



To: Thomas Gordon, County Executive
David Grimaldi, Chief Administrative Officer
Jim McDonald, Deputy Chief Administrative Officer
Mike Coupe, Chief Financial Officer
Bernard Pepukayi, County Attorney
Denzil Hardman, Accounting and Fiscal Manager
County Council Members

From: Robert Wasserbach

Subject: Interim Update on Issue with Calculation of Certain NCC 2013 Sewer Bills

Date: July 15, 2013

Issue

The 2013 New Castle County (NCC) residential (and some commercial) sewer bills connected with Artesian water consumption were incorrect for many customers because Artesian's calculation of the quarterly water consumption figures was often based on materially more than a 12-month period.

Background

NCC residential sewer bills are based on the *lowest two* quarterly water reads in a 12-month period, annualized and multiplied by a rate per thousand gallons. (See Exhibit II for Relevant Authority.) The water consumption information, broken down by quarters, is obtained from the various water utilities utilized by NCC sewer customers.

One of the water utilities, Artesian, converted its customer billing from quarterly to monthly in April 2012 and, partly because of this, there was a problem with the "quarterly" water consumption data Artesian provided to NCC in late 2012, i.e., the data to be used by NCC to calculate the sewer bills. The purchase order provided to Artesian requesting the water consumption information contained the same language as was used in previous years' requests (except for the years):

"... Water consumption broken down by quarter (4 quarters required with applicable reading dates pertaining to each quarter). Required consumption generally to be for the 2011 – 4th quarter (beginning 10/01/11) through 2012 – 3rd quarter (ending 9/30/2012). This data would, in any case, be for those four quarters subsequent to that submitted last year ..."

Note: Given that NCC Finance knew that Artesian had gone from quarterly to monthly billing cycles effective April 2012, we believe the purchase order should have anticipated the risk that more than 12 months of consumption data might be provided per the request as written.

Artesian accounts have different billing cycles and therefore different meter read periods on which their water meters are read. Before Artesian switched to monthly billing, an account's meter read date could be in any of the three months during the applicable quarter (based upon roughly 3 months since the prior read). Thus, the start and end dates used in Artesian's calculation of the quarters for a prior 12-month period were dependent (in the water consumption information supplied to NCC) on the account cycle.

Example: The file provided by Artesian for the 2012 sewer bills included 4 quarters of water consumption information based upon 12 months; however, the period of time encompassed by each bill was different. For instance, some Artesian account cycles covered a period beginning on a date in June 2010 and ending on a date in June 2011. (Other cycles might have covered a period beginning on a date in September 2010 and ending on a date in September 2011.) For these accounts, the information provided by Artesian for the 2013 sewer bills should have covered a 12-month period beginning in June 2011 and ending in June 2012. However, in an apparent effort by Artesian to provide water consumption information to NCC on all accounts through the same end date (September 2012, as per the request above), the information provided on these accounts (and, thus, the calculation of the quarters) covered much more than a 12-month period, i.e., June 2011 through September 2012 in this example.

Although historically broken down by quarterly water consumption based on approximately a 12-month period (and approximately 365 days), the Artesian file sent to NCC to calculate the 2013 sewer bills is estimated to have been comprised as follows:

- 22% of the cycles represented a 12-month period (up to an estimated 380 days)
- 27% of the cycles represented an estimated 380–400 day period
- 20% of the cycles represented an estimated 401-431 day period
- 31% of the cycles represented an estimated 432-454 day period
- (See Relevant Authority section in Exhibit I outlining NCC’s basis for calculating sewer bills based on 12-months of water consumption.)

Please note that we had to estimate the number of days in each cycle because Artesian was not able to provide Audit or Finance with the actual time periods covered by each bill date. We estimated the number of days for each cycle based upon looking at some actual Artesian bills (which include the period covered by the bill). For example, we knew from looking at an actual bill that the billing period for the 12/14/11 Artesian bills covered the period 9/6/11 through 12/8/11. Since each of the approximately 250 Artesian billing cycles has different billing dates, the number of days we estimated to be covered by each bill could be off by a few days.

The accounts in the file received from Artesian contained four “quarterly” consumption reads. However, because of the problem discussed above, the third quarter provided in this file was essentially a “filler” in that it contained in many instances materially more than a three-month period. The fourth quarter read was always for the last three months of the consumption period provided, regardless of the length of the record. This is supported by a later Excel spreadsheet the Billing Division of the Finance Department requested from Artesian, which was broken down generally as follows:

- Two *full, true* quarterly readings billed prior to March 2012 (in the same format as in previous files received).
- A long reading, billing date of April 2012, covering the consumption for the period since the previous full quarterly reading (often more than a 90-day, three-month, period).
- A shorter reading (10 days, more or less), also with a billing date of April 2012, to bring things current to the new monthly billing cycles. (Some of the shorter April reads had a reading of zero.)
- Monthly readings with corresponding billing dates thereafter from May to September.
- In all, most of the residential accounts in the spreadsheet had nine account reading line items per above.

For many sewer bills, this caused a flawed calculation of the lowest two quarters for water consumption because Artesian used all of the readings in calculating the quarters regardless of the length of the period provided. See Exhibit I for account level examples of what this entailed for billing appropriateness and accuracy.

Timeline of Events Concerning Artesian File

The chronology of events concerning the Artesian file is as follows:

- Artesian issued a press release on 3/30/12 stating that it was “converting its quarterly customer billing to a monthly billing cycle starting in April 2012.” Therefore, NCC should have at least known about the change in March 2012. (Note: Artesian actually notified its customers of the change in April 2012; there was a page attached to the billing statement outlining the change.)
- The purchase order (P.O.) requesting the file, prepared by NCC Finance’s Billing Division, was dated 10/23/12, with an expected delivery date of 10/31/12.

- It appears that Artesian delivered the file to NCC on or around 10/25/12.¹
- The file was uploaded to the NCC Water System in early December 2012. The Billing Division's Accounting & Fiscal Manager informed us that he waits until the files from all the water utilities are received before uploading any of them to the Water System.
- The Billing Division, in performing reasonableness checks of the Artesian data, discovered the problem with the file in December 2012.
- The Billing Division's Accounting & Fiscal Manager asked Artesian for another file of all their accounts, broken down by billing date. This file was received on or around 12/11/12. The Accounting & Fiscal Manager then used this file (actually an Excel spreadsheet) to manually adjust the quarterly water consumption figures for certain accounts. (Note: There is no documentation to support the adjustments made and for which accounts.)
- When the scheduled date arrived in January 2013 for having the NCC sewer billing system generate the bills, the Billing Division's Accounting and Fiscal Manager made the decision to handle any other adjustments (corrections) on a customer complaint/inquiry basis, i.e., post billing.
- Our review, based on customer complaints/inquiries through 4/24/13, indicates that the Billing Division processed approximately \$30,000 in sewer bill adjustments related to the issue with the Artesian file.

Audit's Analysis

- The Billing Unit's Policies and Procedures Manual states in its mission: "To serve the County's customers in an excellent manner by providing timely and accurate property tax, sewer service, and Maintenance Corporation Assessment billings which adhere to all related ordinances, statutes, and policies." However, NCC is not treating all NCC sewer customers, whose billing is based on Artesian water consumption, equally and NCC has overbilled customers in many instances. The incorrectly-calculated bills also distort the County's revenue for Fiscal Year (FY) 2013 and, most likely, distort the County's budget projections for FY 2014.
- We have performed our own analysis to estimate the number of accounts affected and the potential net dollar amount of customer over-billings. The following is a summary of the findings:
 - Of 872 residential accounts tested, 479 were over-billed and 68 were under-billed, 55% and 8% respectively, (using a bill recalculation method of "as close to 365 days as feasible given the information supplied by Artesian").
 - Of 18 like billing cycle ranges, only four had no billing errors. This is mainly because these four billing cycle ranges provided in the file were closer to 12 months than others in the file *and* had zero readings in the "short April reading" – see Background above. ("Like" billing cycles were identified as those groups of sequential cycles that had similar characteristics, such as similar start/end dates and similar number of estimated days within the cycle periods provided.)
 - Of the 479 (55%) accounts over-billed, 218 (25%) were for amounts greater than \$22.
 - While, in our opinion, a dollar value is not critical to the corrective action required, we did extrapolate from our testing that as much as a net \$915,000 could have been over-billed for residential accounts, i.e., *net* of under-billings. Please note that Audit recognizes that its extrapolation has limitations based upon numerous factors, including not knowing: the distribution of accounts, as opposed to cycles, with 12, 13, 14 and more months of data; the number of commercial accounts that were always on monthly billing; the number of senior discounted accounts; the number of accounts with septic systems (using Artesian water but not NCC's sewer system); the number of cycles (and accounts) that were not included in the file we worked with, e.g., cycle 499, Delaware City.
 - **We believe management should focus its attention on the high percentage in our sampling of accounts that were billed incorrectly, i.e., 63%. Regardless of what the total dollar amount of net over-billings turns out to be, the important thing for management to keep in mind is that NCC (1) should have 0% of bills that are incorrect, as implied in the NCC Billing Division's Mission Statement, and (2) should ensure its billing methodology is as disclosed in the NCC Code, i.e., in terms of quarterly consumption calculations.**
 - While most commercial sewer accounts have historically been on a monthly water billing basis, we tested 11 NCC commercial accounts (covering 52 Artesian accounts/meters) that had been affected by Artesian's change from

¹ Note: We spoke to the Artesian Customer Service Supervisor (whose name was on the P.O.) and asked her whether there was any dialogue between Artesian and NCC on how the quarters of water consumption should be calculated. She said that she did not have any dialogue; however, it was her understanding that the Artesian employee responsible for creating the file did have a conversation with the Accounting & Fiscal Manager and that NCC was in agreement with how the quarters were to be calculated. We have tried to talk to this particular Artesian employee but have not been successful in reaching him. Therefore, we are unsure of the actual dialogue that occurred between Artesian and NCC.

quarterly to monthly billing. (We do not have a count of how many such commercial accounts there were.) Eight of the 11 involved over-billing for an approximate total of \$6,200. Due to the findings already identified, we deemed it not necessary to test commercial accounts further.

- Similarly, we tested 16 NCC apartment accounts (covering approximately 150 Artesian accounts) affected by Artesian's quarterly to monthly water billing change. We believe we tested all of them. Twelve accounts were over-billed by approximately \$41,000 in total.
- Separate from the above residential accounts, we performed another billing accuracy test of most of *one* residential sub-division (we reviewed 141 accounts) that had been "verified" in March 2013 by Artesian as (largely) correct. We decided to add this test because management had represented in a meeting that the Artesian verification of accounts in this sub-division only revealed "three or four" mis-billings. Our testing revealed that 99 of the 141 accounts tested (70%) had been over-billed, eight in excess of \$100 (the highest was \$430). The profile for this cycle was that it had an estimated 393 days of data in the billing file. Omitting (only) the last month then in our calculation took us to a 365-day billing basis.
- Please note that the testing had to involve a lot of estimating due to unavailable data. For example, as indicated above, to determine the number of days in the third quarter of the actual bill, Audit had to estimate, consistently, the meter-read periods that went with each billing date based on limited meter-read information that *was* available.

Recommended Corrective Action

- We recommend that the County Administration take steps *immediately* to remedy the billing issue and to make the applicable customers whole. The County Auditor's Office will evaluate the remedial steps. We believe these remedial steps should include:
 - Review analysis performed by County Auditor's Office and perform any additional analysis deemed necessary.
 - Inform external auditors of issue and inform them that management is taking steps to address it. NCC Finance should strive, based upon the following steps, to determine the necessary corrections and adjust the revenue numbers accordingly.
 - Decide on the revised fairest formula to be used for properly calculating the quarters of water consumption.
 - Meet with Artesian, and ask them to re-program the formula for arriving at the quarters.
 - Ask Artesian for a new file. (Audit recognizes from its testing that it may not be possible to get a clean file with four true quarterly readings because in many instances the longer April reading appeared to have been for much longer than 90 days. This will involve additional decision making on the part of management.)
 - Use the new Artesian file to calculate what the bills should have been; then compare this information to the actual bills and make any necessary adjustments. (Note: Management will have to make the decision on what to do with accounts that were either over- or under-billed, e.g., for over-billings, does NCC issue refunds or apply a credit towards next year's bill?).
 - If any of the affected accounts are delinquent (and possibly even in legal proceedings to collect the delinquency), ensure the adjustment to the customer account is taken into consideration.
 - Obtain consensus from NCC Council and the Law Department on the corrective action being taken, including what notices, if any, should be sent to the affected customers, and also including such elements as what is an acceptable number-of-days threshold for a quarter.
 - Make any necessary adjustments to the Fiscal Year 2014 budget.
 - Work with Artesian and with entities internally, as warranted, to ensure there are no problems with next year's file.
 - Assess NCC's file validation and issue escalation procedures.
- For Artesian customers who have called the NCC Billing Division inquiring about the accuracy of their sewer bills, Billing has been asking Artesian to supply NCC with corrected quarterly water consumption figures; Billing relies upon this information and, if necessary, makes sewer account adjustments. In reviewing many of the adjustments that have been made as a result of this problem, we found instances where Artesian applied different formulas for accounts within the same billing cycle. Thus, the NCC Billing Division is relying upon Artesian to supply corrected information and Artesian is not always doing so consistently. (The Artesian "verification" of the one-subdivision file, referenced above, further supports this statement.) We believe that NCC must take some responsibility for ensuring its customers' bills are calculated based upon accurate information, particularly where NCC is already aware there is a problem. The process would have been much cleaner had NCC validated properly the file received from Artesian; the data would then be NCC's to be responsible to bill properly.

Next Steps for Audit:

The County Auditor's Office will be issuing an interim audit report shortly on our review and testing of sewer billing related to Artesian water consumption. Ultimately, our final audit report will include additional work related to other sewer-related items such as a review of sewer connection fees, testing of accuracy of sewer bills based on other water company data, and an overall analysis of internal controls surrounding NCC sewer bills, e.g., data validation, adjustment procedures, problem escalation procedures.

The County Auditor's Office may suggest in the final audit report that management evaluate its present sewer bill methodology and compare it to methodologies used by other municipalities. Preliminarily, it would appear that the lowest two quarters basis for calculating sewer bills may be unfair to one property owner profile (who consumes a similar volume of water consistently through the year) to the advantage of another property owner profile (who, for a series of possible reasons, consumes water at materially different volumes throughout the year).

Water Consumption Activity

Bill Date	Estimated Read Period	Est # Days	
Oct 4, 2011	6/19	9/19	93
Jan 3, 2012	9/20	12/19	92
Apr 16, 2012	4/1	4/9	9
Apr 16, 2012	12/20	3/31	102
May 11, 2012	4/10	5/4	25
Jun 13, 2012	5/5	6/6	32
Jul 16, 2012	6/7	7/9	33
Aug 13, 2012	7/10	8/6	28
Sep 14, 2012	8/7	9/7	32
			446

Bill As Calculated by NCCO using Artesian's "quarterly" data:

- Grouped consumption activity into "quarters" as follow	Est # Days		
Quarter 1	4-Oct	93	
Quarter 2	6-Jan	92	
Quarter 3	All data from April 16-Jun 13	168	
Quarter 4	Jul 16+Aug 13+Sep 14	93	
	Total days	446	
- Identified lowest two "quarters"			
9,000	and	6,000	
- Divided by 1000	9	and	6
- Combined		15	
- Multiplied by 2 (annualized)		30	
- Multiplied by the NCCO sewer rate			
	30	X	\$5.525
- Actual Bill Amount			\$165.75

Key Points:

The period used here is an estimated 446 days, rather than the 12-month/four-
quarters per code.

The extra days are reflected in the third quarter.

Water Consumption Activity

Bill Date	Estimated Read Period	Est # Days	
Oct 4, 2011	6/19	9/19	93
Jan 3, 2012	9/20	12/19	92
Apr 16, 2012	4/1	4/9	9
Apr 16, 2012	12/20	3/31	102
May 11, 2012	4/10	5/4	25
Jun 13, 2012	5/5	6/6	32
Jul 16, 2012	6/7	7/9	33
Aug 13, 2012	7/10	8/6	28
Sep 14, 2012	8/7	9/7	32
			446

Key Points:
 The period used here is 377 days, within a four-quarter/12-month threshold. Not using the 1st April read accomplished this.
 The Aug and Sep reads were not used, therefore, in the recalculation.

Bill As Recalculated by Audit (using as close to 365 days as possible):			
- Grouped consumption activity into "quarters" as follow Est # Days			
Quarter 1	4-Oct	93	9,000
Quarter 2	6-Jan	92	6,000
Quarter 3	16-Apr (Second)	102	7,000
Quarter 4	May 11+Jun 13+Jul 16	90	8,000
		Total days 377	
- Identified lowest two "quarters"			
		6,000	and
		7,000	
- Divided by 1000			
		6	and
		7	
- Combined 13			
- Multiplied by 2 (annualized) 26			
- Multiplied by the NCCO sewer rate			
		26	X
			\$5.525
- Recalculated Bill Amount			
			\$143.65

Water Consumption Activity

Bill Date	Estimated Read Period	Est # Days	
019 XX XX			
6XXXX000000			
Oct 4, 2011	6/19	93	9,000
Jan 3, 2012	9/20	92	6,000
Apr 16, 2012	4/1	9	1,000
Apr 16, 2012	12/20	102	7,000
May 11, 2012	4/10	25	2,000
Jun 13, 2012	5/5	32	2,000
Jul 16, 2012	6/7	33	4,000
Aug 13, 2012	7/10	28	3,000
Sep 14, 2012	8/7	32	3,000
		446	

Key Points:
 This recalculation method uses all of the sequential reads but has the short April read in the 4th Qtr
 Both 3Q and 4Q are more than an acceptable threshold for a "quarter" definition.

Bill As Recalculated by Audit (using as close to 365 days as possible, but including the shorter April read):			
- Grouped consumption activity into "quarters" as follow	Est # Days		
Quarter 1	4-Oct	93	9,000
Quarter 2	6-Jan	92	6,000
Quarter 3	16-Apr (Second)	102	7,000
Quarter 4	May 11+Jun 13+Jul 16+Apr 16(1st)	99	9,000
		386	
- Identified lowest two "quarters"			
	6,000 and 7,000		
- Divided by 1000	6 and 7		
- Combined	13		
- Multiplied by 2 (annualized)	26		
- Multiplied by the NCCO sewer rate	26 X \$5.525		
- Recalculated Bill Amount			\$143.65

Exhibit II -Relevant Authority

County Code Chapter 38, Article 2, Section 38.02.505 states “Where metering is available for residential consumption, the charges shall be calculated using the lowest available two (2) quarterly or semiannual water readings greater than zero (0) adjusted to an annual or charging period consumption.”

Although we have not yet sought a legal opinion, we find it difficult to believe that “quarters” would be based on much more than a 12-month period, particularly since the County uses the term “12-month period” in various communications (see below) provided to customers and, in the past, quarters were calculated on a 12-month period (or very close to it). Also, a dictionary definition of “quarter” is “one of a set of four 3-month divisions of a year”.

- The County’s webpage on Sewer Service Billing states “Sewer service bills are based on a property’s water usage over a prior 12-month period. The property’s water company provides this information in quarterly amounts to New Castle County.” As we pointed out above, the file provided by Artesian (upon which the calculation of the sewer bills was based) covered greater than a 12-month period in approximately 80% of the sewer bills.
- That same webpage provides a link to “Sewer Service Billing Frequently Asked Questions.” One of the questions and the associated response are as follows:

Q: What is my sewer service bill based upon?

A: Sewer service bills are based on a property’s water usage over a prior 12-month period. The property’s water company provides this information in quarterly amounts to New Castle County. The water consumption amount is usually calculated using the first three quarters of the prior year and the fourth quarter of the year before that. For example, the annual sewer service amount for 2013 is usually based on the fourth quarter of 2011, and the first three quarters of 2012. The time periods used could vary slightly due to the meter read cycles of some water companies.”

- The NCC sewer bills, mailed in January, state on the back of the bill “New Castle County calculates your sewer charges based on water usage data provided by your water supplier. Four quarterly readings are compared – usually those from the first three quarters of last year and the fourth quarter of the year prior to last year. New Castle County uses the two quarters of lowest consumption (greater than zero), adds them together and doubles this sum to create an annual billing consumption. The annual billing consumption is multiplied by the rate to determine your annual billing charge.”