic Consumption' report. NI Water was unable to present a copy of this report to support the volume reported.

We note that there has been a decrease of 9.53 Ml/d or 18% in the volume compared with that reported in 2008/09. The Company explain that this decrease is associated with reduced consumption due to the economic downturn and a number of non-return to sewer allowances which were granted during the year.

We noted that the volumes reported are also somewhat lower than reported in the Company's Principal Statement submission. The volume reported within this submission was 49.4Ml/d which is circa 12% lower than that reported within AIR10.

Line 6 – Volume trade effluent

From April 2009 all traders now pay charges. This is a significant change from previous years when charges were based on whether a trader paid rates or not. This change has provided a more complete, accurate and detailed view on trader discharge activity. Trade effluent volumes for this report have been obtained from the Billing Section in Customer Services. As before, volumetric data is based on trade effluent discharge meters where fitted, or alternatively on metered water supplied, with an allowance deducted for domestic and/or process use on the premises involved. A figure of 28.37 Ml/d has been reported at a confidence grade of B2.

This is a 54% increase on the 18.44 Ml/d reported for AIR09 (at a confidence grade of C4) and we challenged why this was. We were advised that there had been increased volumes from a number of newly consented standard strength traders and major hospitals, and that the volumetric data was now more accurate due to all traders being charged. However, this appeared to be inconsistent with a 15% reduction in trade effluent loads reported in Table 15 Line 1.

We examined the spreadsheet used to derive trader volumes. Due to a number of traders working less than 365 days per year, annual discharge volumes have been divided by the number of days a trader was actually discharging in the year to obtain the Ml/d figure. We queried this approach and indicated that we believed the annual discharge volume should be divided by 365 days in all cases to give a daily average discharge volume figure which would be consistent for all traders. The figure calculated in this manner would be 24.46 Ml/d, some 13.8% lower.

We have discussed this issue with NIAUR and they are also of the opinion that annual volumetric data for each trader should be divided by 365 days to obtain the Ml/d figure, irrespective of the number of days worked. This is particularly important since we understand NIAUR convert the Ml/d figure in the table to a total annual discharge volume by multiplying by 365, prior to calculating unit cost data. If the company is using a different division factor, then the total volumes for the year will not match between Company and regulator.

To help clarify the issue, we have also carried out a limited review of methods applied by other water companies in England. One company reports data for a very small number of sites based on the days actually discharged in the year, but highlights which sites and

the associated days used in their commentary. Another company uses 365 days for all sites.

We therefore recommend that NIAUR and NI Water should review and agree the precise methodology for calculating the figure for this line, so that each party is aware of what the number represents. This is particularly important if the data is subsequently used in further calculations to determine unit costs etc. We understand that NIAUR have now communicated with Ofwat in this regard to ensure a consistent approach. The methodology should be agreed in time for implementation for the AIR11 data.

We also note that the proportion of the total volume estimated from the discharge consent rather than any measurement has increased from 7.8% in AIR09 to 33% in AIR10. This is a significant change and reflects the new charging and consenting of many new sites, including a number of large hospitals where no volume measurement currently exists. We recommend that measured data should be obtained from these large sites before AIR11 reporting.

A confidence grade of B2 is applied to the data to reflect improved knowledge associated with the introduction of full charging and the associated with the introduction and associated volumetric data gathering. We support this grading provided that the volumetric data is processed in an agreed and transparent manner to obtain daily average discharge volumes.

We also noted that the trade effluent volumes reported are somewhat lower than reported in the Company's Principal Statement submission. The volume reported within this submission (supporting calculation 7) was 16.4Ml/d which is circa 43% lower than that reported within AIR10.

Line 7 – Volume waste water returned

The total volume returned to sewer is the total of the preceding entries.

Line 8 – Volume of Road Drainage

The Company had provided a volume estimate for the volume of road drainage returned and within their commentary provide an overview of their methodology.

We have not sought to verify the assumptions made within the methodology applied but note it is based on a number of third party data sources and assumptions.

5. Company Assumptions

Lines 1 to 2 – unmeasured volumes

The Company assumes a 95% return to sewer of volume.

Line 6 – Trade Effluent

For the larger industrial traders where discharge flow meters are fitted and operating, this data has been used. Where no discharge meters are fitted, discharge volumes are based on metered water supplied, with an allowance deducted for domestic and process use onsite. As in previous years, domestic use is assumed to be 25 litres per head per day where there is no onsite canteen, or 50 litres per head per day where there is an onsite canteen.

The Company has assumed that for discharges where the measured discharge volume or water supply information is not available, the discharge volume is estimated to be equal to the consented discharge. We requested a figure for the total volume estimated in this way, and were advised that it is 9.29 Ml/d or 33% of the total. It therefore represents a significant proportion of the total and we enquired why this figure had increased from the AIR09 percentage of 7.8% of the total. We were advised that for many of the newly consented sites, including a number of large hospitals, consented volumes were being used. This was because trade effluent volumetric data was not available, as these customers are not currently on the billing system. This has increased the percentage from 7.8% for AIR09 to 33% for AIR10.

All the data relating to trade effluent volumes is collected from the Billing Section of Customer Services. Where annual volumes were not available for the whole year, the available data has been pro-rated to obtain a figure for the whole year.

Line 8 – Volume of Roads Drainage returned

As detailed within the Company's commentary a number of assumptions have been used to derive the volume reported. As stated above we have not sought to verify the accuracy of the assumptions used.

6. Confidence Grades

The confidence grades assigned to the volume estimates in lines 1 to 5 are consistent with that reported previously and are a fair reflection of the methodologies in place.

For line 6, the Company has assigned a confidence grade of B2 to all of their data in this category, compared to C4 reported last year. The improved grading is consistent with the introduction of trade effluent charging for all discharges in April 2009 for the current financial year and has greatly improved data gathering and accuracy for AIR10 reporting. However, we feel that calculation procedures must be clarified by all parties to ensure that the basis for the reported data is clear.

For line 7 - volume of waste water returned a confidence grade of C4 has been assigned. We queried this as the line is the addition of other components of the table where the confidence grade is higher than the grade assigned. We believe that the grade reported should be at least a C3 grade which is equivalent to the lowest grade assigned to the unmeasured volume.

The Company has assigned a grade of CX to line 8 – volume of road drainage returned. We believe that this is reasonable as the estimate made is based on third party data and a number of assumptions.

7. Consistency Checks

Not applicable.

Date: 30 July 2010
Prepared by: [x]

Table 15 – Sewage Treatment**Commentary by REPORTER****1. Background**

This table collects details on sewage loads, sewerage service facilities and sewage sludge disposal. The information in this table is used to assist in operating efficiency studies.

2. Key Findings & Recommendations

- For Table 15 (Total) there is a greater sewage load receiving treatment (sum of lines 2,3 and 4) than is entering the sewage system (line 5). This is due to no sewage load being shown entering the system associated with treatment at PPP sites (Table 15 PPP only). We recommend that either this should be made clear in the tables or that the currently “greyed out” line for sewage entering the system on the PPP only table should be completed, which would be more consistent with the data shown on the “NIW only” table.
- Total trade effluent BOD loads have reduced by 11.5% compared to AIR09, from 4484 tonnes BOD per year down to 3965.8 tonnes BOD per year.
- Significant work has been carried out in the past year to update sewage works population equivalent data. Since AIR09, 143 STWs have been updated.
- Reporting of zero for line 17 is incorrect. Although there is no additional volume to report for 09/10, the volume reported in 07/08 should be carried forward as an accumulative weight and reported this year.

3. Audit Approach

The responsibility for the compilation of table 15 is split between a number of system holders, all of whom was audited. The Company methodologies were examined and the sources of data were reviewed.

4. Audit Findings**4.1 Sewage – Loads (NI Water Only)***Line 1 – trade effluent*

From April 2009, all traders have paid charges. This is a significant change to previous years when charging was based on whether or not a trader paid rates. The new system represents a more accurate, appropriate and consistent basis for charging.

Trade effluent volumes have been obtained from the Billing Section of Customer Services. Data is based on trade effluent discharge meters where fitted, or on adjusted metered water supplied, with an allowance deducted for domestic and/or process use on

the premises involved. Where no other data is available volumes have been based on the discharge consents. A figure of 28.37 Ml/d has been reported for total trade effluent flow at a confidence grade of B2 in Table 14, Line 6. We have queried this figure as it is based on the actual number of days each trader discharges in the year rather than an annual average divider of 365 days for all traders. Please see Table 14 Line 6 commentary for further details. However, data for Table 15 Line 1 will be unaffected as it is based on annual volumes and loads.

For traders that have been sampled, BOD strengths are based on sample results. For traders not sampled and on standard charge, BOD has been estimated as that of standard sewage strength, measured as the average of monthly samples taken at the inlets of twelve major works sampled for UWWTD compliance. The result is a strength of 196 mg/l BOD, marginally lower than the figure of 200 mg/l BOD calculated in the same way for AIR09

Trader loads have then been allocated to their respective receiving sewage treatment works to allow a division of loads between NIW and PPP receiving works.

Total trade effluent BOD loads have reduced by 11.5% compared to AIR09, from 4484 tonnes BOD per year down to 3965.8 tonnes BOD per year. We queried this reduction and have been advised that it is due to a number of closures at traders producing high BOD effluent, and a number of companies installing effluent pre-treatment plant to reduce their charges. In addition, the standard sewage strength used for non-sampled traders has reduced by 2% from 200 mg/l down to 196 mg/l.

NI Water only trade effluent loads have reduced by 31% due to the transfer of 879 tonnes BOD per year of load to PPP sewage works.

A confidence grade of B2 has been assigned by the Company for this data. The position has improved significantly since last year with the adoption of full trade effluent charging from April 2009 and the associated increase in real and accurate data.

Line 2 to 13 – sewage loads and treatment facilities

Significant work has been carried out in the past year to update sewage works population equivalent data. Since AIR09 143 STWs have been updated.

The figure for the number of sewage treatment works reported in this table has been adjusted by deducting the number of screened and unscreened outfalls (18 in total) from the figure given in Table 17c, as required by the definition.

Treatment capacity is based on works design population equivalent converted to BOD via the advised factor of 60g BOD per person per day.

4.2 Sludge Disposal

Lines 14 – 17, NI Water Only

The Company confirmed that the procedures in place for the disposal of sludge are well controlled and robust. All sludge disposed of is considered to have been disposed of via appropriate routes and that no unsatisfactory sludge disposal has been carried out in the report year. With respect to the agricultural disposal route it is understood that NIEA scrutinize disposal records and application rates to ensure that disposal is in accordance with ADAS matrix and satisfactorily disposed of.

The mass of sewage sludge disposed in the year has remained relatively constant over the past few years, reflecting both stable operation of the system and a relatively constant population, as well as good data recording facilities that have been in place for some time, allowing accurate capture of the mass of sewage sludge produced. The figure of 37.9 ttds is a decrease of 0.1 ttds from AIR09.

In previous years an adjustment has been made for sludge volumes arising from septic tanks, which was also planned for this year. However, following the audit meeting it was determined that this was not needed as the data as collected was correct and included this load.

There is no Company commentary for lines 14-17 NI Water only. However, we have reviewed the methodology document for these lines which has detailed commentary statements specific to AIR10 within it. We would recommend that elements of this methodology statement are reproduced in the Company commentary for future returns.

The Company methodology to calculate thousand tonnes of dry solids uses an annual average % to convert wet tonnes to dry solids. This is an average of all their sludge processing plants. Although this will give a reasonable estimation of the ttds by this method, the overall accuracy could be improved by applying the annual average for each works to the production volume for each works instead. This information is known to the Company and it would be a relatively easy improvement to undertake this alternative calculation method. The Company should consider this approach for AIR11.

The Company has included the weight of grit and screenings in the reported data (680 tonnes).

There is a 6.4ttds difference between the sludge produced and disposed of for lines 15 and 16 (NI Water only). This difference is not a result of storage but in origin as there is a complementary 6.4 ttds difference for lines 15 & 16 (PPP only). The completion of several PPP treatment schemes has resulted in production of 'PPP' sludge which is disposed of at NIW treatment facilities. NIW has negligible sludge storage capacity available within its system.

The Company has reported zero for line 17. This is not in line with the reporting requirements, that requires an accumulative weight of sludge to be reported from the

baseline point of April 2007. Although it is understood that there has been no additional sludge created in the report year 09/10 the volume reported in 07/08 should be reported as an ongoing total. It is understood that in 07/08 an additional 1465 tonnes was produced from a combination of North Coast and North Down sites. Further more it is understood that this reported figure was a part year figure for 07/08, the ongoing full year figure should be reported in this and subsequent years (circa 2.0 ttds).

4.3 PPP data

For AIR09, data from two PPP sites (Kinnegar and North Down/Ards) was reported. For AIR10, PPP activities have expanded significantly. The phased addition of sites operated by the Omega contractor now includes Ballnacor, Ballyrickard, Armagh and Richill and this has increased the total load receiving secondary treatment in Table 15 PPP Line 2 from 3331 tonnes BOD for AIR09 to 8105 tonnes for AIR10.

We queried the reduction in the confidence grade for this line from A2 last year down to B3 for this year. We were advised that Kinnegar is sampled daily whereas the Omega contract sites are sampled weekly. For the lower level of sampling the PPP group have applied a confidence grade of B3 and since this covers the majority of sites, this has been applied overall.

Reporting of data for PPP sludge treatment and disposal has been complicated for AIR10 by the transfer of operating responsibility of the Ballynacor sludge treatment facility during the reporting period. The site was run by NIW from 1 April 2009 until 18 February 2010. It was then run by the Omega PPP concession from 19 February 2010 until 31st March 2010.

As such, for the 7.4 ttds (thousands of tonnes of dry solids) total sludge produced by the PPP sites in Table 15 Line 15 (PPP only table) only 1.0 ttds was disposed at PPP sites, the rest being routed to NIW disposal.

Volumes of sludge disposal are calculated in a similar manner to the NI Water lines as discussed above and the same commentary observations apply. A small amount of sludge has been disposed of by PPP which has been recycled to land. The remainder of the 7.4 ttds produced has been disposed of via existing NIW routes.

5. Company Methodology

5.1 Sewage – Loads (NI Water Only)

Line 1 – trade effluent

For the larger industrial traders where discharge flow meters are fitted and operating, this data has been used. Where no discharge meters are fitted, discharge volumes are based on metered water supplied, with the normal procedure of an allowance deducted for domestic and process use onsite.

For sites where neither discharge flow nor water supply data is available, discharge volume has been estimated as 100% of the consented volume. The proportion of the total trade effluent flow estimated in this way is 33 %, an increase from 7.8% in AIR09. We were advised that this is due to the large number of new sites being added to the Trade Effluent Register including many large hospitals, and we have recommended that some form of measurement should be installed at the larger sites in this category before AIR11 reporting.

No conversion from COD to BOD is required for this data as the trade effluent group analyse effluent for BOD, as well as COD which is used for charging.

Line 2 to 13 – sewage loads and treatment facilities

We reviewed in detail the asset performance master spreadsheet which is used to populate this and other tables. The spreadsheet allows the basic data on each STW to be entered such as works name, design pe, treatment process etc, and then the data can be manipulated to populate the various parts of the tables. The spreadsheet also covers Tables 17b, 17c and 17d as they contain comparable information. Inputs to the spreadsheet are gathered from a variety of information sources as shown below.

- Environmental Regulation Team. Updated consents and regulatory obligations
- Operations Technical Support. STW improvements and changes to treatment process
- Engineering & Procurement. New works, extensions and modifications

Population data is gathered on a theoretical basis from properties in the catchment and standard occupancy assumptions. It is planned to check and improve this data with a series of flow and load surveys in the future to improve the C5 confidence grade in Lines 6 & 7. Better links are also required to the customer database to ensure new properties are included. Tourist populations are excluded as required, based on the proportion of pe in hotels, caravans and tent pitches.

We queried the confidence on the number of STWs (Line 8) as A2 when we felt that such a figure should be A1. However, we were advised that is possible for a number of issues arise which create uncertainty within the dataset. For example, a septic tank serving two houses is classified as one sewage work. However, if one property is then sold, the septic tank is only then serving one house and is no longer designated a sewage works. Such updates are not always discovered, hence a small reduction in the confidence grade. Small septic tank STWs can also be easily overlooked as overgrown underground structures giving further uncertainty.

Treatment capacity available (Line 9) is calculated from design capacity in terms of population equivalent served, converted to BOD load.

We queried the fact that for the PPP only Table 15, no load entering the sewage system is given (Line 5). This has the effect that for the total loads for Table 15, there is

significantly more load receiving treatment (48,574 tonnes BOD) than is entering the sewerage system (40,931 tonnes BOD). We were advised that Line 5 in the PPP table is “greyed out” by the regulator and so no load can be entered. It is recommended that this point be clarified to ensure that all parties are aware of the missing load input, or that it is entered elsewhere.

Data reported has been reconciled with the previous Reporting Year, with full details stated in the Company commentary. We queried the increased load receiving preliminary treatment only, at a time when treatment processes were being improved. We were advised that Ballycastle STW pe had been updated for AIR10 and the population equivalent had increased from 1,071 in AIR09 to 3,703 for AIR10, resulting in the increased load in this category.

We also queried whether tankered waste loads had been included but were advised that although requested, the data is not currently available. We are told that the loads will be included for AIR11.

We also asked about untreated outfalls included in the number of sewage works and were advised that there are 13 included.

We reviewed a number of spreadsheets and data checks carried out by the Asset Performance Team, together with confirmatory emails on data queries and checks.

The general reductions in loads and population equivalents served in the NIW only Table 15 are matched by equivalent increases in the data for PPP Table 15.

5.2 Sewage – Sludge Disposal

NI Water

The total mass of sewage sludge produced/disposed is taken from line 2 column 10 of the ‘total’ section of table 17g. The methodology for calculating the mass of sludge is discussed in more detail in our commentary above and to table 17g.

PPP

The methodology for deriving this volume is similar to NIW methodology, recorded wet tonnes are converted to ttds using annual average percentage dry solids.

6. Assumptions

For line 1 the Company has assumed that for discharges which cannot be measured, the discharge volume is estimated to be equal to the discharge volume in the consent. The volume estimated in this way is 9.29 Ml/d or 33 % of the total. It therefore represents a significant proportion of the total and we have recommended that some form of measurement should be introduced for the larger dischargers in this category for AIR11 reporting.

It is assumed that the mass of sludge produced is the same as that disposed of, given that there is negligible sludge storage within the system.

Refer also to our commentary on Tables 17d and 17g for further assumptions that have been made in the background data used to estimate populations, loads and sludge volumes.

7. Confidence Grades

For line 1 (NI Water only), the Company has assigned a confidence grade of B2 to all of their data in this category, compared to C4 reported for AIR09. The introduction of trade effluent charging for all discharges in April 2009 for the current financial year has greatly improved the accuracy of data for this area.

For lines 2 to 13 (NIW data only), the confidence grades are broadly unchanged from AIR09 with the exception of the number of STWs providing nutrient removal and disinfection confidence grade improving to A1. The latter is a clear and well documented fact and we support the higher grade.

A confidence grade of A1 has been assigned to lines 14 as this is zero value and understood to be correct.

A confidence grade of B3 overall has been assigned to lines 15 and 16, which is consistent with table 17g. The NIW element of these lines is felt to be B2 but the PPP element is only B3 resulting in a B3 overall. This is appropriate.

The CG for line 17 has been entered as A1 because they understood it to be a zero entry, however as discussed above this entry should be the cumulative value from 2007 and an appropriate confidence grade for this should be applied eg B3 as reported in AIR08.

In relation to PPP data line 1 confidence grade is the same as the NI Water data and since this is derived in the same way we support this grade. The line 2 grade has been reduced from A2 to B3. This is due to the additional PPP sites being sampled weekly rather than daily, giving reduced accuracy. This has reduced lines 6,7,11 and 13 grade in turn. We agree with these revisions.

8. Consistency Checks

No consistency checks are required for this table.

Date: 30 July 2010
Prepared by: [x]

Table 16 – Sewerage Service Activities**Commentary by REPORTER****1. Background**

Network activities provide a good measure of work achieved, provided that they can be related to associated investment. The investment breakdowns included in these reporting requirements provide this linkage, with the separation of base service expenditure from that related to enhancements on table 36.

2. Key Findings

- The commission to improve the identification of critical sewers has been completed which has resulted in an increase in the number of sewers identified as critical. The commission will not have captured all critical sewers due to the limitations of the study. Similarly missing data records requires a degree of extrapolation to cover these records.
- A project to calculate the length of public lateral sewers is ongoing and lengths of lateral sewers are currently not included in the return. Most public laterals are not mapped, so this exercise will estimate the length of these laterals by calculating the distance from each property to the nearest main surface water and foul sewer.
- There has been a significant increase in the number of unsatisfactory intermittent discharges (UIDs) reported this year, compared to AIR09. This is as a result of including an extrapolated estimate of UIDs not just those discharges classified to date by the NIEA as unsatisfactory.
- The total number of intermittent discharges from the sewerage system has reduced to 1684 for AIR10, from 1739 in AIR09. This is mainly due to a rationalisation exercise, 31 new discharges were identified but a further 86 removed with the rationalisation.
- There is an inconsistency between the reporting of WwTW IDs in line 17a but excluding WwTW UIDs from line 16a.
- Progress on completion of drainage area plans has increased since last year with the cumulative total completed increasing from 54 last year to 70 this year, out of a total of 109 drainage areas. Although this is principally a result of completing 13 scoping studies of smaller networks.
- As the methodology for lines 12 and 13 is unchanged from last year we would recommend retaining a C5 for AIR10. When NI Water is able to assess the number of collapses/blockages occurring on lateral sewers, we would support an improvement to the confidence grade.

3. Audit Approach

The responsibility for the compilation of table 16 is split between 6 line owners, each of whom was audited. The systems and methodologies used to gather data were reviewed.

4. Audit Findings

4.1 General

The company has improved data collection activities for much of the information in this table through the use of the CAPTRAX database to collect information on project activities, this database makes use of multiple dropdown menus to select attributes about entries and assist with classification of sewers. A commission undertaken by an external consultant to improve identification of critical and non critical sewers has been completed, this has improved the identification of critical sewers through extending the considerations for classification to include traffic sensitive streets and sewers under buildings. A small amount of reconciliation has been undertaken on the data in the GIS database but essentially the commission has only improved the interrogation of the information not the quality of it.

4.2 Asset Balance (Lines 1 to 2) (NI Water only)

The total length of sewers at the start of the report year is consistent with the asset balance at the end of the previous year (lines 14 and 15, column 4) and was carried forward correctly.

NI Water, unlike other water companies, is responsible for most lateral sewers as well as main sewers. Only the main sewers are included in the lengths reported in lines 1 and 2 as there are very few laterals mapped. The laterals that are mapped within GIS are clearly distinguished from main sewers and are excluded from these totals.

4.3 Changes during Report Year (Lines 3 to 11) (NI Water Only)

Both Engineering and Procurement (E&P) and Operations (Ops) are responsible for carrying out sewerage service activities. Data has been gathered from both sources and summed to determine the total activity during the report year.

Line 3 – New Critical Sewers

New critical sewers are added onto the company's GIS system in two ways, through adoptions by Ops and completion of capital projects by E&P.

Sewers laid by E&P are new public sewers within roads and other public areas. Information is captured on the company's CAPTRAX database which has been designed with regulatory reporting in mind. Data is entered by contractors via a portal to the database and is approved by the appropriate project manager. The data collection by this process is quite extensive, drop-down boxes are used to define critical and non critical

sewers. Approval by the project manager and the link to contractor payments helps with data verification, it is also understood that a degree of sample checking is undertaken by the E&P team. The use of the CAPTRAX database is enabling the company to collect information in an improved manner from previous methods.

Operations maintain a database of new adoptions which feed into the GIS database of sewer records. The process was reviewed and appears reasonably robust although it does rely upon transposition of data by hand at each stage; information is transferred from sewer plans to the certificate, from the certificate to a hand written ledger and then into an excel spreadsheet. There is currently no reconciliation of the data through these stages and the company should give consideration to ways of doing this such as cross checks with lengths of CCTV undertaken as each adopted sewer should have a CCTV record. The error in transposition is likely to be small and within the confidence grade for the line.

The identification of critical sewers as part of this process does not follow completely the guidelines of the WRC Rehabilitation Manual, although the definitions of critical sewers are known by Ops they do not have sufficient information to check all parameters and rely on size of sewer being greater than 450mm dia as the main classification criteria. It is understood from last years audit proximity to buildings is also considered but information on high traffic volumes, sensitive areas, difficult access etc is not known. As the nature of most adoptions are new housing developments, the diameter criteria is likely to capture most critical sewers but there is still going to be some small degree of error.

Line 4 – Critical Sewers Inspected by CCTV

There were 4.78km of critical sewer inspected by CCTV by E&P and 35.65km of critical sewer inspected by Ops.

The sewer inspected by E&P generally relates to new sewers inspected following their construction. The classification into critical and non-critical sewers is made by the delivery team project managers. There may be an issue with respect to when the sewer was surveyed compared to the report year as the date of survey relates to the date of construction of it in their database. This difference is largely immaterial if the company consistently reports in this manner and double counting between report years does not occur.

The information gathered by Ops means that it is not possible to classify whether the sewers that were inspected by CCTV were critical or non critical, therefore it is assumed that the proportion of sewers inspected by CCTV that is critical is the same as the proportion of NI Water's sewer stock that is critical.

Line 5 – Critical Sewers Renovated

There were 0.81km of critical sewers renovated by E&P in the reporting year. The classification into critical and non-critical sewers is made by the delivery teams.

There were no critical sewers renovated by Ops in the reporting year, as this is not activity that would normally be carried out by Ops.

Line 6 – Critical Sewers Replaced

There were 5.07km of critical sewers replaced by E&P in the reporting year. The classification into critical and non-critical sewers is made by the delivery teams.

There were no critical sewers replaced by Ops in the reporting year, as this is not activity that would normally be carried out by Ops.

Line 7 – Abandoned Critical Sewers and Other Changes

There were no critical sewers abandoned during the report year.

Line 8 – New Non-critical Sewers

There were 57.20km of non-critical sewers laid by E&P and 98.38km of non-critical sewers adopted by Ops.

Line 9 – Non-Critical Sewers Renovated

There were 1.38km of non-critical sewers renovated by E&P during the report year. There were no non-critical sewers renovated by Ops in the reporting year, as this is not activity that would normally be carried out by Ops.

Line 10 – Non-Critical Sewers Replaced

There were 6.19km of non-critical sewers replaced by E&P during the report year. There were no non-critical sewers replaced by Ops in the reporting year, as this is not activity that would normally be carried out by Ops.

Line 11 – Abandoned Non-critical Sewers and Other Changes

There were 0.49km of non-critical sewers abandoned during the report year.

4.4 Sewer Collapses and Blockages (Lines 12 to 13) (NI Water Only)

There were 68.7 collapses per 1000km and 1791 blockages per 1000km reported in 08/09. Rising main failures account for 2.5% of collapses.

The above figures appear to be extremely high when compared to water companies in England and Wales, as the figures include blockages and collapses on public lateral sewers (which are the responsibility of NI Water, but not E&W water companies).

As reported in our commentary for T16a of AIR10, the Company has recently added critical and lateral sewer base layers to NI Water's Corporate Asset Register. Work is also

progressing on identifying sewer repairs as a result of CCTV surveys. As such, NI Water should be in a better position to report on whether collapses or blockages have occurred in a private lateral, public lateral or public main sewer for AIR11.

4.5 Asset Balance at March 31 (Lines 14 to 15) (NI Water Only)

Lines 1 & 2 are transferred data from the previous year as discussed above and are correct. Lines 14 & 15 should then be the summation of data entries from lines 1 & 2 and lines 3 to 11, however NIW have not followed this approach instead opting to adjust lines 14 and 15 to corrected figures obtained from their GIS database. This approach has allowed them to report the correct entries in lines 3 to 11 and also a more appropriate value for the total lengths reported in lines 14 and 15.

Reconciliation of the asset balance correction is needed as the company continues to update and improve its GIS database. 111km of additional sewer has been added in the reconciliation of line 14. One example of the reconciliation process presented by the company is the addition of a sewer length that had previously identified on the records as a water main, this correction obviously also impacts on the reconciliation of table 12.

During the AIR10 reporting period the company has undertaken a study to improve the identification of critical sewers. An independent consultant has carried out the work, a desk study to identify the proportion of the sewer stock that falls into the critical category under the WRc rehabilitation manual definitions. It can be noted that the study although appropriately undertaken does have limitations which have been acknowledged within the report. The WRc definitions are extensive and information is not readily available to undertake a full categorisation, similarly the report identifies that large proportions of data on sewer attributes are missing which make some classifications difficult, for instance depth of sewer is not known for 12.8% of records. However, the study as presented still provides a good estimation of the extent of the company's critical sewer stock. Further investment to improve the identification could be undertaken but the benefit to the company of doing this is probably limited.

The total length of sewers at the end of the reporting period is 14745.61km, of which 3653.62km are considered to be critical.

4.6 Intermittent Discharges (lines 16 and 17) (NI Water Only)

The identification of UIDs by NIW is continuing and not complete in time for this submission but best estimates have been made to present applicable information.

Line 16a : Number of UIDs excluding CSOs is estimated from the identified number of IDs multiplied by the percentage of IDs that have been classified rather than from a defined list agreed with NIEA. The percentage of UIDs is calculated from a small sample of combined pumping stations only and is therefore likely to have limited accuracy. The information for this line and 17a (number of intermittent discharges ex CSOs) is only based upon combined pumping station overflows. Foul-only pumping station overflows are not included as they don't have a formal NIEA classification. Similarly overflows

within the boundaries of WwTWs are not included in line 16a as it is expected that any improvements to overflows at works are expected to be included in improvements at works, the total number of overflows at works are however included in line 17a.

Information for lines 17a and 17b is extracted from the Asset Information Centre database which has been improved since AIR09 but is still being worked on. Cross checks are understood to have been undertaken between the Asset Information Centre and the Asset Performance Team, unconsented CSOs that have been identified have been included. The company has provided comprehensive details and breakdowns of the reconciliation exercises that they undertaken in their commentary.

The regulator guidance on the preparation of lines 16a and 17a is not explicit and NIW should seek guidance on whether foul-only pump station overflows and WwTW overflows are to be included in these lines for future returns. However, it would appear that the inclusion of WwTW overflows in the total for line 17a but excluding unsatisfactory WwTW overflows from the total for line 16a is inconsistent. An estimate of the number of foul-only pump station UIDs and WwTW UIDs is not known.

Lines 16a and 16b are based on extrapolated estimates as described above and hence the associated accuracy of these is expected to be low. Similarly the total numbers of IDs and CSOs is not accurately known and subject to continuing work to determine them through improvements to their GIS system. The confident grades of C2 for lines 16a/b and B4 for lines 17a/b reflect this.

4.7 Drainage Area Plans (lines 18 and 22) (NI Water Only)

The company uses a definition of a definition of all networks greater than 250PE for line 20, total number of drainage areas. This would appear a reasonable approach and results in 263 being reported for the line. The company's ongoing programme of studies is based upon drainage areas with a resident population greater than 1000 and hence they have only 109 areas out of the 263 in their programme although some studies have been completed for less than 1000 domestic population in the last 5 years. Further to this they have recently undertaken a scoping study across all the networks less than 5000 population to ascertain if a full DAS is justified. 13 completed scoping studies have been included in the total reported this year which would appear justified under the line definition which allows abbreviated investigations to be substituted for full DAPs where appropriate. The company has used a 2003 baseline for reporting model builds including all those built or maintained after this date.

The percentage completions and percentage coverage of population, have been calculated appropriately.

The confidence grades associated with the lines are appropriate. The reduced confidence grade for line 22 reflects the inaccuracy of the population estimates for the drainage areas.

4.8 Other Sewerage Service Activities (lines 23 to 30) (NI Water Only)

This section is not required to be completed for AIR10.

4.9 Asset Balance and changes during report year (lines 1 to 15) (PPP only)

There have been no changes to the asset balances or sewer stock as a result of PPP activities in the reporting year.

No PPP sewers have collapsed or blocked in the reporting year, however there are mechanisms to collect this data if they do occur.

4.10 Intermittent Discharges (lines 16 and 17) (PPP Only)

Reporting guide lines do not require PPP IDs and CSOs to be included in the reported data. The number of IDs reported in the table has been reduced by 5 for the report year which relates to overflows at works which have been transferred to PPP sites within the year. Within the commentary the company has listed all the PPP discharges including overflows and outfalls from treatment works.

4.11 Drainage Area Plans (lines 18 and 22) (PPP Only)

This information is not required to be completed for PPP contracts, as it is not relevant.

4.12 Other Sewerage Service Activities (lines 23 to 30) (PPP Only)

This section is not required to be completed for AIR10.

4.13 Asset Balance (lines 1 to 2) (Total)

NI Water had 14465.23km of sewers at the beginning of the reporting period, of which 2889.10km was critical. The overwhelming majority of these totals are from NI Water only stock.

4.14 Changes during Report Year (lines 3 to 11) (Total)

There was no activity reported in these lines for PPP, therefore the total of each of these lines is the same as for NI Water only.

4.15 Sewer Collapses and Blockages (lines 12 to 13) (Total)

There were no collapses or blockages reported under PPP contracts. The length of PPP sewer is such a small percentage of the total sewer length that these lines are the same as for NI Water only.

4.16 Asset Balance at March 31 (lines 14 to 15) (Total)

NI Water had 14745.61km of sewers at the end of the reporting period, of which 3653.62 was critical. The overwhelming majority of these totals are from NI Water only stock.

4.17 Intermittent Discharges (lines 16 and 17) (Total)

Refer to the commentary for NI Water, these lines are not completed for PPP.

4.18 Drainage Area Plans (lines 18 and 22) (Total)

Refer to the commentary for NI Water, these lines are not completed for PPP.

5. Company Methodology**5.1 Asset Balance (lines 1 to 2)**

These lines are equal to lines 14 and 15 of the previous year's return

5.2 Changes during Report Year (lines 3 to 11)

Information is collected from a variety of sources to complete these lines.

Both Engineering and Procurement (E&P) and Operations (Ops) carry out the activities in lines 3 to 11 for NI Water. The PPP contractors may also carry out these activities.

The information is collected through the company's CAPTRAX database. Data is entered directly by contractors via a portal. The database has been developed with the reporting of AIR10 in mind and has comprehensive data fields to collect appropriate information about new assets. Drop-down boxes have been created to allow the selection of critical and non-critical sewers. The information entered by contractors is checked and approved by E&P. The information is cross-checked against invoices prepared by the contractor, which ensures that work being completed and invoiced is being reported.

Within Ops, 3 functions have the potential to be involved in the activities – Networks Sewerage, Operations Contract Management Centre and Tactical Asset Management (TAM). It was found that in past returns the activities of all the functions of Ops were not necessarily being fully captured, so for AIR09, each function was asked to confirm which activities, if any, it carried out. As a result of this process, the only activities that were identified were lines 3 and 8 (TAM) and line 4 (Networks Sewerage).

The components of lines 3 and 8 (new critical and non-critical sewers) that are the responsibility of TAM are those sewers constructed by developers and then adopted by NI Water. Design drawings are submitted by developers for approval by TAM. Once as-constructed drawings are submitted (and inspection of the new sewers is passed),

TAM issues a preliminary adoption certificate and the sewers are mapped in GIS, but marked as “unadopted”. Following the defects liability period (12 months) a final adoption certificate is issued by TAM and the status of the sewers is changed to “adopted” in GIS. When the final adoption certificate is issued, the details are logged in a Final Adoptions book, and then compiled from there into a spreadsheet tabulating the diameter and lengths of pipe for each scheme. This information is used to generate the lengths of new sewer for lines 3 and 8.

Activity by the PPP contractors is reported by each of the PPP contractors, based on as-constructed drawings.

5.3 Sewer Collapses and Blockages (lines 12 to 13)

The number of sewer collapses and blockages per 1000km is calculated based on other data as follows:

- line 12 (sewer collapses) = [table 16a line 1 (rising main failures) + table 16a line 2 (gravity sewer collapses)] / [table 16 line 14 (length of sewers at end of year)]
- line 13 (sewer blockages) = [table 16a line 3 (sewer blockages)] / [table 16 line 14 (length of sewers at end of year)]

5.4 Asset Balance at March 31 (lines 14 to 15)

These should be calculated from the previous lines as:

- line 14 = line 1 + line 3 + line 8 – line 7 – line 11
- line 15 = line 2 + line 3 – line 7

However the company adjusts the entries to allow reconciliation of the sewer stock data recorded on it's GIS database as discussed above.

For AIR10 the company has a new methodology for determining critical sewer lengths which is based upon the work undertaken by a consultant on their behalf. The consultant has completed a study report to better identify critical sewers using a combination of Mapinfo queries and MapBasic programming to run an analysis of the data held within the company's GIS database. The study report bases the analysis around the WRC manual 4th edition but has limitations due to two factors; not having all the information fields available to fully comply with the possible definitions for critical sewers (eg ground conditions, proximity to sensitive areas etc) and incomplete data fields within the database (eg depths, sizes or material types missing for some records).

The study exercise was only desktop so no reconciliation of data was undertaken to try to improve records this will be an ongoing exercise for the company. There has been no material improvement in records from AIR09 to AIR10 only in the method of analysis.

The study report highlights that considerable data sets are missing;

- 18.2% of records have no data for material
- 26.5% of records have no data for downstream depth
- 23.8% of records have no data for upstream depth
- 12.8% of records have no data for up and downstream depth combined
- 0.2% of records have no data for function
- 6.6% of records have no data for size 1
- 99.4% of records have no data for size 2

It is understood that for these records the sewers have been classified as unknown and hence the analysis is based on the know records only which is circa 76% of the sewer stock. The remaining 34% it is understood has been classified in the same proportion for critical and non-critical.

A recommendation was presented last year to report sewers with a known shallow depth either upstream or downstream but no known complementary depth as ‘non-critical’ as this would be a reasonable assumption. The study report methodology does not appear to have taken this recommendation on board and needs clarifying as the company commentary suggests it has been incorporated into the methodology. It would be consistent to do this as ‘critical’ sewers have been classified using a single depth parameter so ‘non-critical’ sewers should be classified using a single parameter as well to give a representative proportion.

The improved methodology has increased the estimated proportion of critical sewers from 19.97% for AIR09 to 24.78% for AIR10.

5.5 Intermittent Discharges (lines 16 and 17)

Lines 16a and 16b

The methodology for this line has changed since AIR09 following the clarification of a query. In AIR09 the company reported on the number of UIDs classified by NIEA to date, for AIR10 the company has made an estimate of the total number of UIDs based on those classified to date and the total number.

Lines 17a and 17b

The methodology for these line is unchanged from last year , rationalisation exercises have been undertaken to identify the incorrect entries such as dual manholes and bifurcations. In addition an independent consultant is undertaking an exercise to ascertain any additional sewerage system overflows which may exists but for which NIW has yet to apply for a Water Order Consent. This work is not yet complete and has hence not been included in the AIR 10 data.

5.6 Drainage Area Plans (lines 18 and 22)

Data for this line is obtained from the maintained plan of drainage studies and is unchanged from last year.

5.7 Other Sewerage Service Activities (lines 23 to 30)

This is not required to be completed for AIR09.

6. Confidence Grades

The company has assigned a confidence grade of B3 to line 1, repeating the CG for line 17a in last year's return from which line 1 is copied. The confidence grading recognised that the GIS record is not complete, and that there will be some unmapped sewers.

The company has assigned a lower confidence grade of C4 to line 2, a repeat of the CG assigned to line 15 in AIR09. The lower grade is because of the sewers that are mapped, not all have material, diameter or depth attributes so it is not known whether they are critical. Also last year the extent of critical sewers did not include sewers that are critical because of their location. Following the work undertaken to improve the classification of sewers on their database the company has decided to improve the CG for line 15 this year to C3.

The company has assigned a confidence grade of B2 to line 3 this year, the data is a combination of two sources E&P and Ops although the E&P data could be classed A2 overall a B2 grade has been assigned which we believe is appropriate.

The company has assigned a confidence grade of C4 to line 4. The total length of critical sewers inspected by CCTV has been recorded, but the length of critical sewers inspected has not, so the company has had to make assumptions to calculate the entry for this line, resulting in a low confidence grade.

The company has assigned a confidence grade of A2 to lines 5 and 6, which we believe is appropriate.

Line 7 has a zero entry and is the complementary to line 11 (abandoned sewers; critical and non-critical) Both lines 7 and 11 have been given A2 confidence grades which are appropriate with relation to the collection of the data. However, with a zero entry any degree of error which may exist would be beyond any percentage range. The correct CG for a zero entry that has an uncertainty attached (even very small) should be X.

The company has assigned a confidence grade of B2 to line 8 and A2 to lines 9, 10 and 11. These are improvements to last year which reflect the additional work that has gone into determining the data. We consider these are appropriate.

The company has assigned a confidence grade of B3 to lines 12 and 13, which is a significant improvement from the C5 reported for AIR09. As the methodology for lines 12 and 13 is unchanged from last year we would recommend retaining a C5 for AIR10.

When NI Water is able to assess the number of collapses/blockages occurring on lateral sewers, we would support an improvement to the confidence grade.

The CG for line 14 is B3 the same as last year and in alignment with the CG for line 1 which is appropriate.

The confidence grade for line 15, has been improved from C4 to C3 this year as a result of the improved assessment undertaken by the external consultant. Although the company's GIS data still has a high degree of missing information we believe the C3 confidence grade is appropriate.

The Company has assigned a confidence grade of C2 to lines 16a and 16b. This is a reduction from the A2 last year as a result of the change in approach for this line which now includes estimated data of the number of intermittent discharges as well as those listed by NIEA.

Confidence grade are maintained at B4 to lines 17a and 17b, the same as last year and continues to be appropriate.

Confidence grades vary between A1 and A2 for lines 18-21. Since the data is pure direct measurement we support this grading. C4 has been applied to line 22 which is a reflection of the grading for the population data grading reported else where in AIR10.

8. Consistency Checks

- Lines 12 and 13 are consistent with lines 1-3 of table 16a and line 14 of table 16.
- Lines 14 and 15 are not consistent with lines 1, 2, 3, 7, 8 and 11, as discussed in the body of this report but the reason this is understood.

9. Company Commentary

The Company has not addressed a number of issues that the NIAUR requires to be included in the company commentary, including:

- A report on the proportion of sewers repaired as a result of planned CCTV surveys, as opposed to a more reactive approach
- Data on drainage area studies presented in the prescribed format. The company has provided tables on DAP studies undertaken and planned but the collection of data on start and finish dates and updates is not fully presented as required. Following audit further data has been presented on the company's DAP programme which is attached.

Date: 30 July 2010

Prepared by: [x]

DRAINAGE AREA STUDY PROGRAMME

STATUS AT JULY 2010

CATEGORY A. - DASs COMPLETED SINCE 2003

Catchment	Domestic Population	Completion Date
Initial DAS		
Magheralin	1427	July 05
Tandragee	3523	June 05
Waringstown	3015	June 05
Draperstown	1983	June 06
Maghera	3950	June 06
Money more	1800	June 06
Greyabbey	1148	February 06
Kircubbin	1056	February 06
Portaferry	2514	February 06
Ballyhalbert	602	August 06
Ballywalter	1675	August 06
Cloughey	927	August 06
Portavogie	2320	August 06
Castledawson	1244	November 06
Magherafelt	9817	November 06
Portglenone	1206	October 06
Castlewellan	2049	October 06
Dromore	6305	November 06
Maghaberry	1653	November 06
Donaghadee	6470	March 06
Millisle	2331	March 06
Whitehead	3880	March 06
Newcastle	9050	December 05
Annalong	2554	June 06
Dundrum	1291	July 06
Kilkeel	6993	July 06
Downpatrick	10146	September 05
Ardglass	1631	October 06
Upper Falls	27683	April 09
Bushmills	2015	April 09
Portballintrae	1785	April 09

Catchment	Domestic Population	Completion Date
<i>Revisited DAS</i>		
Ballyrickard	36814	November 08
East Belfast	100,000	February 10
Greenisland	6477	April 10
Lisburn	42563	October 09
Ballymoney	5017	October 04
Seahill	2831	April 06
Dunmurry	31958	November 03
Hillsborough	2503	August 03
Ballyclare	12,286	July 04
Coleraine	22,730	November 06
Moirá	4367	April 03
Lurgan	26512	April 03
Rathfriland	2827	November 03
Bessbrook	3000	February 04
Richhill	3225	February 04
Limavady	14744	September 03
Strabane	14365	September 03
Londonderry	90707	November 06
Carrickfergus	27327	August 03
Randalstown	5734	March 08
Antrim	31983	March 08
Ballycastle	5493	June 05
Portadown	30154	November 06
Craigavon	16281	November 06
Armagh	21053	April 09
Warrenpoint	6000	April 09

CATEGORY B - CATCHMENTS SUBJECT TO SCOPING STUDIES

Catchment	Domestic Population	Completion Date
Annahilt	1183	June 2010
Saintfield	3344	June 2010
Crossgar	1892	June 2010
Ballykelly	2196	June 2010
Dungiven	3135	June 2010
Eglinton	3165	June 2010
Greysteel	1230	June 2010
Ballygowan	2507	June 2010
Killyleagh	3276	June 2010

Catchment	Domestic Population	Completion Date
Fintona	1534	June 2010
Fivemiletown	1340	June 2010
Irvinestown	2219	June 2010
Lisnaskea	2949	June 2010
Newry	24485	November 2010
Banbridge	16074	November 2010

CATEGORY C - DASs CURRENTLY IN PROGRESS

Catchment	Domestic Population	Completion Date
Initial DAS		
Coalisland	6590	On Hold*
Gilford	2227	On Hold*
Markethill	1744	On Hold*
Castlederg	3106	February 2011
Newbuildings	4500	On Hold*
Newtownstewart	1866	On Hold*
Sion Mills	3174	On Hold*
Castlerock	1883	February 2011
Bellaghy	940	On Hold*
Garvagh	1273	On Hold*
Kilrea	1554	On Hold*
Ballycarry	1025	On Hold*
Ballystrudder	890	On Hold*
Crossmaglen	1717	On Hold*
Dungannon	14886	February 2011
Keady	3592	On Hold*
Glenavy	1041	On Hold*
Ballynahinch	5601	December 2011
Revisited DAS		
Whitehouse	60874	March 2011
Greencastle	8500	On Hold*
Bangor	59813	October 2010
Omagh	23093	June 2011
East Belfast	100000	August 2010
Cookstown	12645	March 2011
Ballymena	28367	On Hold*
Belfast	190000	June 2011

* Subject to Agreement with NIEA

CATEGORY D - DAS YET TO COMMENCE

Catchment	Domestic Population	Completion Date
<i>Initial DAS</i>		
Newtownbreda	24574	September 2011

CATEGORY E - DASs WHICH WERE IMPLEMENTED

Catchment	Domestic Population	Completion Date
Larne	19928	Further Work On Hold*
Cushendall	2298	Further Work On Hold*
Glenarm	375	Further Work On Hold*
Cushendun	474	Further Work On Hold*
Portrush	7588	Further Work On Hold*
Portstewart	9563	Further Work On Hold*
Rostrevor	2500	Further Work On Hold*
Enniskillen	16174	Further Work On Hold*
Helens Bay	1410	Further Work On Hold*

* Subject to Agreement with NIEA

CATEGORY F - DASs REQUIRING REVISIT

Catchment	Domestic Population	Completion Date
Crumlin	4260	On Hold*
Hollywood	12000	November 2010

* Subject to Agreement with NIEA

*Residential populations, extracted from NIAMP2 (2002)

Table 16a – Sewerage Service Serviceability Indicators**Commentary by REPORTER****1. Background**

This information in this table is required to measure the level of maintenance activity undertaken within a Company.

2. Key Findings

- It is still not possible to distinguish failures on laterals from failures on main sewers, although NI Water has recently added critical and lateral sewer base layers to NI Water's Corporate Asset Register.
- The improved collapse/blockage performance would suggest an improvement in wastewater infrastructure serviceability; however, it is difficult to draw strong conclusions until a consistent methodology is established over several years to determine the real trend
- The company have reported a total of 10,882 equipment failures repaired in this category, at a confidence grade of B2. This is a comparable figure with last year and the second year the company has used improved reporting procedures.
- The improvements instigated at the end of 2008 greatly improve the management and recording of M&E maintenance, failures and repair compared to previous years.
- The data obtained so far is already being used to target improvements to the maintenance regime and other equipment improvements.

3. Audit Approach

The responsibility for the compilation of table 16a is split between 2 system holders, each of whom was audited. The audit consisted of an interview with the line owners to discuss the methodology and data used to generate this table.

4. Audit Findings**4.1 General**

We highlighted in our AIR09 commentary that NI Water is responsible for most laterals, whereas their English and Welsh counterparts are not. We would expect blockages and collapses on public laterals to account for a reasonable percentage of the totals reported in table 16a, and as such recommended that NI Water develop systems to enable the identification of critical and lateral sewers and thus identify what proportion of collapses and blockages occur on public laterals.

We confirm that the Company has recently added critical and lateral sewer base layers to NI Water's Corporate Asset Register. Work is also progressing on identifying sewer

repairs as a result of CCTV surveys. As such, NI Water should be in a better position to report on whether collapses or blockages have occurred in a private lateral, public lateral or public main sewer for AIR11.

4.2 Sewers – Maintenance (lines 1 to 4)

Rising Main Failures (line 1)

There were 25 rising main failures recorded in the reporting year, identical to the reported in AIR09.

Gravity Sewer Collapses (line 2)

There were 988 gravity sewer collapses recorded in the reporting year, 380 fewer than reported in AIR09. On the surface, this suggests a significant improvement in wastewater infrastructure serviceability; however, it is difficult to draw strong conclusions until a consistent methodology is established over several years to determine the real trend.

Sewer Blockages (line 3)

There were 26,409 sewer blockages recorded in the reporting year, 1601 fewer than reported in AIR09. As above, this could suggest an improvement in wastewater infrastructure serviceability; however, it is difficult to draw strong conclusions until a consistent methodology is established over several years to determine the real trend.

Equipment Failures (line 4)

The systems used for managing and recording M&E maintenance were upgraded at the end of 2008 and are operating well. Initial problems with remote field communications have been overcome by improvements to band width and are performing well. Further development is required to enhance the ability of the systems to differentiate between failures which cause a detrimental impact on service to customers or the environment, and those which don't, and the Company is already reviewing actions in this area.

The Company's substantial investment in this area and the systems already in place will provide an excellent foundation for future development. The company is already using the data being gathered to improve the performance of the equipment, and the service provided to customers and the environment.

The Company has proposals to invest in a future commission to undertake improved asset data tagging of its assets to further improve collection of data on its assets.

5. Company Methodology

5.1 Rising Main Failures, Gravity Sewer Collapses, Sewer Blockages (lines 1 to 3)

Network failure data is collated by the Networks Sewerage field managers using checked and paid invoices from the sewer maintenance contractor. The base data that is collected differentiates between rising main failures, gravity sewer collapses and sewer blockages. This data is submitted on a monthly basis to the three network area managers and then to the Networks Sewerage Business Unit.

This information is then compiled to give totals for the whole year.

5.2 Specific methods (line 4)

The Company recorded the relevant information for this category in the Asset Maintenance Management System (AMMS) and the Mobile Work Management (MWM) system. This is the first full report year of a new mobile work management system known as “Ellipse” which was introduced in late 2008. Data is gathered on sewage pumping stations, terminal pumping stations, CSOs etc, but currently is not recorded for non-electromechanical equipment such as storage tanks or hydrobrakes.

The systems also are currently unable to differentiate between a pump failure and the outcome of that failure ie whether there was a detrimental impact. Pump blockages are also recorded even if the blockage was due primarily to a flash flood rather than an actual pump failure.

A description of the process which gathers the information regarding failure and repair to be illustrated by e.g. a pump failure and were advised as follows:

- Failure is recorded by either telemetry (approximately 90% of cases) or by a mobile operator site visit (10% of cases).
- Alert is passed to the Function Supervisor in the Work Control Centre. Details are passed out to the mobile technicians via ‘toughbooks’. These are mobile laptops fitted with wireless communication and record details of the failure. The technician then completes the repair and records job completion and/or any further work requests.
- Data is passed back to the Work Control Centre and recorded via Ellipse.

The system has been observed in operation at company work control centre at previous audits and is unchanged this year.

5.3 Information Analysis

Implementation of the new system for collecting data at the end of 2008 has improved the collection of data. The 'Ellipse' work management system and associated 'toughbooks' are working well, early communication issues have been overcome by increasing the band width of the data link.

The company is using the improved data gathering to target problem areas with high failure rates to see if there are fundamental causes which can be addressed to reduce recurrences.

The Company is also using the failure data pro-actively to drive planned maintenance regimes. Thus high failure rates in equipment may result in an increased planned maintenance frequency, or vice versa. Also, more modern pump sets less prone to blockage and ragging are being reviewed and installed where appropriate.

The Company is introducing improved control systems and optimisation systems where possible to prevent blockages. These systems detect increased motor electrical current usage from a partial blockage and instigate a brief temporary pump reversal to attempt to unblock the pump before full blockage occurs and intervention is required

6. Assumptions

No significant assumptions to report.

7. Confidence Grades

The Company has assigned a confidence grade of B3 to lines 1 to 3. This reflects improved reliability of the data due to cross-referencing with maintenance contractor invoices.

The Company has assigned a confidence grade of B2 to line 4. The data quality is good however failures from non-electromechanical systems are not recorded. Finally, there is some inability of the system to identify when a failure caused a detrimental impact to service. On this basis we support the confidence grade assigned.

8. Consistency Checks

- line 2 = table 16 line 12 multiplied by table 16 line 14 divided by 1,000 minus table 16a line 1
- line 3 = table 16 line 13 multiplied by table 16 line 14 divided by 1000

Date: 30 July 2010

Prepared by: [x]

Table 16b – Sewerage Service Serviceability Indicators**Commentary by REPORTER****1. Background**

This table illustrates sewage treatment works performance in relation to consent standards for biochemical oxygen demand (BOD), suspended solids (SS) and ammonia (NH₃). The performance estimate made enables the trend in performance to be identified and serviceability assessments to be made.

2. Key Findings

- General improvement in performance indicators
- Apparent deterioration of performance at new PPP sites believed to be misleading due to the impact of historic data and possible inconsistencies in calculations for the PPP sites last year.

3. Audit Approach

The audit consisted of discussions with the line owner to understand the methodology, inspection of the data held within the Laboratory Information Management System (LIMS) and how this is extracted for the purpose of generating the data for this table, and review of the spreadsheet that is used to carry out the analysis for this table.

4. Audit Findings**4.1 General**

There have been no significant changes to the data sources or methods used to calculate the line totals this year. In line with our recommendations made last year, NI Water confirmed that the population equivalents used to allocate size bands have now been updated to be in line with Table 17 to improve continuity between the tables. This year, both tables are based on population equivalents as of 31st March 2010 taken from the AIR10 returns.

However, although the table is based on the situation at 31st March 2010, the performance data used to calculate the event forecasts is based on calendar year. In theory, this means that the two data sets are slightly misaligned. However, in practice, as the totals use a set calculation based on a rolling 3 years of data, the overall impact is considered insignificant. NI Water confirmed that they omit works that are out of service on 31st March 2010, even though they have a full set of data for the respective calendar year to ensure continuity between tables. We agree with this approach as a reasonable compromise.

The total number of PPP owned and operated STWs has increased this year to 6.

The Company provide a detailed list of all excluded sites in their commentary which we reviewed. Of the 66 sites excluded for BOD and SS, 10 were listed as being no longer in service and only 5 were listed as insufficient data (3 NI Water and 2 PPP sites). The remainder are all excluded due to size banding. We queried the reasons for insufficient data at the 3 NIW sites and were advised that all are intermittent, discharging works only with no numerical consent requirements and that no sampling is therefore undertaken at the sites. These have therefore been correctly excluded on the basis of insufficient data. The 2 PPP sites (Ballynacor and North Down/Ards WwTWs) were excluded as they have only been in service for <3 years and hence do not have the requisite data set. We requested that these sites were specifically stated in their commentary for clarity. The other 4 PPP sites are included as they were all upgrades to existing works.

For clarity, the Company also lists approximately 700 small sites which are excluded on the basis of size banding. We challenged the inclusion of Tully Road Headworks with a Band 4 PE of 2136 in the list and were advised that the site is part of a larger site and hence is excluded to avoid duplication.

The Company has a number of sites without relevant numerical consents (i.e. relating to BOD, SS, NH₃) which are not monitored and not recorded in LIMS. However, these sites are predominantly all Band 1 or 2 sites and hence excluded on the basis of size banding anyway and hence have no impact on the line totals. NI Water confirmed that these sites are listed in their commentary as the 700 small sites for clarity.

In line with our requests, NI Water has provided performance charts to indicate change over time in the performance indicators. As this is only the second year of full data, the charts only indicate two points for each line. It is therefore difficult to assess any real trends in the parameters, particularly as there is an element of randomness to the nature of compliance as acknowledged by the use of the poisson distribution (e.g. performance may have been poor due to a particularly wet season, or due to process upsets caused by abnormal trade effluent discharges). However, the basic changes indicate a general improvement in BOD and SS parameters and decline in NH₃ performance. These are discussed in more detail in the next sections.

4.2 BOD Performance

NI Water Only

Predicted performance indicates slight improvement with the event indicators ranging from 88.9% to 93.7%. As stated above, it is difficult to assess the significance of this change.

PPP Only

Predicted performance for BOD for the included 4 PPP sites has declined significantly from 100% to event indicators ranging from 80.7% to 92.9%. Given the new and upgraded status of these works, these results were concerning and we investigated further.

We discussed the reasoning behind this apparent decline with NI Water and ascertained that the apparent decline may be misleading and is likely to be caused by the relatively recent upgrades and the effects of averaging over 3 years. As the data is based on the past 3 years, any historic failures prior to the upgrade or during the construction/commissioning stage are still included in the calculations and hence still directly impact the results. On this basis, it is probably incorrect to have reported 100% last year, although this is probably more representative of their true performance since upgrade.

To validate this theory, we analysed the source data and asked the Company to review the results for first 6 months of 2010 to guarantee a post-completion data set. Our analysis indicated that the majority of high levels of the monitored parameters occurred in 2007 and 2008 (typically before upgrades complete) and that the 2009 data typically listed values significantly lower than those in the first 2 years of the data set. NI Water also advised that their review of the 2010 data indicated that the 4 PPP sites included in the line totals would qualify for 100% in all categories. The indications are that the PPP sites are currently performing well.

We are therefore satisfied that the performance on the PPP sites is substantially better than that implied by the reported line totals. On this basis, we therefore expect that the results within the next 2 years should indicate significant improvements at these sites.

Total

Our audit initially highlighted an error in the calculation in this spreadsheet which NI Water duly corrected. We can confirm that final totals are a correct conglomeration of the previous tables.

4.3 SS Performance

NI Water Only

Predicted performance indicates slight improvement with the event indicators ranging from 91.8% to 95.3%. As stated above, it is difficult to assess the significance of this change.

PPP Only

Predicted performance for the 4 included PPP sites has improved from 85.8% in the maximum category to 92.9%, in all categories. However, this represents a decline from 100% in the other two event categories.

As discussed in Section 4.2, our assessments indicate that the results are skewed by past data and we believe that the current upgraded works are achieving nearer 100% performance in all event indicators.

Total

Our audit initially highlighted an error in the calculation in this spreadsheet which NI Water duly corrected. We can confirm that final totals are a correct conglomeration of the previous tables.

4.4 Ammonia Performance**NI Water Only**

Predicted performance indicates slight deterioration with the event indicators ranging from 86.5% to 93.7%.

We discussed the possible reasons for the apparent decline in NH₃ performance and understand that NI Water have not identified any clear reasons for the change. Whilst this may represent an actual decline in performance, our view is that it is equally likely to represent changes in the coverage of data sets or consent levels or indeed a natural fluctuation in the numbers and such conclusions can only really be gauged from longer term trends.

PPP Only

Only 1 of the 4 included PPP sites (Armagh WwTW) has a numerical ammonia consent. The event indicators suggest some problems with performance at this site with only 71.7% below the max and 95%ile indicators. There were no PPP sites reported in this category last year for comparison.

As discussed in Section 4.2, our assessments indicate that the results are skewed by past data and we believe that the current upgraded works are achieving nearer 100% performance in all event indicators.

Total

Our audit initially highlighted an error in the calculation in this spreadsheet which NI Water duly corrected. We can confirm that final totals are a correct conglomeration of the previous tables.

5. Company Methodology

There are no significant changes to the Company Methodology this year, although further detail has been added to expand key sections. The Company reports on results from the last 3 years in accordance with the guidelines.

The Company identifies all STWs that it is responsible for and downloads the current and historical consent conditions for each STW from LIMS, then excludes some from the analysis for the following reasons:

- no numerical consent (includes sites that only have urban wastewater treatment directive consents)
- size band 1 or 2 (ie <500 PE)
- insufficient data (if less than the specified 3 years of data needed with 6 or more samples in each year)
- site taken out of service within the year (on the basis that the table is providing a prediction of future compliance rather than past performance)

For the remaining STWs, the analysis is carried out in accordance with the guidance set out by NIAUR. The calculation process is a mechanical one, identical to previous years, and we can confirm that it complies with the procedure set out in the guidance.

We can also make the following clarifications:

- sample data is downloaded from LIMS, which holds all test results
- tests are carried out by NI Water accredited laboratories
- information in LIMS has been through various quality control procedures, both in the laboratory and entering the data. Any results that are abnormally high are retested. If the second test supports the first test result, then the first result stands. Otherwise, with further evidence, the result is changed
- changes to results in LIMS are clearly identified with the original result, the new result, the date of the change and the reason for the change.
- only samples that were taken for regulatory compliance monitoring purposes are used in the analysis. Ad-hoc samples that might have been taken for other reasons (e.g. by operations for process monitoring) have not been included in the analysis
- the sample data is divided by the consent condition that was in place at the time that the sample was taken to produce a normalised value, therefore any changes to consent conditions are accounted for

6. Assumptions

Results that are “below the limit of detection” are assigned a value equal to half the limit of detection.

The performance data taken from the calendar year is assumed to be representative of the period to the end of the Report Year.

7. Confidence Grades

The Company has assigned a confidence grade of A2 to all lines. On the basis of the data collated and pre-defined methods for calculating line totals, we believe this to be appropriate.

8. Consistency Checks

We discussed our findings and the apparent errors in the tables with NI Water directly. We understand that the table has been appropriately revised and resubmitted. Comparison of Line 1 (NI Water only) in the Company's submission against Table 17c appears to correlate reasonably well once allowance is made for closures within year and the exclusion of sea outfalls from this table.

Date: 30 July 2010

Prepared by: [x]