SUEZ Water Westchester

2016 Year-End Non-Revenue Water Report & Non-Revenue Water Reduction Plan

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PART I: PROGRAM OVERVIEW & CRITICAL ACTIVITIES

Non-Revenue Water (NRW) is an important issue to Suez Water Westchester (SWWC RD1 & RD2) and the communities it serves. SWWC is expending significant resources to realize a reduction in NRW. This Non-Revenue Water (NRW) update is a continuation of the strategy set forth in the Company's prior annual NRW report and reduction plan filings.

The ultimate goal of any sustainable and responsible NRW plan is to drive the water loss percentage to the economic level. In the medium to long term, NRW levels in the 15%-18% range will be the goal to drive towards in SWWC service area given the geographical topography, system age and composition, and the diminishing returns seen as NRW levels approach the economic level of loss. The introduction of a NRW strategy will be viewed as a long-term strategy, which will continue until an economic level of leakage is reached. When this economic level is reached, the water production and consumption data will be constantly monitored to ensure that the level is maintained. Therefore, the most important task in reducing NRW is to establish the infrastructure, procedures, and policies, in order to accurately understand the impact of water loss indicators.

As referenced in the Company's prior annual Non-Revenue Water Report and Reduction Plan filings, SWWC has established an ongoing program to improve system efficiency, reduce the cost of service through water loss reduction, and ensure sustainability of critical water supplies. The current Non-Revenue Water program focuses on developing and utilizing critical system operating data to profile the nature of water losses occurring throughout the system in greater detail, allowing for effective actions and controls to be implemented according to the specific needs that are identified (detailed in *Part II: Ongoing NRW Reduction & Sustainability Strategy*).

Numerous actions have been taken to improve the way the Company collects and validates system operating data, refine the methodologies and processes used to characterize water losses, and develop actions to resolve water loss occurrences accordingly:

1. A network of fixed flow meters and pressure monitors were installed throughout the distribution system to sub-divide the piping grid into District Metered Areas (DMA's). These sectorized production zones allow for system draft calculations to be performed on manageable sized portions of the system, and allocate leak detection and other resources based on the specific needs of each district.

2. A network of both fixed and mobile AMI customer meter data collectors were installed to provide high-resolution consumption and usage information, as well as identify customer consumption patterns which deviate from typical conditions, possibly indicating tampered or removed meters. All service connections are metered and in the process of being equipped with RF transmitters capable of providing frequent usage data to the collector system.

3. The Company is has implemented monthly meter reading and billing cycles to better correlate system consumption and production. As part of the transition, meter read

cycles will be revised to focus on individual DMA/Pressure Zone regions in sequence, which will allow for high-accuracy mass balance and water audit calculations to be performed on a Zone-specific basis.

4. All customer metering points were assigned a DMA/Pressure Zone identifier to allocate metered consumption to specific zones within the system. Previously, all metered customer accounts were geocoded and mapped within the Geographic Information System (GIS), and all service points were reconciled with their corresponding record within the Customer Information System (CIS) to ensure consistency with customer metering records.

5. A *Strategic Metering Initiative* was implemented to ensure that accurate consumption data was being collected for the Company's 129 largest customer meters (Combined Rate Districts), accounting for approximately 20 percent of total customer usage. The reporting accuracy of compound meter bodies at or near their reasonable useful life was found to be impacted by wear and damage that had occurred over the in-service life of the meter bodies. As part of the initiative, policies and procedures for annual monitoring, testing, and replacement (where needed) of all large customer meters were improved.

Additionally, specific process and best practice improvements have been made to strengthen core operational activities associated with water loss control, and ensure sustainability of the Non-Revenue Water Reduction initiatives:

1. Leak and main-break Find-to-Fix times, or the time between when the Company becomes aware of a leak and when it is repaired were minimized by repair policies prioritized by leak magnitude and resulting system impacts. The Company repairs most leaks within hours of discovery and will continue this practice. Dedicated leak correlation personnel have been assigned and trained on the various equipment and methods used under best-practice techniques.

2. A strategic production data/trend monitoring policy has been implemented at the management level to minimize leak and main-break awareness times, or the time between when a leak develops and when the Company becomes aware of the leak. Some leaks that develop remain as non-surfacing leaks for a period of time before they are discovered by conventional means. This desktop analysis will improve efficiency by narrowing down the area where new leakage has likely developed. This policy has been expanded to include front-line operators and supervisors in the Production Department.

3. New Business processes, policies, and procedures have been evaluated and improved to ensure proper tracking and handling of all new service requests, and proper sizing and configuration of new customer meters.

4. The Company is working to better characterize the nature of A*voidable Real Loss* occurring within the system, and identify any patterns, trends, or correlations which could help steer future leak detection surveys and associated activities, as well as identify any

potential operational adjustments which could help mitigate the main-break frequency rate and severity.

5. A custom-developed Meter Data Management (MDM) program was implemented in conjunction with the AMI system, to assist with identifying customer usage patterns which could be indicative of theft or tampering.

6. The Company's continued optimization of reporting functions within its billing system has brought tighter controls on items such as estimated bills and zero read meters. The recent transition to monthly billing has further optimized use of these controls.

PART II: ON-GOING NRW REDUCTION & SUSTAINABILITY STRATEGY

The overall strategy of the Non-Revenue Water reduction program for the Suez Water Westchester Company is to continue to monitor and characterize the nature of water loss occurring in the system within geographical or district-based regions. This information will be used to improve water-loss profiles and audit reports for various sectors of the distribution system, allowing for efficient and effective actions to be targeted according to the specific needs of each sector. Once Non-Revenue Water levels have been reduced to the economic level of water loss (point of diminishing returns), sustainability policies and procedures will be followed to ensure efficient system operation and prevent recurrence of excessive water loss.

At the current time, it is difficult to define achievable targets regarding the economic level of water loss for the SWWC system. Improved data resolution on both the production and consumption side would be needed to perform an economic level of water loss evaluation with reasonable accuracy. The completed DMA and AMI systems will provide data needed for a proper economic level of loss study. Once the individual components of NRW have been completely established and profiled for the SWWC system, the optimal efficiency point of the system will become better understood.

In general, the individual components of water loss consist of real and apparent losses, and can be further broken down as follows:

Apparent Losses – Consist of unauthorized consumption (theft & illegal use), as well as inaccuracies associated with production and billing metering.

- Production meter inaccuracies
  - Includes source of supply & purchased water interconnections.
- Customer billing meter inaccuracies
  - Losses caused by inaccuracies associated with aged or stopped billing meters.
  - Losses caused by improperly sized billing meters.
- Unauthorized or non-compliant service connections
  - Increased risk due to customer billing meters located within private property.

- Theft and unauthorized use from fire hydrants
- Tampered billing meters or reading equipment
    - Increased risk due to customer billing meters located within private property.
- Data handling errors within the meter or billing systems

Real Losses – Consist of physical water losses from the system up to the point of customer consumption.

- Un-avoidable annual real losses (UARL, or normal background leakage)
    - IWA methodology used to calculate the minimum achievable level of real losses.
- Potentially recoverable real losses (burst, joint, or outside service leakage)
    - Could exist as Surfacing or Non-Surfacing
- Storage facility overflows
- Un-metered customer service line leaks (inside service leaks)
    - Leakage on non-company owned infrastructure which contribute to non-revenue producing water losses.

Furthermore, certain authorized un-billed consumption also contributes to the volume of non-revenue producing water:

1. Water used for Company internal purposes such as:
    - Hydrant flow tests & hydrant maintenance
    - Chlorination of water mains
    - Distribution system flushing & maintenance
    - Operational use at sources of supply
    - Instrumentation use at system facilities
2. Water used by external authorities such as:
    - Fire Department activity including training/drilling
    - Water used by Municipalities for street-sweeping or maintenance activities.

Authorized un-billed consumption is currently considered lost water, and is included in the overall NRW percentage. Fire department use is currently considered unmetered authorized usage, and Company internal use is also considered to be non-revenue water. These activities represent regulatory requirements, and are not under the direct control of Suez Water Westchester. As a result, these lost volumes of water are unavoidable, and can be better reflected by removing this usage from the calculation of the NRW percentage. Please reference the New York Uniform System of Accounts instructions under *§ 566.3* and the requirements of account 927, copied below, which describe accounting for such usage.

§ 566.3 - Water or steam used by the utility

A. If the utility desires to charge the appropriate accounts in any of its water operations with the cost of water or steam used from its own supply, the credit therefore shall not be made to operating revenue accounts, but to account 929, Duplicate Charges--Credit.

B. Water supplied by the utility from its own supply to other departments shall be accounted for in the following manner: If the water is supplied under a definite arrangement whereby the actual costs are allocated between or among the departments using the water, the credit in the accounts of the water department shall be made to the appropriate operations or maintenance account or accounts, except that the amount of any return or interest, and the amount of depreciation and taxes charged against the other departments shall be credited to account 473, Interdepartmental Rents. If the charges are at tariff or other specified rates for the water supplied, then the entire amount charged shall be credited to account 467, Interdepartmental Sales.

§ 567 section 927- Franchise Requirements

A. This account shall include payments to municipal or other governmental authorities, and the cost of materials, supplies and services furnished such authorities without reimbursement in compliance with franchise, ordinance, or similar requirements; provided, however, that the utility may charge to this account at regular tariff rates, instead of cost, utility service furnished without charge under provisions of franchises. (See also account 302, Franchises and Consents.)

B. When no direct outlay is involved, concurrent credit for such charges shall be to account 929, Duplicate Charges-Credit.

Treatment of these un-billed usages according to the provisions described under §566.3 enables the utility to account for miscellaneous authorized use without undue penalties associated with lost or unaccounted for water volumes.

In order to better understand the extent to which the various water loss components exist within the SWWC system, a process was developed to measure the individual components of water loss, beginning with the equipment and facilities necessary to collect information regarding current system operation and the corresponding systems to organize and evaluate the information. This information will be used to better allocate resources for actions and interventions aimed at maximizing system efficiency, and implement policies and procedures for best practices and sustainability. The process can generally be broken down into the following components:

1) <u>Information Generation</u>

Includes facility design, equipment implementation, and system operational changes needed to divide the distribution system into sectorized production zones, and generate and record high resolution operating and customer usage information.

2) Information Handling & Management

Includes data collection, validation, and management procedures needed to organize, store, and report on system operating and usage information.

3) Data Processing & Evaluation

Use system operating and customer usage information to measure and characterize the nature of water loss occurring in each DMA sector, and develop reduction strategies accordingly.

FIGURE 1 illustrates a sample Water Loss Profile for a given water system.

4) Actions & Interventions

Execute the proper corrective actions needed to reduce water loss and maximize system efficiency, based on the specific strategies developed for each sector of the system. Typical actions include targeted leak detection and repair, and customer meter installation, replacement, or verification.

5) Sustainability

Develop policies, procedures, and best practices necessary to prevent recurrence of excessive water loss, and maintain system efficiency. Newly implemented DMA and AMI systems, along with monthly billing procedures will be used to monitor system performance on a continual basis, and generate alarms to notify operators of possible anomalies or events within the system.

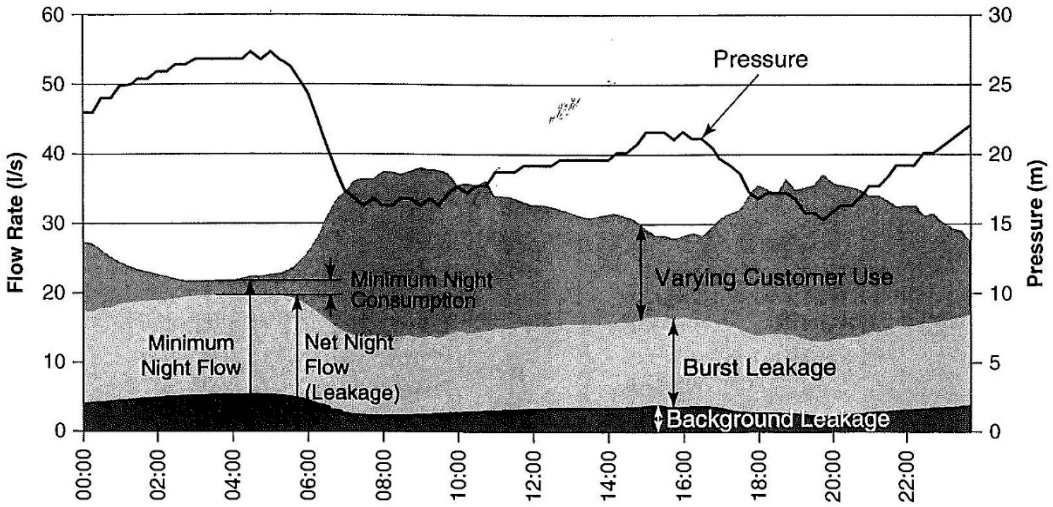


FIGURE 1 – Example Water Loss Profile

NRW Sustainability Assessment

In the absence of real-time consumption information, water audits and mass balance assessments traditionally rely on estimates and averages in an attempt to align water produced with water consumed within a given region or district of the system. The 12-month rolling-average calculation serves as a lagging indicator of current NRW, as any particular loss reduction instance is not realized right away, but rather produces gains incrementally across a full 12-month period. As a result of this lagging indicator, NRW fluctuations are often improperly correlated to the actions or events which actually produced the reductions (or increases).

In order to properly assess the sustainability of water loss levels, longer-term NRW trends must be differentiated from impacts caused by seasonal or short-term events such as cold weather, drought, billing anomalies, rate increases, or other circumstances outside of the specific actions the company is undertaking to reduce water loss levels. To better understand the factors that influence sustainable water loss levels, it's important to establish the following considerations:

1. Annual Baseline consumption levels are defined across the November through March time period, when typically only indoor water use occurs. Water usage patterns across this time period are generally stable on a daily basis as well as year-over-year, which establish baseline level flow rates for which current-year production (draft) data can be benchmarked. The November/December time period is particularly useful, as outdoor usage has ceased, but the weather has not yet become cold enough to impact Real Loss.

2. Real Losses have much more of an ability to influence short term water loss levels than do Apparent Losses such as metering inaccuracy, theft, etc., which are generally much more consistent from year-to-year, and develop or resolve relatively slowly over time, as compared to Real Losses.

3. Water lost due to normal surfacing leaks are generally considered to be losses that are not economical to recover beyond a certain extent. These losses can only be reduced through pressure reduction (where practical) and large-scale targeted infrastructure replacement, along with minimized find-to-fix times for repairs.

4. Water lost due to the awareness time of non-surfacing leaks, or the time between when a leak develops and when the company becomes aware of the leak, represents *Avoidable* Real Loss, and can be greatly reduced by early identification of such leakage. Non-surfacing leaks typically generate a much larger total volume of water loss than surfacing leaks, due to their ability to remain un-detected for long periods of time, even at high flow rates.

In water systems with well-developed SCADA systems, production data can be used as a leading indicator of current NRW levels. Production patterns (specifically draft, which factors in storage volume change and water that is not available for consumption) actually reflect consumption

patterns, only offset uniformly by the baseline level of leakage. The degree of this offset can be used to determine the extent to which real-loss (leakage) levels within the system have been reduced (or increased), especially when used during the winter months when consumption patterns are stable. System/Zone draft patterns represent instantaneous conditions, independent of any Apparent Losses associated with theft, metering inaccuracies, or billing-system related adjustments, estimates, anomalies, or reporting lag. Rather than attempting to estimate consumption values over short intervals (with current technology), assessments can be more accurately performed during periods where consumption can be nearly removed from the equation.

Analysis of Internal Actions Contributing to Water Loss Reductions

Over the past few years, SUEZ companies have undertaken various measures to improve the way the Companies collect, validate, and evaluate system operatinig data, refine the methodologies and processes used to characterize water losses, and develop actions to resolve water water loss occurrences accordingly. NRW reductions to-date can be primarily attributed to the following activities:

- Reductions in the awareness time of non-surfacing leakage
- Improvements in the find-to-fix times of normal surfacing leakage
- Apparent Loss reduction through
- Improved metering accuracy for large customers

The proportion of non-surfacing leaks in Suez Water Westchester, is currently 23%, meaning that nearly one in every four leaks that develop would normally remain undetected by the Company. The DMA system has enabled the Company to reduce the awareness time of newly developing non-surfacing leakage, as well as identify zones which demonstrate high levels of existing baseline water loss. The minimized awareness time is evidenced by the fact that virtually no production increases were seen across the 2014/2015 severe winter seasons within that system. As a result, SWWC is currently approaching the economic level of Real Loss, despite the effects of consecutive severe winters combined with a high proportion of non-surfacing leakage.

Large Customer Metering & Apparent Loss Analysis

The Company has defined Strategic Meters to be the collection of large customer meters accounting for 20% of total system consumption. The most recent Strategic Meter Replacement list identified a total of 95 meter replacements in SWWC RD-1 and 34 meter replacements in SWWC RD-2 (129 Total Meters). SWWC performed replacements of all large or compound meters within the system in the 2006-2007 timeframe. This means that the meter bodies currently installed are relatively young compared to other Business Units, and are therefore expected to be in somewhat better operational condition.

Since, it is not possible to accurately predict the reasonable useflul life of every meter, SWWC has improved upon the Strategic Meter initiative and implemented a meter testing policy whereby all large customer meters will undergo field testing as they become due for UME register replacement. This will ensure that only meter bodies/UME registers which fail testing are replaced, and enable the company to address many more large meters per year for a given investment level, as well as reduce lost consumption associated with meters that have failed before their standard scheduled replacement date based on meter size.

Addressing Apparent Losses at small (residential) customer meters provides much less return for a given investment level, and approaches the economic level of loss on the Apparent Loss side. Small-scale theft such as lawn irrigation systems which bypass the meter are difficult to identify and require extensive field activity to confirm and resolve. As a result, small-meter losses are difficult and less economical to address without high-resolution consumption data to support a desktop analysis of suspected Apparent Loss prior to allocation of field-resources, similar to the desktop analyses performed on Real Losses using the DMA systems prior to deploying leak detection resources.

Customer metering accuracy is generally considered to be sustainable with proper monitoring, testing, sizing, and replacement policies. However, Apparent Losses associated with outdoor use theft and irrigation, are likely to be impacted by external factors such as weather patterns or dry summer conditions.

Impact of External Influences on Water Loss Levels

Extreme cold can directly impact levels of Real Losses occurring throughout the system. According to a Water Research Foundation (WRF) study, the average pipe-break rate for water utilities is between 21 to 27 breaks per 100 miles of pipeline per year. For the 8-year period between 2006 and 2013, the average pipe-break rate in SWNY (a sister company), for example, was slightly over 26 breaks per 100 miles of pipe per year, which is consistent with industry averages. However, this number surged to nearly 37 during the severe winter weather outbreak of the 2014/2015 season. This surge in main breaks resulted in a corresponding surge in non-surfacing leakage, which would continue to exist if no additional efforts had been undertaken to resolve the events. Real Losses remain in effect until actions cause them to be reduced.

DMA System flow rate analysis of discovered leaks indicates that many non-surfacing leaks reach full failure during the winter months, likely resulting from additional stresses acting on the pipe from frozen ground movements and changes in water temperature. Therefore, clean-up of existing baseline leakage is beneficial to conduct prior to the cold winter months.

General NRW Sustainability Conclusions

NRW reductions to-date are action-driven and are likely to be sustainable through 2017, barring extreme events causing recurrence of Avoidable Real Loss in the form of non-surfacing leakage. In general, sustainability of any NRW program hinges on the Company's ability to identify and localize water loss events in an efficient manner using new technology for data collection and evaluation techniques.

Short-term sustainability is dependent on the Company's ability to reduce the awareness time of newly developing Avoidable Real Loss. Regional Business Units demonstrate a high percentage of non-surfacing leakage, which can remain hidden for long periods of time and generate large volumes of water losses with a single occurrence. Production data is a leading indicator of such losses, and can be used independent of consumption data when evaluating short-term system efficiency. Large-scale Real Loss clean-up is beneficial to conduct prior to implementation of a DMA system or fixed leak logger deployment, as baseline levels of loss are much easier to maintain once achieved. Real Loss reductions are more likely to be sustainable in zones where the awareness times of new leaks can be minimized.

Long-term sustainability of efficient water loss levels are dependent on the continuation of short-term optimization activities *plus* the ability shrink the economic level of loss by:

1. Pressure reduction & optimization throughout the system (where practical).

2. Targeted infrastructure replacement considering water loss criteria for below-ground assets.

3. Implementing effective policies for monitoring, testing, and replacement of customer meters, particularly for large users.

PART II: 2016 PROGRESS UPDATE & FINDINGS

The above mentioned activities, along with timely execution of the NRW action plan have ***resulted in a three-year NRW reduction of 4.7%*** for the SWWC RD-1 system, and a ***three-year NRW reduction of 4.2%*** for the RD-2 system. In general, the improvement can be attributed to reductions associated with *Avoidable Real Losses*. Using the newly-implemented District Metered Areas (DMA), SWWC was able to reduce the size of metered production zones to better identify areas of the system which demonstrated excessive baseline flows, possibly indicative of real losses.

DMA System mass-balance data was used to target real losses by:

- Creating DMA specific production/draft reports to identify zones which demonstrate a high degree of baseline usage, possibly indicating real losses are occurring in the area.
- Monitoring the night flows in each DMA/zone to identify any patterns which deviate from normal diurnal fluctuations, using the AquAdvanced and eOps programs.
- Identifying and triangulating the location of leaks which have occurred but not yet surfaced, thereby reducing the event-to-find-times of new, non-surfacing leaks.
- Deploying pressure loggers in suspect areas to identify any pressure variations from hydraulic model-predicted levels, which may indicate losses are present.

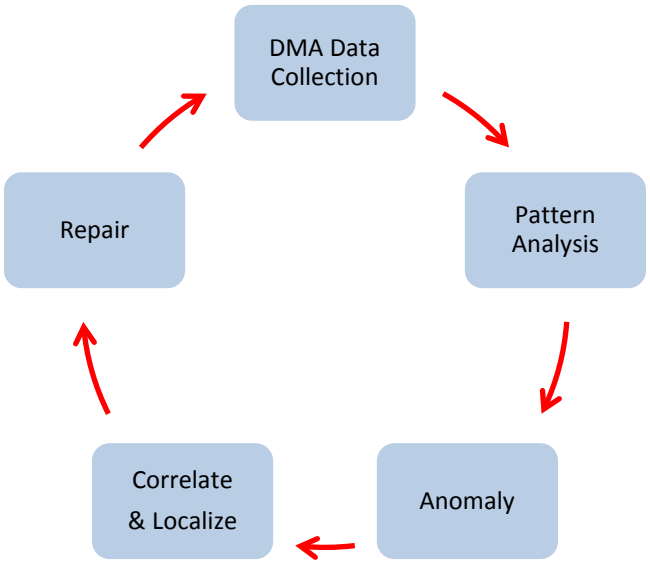
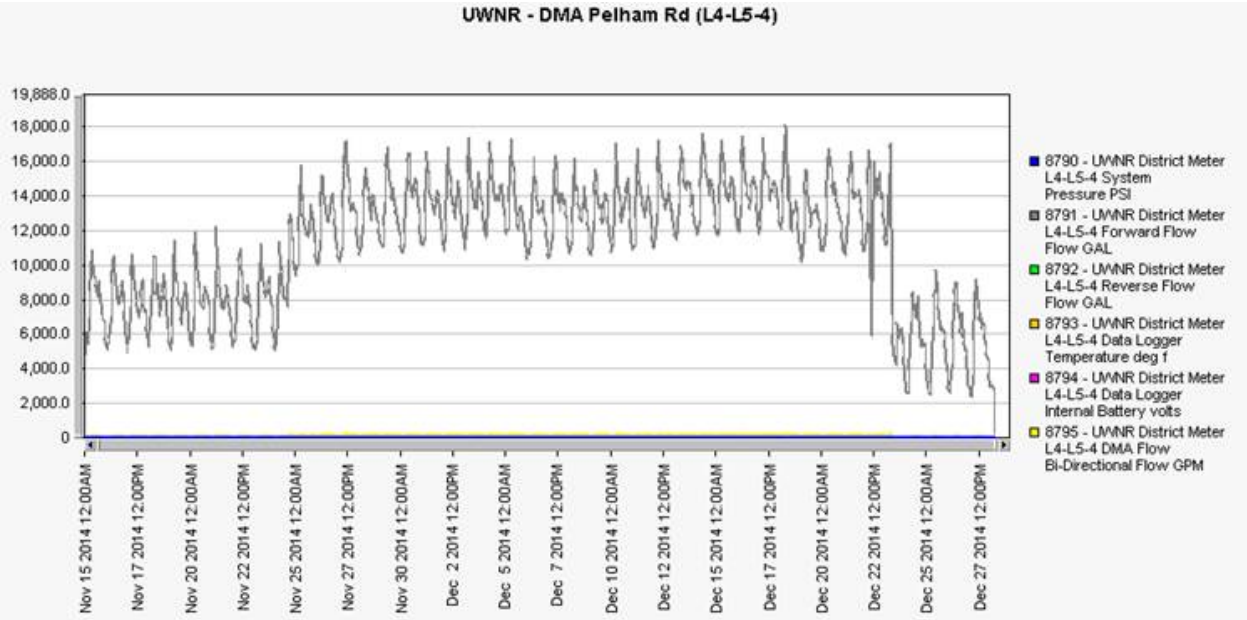


Diagram illustrating the Leak Localization Process implemented in SWWC

Using this system, SWWC was better able to target leak correlating personnel within blocks of non-surfacing leaks, within the zones that demonstrated higher-than-expected baseline overnight flows. The illustration below is an example of how SWWC utilizes the desktop leak localization process to identify and localize water loss events.



Graph illustrating an example of Baseline Leakage reduction for a particular DMA Zone of SWWC, as a result of Non-Surfacing Leakage being repaired. The spike in flow indicates the point at which the leak reached full failure, and still remained un-detected. The final drop indicates the point at which the leak was repaired, and flows were restored to below the original baseline. The time in-between the leak developing and the repair represents the Awareness Time plus Find-to-Fix Time of the Non-Surfacing Real Loss. Awareness Times have been greatly reduced as a result of the DMA system implementation.

On the apparent loss side, the *Strategic Metering Initiative* was expanded upon to include field testing of all large customer or compound meters in the system. This will ensure that only meter bodies/UME registers which fail testing are replaced, and enable the company to address many more large meters per year for a given investment level, as well as reduce lost consumption associated with meters that have failed before their standard scheduled replacement date based on meter size. Desktop evaluations and prioritization of large meter replacements were completed in 2016, and field testing is scheduled to commence in Q1 2017.

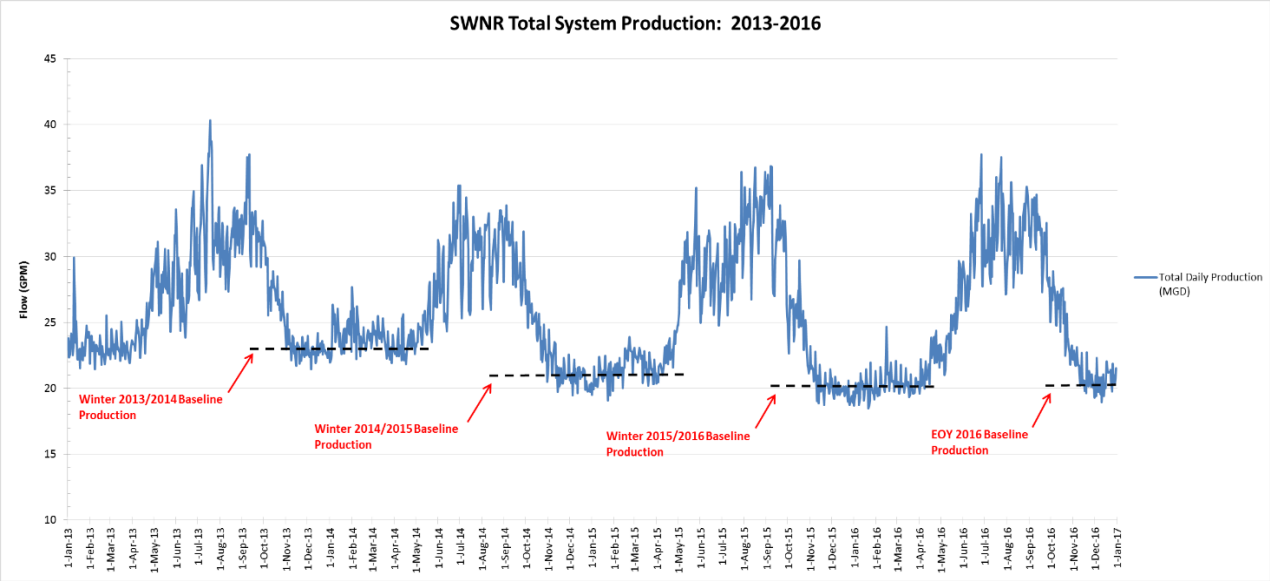
Much like the approach taken for targeting real-losses, apparent loss investigations begin with a comprehensive desktop review to better focus field activities on the locations that most likely demonstrate theft of service or tampering issues. Desktop evaluations involve compiling service point information from various internal and external data sources to identify 'red-flag' type discrepancies, or data which is outside of expected parameters for a given service point. Denial of SWWC access by customers presents difficulty in confirming if all meter sets remain in compliance with Company Tariff requirements after the initial installation. SWWC continues to work with customers and invokes the protections provided by the Tariff to address these issues. However, denial of access delays SWWC's ability to rectify meter set issues and also impacts productivity as some properties must be visited multiple times.

The transition to monthly meter-reading and billing cycles has allowed for seasonal consumption comparisons to be performed across the customer base, and has improved the quality of theft-of-service investigations particularly related to outdoor use theft. According to seasonal indicators of system water loss levels, outdoor use theft is a major contributor to SWWC water losses across the summer time period. Analysis of 2016 water loss data for RD-1 reveals that, on average, volumetric water losses trend higher by 18.6 MG per month during the typical outdoor use period of May through October. This increase yields a total approximate outdoor use water loss of 111.6 MG, or 1.75% of total annual production (which impacts NRW percentages by a corresponding amount). For RD-2, there was an approximate outdoor use water loss of 52.9 MG, or 2.0% of total annual production. 2016 was a particularly favorable period for evaluating seasonal water loss trends, as the mild winter early in the year prevented the typical spike in Real Losses associated with the cold weather. As such, Real Losses along with indoor use theft could be considered to be relatively constant throughout the year, allowing estimates for outdoor use theft to be extracted from summer data.

The implementation of a fully deployed AMI system will further improve the quality of such evaluations, as well as enable the Company to identify discrepancies between production and consumption trends throughout the system.

Rate District #1 Results:

Despite the unfavorable 2014 and 2015 winter weather and increased number of total main breaks, the *Avoidable Real Loss* targeting effort has resulted in a significant three-year reduction in total system production (purchased water). Total system production has been reduced by 430 MG, of which only 35 MG can be attributed to a reduction in total system consumption. This yields a three-year ***net reduction in production of 395 MG (6.2% of total 2016 production)***. Graph-1 below illustrates the decreasing baseline production trend between 2013 and 2016.



GRAPH-1: SWWC RD-1 Total Daily Production 2013-2015

Real Losses in the SWWC RD-1 System were overstated within the 2016 AWWA Water Audit, given the fact that metered consumption used for Company internal purposes**,** although un-avoidable, is currently considered to be water delivered to the system, and therefore is contributing to the non-revenue producing volume which the company must report. Company use water could be more accurately accounted for by removing this usage from the Non-Revenue Water calculation.

Authorized Un-Billed Consumption (Company Internal Use):

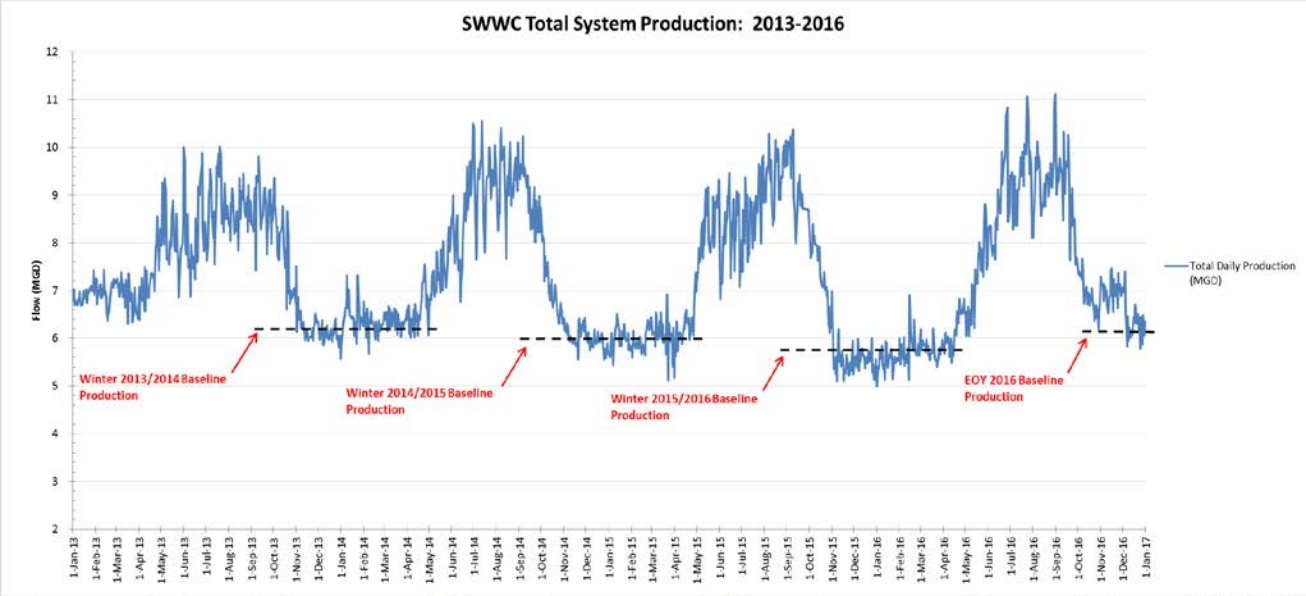
- Operational/Facility Use: 22.23 MG
- House Meters (Offices): 1.43 MG

Total Internal Use: 23.66 MG

Please refer to APPENDIX A for the complete SWWC RD-1 AWWA Water Audit Report for 2016.

Rate District #2 Results:

Despite the unfavorable 2014 and 2015 winter weather and increased number of total main breaks, the *Avoidable Real Loss* targeting effort has resulted in a significant three-year reduction in total system production (purchased water). Total system production has been reduced by 116 MG, along with a consumption increase of 30 MG. This yields a three-year ***net reduction in production of 146 MG (5.5% of total 2016 production)***. Graph-1 below illustrates the decreasing baseline production trend between 2013 and 2016.



GRAPH-1: SWWC RD-2 Total Daily Production 2013-2016

The sudden increase in system baseline production that can be seen at the end of 2016 represents a system anomaly caused by large-scale operational adjustments needed to accommodate drought conditions at the Company's largest bulk water supplier. These conditions resulted in the need for SWWC to reduce dependence on the Comly Ave interconnection, which represents approximately 65-70% of total system supply, and instead rely heavily on the Westchester Ave interconnection as the primary water source. The full extent of the impacts of these adjustments on water losses are not fully understood at this time, and are currently under investigation by SWWC. The Company expects water losses to return to normal baseline levels upon returning to standard operation at the purchased water interconnections in Q1 2017.

Real Losses in the SWWC RD-2 System were overstated within the 2016 AWWA Water Audit, given the fact that metered consumption used for Company internal purposes**,** although un-avoidable, is currently considered to be water delivered to the system, and therefore is contributing to the non-revenue producing volume which the company must report. Company use water could be more accurately accounted for by removing this usage from the Non-Revenue Water calculation.

Authorized Un-Billed Consumption (Company Internal Use):

- Operational/Facility Use: 0.802 MG
- House Meters (Offices): 0.0 MG

Total Internal Use: 0.802 MG

Please refer to APPENDIX B for the complete SWWC RD-2 AWWA Water Audit Report for 2016.

In keeping consistent with industry best practices for water loss management, system efficiency, and conservation, a pressure reduction project was implemented for two DMA Zones (LOW-1 and LOW-2) which demonstrated favorable topology and excessively high operating pressures. Average operating pressures within these zones were reduced by 20 psi (21%), by activating three existing PRV sites serving this area. The reduction in operating pressure appears to have moderately lowered total production for these zones; however the data is still being studied in detail.

PART IV: NRW PROJECT TEAM & OBJECTIVES

In order to accomplish the goals of the NRW reduction program as outlined in *Part II: Ongoing NRW Reduction & Sustainability Strategy*, components of the program were broken down into individual, manageable task items categorized by department involvement and staff responsibility. The project team consists of the following departments and associated responsibilities:

Engineering/GIS:

Assist with facility design and implementation, hydraulic modeling & GIS updates and evaluations, and capital improvement projects as part of an overall asset management strategy.

- Plan and implement a DMA Network. The DMA network will be used as the primary flow monitoring system, and provide for accurate mass-balance and water audit calculations to be performed on each zone independently.
- Plan and implement an AMI Network. The AMI network will be used to monitor customer consumption with high-resolution, and allow for period-specific consumption reports to be generated.
- Update and maintain GIS and hydraulic modeling tools, and provide assistance with specialized evaluations using spatial analysis and modeling procedures.
- Evaluate pressure management opportunities to reduce the level of real losses within the system, in conjunction with the District Metering Project.
- Evaluate below-ground asset performance and develop a prioritized Underground Infrastructure Replacement Program (UIRP) considering water loss criteria.

Customer Service & Billing:

Gather, analyze, and maintain accurate customer account and consumption information. Responsible for ensuring that every customer account within the service territory is properly maintained within the CIS system, and investigating any abnormalities.

- Implement and maintain *monthly* billing cycles for all customers to allow for more accurate water balance calculations by eliminating the need for 12-month rolling average estimates, and better align consumption and production data.
- Closely monitor monthly consumption reports and promptly investigate any abnormalities which could result in lost revenues or consumption.
- Review Meter Data Management (MDM) System and customer consumption patterns for abnormalities such as zero or negative consumption, or evidence of a tampered customer meter.
- Minimize systematic data handling errors within customer billing operations and consumption reporting processes.

Metering:

Responsible for ensuring that every customer account within the service territory is properly metered and reporting consumption, and investigating any abnormalities which may result in lost consumption.

- Maintain compliance with aged meter replacement and testing requirements.
- Monitor all large and/or un-metered services to ensure accurate reporting and compliance with SUEZ Water fire/irrigation service connection policies.
- Field test all large customer and Strategic Meters on an annual basis.
- Establish DMA/Pressure Zone specific meter read routes for improved alignment of Production and Consumption data on a monthly basis.
- Facilitate the transition to the Advanced Metering Infrastructure (AMI) system.

Production & Distribution:

Calibrate all master pay and plant meters, validate and report system production, and maintain system production structures. Operate and maintain system valves and hydrants, and manage the construction and repair policy of system infrastructure and facilities.

- Calibrate and maintain production master meters and pressure reducing valves semi-annually, and document calibration records and reports.
- Verify and maintain pressure division and DMA sectorization valves to ensure hydraulic isolation of all zones.

- Manage and administer the company's leak detection program including; targeted leak surveys, interconnection and cross-connection monitoring, hydrant and valve leak sounding, and deployment of acoustic loggers.
- Coordinate, prioritize, and manage leak and water main-break repairs, and ensure proper recording and documentation of all repairs.
- Work with local municipalities and fire departments to ensure sensible, conservation-minded water usage practices and minimize water losses through proper metering of necessary usage.

Hydraulic Modeling (Engineering Department):

As part of the Engineering Department, the Hydraulic Modeling group will be responsible for calibrating and maintaining system hydraulic models, and perform specialized analyses aimed at optimizing system operation and efficiency, and identifying areas of the system which demonstrate a high likelihood of real losses.

- Ensure that the master version of the model is current and reflective of measured system conditions including DMA meter flows and pressure point monitoring values.
- Develop specialized NRW related model scenarios focusing on demand side hydraulics to study avoidable losses.
- Utilize the software's genetic algorithm to perform "hot-spot" leakage detection, whereby the system areas which demonstrate the greatest divergence from measured conditions are identified.

Efficiency Management (NRW Manager):

Develop and maintain the overall NRW reduction strategy and action plan for all departments, and oversee implementation of the plan. Perform comprehensive water audit and mass balance calculations for all metered zones. Utilize high-resolution production and consumption information, in conjunction with leakage studies and hydraulic modeling results, to characterize the nature of water loss occurring in the various zones.

- Conduct UARL background leakage study by zone per IWA methodology, to establish the baseline proportion of real losses considered to be unavoidable.
- Establish standards for calculating NRW percentages on a DMA/district basis, including water audit templates and data handling procedures.
- Create workflow procedures to account for minor losses associated with internal activities such as flushing and chlorination, and authorized unmetered consumption such as fire department use.
- Perform water audits and develop the annual Non-Revenue Water Report and Non-Revenue Water Reduction Plan.

- Coordinate NRW reduction and efficiency improvement activities across departments.
- Develop and implement “Smart Utility” solutions for monitoring and optimizing network performance and efficiency management.

Planning & New Business:

Responsible for all new water service requests and main extensions for connecting new customers to the system, ensuring that all new service projects are consistent with and conforming to SUEZ Water standards and policies.

- Track and manage all new service requests from the point of application for service through meter installation and bill generation.
- Determine proper sizing of new customer meters to ensure maximum meter accuracy based on anticipated usage estimates and customer classification.
- Inspect new customer service connections and meter configurations to ensure compliance with Suez and Rockland County Health Department regulations.

Sustainability (All Departments):

Develop policies, procedures, and best practices needed to ensure optimal efficiency of the system. Create system efficiency indicators and typical operating profiles to assist in identifying and locating operational abnormalities or infrastructure failures.

- Implement capital improvement projects designed to maximize system efficiency, ensure proper service parameters are maintained, and eliminate under-performing assets from the system.
- Verify and document all boundary valve positions and possible cross-connections to ensure distribution system and DMA zone integrity.
- On-going routine leak detection surveys of transmission mains and high failure rate mains.
- On-going DMA and production meter calibration and maintenance.
- Maintain compliance with customer meter replacement and testing programs, and continuously monitor MDM system for customer usage pattern abnormalities.
- On-going high resolution water audits using DMA/Pressure Zone specific production data, along with monthly consumption data collected by Zone specific meter read cycles.
- Minimize the awareness time of newly developing water loss by continually monitoring and validating DMA/Pressure Zone specific production data to identify patterns and trends which could be indicative of Avoidable Real Loss.

APPENDIX A – 2016 AWWA Water Audit Summary**

Rate District #1

** Note: Cost Data Section on AWWA Water Audit Spreadsheet Reflects Combined Rate-District Values. Financial Indicators Cannot be Separated by Rate-District

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: SUEZ Water Westchester - Rate District #1
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	n/a	0.000	MG/Yr				MG/Yr
Water imported:	9	6,355.666	MG/Yr				MG/Yr
Water exported:	9	14.446	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 6,341.220 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	9	5,098.130	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	9	23.661	MG/Yr			
Unbilled unmetered:		79.265	MG/Yr	1.25%		MG/Yr

Use buttons to select percentage of water supplied **OR** value

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 5,201.056 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,140.164 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:	8	228.033	MG/Yr		228.033	MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	9	138.341	MG/Yr	2.63%		MG/Yr
Systematic data handling errors:	7	89.691	MG/Yr		89.691	MG/Yr

Apparent Losses: ? 456.065 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 684.098 MG/Yr

WATER LOSSES: 1,140.164 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 1,243.090 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	7	426.7	miles
Number of active AND inactive service connections:	9	41,256	
Service connection density:		97	conn./mile main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	9	31.1	ft
Average operating pressure:	9	79.6	psi

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

Total annual cost of operating water system:	9	$ 31,776,070	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$ 5.77	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$ 2,132.93	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 87 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Systematic data handling errors
3: Customer retail unit cost (applied to Apparent Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: SUEZ Water Westchester - Rate District #1
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 87 out of 100 ***

System Attributes:

	Apparent Losses:	456.065	MG/Yr
+	Real Losses:	684.098	MG/Yr
=	Water Losses:	1,140.164	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	299.82	MG/Yr
	Annual cost of Apparent Losses:	$3,514,753	
	Annual cost of Real Losses:	$1,459,130	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	19.6%	
	Non-revenue water as percent by cost of operating system:	16.3%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	30.29	gallons/connection/day
	Real Losses per service connection per day:	45.43	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.57	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	684.10	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.28	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	SUEZ Water Westchester - Rate District #1	
Reporting Year:	2016	1/2016 - 12/2016
Data Validity Score:	87	

Own Sources (Adjusted for known errors)
0.000

Water Imported
6,355.666

System Input
6,355.666

Water Exported
14.446

Water Supplied
6,341.220

Authorized Consumption
5,201.056

Water Losses
1,140.164

Billed Authorized Consumption
5,098.130

Unbilled Authorized Consumption
102.926

Apparent Losses
456.065

Real Losses
684.098

Billed Water Exported

- Billed Metered Consumption (water exported is removed): *5,098.130*
- Billed Unmetered Consumption: *0.000*
- Unbilled Metered Consumption: *23.661*
- Unbilled Unmetered Consumption: *79.265*
- Unauthorized Consumption: *228.033*
- Customer Metering Inaccuracies: *138.341*
- Systematic Data Handling Errors: *89.691*
- Leakage on Transmission and/or Distribution Mains: *Not broken down*
- Leakage and Overflows at Utility's Storage Tanks: *Not broken down*
- Leakage on Service Connections: *Not broken down*

Revenue Water
14.446

Revenue Water
5,098.130

Non-Revenue Water (NRW)
1,243.090

APPENDIX B – 2016 AWWA Water Audit Summary**

Rate District #2

** Note: Cost Data Section on AWWA Water Audit Spreadsheet Reflects Combined Rate-District Values. Financial Indicators Cannot be Separated by Rate-District

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: SUEZ Water Westchester - Rate District #2
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	n/a	0.000	MG/Yr				MG/Yr
Water imported:	9	2,671.306	MG/Yr				MG/Yr
Water exported:	9	14.169	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 2,657.137 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	9	2,028.084	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	9	0.802	MG/Yr			
Unbilled unmetered:		33.214	MG/Yr	1.25%		MG/Yr

Use buttons to select percentage of water supplied **OR** value

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 2,062.100 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

595.037 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:	8	119.007	MG/Yr		119.007	MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	9	54.801	MG/Yr	2.63%		MG/Yr
Systematic data handling errors:	8	64.206	MG/Yr		64.206	MG/Yr

Apparent Losses: 238.014 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 357.023 MG/Yr

WATER LOSSES: 595.037 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 629.053 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	172.0	miles
Number of active AND inactive service connections:	9	13,607	
Service connection density:		79	conn./mile main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	8	34.4	ft
Average operating pressure:	9	76.9	psi

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

Total annual cost of operating water system:	9	$31,776,070	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$5.77	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$2,132.93	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 88 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Billed metered
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: SUEZ Water Westchester - Rate District #2
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 88 out of 100 ***

System Attributes:

	Apparent Losses:	238.014	MG/Yr
+	Real Losses:	357.023	MG/Yr
=	Water Losses:	595.037	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	102.07	MG/Yr
	Annual cost of Apparent Losses:	$1,835,889	
	Annual cost of Real Losses:	$761,505	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	23.7%	
	Non-revenue water as percent by cost of operating system:	8.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	47.92	gallons/connection/day
	Real Losses per service connection per day:	71.89	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.93	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	357.02	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	3.50	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	SUEZ Water Westchester - Rate District #2	
Reporting Year:	2016	1/2016 - 12/2016
Data Validity Score:	88	

Own Sources (Adjusted for known errors)
0.000

Water Imported
2,671.306

System Input
2,671.306

Water Exported
14.169

Water Supplied
2,657.137

Authorized Consumption
2,062.100

Water Losses
595.037

Billed Authorized Consumption
2,028.084

Unbilled Authorized Consumption
34.016

Apparent Losses
238.014

Real Losses
357.023

Billed Water Exported

Billed Metered Consumption (water exported is removed)
2,028.084

Billed Unmetered Consumption
0.000

Unbilled Metered Consumption
0.802

Unbilled Unmetered Consumption
33.214

Unauthorized Consumption
119.007

Customer Metering Inaccuracies
54.801

Systematic Data Handling Errors
64.206

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
14.169

Revenue Water
2,028.084

Non-Revenue Water (NRW)
629.053

APPENDIX C – 2016 AWWA Water Audit Summary**

Combined Rate Districts (RD-1 & RD-2)

** Note: Cost Data Section on AWWA Water Audit Spreadsheet Reflects Combined Rate-District Values. Financial Indicators Cannot be Separated by Rate-District

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: SUEZ Water Westchester - Combined Rate District (#1, #2)
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	n/a	0.000	MG/Yr				MG/Yr
Water imported:	9	9,026.972	MG/Yr				MG/Yr
Water exported:	9	28.615	MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 8,998.357 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	9	7,126.214	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	9	24.463	MG/Yr			
Unbilled unmetered:		112.479	MG/Yr	1.25%		MG/Yr

Use buttons to select percentage of water supplied **OR** value

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 7,263.156 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,735.201 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:	8	347.040	MG/Yr		347.040	MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies:	9	193.142	MG/Yr	2.63%		MG/Yr
Systematic data handling errors:	7	153.898	MG/Yr		153.898	MG/Yr

Apparent Losses: 694.080 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 1,041.120 MG/Yr

WATER LOSSES: 1,735.201 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,872.143 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	595.7	miles
Number of active AND inactive service connections:	8	54,863	
Service connection density:		92	conn./mile main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	7	32.0	ft
Average operating pressure:	9	78.8	psi

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

Total annual cost of operating water system:	9	$31,776,070	$/Year	
Customer retail unit cost (applied to Apparent Losses):	8	$5.77	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$2,132.93	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 87 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Systematic data handling errors
3: Customer retail unit cost (applied to Apparent Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: SUEZ Water Westchester - Combined Rate District (#1, #2)
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 87 out of 100 ***

System Attributes:

	Apparent Losses:	694.080	MG/Yr
+	Real Losses:	1,041.120	MG/Yr
=	Water Losses:	1,735.201	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	401.11	MG/Yr
	Annual cost of Apparent Losses:	$5,353,698	
	Annual cost of Real Losses:	$2,220,636	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	20.8%	
	Non-revenue water as percent by cost of operating system:	24.8%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	34.66	gallons/connection/day
	Real Losses per service connection per day:	51.99	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.66	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,041.12	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.60	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	SUEZ Water Westchester - Combined Rate District (#1, #2)	
Reporting Year:	2016	1/2016 - 12/2016
Data Validity Score:	87	

Own Sources (Adjusted for known errors)
0.000

Water Imported
9,026.972

System Input
9,026.972

Water Exported
28.615

Water Supplied
8,998.357

Authorized Consumption
7,263.156

Billed Authorized Consumption
7,126.214

Billed Water Exported
7,126.214

Billed Metered Consumption (water exported is removed)
7,126.214

Billed Unmetered Consumption
0.000

Unbilled Authorized Consumption
136.942

Unbilled Metered Consumption
24.463

Unbilled Unmetered Consumption
112.479

Water Losses
1,735.201

Apparent Losses
694.080

Unauthorized Consumption
347.040

Customer Metering Inaccuracies
193.142

Systematic Data Handling Errors
153.898

Real Losses
1,041.120

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Revenue Water
28.615

Revenue Water
7,126.214

Non-Revenue Water (NRW)
1,872.143