

SERVICE LEVEL GLOSSARY



and

WATER REVENUE BUREAU

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**PHILADELPHIA WATER DEPARTMENT
AND
WATER REVENUE BUREAU**

SERVICE LEVEL GLOSSARY

Welcome to the first edition of the PWD/ WRB Service Level Glossary. This document is intended to serve as a reference tool for your improved understanding of the service and performance measures currently presented as part of the Monthly Managers' Report. Enclosed herein are descriptions for the service measures provided by just about every unit and division reporting in the Managers' Report. It has been quite an undertaking, and I hope the effort has produced a tool that you will use and rely upon.

The glossary descriptions typically include the measure's definition and data source as well as general explanatory information regarding the rationale for tracking the measure and possible reasons for variation. Much of the effort that has gone into the glossary development has been focused on crafting the descriptions to give the lay-reader a more complete understanding of what the measure means and why we track it. Some of the measures of our utility's performance, however, are quite technical. While we tried to accurately define such measures in a general context, we may have omitted some nuances important to the measure or left the description still too technical for thorough understanding. We apologize if this is the case and most importantly, please let us know when you encounter such instances. We view this glossary as a work-in-progress, very much like the Managers' Report itself, so your comments and ideas for improving the descriptions are important to the refinement and increased utility of this tool.

At this time, we do not foresee that this glossary will need to be published with each edition of the Managers' Report. Instead, we intend that the glossary will be published and distributed again when substantial changes and updates have been made to the measures or to the descriptions in this first edition of the glossary. For instance, a new edition will be published as new units and divisions begin their service level reporting, when new, more refined measures replace old, less useful measures, and as we incorporate your comments and ideas for improving the discussions. For your continued access of the glossary, we will make it available on the Finance division's website, accessible by typing *finweb.pwdfinance.gov* or our IP address, *170.115.81.214*, into the address prompt of your web browser.

As always, I encourage you to communicate your ideas about ways to make this glossary a more useful tool for you. Please do not hesitate to contact myself, Joe Makowski, and/or Nora Freeman to share your thoughts. Thanks.

- Michael Nadol, Deputy Water Commissioner, September 10, 1997

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BUREAU OF LABORATORY SERVICES

The Bureau of Laboratory Services' (BLS) mission is to provide high quality analytical, research, and investigatory services in support of the Water Department programs, as well as to programs of other city agencies, when called upon. These services are multi-disciplinary in nature, drawing upon the biological and chemical sciences, and on sanitary, civil, and mechanical engineering.

ANALYSES

An analysis is the determination of the quantity of elements (e.g., lead, oxygen), compounds (e.g., ammonia chloroform), and microorganisms (e.g., coliform bacteria, algae) that are present in source water, drinking water, wastewater, biosolids, industrial wastes, and in the different water and wastewater treatment processes. Drinking water is monitored to protect the health of the general public and wastewater and biosolids to protect the environment. They are also monitored to meet federal and state regulations, e.g., the federal Safe Drinking Water Act which regulates the amount of organic and inorganic compounds allowed in drinking water, such as lead. BLS also has a Materials Engineering Lab (MEL), which performs tests on various infrastructure materials that the department (and other city agencies) purchase, such as poured concrete, ductile pipe, manhole covers, etc. One analysis can, and frequently does, yield more than one "result." What is reported in the monthly columns of the spreadsheet is the number of results, as a consequence of these analyses. One analysis may take weeks to complete, or it may be a just matter of hours.

Northeast, Southwest and Southeast Water Pollution Control Plants (NEWPCP, SWWPCP and SEWPCP, respectively) Labs: BLS has personnel permanently assigned to these three wastewater treatment plants. These personnel analyze the influent and effluent of the plants, and samples drawn at different points in the plants' various processes. These analyses show how effective the treatment processes are. Parameters analyzed include solids, BOD, digester gases, volatile acids, and chlorine residuals. The National Pollution Discharge Elimination System (NPDES) permits require some of the testing. NPDES establishes the standards for meeting effluent quality. Not meeting NPDES permit standards can result in fines. These lab personnel are on duty during the *day shift* hours, seven days a week, 365 days a year.

Biology Lab: The Biology Lab analyzes river water for algae, drinking water for bacteria content, wastewater and biosolids for fecal coliform, and "mixed liquors" (from the waste water treatment plants' digestion tanks) for protozoa. These lab personnel are on duty during the *day shift* hours, seven days a week, 365 days a year.

Inorganic and Organic Labs: These labs analyze for over 200 compounds in drinking water, wastewater, and biosolids, including chlorine, nutrients, metals, volatile and semi-volatile organics, and for turbidity. They are performed over various periods of time: some are performed daily, some weekly, some monthly or even quarterly.

Materials Engineering Lab (MEL): The Physical Analysis Section of MEL analyzes infrastructure materials such as poured concrete, ductile pipe, manhole covers, filter media for water plants, and reinforcing bars. It also analyzes other purchased items, such as raincoats or plastic trash bags. This is often done for the Procurement Department. The American Society for Testing Materials (ASTM) and federal government standards are used to determine the quality of the materials being purchased.

Accuracy: BLS has a Quality Assurance Unit which prepares and distributes over 200 quality assurance "blind" samples to all PWD laboratories. If the results from the laboratories are not 100% accurate, the supervisor of the lab must investigate, write a report on what went wrong, and indicate what corrective actions will be taken. BLS's goal is 100% accuracy. Such continuous monitoring is performed in order to assure the accuracy and reliability of BLS results.

SAMPLING

Sampling is the first step in the analytical scheme. Samples should represent the whole that is being evaluated. For example, BLS samples drinking water throughout the city at many different points, in order to be sure that the drinking water that *all* customers are receiving is potable. These samples are then sent to the Biology, Inorganic and Organic labs to be analyzed. This is done to protect the health of the general public and to meet federal and state regulations.

Drinking Water: This water is sampled every day of the year. Samples are collected from over 80 sampling sites, water treatment plants, reservoirs, and supply tanks. Technicians start collecting samples at 3:00 a.m., throughout the city, 365 days a year.

Sanitary Release: When new or rehabilitated water mains are ready to be placed in service, the water in them must be sampled for bacteria and chemicals before the main can be placed into service. (A rehabilitated main is one that has inserted a new inner lining, or sleeve. This can be performed on a scheduled basis, or when rust starts to occur in the water.) The term, "sanitary release," means the **assurance** of not having water introduced into the new or rehabilitated main becoming contaminated. Samples are collected for every 500 feet of water main.

Water Pollution Control Plant – National Pollution Discharge Elimination System (WPC – NPDES): BLS collects samples for testing of organic compounds at all three Water Pollution Control Plants (rather than having plant personnel collect the samples). In addition, at SWWPCP, BLS also collects the samples for testing for all other analyses. This procedure was arranged while the plants were under acting under the Environmental Protection Agency's Consent Decree dictates. Although the plants are no longer operating under the Consent Decree, this procedure has remained.

INSPECTIONS

These are inspections of source situations where non-potable water could possibly be introduced to potable drinking water, within the distribution system. Examples are given below:

Cross Connections: Any legal or illegal connection using the drinking water supply line as the water source for a non-potable system, e.g., industrial processing, boiler systems, HVAC, swimming pools, etc. This type of connection is commonly located in commercial and industrial buildings. In such situations a "backflow" device (basically, a one-way valve) should be installed at the juncture of the two systems, to prevent the possibility of any water from the industrial or commercial process to re-enter the potable water system. Such re-entry can happen if there is a significant reduction in pressure within the water main (as from a broken main, hydrant abuse, or high water demand), creating a suction effect within the distribution system. This occasionally does happen and is beyond the control of the water distribution system operators. In order to assure proper backflow device installation compliance, BLS has a cross-connection control and inspection program.

Vendor Surveillance & Plant Certification: Personnel from the Physical Analysis Unit (of the Materials Engineering Lab) make on-site inspections of companies which supply infrastructure material to the department (and other city agencies). Examples of such material are: dry concrete mixes, filter media (for the water treatment plants), butterfly valves used in water mains, pre-cast concrete pipes, etc. Such on-site inspections allow BLS personnel to better evaluate the quality of the products, rather than doing it solely through after-purchase testing. It also allows them to maintain close communication with the vendor, with quick feedback about problem areas, and a clear understanding about what the department requirements are.

COLLECTORS

FLOW CONTROL

The Flow Control unit's major responsibilities include maintaining 47 main pumps used throughout the waste and stormwater collection system, combined sewer overflow chamber maintenance, and closed circuit television inspections of the sewer system.

Main Pump Availability: The percent of time in the month that the 47 waste and stormwater pumps are available for use at the 16 wastewater pumping stations. The availability measure is calculated by totaling the actual number of hours the pumps were available to run during the month divided by the total possible running hours of all the pumps (i.e., 47 pumps x 24 hours x 30 days = 33,840 possible running hours), and expressing the result as a percentage. The unit's goal is to keep the pumps available over 90% of the time, which is achievable through an aggressive preventative maintenance program and a sufficient spare parts inventory. 100% availability is not desirable because of the unit's preventative maintenance program. This program constantly requires a small number of pumps to be unavailable for service. This will prevent an emergency situation where more than 10% of the pumps out of service at one time.

Combined Sewer Overflow (CSO) Dry Weather Discharges per 100 Inspections: The number of observed dry weather discharges per 100 inspections performed by the field crews. There are 6 CSO Regulator Maintenance Crews that log, on average, over 690 CSO site inspections per month and correct over 60 malfunctions and blockages per month. An observed dry weather discharge can occur when a block or malfunction is not caught in time, causing overflow conditions and also during the correction of a block or malfunction. The unit's goal is to keep the number of discharges below one occurrence per 100 inspections. Typically, this measure will increase during the summer months when summer storms increase the debris in the sewers.

Closed Circuit TV (CCTV) Inspections (in feet): The total number of linear feet of sewer that is video taped for the month. The Technical Inspections crews in the Flow Control unit operate 5 CCTV trucks for the Department, and their inspection work consists of new constructions, defective lateral connections, complaint-driven inspections, design requests, preventative scheduled inspections, and other special requests from various Departmental-operating units. A service goal has not yet been established for this work since this work is new to the Flow Control unit and the technical CCTV operator positions were recently filled.

INLET CLEANING

The Inlet Cleaning unit is responsible for the inspection and cleaning of the City's 90,000 stormwater inlets.

Inlet Cleaning: The number of inlets cleaned per month. This work is generated in response to complaints and also per a scheduled inlet cleaning maintenance routine. The number of inlets cleaned will decrease in the winter months due to weather related complications in the work. Cold temperatures, freezing rain or snow will invariably increase several factors that are critical for efficient performance of the inlet cleaning unit, including travel time, reliability of the vehicles, and the time it takes to perform the work.

SEWER MAINTENANCE

The Sewer Maintenance unit is responsible for the maintenance of the City's waste and stormwater system and its appurtenant structures. This includes the maintenance of all branch, intercepting, and main sewers, the repair of inlet laterals, inlets and manholes, the cleaning and repair of drainage ditches and outlets discharging stormwater, and maintenance and drainage of right-of-ways and land for public use. The activity of the Sewer Maintenance unit is complaint-driven as well as scheduled for preventative maintenance purposes, and will vary with the seasons. During the winter months, cold temperatures and freezing rain or snow will invariably increase several factors that are critical for efficient performance of the unit, including travel time, reliability of the vehicles, and the time it takes to perform the work.

Inlets Reconstructed: The number of inlets that required major reconstruction for the month. Reconstruction is defined as a repair that required over 20 bricks to complete the work. Typically, inlet reconstruction work makes up approximately 25% of the Sewer Maintenance unit's monthly activity.

Inlets Examined: The number of inlets that were examined by sewer maintenance crews during the month. These examinations include the condition of the inlet structure and connecting pipe, and may lead to a request for cleaning. Typically, inlet exam work makes up approximately 30% of the Sewer Maintenance unit's monthly activity.

Sewers and Laterals Examined: The number of branch sewers, 3 feet and under, and the number of main sewers, over 3 feet, examined for reconstruction (under the capital program) or for various complaints, such as flooding in the basement, sewage back-ups, etc. Typically, sewer and lateral exams make up approximately 15% of the Sewer Maintenance unit's monthly activity.

Other: The number of repairs and exams in all other work categories performed by the Sewer Maintenance unit. This work largely consists of the examination of sewer manholes, resetting manholes and inlets, repairs to inlet walls, traps, and dripstones, choked sewer repairs, sewer excavations, and examination and cleaning of drainage right-of-ways. This activity typically makes up approximately 30% of the Sewer Maintenance unit's monthly workload.

CONSTRUCTION & SURVEY

CAPITAL CONSTRUCTION MANAGEMENT

Capital construction refers to the construction or reconstruction of water/sewer infrastructure, or of PWD plant process facilities and buildings. These projects are funded by monies from the capital budget, and may take many months or years to complete. They require close management to assure contractor compliance with designed specifications, committed costs and estimated times to completion. "Progress" payments are made to the contractor, generally on a monthly basis, as significant components of the job are completed, and are closely monitored. The final progress payment "closes-out" the contract, prior to which all administrative issues or disputes must be resolved. The data source for tracking this information is CAPMAN (capital projects management system), and several PC-based systems maintained by Construction Branch.

Completed Contracts: Contracts on which all work has been completed and final payment made. Data from these contracts can be measured to compare the following service level goals:

Actual Contract \$/Bid Contract \$: The dollar amount that the contract actually costs vs. the contractor's original bid. The goal is that the actual contract cost does not exceed the bid price by 5%, or 1.05, as stated in the service level table. The period of measurement is a rolling average of all contracts completed in the past 12 months.

Actual Duration/Spec Duration: The length of time the contract actually took to complete, vs. the schedule agreed upon at the time the contract was awarded. The goal is that the actual completion schedule not exceed the agreed timetable by more than 50%, or 1.5. The established goal takes into consideration a number of factors affecting contract duration, beyond control of Construction Branch, e.g., labor shortages, strikes, unforeseen site conditions, disputes, severe weather, environmental and operational constraints, additional work required, long city processing times, etc. Again, the period of measurement is a rolling average of all contracts completed in the past 12 months.

Calendar Days to Close-out: The number of calendar days required, following substantial completion of work, to resolve outstanding administrative issues and disputes, and issue final payment. The goal is to not exceed 180 calendar days, and is based on a 12 month rolling average. The final payment is important in order to keep the volume of disputes and unresolved issues at manageable levels, and to free up unused capital funds for other projects.

Current Contracts: Contracts on which work is currently being performed by the contractor, inspected by Construction, and on which interim payments are being made.

Calendar Days to Process Payment: The number of days it took Construction to verify that the work was performed as specified and to process the interim payments. Construction's goal is to process this information within seven days, but the total duration of the payment process is actually much longer. Payment processing also involves the Finance Division's Capital Improvements Unit, Central Finance, the Controller's Office, and the Treasurer's Office and delays by any one of these parties can result in work delays, disputes, and claims.

ONE CALL NOTICE ACTIVITY

The One Call Notice System was instituted in 1974, by Pennsylvania Act 38, "Underground Utility Line Protection Law" and requires that anyone excavating in the state must call a prescribed phone number to give one's name, phone number and the exact location where they will be excavating. These calls are then referred to utilities, in writing, so they may research whether they own infrastructure in that location, which may be damaged by the excavation. This information is tracked with software purchased from the Pennsylvania One Call System Inc. (POCS), a non-profit Pennsylvania corporation. If there is infrastructure in the proposed area, utilities must physically mark the area within two working days of receiving a notice. Even if there is no infrastructure at the precise location to be excavated, the utilities must respond with a negative report, within two days.

Tickets Received: The number of tickets or printed notices received from the Pennsylvania one-call system.

Tickets Classified: The percent of tickets that were addressed and passed onto the appropriate parties for action within one day. If the ticket is for an excavation only, it is researched by Construction, and a determination made whether field marking is required or not. About 90% of the tickets are for excavation only. If the ticket involves new building construction or reconstruction of an existing building (which may affect water/sewer lines, their location, or size) the tickets are referred to Design Branch. There is no field marking involved in these tickets.

Design Tickets Referred: The percent of tickets requiring referral to the Design Branch that were actually referred. There are times when tickets destined for Design arrive on the last day or two of the month, and are not referred to Design until the first or second day of the following month. This is the reason why the goal of 100% is not always achieved.

Red Tickets Referred: "Red" tickets are those in which PWD does have infrastructure in the excavation area and a work order is issued to Survey Unit to mark the site. This measure indicates the percent of tickets that were passed onto Survey for marking. At this time, the Design Branch is unable to research and refer all tickets where there is PWD infrastructure. The current goal of 60% represents an improvement over the last year, when only 50% were being referred. Eventually, 100% will become the goal.

Red Tickets Marked: The number of tickets marked by Survey Unit in the month divided by the number of tickets referred to Survey Unit for marking that month. Occasionally, this ratio will exceed 100%, the goal, because of small backlogs occurring and being cleared.

Green Tickets Processed: “Green” tickets indicate that there is no PWD infrastructure at the location. This measure tracks the percent of tickets in which the contractor was informed that there is no infrastructure. Currently, the Design Branch is unable to call back all the contractors, due to the large number of referrals. The goal is 60%.

SURVEY DRAFTING

The Survey Unit provides a number of field survey and drafting services for Construction Branch, Design Branch and, upon special request, various Operations Division units and other City agencies.

Misc. Survey Drafting Projects: “Miscellaneous” refers to survey jobs other than for water mains/sewer lines. Examples of such projects include measuring the depth of a water treatment plant lagoon to verify accuracy of silt removal by a contractor or measuring PWD property lines in a dispute with adjoining properties’ owners.

New Survey Drafting Assignments: The number of new jobs received in that month.

Completed Survey Drafting Assignments: The number of jobs completed that month.

Survey Drafting Backlog: The number of assignments yet to be completed and there is a goal of keeping the backlog at five or fewer assignments.

Return Plans (water mains & sewers): These are drafting plans of mains and sewers as they actually went into the ground. During construction, there sometimes are necessary deviations from the original Design plans that are indicated on these “return plans,” kept in the Department’s official records.

New Return Plan Assignments (projects/sheets): The number of new jobs received in that month. “Project” means the new job in its entirety. “Sheets” refers to the number of drafting pages the project is divided into. This is a way of measuring the complexity of the job.

Completed Return Plan Assignments (projects/sheets): The number of return plans completed that month, by project and sheet.

Return Plan Backlog: The number of return plans yet to be drafted. There is a goal of 80 or fewer projects and 300 or fewer sheets.

CONVEYANCE

DISTRIBUTION

The Distribution unit is responsible for repairing all structural failures of water mains that result in water leakage and loss from the system. These mains range from 3" to 93" in diameter and include distribution system, transmission system, hydrant lateral and other connection piping owned by the City of Philadelphia Water Department. The effective and timely repair of water main failures is critical to the efficient operation of the distribution system and also to the Department's efforts to decrease its unaccounted for water. Thus, the unit closely tracks and monitors these repairs and has developed an electronic work order system, the Distribution Maintenance Information System (DMIS), to help manage this information.

Number of Water Main Breaks: This measure tracks the total number of mains that failed structurally and required repair by the Distribution unit. It should be noted that 100% of the mains that break are repaired. The number of water main failures is largely driven by weather conditions, and the number of breaks will increase in the winter and also in the summer months. A particularly cold winter will cause more water mains to fail from fractures due to the freezing temperatures. In warmer summer months when water demand increases, the additional hydraulic stress on the system will cause more of the older, less sound mains to fail.

Average Time to Repair Break: This measure indicates the average time, in hours, it took Distribution crews to repair the water mains that failed during the month. This service level is calculated by totaling all the time crews spent repairing breaks, beginning from when the crew arrived at the site and ending when the crew left the site, and dividing by the total numbers of mains repaired. While crews are closely managed in their repair of mains, the time it takes to repair a break will change with the type of failure. Thus, any changes in this ratio from month to month can be due to more or less time consuming repair jobs as well as actual changes in the efficiency in the crew's repair time.

EMERGENCY & SUPPORT SERVICES

The Emergency and Support Services (E&SS) unit is responsible for maintaining all the City's 28,000 standard pressure fire hydrants to ensure that they are serviceable in the event of a fire. Toward this end, E&SS also manages the Department's hydrant locking program, which was initiated to minimize illegal water use. The unit manages these activities through an electronic database, the Fire Hydrant Maintenance System. Additionally, the E&SS unit is responsible for shutting-off the water service to customers who have delinquent water and sewer accounts.

Hydrant Availability: This measures the percent of City-owned standard pressure fire hydrants that are in-service and available for fire-fighting use. Typically, the hydrant availability measure will decrease between April and November when the Fire Department is inspecting the City's hydrants and generating work orders for repair of any malfunctioning hydrant. As a result of this repair work, the hydrant availability measure will increase during the winter months to ensure that the City is maximally prepared to respond effectively in the fire season (January – March).

Hydrant Repairs: This measure tracks the number of repairs made to standard pressure hydrants. It include major repairs to out-of-service hydrants to place them back in-service as well as minor repairs to hydrants that were in-service but not operating optimally. Maintenance and repair of fire hydrants have improved significantly in FY97 and are expected to continue improving due to a creative, in-house spares parts rehabilitation program that has increased the number of repairs possible.

Center Compression Locks (CCL) Installed: This measure tracks the number of center compression locks installed on standard pressure fire hydrants to control illegal hydrant use. These locking devices have proven to be extremely successful in curbing hydrant abuse with significantly less water being lost from the system in recent years, particularly during the summer months. The Department's long-term plan is to install locks on 100% of the City's 28,000 standard pressure fire hydrants. The same crews are used to both install hydrant locks and perform hydrant repairs and the workload is balanced between both programs to meet the service goals of each. Thus, any significant change in the workload of one of the programs will have an effect on the other (e.g., if repairs increased dramatically in one month the number of locks installed for that month would be expected to decrease).

Shut-Off Accounts from WRB: This measure tracks the number of delinquent water and sewer accounts that are referred to PWD from WRB in order for water service to be terminated. These crews visit each account and either collect the delinquent payment from the customer or terminate the water service. There is a moratorium on terminating water service to delinquent residential customers during the winter months (December through March), which generates a large number of delinquent accounts that need to be addressed in April, when the moratorium ends.

Accounts Serviced: This measure indicates the total number of visits shut-off crews make to the delinquent accounts referred from WRB. In most cases, more than one visit is required to each account in order to properly resolve the delinquency (i.e., either terminate the water service or collect the payment due). This is largely a result of the crews' inability to access the curb box to shut-off the water service when the customer does not present the payment due (e.g., a car or other obstruction may be over curb box). During the moratorium season, the majority of the shut-off crews assist the Distribution unit in the repair of water main breaks while the remaining crews service the delinquent commercial accounts.

Accounts Serviced per Crew: This is a measure of the productivity of the crews and is calculated by totaling the number of crews addressing delinquent accounts and dividing by the total number of accounts those crews visited.

LOAD CONTROL

The Load Control Unit provides power-efficient pumping and transmission operations for the water distribution system and conducts a variety of surveys and tests of the system, consisting largely of leak detection work and hydraulic investigations. In addition, the unit performs the Operations Division's review of preliminary design drawings for water main replacement contracts, which are part of the capital program.

Miles of Pipeline Surveyed for Leaks: Leak detection is a key component of the Department's improved water accountability efforts, and this measure indicates the proactive or preventative maintenance activities performed by the unit's Leak Detection Squad to detect undiscovered leaks. The mileage has been previously scaled from the Water Distribution System Plate Maps of the entire City. Leak Detection crews are assigned 1 of the 124 maps at a time. For most of the assignments, leak survey work can be completed in a 1 to 3 month period. A few assignments are substantially more or less since the pipeline mileage can vary considerably among the different plate maps. There are approximately 3,200 miles of water main in the distribution system and the entire system is surveyed approximately every 3 years, with traditional high leakage areas surveyed annually and low leakage areas investigated on a 5-6 year interval. During the winter months, miles surveyed tends to be less due to the unit's response to requests for pinpointing known, difficult-to-find leaks ("referrals"). In addition, miles surveyed decreases when personnel are loaned to other units in Conveyance (such as to the Distribution unit to assist in the repair of breaks in the winter, to Emergency and Support Services for increased shut-off activity in the spring, or in response to hydrant abuse in the summer). In general, high survey mileage, comparing year-to-year trends, suggests the system is in good condition. It indicates that crews have the time to survey for unknown leaks rather than respond to complaint-driven, referrals and also that crews are not finding a high number of leaks in their survey work.

Peak Electric Power Demand: This measure indicates the maximum rate of power usage, in kilowatts, used by all the pumping stations during PECO Energy's "peak" demand period (business hours, Monday through Friday). Since PECO Energy encounters its largest generating requirements during business hours, it configures its rate structure to provide large power users with the incentive to minimize their maximum rate of power usage during these hours. The unit's goal is to meet the demand for water while minimizing the electric power demand during these peak hours to optimize the system's pumping power costs. The unit keeps the weekday electric power demand low by maximizing pumping to water reservoirs at night (when the electric) rates are lower and allowing reservoir water to supplement low daytime pump rates. The unit tracks its progress against this goal through the use of a "baseline" or estimated minimum kilowatt demand needed to operate the system as it is currently structured and meet the current water demand. This baseline is currently estimated at 184,000 kilowatts, and will increase with any changes in the system's structure that limits the unit's ability to pump and store water at night. Such changes generally involve the availability of mains and reservoirs that can result from capital improvement projects, preventative maintenance activity, and pump failures.

Water Main Replacement Contracts Review Function: These measures track the number of preliminary design drawing that were reviewed by the Load Control Unit and returned to the Design Branch. Load Control engineers and technicians provide the Operations Division input to these designs before they are finalized and advertised for bid. Detailed comments on specific operational requirements are included as well as scheduling parameters or other pertinent information. Also, operational databases for valves, fire hydrants and other systems are updated with the information regarding facilities to be renewed by these contracts. Three measures are tracked in evaluating this work:

Number of Contracts Reviewed: Simply the number as provided by the Design Branch from their own designs or those of consultants. The scope of each contract can vary with as little as one city block of pipeline replacement (0.1 mile) to over 2 miles.

New Pipeline Miles: This is a measure of the total miles of main in the design drawings that were reviewed by the Unit. This number includes design drawings that are reviewed by the unit for a second or third time.

Average Time: This measure indicates the number of calendar days it took for the unit to review the design, from the date it was received by Load Control to the date it was returned to the Design Branch.

PUMPING

The Pumping unit is responsible for maintaining approximately 100 pumps used throughout the water system in the transmission and distribution of raw and treated water. This includes large wash water pumps located at the water treatment plants and used in the treatment process as well as all pumps used in the distribution of the finished water to customers.

Availability: This measures the percent of time in the month that all the pumps maintained by the unit are available for use. The availability measure is calculated by totaling the actual number of hours the pumps were in-service and available to run during the month divided by the total possible running hours of all the pumps (i.e., 100 pumps x 24 hours x 30 days = 72,000 possible running hours), and expressing the result as a percentage. The unit has an intensive preventative maintenance program that greatly helps in keeping pump availability above 90%. Yet because of this maintenance routine, 100% availability is not achievable and in addition, the accessibility of spare parts for pump repair will affect the availability measure. Out-of-service pump hours due to both preventative maintenance work and the capital improvement program are kept to a minimum during the summer's high water demand season. Thus, availability will generally be higher in the summer than any other time of the year. In addition, pump availability is an integral measure for the Conveyance unit's cost conservation program to reduce pumping and electricity use during peak periods.

Productivity: This measure indicates how well the unit's planned maintenance routine is in preventing pump failures. It is calculated by totaling the number of hours laborers spent on planned or scheduled maintenance activities and dividing by the total number of hours laborers spent on all maintenance (including corrective and planned activities). The measure includes all maintenance performed by Pumping, including reservoirs and system appurtenance, as well as pumps. The calculation, however, does not include hours spent by administrative or other support staff and does not consider the number of maintenance jobs, only the hours spent on repairs. 100% productivity is not a cost-effective achievement for the unit, although it has had great success in keeping productivity above 90% through its extensive database that catalogs all maintenance activity over the last decade. This data is used to predict the cause of pump failures and is the driver for the unit's planned maintenance routine. The productivity measure is an indicator for pump availability and the two measures will generally parallel one another (i.e., high productivity will correspond to high availability).

Station Efficiency: This measure indicates how efficient the Department's 15 pumping stations are in their use of electricity to pump water. This measure is presented as an aggregated average for all the Department's pump stations and is not weighted for the relative amount of work performed by each station. The efficiency calculation is as follows: ((million gallons of water pumped) x (average monthly pressure that water was pumped) x (a constant of 3.13)) / (kilowatts of electricity used). The flow and pressure data is supplied by the Load Control unit while the electricity data is taken from the station's kilowatt hour meters and in some cases includes more than just the kilowatts used by the pumps (i.e., station heating and lighting are also included). The unit's goal is to keep the average station efficiency at or above 70% and can vary for a number of reasons. Worn pump parts, mechanical or electrical problems, meter errors, and distribution system conditions/restrictions can all cause the station efficiency measure to vary.

FINANCE

The Finance division oversees all Water Department expenditures made for the day to day operation of the utility and improvements to the capital infrastructure. It's capital and operating responsibilities including accounting, auditing, budgeting, purchasing, and rates analysis.

BUDGET

Professional Services - New Contract Requests / Contract Amendments: Once a vendor for the provision of professional services has been selected, a contract can be secured with that vendor in one of two ways: 1) initiation of a new contract, or 2) amendment of an existing contract with the vendor. These contracts go through an extensive development process, where once the Budget unit has reviewed the contract request, it is sent to the Law Department for drafting. The Law Department sends the drafted contract to the Budget unit for review and mailing to the vendor. Once the vendor has signed and returned the contract to the Budget unit without exceptions, the contract can be finalized and conformed by the Law Department. New contracts typically take about twice as long to conform as contract amendments. The monthly measures tracked for new contract and contract amendment requests include the number of requests made, the number of contracts that were conformed, the average number of days for review by the Water Department, Law Department, Vendor, and final conformance, and the total number of days for external review.

CAPITAL ACCOUNTING

Public Works Projects – Estimates Processed within 4 Working Days: Estimates are requests for payment to contractors performing work on capital program. The Projects Control and Construction units are responsible for overseeing this work and determining the amount of payment (or estimate) the contractor is due, and sends their estimate to the Capital Accounting unit for processing. Once the Capital Accounting unit has processed and approved the payment to the contractor, the estimate is sent to the central Finance Department for further processing. This measure tracks the percent of estimates (or requests for payment to capital program contractors) processed by the Capital Accounting unit within 4 days of receiving the estimate. The unit's goal is to process 95% of all estimates received within 4 working days.

Professional Services Contracts – Invoices Processed within 10 Working Days: Invoices for consultants performing work for the Department under a professional service contract. These invoices are sent directly to the Capital Accounting unit from the consultant performing the work. Capital Accounting verifies with the City project manager that the consultant's work was actually completed. Once this verification has been made, the request can be processed, approved for payment, and sent to the central Finance Department for further processing. This measure tracks the percent of invoices processed by the Capital Accounting unit within 10 days of receipt. The unit's goal is to process 90% of all invoices received within 10 working days.

OPERATING FUND ACCOUNTING

Number of Invoices Processed: The number of invoices processed and approved for payments for materials, services, equipment, and supplies purchased by the Department. Once approved, these invoices are sent to central Finance for further processing. The number of days required by the Operating Fund Accounting unit to process these invoices will not be available until FAMIS is reprogrammed.

PROCUREMENT ADMINISTRATION

The Procurement Administration Unit (PAU) provides the Water Department's centralized review and monitoring of purchase requests. It assures that the request is conformed to meet the requirements of the central Procurement Department and serves as the liaison to the Procurement Department to inquire into inordinate delays, resolve problems, and promulgate procedural changes to PWD unit requisitioners. PAU currently tracks all PWD purchase requests through two computer systems: the Advanced Purchasing Inventory Control System (ADPICS) and the Requisition Tracking System (RTS). PAU also provides training to unit requisitioners, as needed. There are basically two steps in purchasing. The first is the requisition or request from the requisitioning department, to the central agency, for specific goods or services. The second is the purchase order created by the central agency giving approval to proceed with the purchasing requested. A purchase order can be for a one-time purchase, or for a number of intermittent purchases, as in a requirements contract (see below).

Small Order Purchases: Purchases are for items greater than \$500, the petty cash limit, and less than \$11,000, the point at which a formal contract is required by the City. At least three bids must be solicited from vendors, at which point the purchase order is entered into ADPICS. Under current procedures, the unit requisitioner solicits the bids and enters the data *directly* into the system. In effect, the purchase order is created by the requisitioners efforts, and precludes further vendor solicitation or processing effort by the Procurement Department. (This is different from the other purchasing methods in that they require a requisition, requesting the Procurement Department to create a purchase order. Procurement then does the requisite work to create the purchase order). PAU then reviews this small order purchase for content and conformance before it is sent on to the Procurement Department. Paper work relating to the bids follows the computerized purchase order to the Procurement Department, and upon their formal approval, the purchase order is "released," or approved by the central agency.

Paper (Manual) Requisitions: Requisitions used to request purchase orders for amounts greater than \$11,000, which require a formal contract. They can be of two kinds: a firm limit contract or a requirements contract (defined below). These requisitions are tracked by RTS, to which Procurement Department inputs the data. After the requisition is approved and a contract is written, the purchase order is created. This gives the unit requisitioner the authority to move forward with the purchase.

- **Requirements Contract:** A contract for the *anticipated* purchase of goods or services, as needed, or over a specified period of time, usually one year. The goods or services can be ordered at any time during this period, or in *partial quantities*, as stated in the contract. A minimum or maximum amount of purchase is not guaranteed to the vendor.
- **Firm Limit Contract:** A contract that cannot exceed the stated dollar amount or quantity of goods or services. This type of contract differs from the requirements contract in that it cannot be used to receive or pay for partial quantities.

Average Days to Purchase Order Released: The average number of days from the date the requisition was received in Procurement Department to the date the actual purchase order was approved. This measure tracks paper requisitions - those used to initiate formal contracts. The service level measures in the spreadsheet reflect the much longer period of time these requisitions require for central agency approval, which includes a formal contract, reviewed and approved by the Law Department.

ADPICS Requisitions: Computer entered requisitions against approved purchase orders. In other words, the requisitioner needs only to initiate the purchase process via a requisition. These are differentiated from Small Order purchases, also in ADPICS, in that the Small Order purchases do not require a requisition. The purchase order *and* requisition are, in effect, created at the same time the Small Order is approved.

Days, PWD Approval to Encumbrance: The number of days from the date PAU forwards an ADPICS requisition or small order purchase, to the date encumbrance is made by the Finance Department. (The encumbrance date is when a purchase is charged to an appropriation that has been reserved for it by the Finance Department. Basically, this means that the purchase is ready to proceed.)

INFORMATION SCIENCE AND TECHNOLOGY

The Information Science and Technology Division is responsible for oversight and maintenance of the Department's information infrastructure. Close monitoring of this infrastructure is important not only to detect and solve problems shortly after they occur but also to help avoid problems before they occur. Performance is monitored on the Department's multiple local area networks (LANs) and wide area networks (WANs). A LAN is a relatively small collection of devices (such as computers, printers, scanners, etc.) connected to one another via a hub for sharing and transmitting data. A WAN is a network similar in configuration and operation to a LAN yet this network of devices links to different physical locations through telephone lines and the use of a router. Network performance is measured by tracking the number of outages, the utilization or volume of information transmitted across the networks, and an index of overall health.

NETWORK AVAILABILITY

Number of Outages (LANs and WANs): Availability of the Department's LAN and WAN segments. This measure records the number and duration of periods when the LAN or WAN is inoperative. Over time, the number and duration of outages should not increase.

NETWORK UTILIZATION

Weekly Volume Leaders (LANs and WANs): Units with the highest volume of traffic across the network for each week in the month on particular LAN and WAN systems. The traffic across the WAN is measured in megabytes while the traffic across individual LAN is measured in gigabytes. The maximum amount of traffic that the LAN and WAN systems can handle without any affect on performance is currently being determined. Tracking this measure over time will give an indication of how much the networks are being used and help with infrastructure capacity decisions.

NETWORK HEALTH

Network Health Index (LAN and WAN): Identifies when problems with the network, individual system, or WAN link may be combining to contribute to poor performance. Generally defined, the health index is the average of values assigned to particular error elements (such as data collisions, discarded frames, communication errors, ethernet errors, etc.) based on the number of errors and their severity. The index ranges from zero to sixteen, and a high health index indicates a problem while a low health index indicates a healthy network.

OPERATIONS ADMINISTRATION – METERING

The Metering unit is responsible for repairing, testing and changing, when necessary, approximately 500,000 meters used in billing water and sewer charges. Meters should register water usage within close limits of plus or minus 2% accuracy, to ensure that charges are equitably distributed among all customers, and that loss of revenue through under-registration is kept to an absolute minimum. The meters can be regarded as the “cash registers” of the Department.

INSTALLATIONS - NEW

Service & Meter Permits: The number of permits issued by L&I staff (which PWD funds) for a *new* water service and meter, or an *additional* water service and meter. The permits can be issued separately, or together. The service permit must be issued to a registered plumber. The meter permit can be issued to a plumber, but generally is issued to a contractor or the customer. For service only permits, the Distribution unit is involved instead of Metering.

INSTALLATIONS - REPLACEMENTS

Rotations: This indicates the number of scheduled meter replacements completed by Water Meter Service Workers (WMSW's) or Water Meter Repair Workers (WMRW's), as part of the department's maintenance routine. Generally, the WMSW's rotate small meters (1" and under) and WMRW's rotate large meters (3" and above). These meters are usually rotated based on their age or a technology change, such as Automatic Meter Reading. (There is an established schedule for changing meters due to age: 5/8" and 3/4" meters are changed every 20 years; 1" and 1 1/2" every 10 years; 3", 4" and 6" every 4 years; 8" and 10" every 2 years. The reason for the significantly shorter rotation for the larger meters is due to the heavy water flows they experience.)

Missing: The number of meters that have been reported as missing and whose location replaced. Generally, the meter reader reports this, but sometimes the customer may report it. Usually, the WRB first learns of this situation and reports it to Metering.

Size Change: The number of meters that have been changed in size to reflect actual water demand. A meter size that best reflects actual usage has more accurate registration, especially at low flow rates. These size changes are generally initiated by Metering under a program of continuous review for larger meters (3" to 10").

Other: The number of other reasons for a meter replacement, such as a non-registering meter, a meter damaged by freezing, a leaking meter, a noisy meter that the customer complains about, or one with a broken glass cover. Generally, the meter reader reports these conditions, but sometimes the customer reports it, usually to WRB, who reports it to Metering.

BILLING INVESTIGATIONS

The number of meter investigations made by WMSW's or WMRW's to verify the validity of the meter's registration of water. The customer, the Water Revenue Bureau, or the Water Department can initiate these inquiries. "\$ Value" refers to the net dollars gained as a result of any billing adjustments made. It could also include any fees for "special tests" requested by customers who doubt the validity of their meters. When a billing investigation is conducted and the meter is found to be accurate, a service fee ranging from \$25 (for 5/8" and 3/4" meters) to \$500 (for the largest meters) is charged. If the meter is found to be inaccurate, however, no fee is charged.

OPERATIONS ADMINISTRATION / PUBLIC AFFAIRS

HOMEOWNERS EMERGENCY LOAN PROGRAM

The Homeowners Emergency Loan Program (HELP) is a zero interest loan program to assist homeowners who are issued a water supply or drainage violation from PWD. Violations and subsequent repairs fall into 3 main categories: water service repairs; sewer service repairs; and repairs of defective laterals (i.e., sanitary sewer laterals are improperly connected to the stormwater system). Activity in the loan program tracks the volume of violations issued.

Completed and Billed Repairs: The number and total volume of jobs for which the plumber has completed the repair and invoiced PWD for their work performed, by major category. The cycle time from when the homeowner signs the loan agreement to the completion and billing of the repair job by the plumber is typically 2 months. Thus, repairs that appear in the completed and billed category usually began in the prior month.

Backlog: These measures track the repair work that is in progress:

Completed and not Billed Work: The total number and value of repair jobs, aggregated for all repair categories, where the plumber has finished the job but not yet invoiced PWD for their work performed. Once the plumber submits their invoice, the job will move into the completed and billed category.

Work-in-Progress: The total number of homeowners who have been approved for a loan and the total value of those loans, aggregated for all repair categories. These repairs are in the process of being made by the homeowners, and when the plumber has completed the work, the job will move into the completed and not billed category.

Total Water, Sewer, and Defective Lateral Repairs: The total value of funds that have been committed to the loan program for the month. It is calculated by totaling all the repair jobs and their value for the month (completed and billed + completed and not billed + work-in-progress).

New Applications Received: This measure tracks the number of loan applications filled out by homeowners and indicates the demand for the program.

Total Calls Received and Answered: This measure tracks both the number of telephone calls received by PWD about the loan program and also all telephone calls made by PWD to resolve a homeowner's inquiry. This measure is another indicator for the demand of the program and also provides an indication of the loan administrator's workload.

PUBLIC AFFAIRS

The Public Affairs division is responsible for the development and distribution of public relation materials, public education programs, and the operation of the customer information call center.

CUSTOMER INFORMATION

Call Abandonment Rate: The percent of telephone calls that enter the automatic call data system and disconnect before a customer service representative speaks to them. This measure is calculated by totaling the number of calls that are received by the system and dividing by the total number of calls that were abandoned by the caller before getting to a customer service representative. This measure includes calls where the caller hangs up after getting the required information from the automatic messages (e.g., bill payment locations, telephone number for billing inquiries, etc.) as well as callers who hang up after being placed on-hold for a customer service representative. This measure will generally increase in the summer when more calls are received regarding illegal hydrant activity.

LABOR COSTS

Class 100 Expenditures: The actual monthly expenditure on labor costs, in dollars. It is calculated by totaling the payroll costs, inclusive of overtime and exclusive of fringe benefit expenses, for the pay periods in the month and estimating the expenditure for days in the month not covered in the pay period. Increases in labor costs indicate possible overtime expenditures.

OVERTIME

Overtime for Shift Workers: The percentage of base labor costs expended on overtime for all "shift" workers. Shift workers fill positions that need to be staffed twenty-four hours a day (e.g., controlling the plant's treatment processes). Since these positions cannot be left vacant as most non-shift positions can, any vacancies caused by long- or short-term circumstances (e.g., vacation and sick time) will almost always result directly in overtime expenditures. Generally, it is the Department's goal to keep these costs below 45% of base labor costs.

Overtime for Non-Shift Workers: The percentage of base labor costs expended on overtime for all "non-shift" workers. Non-shift workers are generally day workers in positions that do not need to be staffed twenty-four hours a day. Overtime worked by individuals in non-shift positions is closely monitored and managed and the goal is to generally keep these costs below 11% of base labor costs through careful scheduling of planned maintenance activity. Position vacancies or emergency maintenance can, however, increase overtime expenditures by non-shift workers.

Total Overtime: The percentage of base labor costs (for all types of workers) that were expended on overtime.

CHLORINE MINIMIZATION PROGRAM

Chlorine Dosage: The pounds of chlorine applied to the treated wastewater to disinfect any remaining toxic impurities prior to discharge to the river. The disinfection process is designed to kill or inactivate most microorganisms in wastewater, including essentially all pathogenic bacteria. There are several ways to disinfect, with chlorination being most frequently used in water and wastewater treatment plants. The Department's NPDES requirement is to disinfect our effluent and not to sterilize it (sterilization is the removal or destruction of all microorganisms, including pathogenic and other bacterial, vegetative forms, and spores). The dosage applied depends upon the strength and chemical composition of the wastewater, the efficiency of the mixing system, contact time, and pH and temperature of the wastewater. Thus, the dosage varies significantly from plant to plant.

Chlorine Cost per MGD: The monthly chlorine expenditure divided by the average monthly flow of wastewater treated. The cost of chlorine can change from year-to-year, which may result in significant yearly variations in this measure. In FY97 and FY98, however, the cost to purchase the chemicals will remain the same, due to multiyear contracts with the chemical suppliers.

Total Chlorine Residual (TRC): The amount of available chlorine remaining after a given contact time with the wastewater. Basically, it is calculated by taking the chlorine applied and subtracting the chlorine demand of the wastewater. The presence of residual chlorine is important as an indicator that demand has been met; however, excessive chlorine can kill beneficial life in the receiving stream. Therefore, chlorine minimization is important to reduce negative impact to the river environment. The measure is expressed as mg/l and the Department's current goal for this measure is less than or equal to 0.6 mg/l. Under the next NPDES permit beginning on September 28, 1998, a TRC limit of 0.5mg/l is likely to be imposed.

SLUDGE FEED TO BRC

The solid material removed during the wastewater treatment. This measure is normally expressed by weight in dry tons (excluding the liquid portion) or by volume in gallons since the material is practically all liquid (2-3% solids and 97-98% liquid). The sludge is the waste product that remains subsequent to initial thickening and controlled decomposition by the wastewater facility, which results in pathogen and mass reduction. This waste is then sent to BRC for further processing, which provides additional mass and pathogen reduction, and ultimate disposal via environmentally beneficial programs. These feed measures are subject to change based on the quality and quantity of the wastewater received at the facilities and the degree of treatment provided.

Percent Total Solids: The portion of the sludge material sent to BRC for processing that consists of solids, expressed as a percent. This measure is taken after the sludge has been processed by the wastewater treatment plant's solids handling facility (i.e., the digester), and this process will reduce the sludge to a more viscous material and destroy the remaining volatile compounds. The greater percent solids of the sludge that entered the solids facility, the greater the percent solids in the sludge that is sent to BRC for processing. A realistic range of percent total solids is 2.0% to 2.5%. Generally, operational difficulties in the cold weather cause less efficiency in the plant's solids handling processes, which cause percent total solids to increase.

WATER TREATMENT PLANTS

The Department's three water treatment plants, Baxter, Belmont, and Queen Lane, treat the raw water drawn from the Delaware and Schuylkill rivers so that it is safe and clean for drinking, fire fighting, and all other uses. Plant performance is measured using the key operational inputs, efficiency measures, and outputs of the water treatment process. These include the amount of water delivered to customers, the cost of labor and chemicals to treat the water, and the quality or purity of the treated water delivered to customers.

FLOW

Treated Water Delivered to Customers: The amount of treated water, in million gallons, that leaves the water plant and enters the conveyance system for delivery to customers. This measure presents the amount of water demanded by users and is a basic component for calculating and tracking water accountability. The amount of water treated and delivered will increase during the hot summer months as a result of increased water demand for general household purposes (e.g., watering the lawn, filling swimming pools, etc.) and also increased illegal hydrant use. Additionally, water flow may increase during winter months when extreme cold weather causes water mains to break and leak. Lastly, plant and water main construction activity may cause changes in the amount of water treated at the individual plants. Typically, a noticeable flow decrease at one plant is absorbed by an increase at another so that the total amount of water delivered from the three plants remains relatively constant and sufficient to meet demand.

Treatment Capacity Utilized: The percentage of the plant's maximum treatment capacity that is being used to meet the demand for water. It is calculated by taking the monthly average of raw water flow into the plant, in million gallons per day (MGD), and dividing by the plant's water treatment design capacity. This measure assumes that the plant is not under construction and operates as optimally designed for each day of the month. Treatment capacity utilized is a meaningful measure to give a sense of the excess capacity that could be employed to meet new water demand. It should be recognized, however, that it is unlikely that a facility will operate at the maximum design capacity except to meet unusual and short-lived demand requirements.

LABOR COSTS

Labor Cost Per Million Gallons of Water Delivered: Personnel expenditures for plant operation and maintenance per the amount of water delivered to customers. It is calculated by totaling the payroll costs, inclusive of overtime and exclusive of fringe benefit expenses, for the pay periods in the month (generally 2 but some months have 3 pay periods) and dividing by the monthly amount of treated water delivered to customers, in million gallons. This measure provides key operational expenditure data since labor costs are one of the largest expenses in the operation and maintenance of water treatment plants. Variations in this measure can be caused by position vacancies driving up overtime costs but are mostly a result of fluctuations in the plant's monthly flow of water delivered. For instance, since Baxter delivers almost four times as much water as Belmont and their labor costs are relatively similar in any given month, Baxter's performance for labor cost per million gallons of water treated is almost four times less than Belmont's.

OVERTIME

Overtime for Shift Workers: The percentage of base labor costs expended on overtime for all "shift" workers. Shift workers fill positions that need to be staffed twenty-four hours a day (e.g., controlling the plant's treatment processes). Since these positions cannot be left vacant as most non-shift positions can, any vacancies will almost always result directly in overtime expenditures.

Overtime for Non-Shift Workers: The percentage of base labor costs expended on overtime for all "non-shift" workers. Non-shift workers are generally day workers in positions that do not need to be staffed twenty-four hours a day. Overtime worked by individuals in non-shift positions is closely monitored and managed and should generally be kept below 9% of base labor costs by careful scheduling of planned maintenance activity. Position vacancies can, however, increase overtime expenditures by non-shift workers.

Total Overtime: The percentage of base labor costs (for all types of workers) that were expended on overtime.

CHEMICAL COSTS

Chemical Cost per Million Gallons of Water Treated and Delivered: The aggregated cost of chemicals used in the water treatment process per million gallons of water treated and delivered. The components of this aggregated total are calculated by multiplying the per pound cost of each chemical by the pounds of the chemical used, and dividing by the monthly flow of the water at the point where the chemical was applied, in million gallons. Chemicals, like labor, are one of the largest expenses in the operation of a water treatment plant and thus this measure provides key operational data. The pounds of chemicals applied in the water treatment process depend upon several factors and will increase when: the treated water flow increases; improvements are desired in quality of the finished water; and also when the water quality fluctuates (e.g., following a rainstorm or an algae bloom event). Each of the plants use a slightly different mix of chemicals in their treatment processes, which makes direct comparisons of this measure between the plants difficult. In addition, chemical costs can change from year-to-year, which may result in significant yearly variations in this measure. In FY97 and FY98, however, the cost to purchase the chemicals will remain the same, due to multiyear contracts with the chemical suppliers.

WATER QUALITY

Turbidity: The "cloudiness" of the treated water. Turbidity is used by the state and federal regulatory authorities and the U.S. water industry as a representative measure of water quality, and is expressed as nephelometric turbidity units (ntu). Turbidity measurements are taken of the finished water by the plant's laboratory technician every three hours and those values are averaged over the entire month. As a participant in the national Partnership for Safe Water, a joint program of the US Environmental Protection Agency and the water industry, the Department has committed itself to a turbidity goal of less than 0.10 ntu. The current federal and state standard is 0.50 ntu for 95% of all samples and the Department's goal positions the utility to routinely achieve future more stringent regulatory requirements. For the Department to achieve its turbidity goal, additional chemical dosage is required in the water treatment process.

WATER REVENUE BUREAU

The Water Revenue Bureau (WRB) has four principal functions: revenue collection, meter reading, billing, and customer service. The meter reading unit is responsible for the accurate reporting of water use while the accounting unit is responsible for the accurate calculation of bills based on the water used. The customer service unit is responsible for addressing customer questions and concerns and for arranging payment agreements and the collection unit is responsible for the timely collection of all charges and fees due to the Water Department.

METER READING

Residential and Commercial: These measures track the activity of the meter reading unit in obtaining actual water consumption data. The total number of meters the unit attempted to read during the month is presented, by residential and commercial account categories. Several categories of responses are tracked regarding the meter reading unit's success in obtaining actual data. These categories include: the percent of attempted reads where actual data was successfully obtained; the percent of attempted reads where no response was received from the property owner; the percent of attempted reads where the property appears to be vacant; and the percent of attempted reads where some other factor prohibited a successful read of the meter (e.g., vicious dog, obstruction of the meter, etc.). The meter reading unit's goal is to obtain actual read data for 34% of residential accounts on a quarterly basis and 63% of commercial accounts on a monthly basis.

REINSPECTIONS

These measures track the reinspection activity of the meter reading unit and their investigation into accounts that have previously had their water service terminated by PWD's shut-off crews for non-payment. The reinspection crews visit a portion of these accounts to ensure that the customer has not illegally turned their water service back on. The measures of this activity track the number of accounts the crews inspected, the percent of those accounts inspected that had illegally turned their water service back on and had to be shut-off again, and the monies collected from customers who paid their outstanding balance to have their water service restored. Account reinspection does not occur during the moratorium season (December through March), and this enforcement activity increased significantly in FY97. In FY98, the meter reading unit has scheduled to reinspect 15,000 accounts.

CONSUMPTION

Gross Water and Gross Sewer: These measures track, by customer account type, the gross water consumption and gross sewer flow into our system, both in million gallons per day (MGD). These consumption figures exclude fire connection and surcharge accounts and all adjustments made to any category of account for billing purposes. This consumption data is fundamental information for the calculation of monthly customer billing and the water consumption data is essential for the Water Department's water accountability statistics. In FY98, gross water consumption is estimated to be 207 MGD while gross sewer consumption is estimated at 6.7 MGD.

Number of Accounts: These measures track the number of active (or billed) and inactive accounts for the month, combining water and sewer customer accounts together. These measures distinguish between active small meter and active large meter accounts, as the majority of the customer base is small-metered accounts. It is important to track the number of active accounts since these figures are a good indicator of monthly gross water and sewer consumption. Accounts may be placed in inactive status because the billing has been suspended following the shut-off of water service, the property is new and billing will begin when it is occupied, or the water service has been discontinued. The number of inactive accounts excludes vacant properties or lots that have had no activity for at least one year. The number of inactive accounts generally will vary most significantly due to changes in the number of accounts that have been shut-off.

CUSTOMER SERVICE

Inbound Telephone Calls: These measures track the activity of the call center in the customer service unit. The total number of calls received by the automatic call data system are tracked, and well as the percent of those calls that reached a customer service representative. Lastly, the average time a customer had to wait in the queue before being picked up by a customer service representative is also measured. In FY98, the customer call center expects to receive just over 600,000 calls, have 85% of those calls responded to by customer service representatives, and have customers wait a little over 4 minutes on hold before speaking to a representative.

Correspondence: This measure tracks the number of pieces of mail received by the customer service unit, including inquiries from customers as well as mail returned for wrong addresses.

Low Income Assistance Program: These measures track the number of grant applications that were received by the customer service unit for assistance with water bill payment and the percent of those applications (of the total applicant pool) that received a grant and entered into a payment agreement with the Bureau.

WATER STATISTICS

Categories and Components ¹

<u>CATEGORY</u>	<u>CHARACTERISTICS</u>	<u>TYPICAL COMPONENTS²</u>
Water Delivery (Master meter total)	Water input to distribution system	287.2 mgd for FY97
Customer Billed Usage (Total account usage)	Delivered, metered/estimated and billed	195.4 mgd for FY97
Permissible Usage³ (Non-account usage)	No permanent meter Measurable or estimable Confirmed to exist Site specific Permissible: either permanently or temporarily	<p>Delivery Withdrawal from the delivery system prior to reaching a permanent customer installation:</p> <ul style="list-style-type: none"> -Firefighting -System maintenance/flushing -Fire hydrant sprinkler program -Fire hydrant permits -Leakage awaiting capital program abatement -Unavoidable leakage -Master meter low flow tolerance <p>Destination Authorized unmetered customer usage</p> <ul style="list-style-type: none"> -Scheduled, S/M, unmetered fire connections -Community gardens -Customer meter low flow tolerance
True Unaccounted-for-Water⁴ (Water/revenue loss)	Cannot be measured in a practical manner Difficult/costly to verify Scattered-difficult to pinpoint	<p>Delivery Loss → Inflates Operational Costs</p> <ul style="list-style-type: none"> -Master meter malfunction -Recoverable leakage -Theft: Fire hydrant abuse/theft -Operational error -Data error <p>Destination Loss → Causes Revenue Loss</p> <ul style="list-style-type: none"> -Customer meter malfunction -Theft: Tampered meters, illegal restores -Data error: Poor estimates, meter reading error

Will be updated and modified at end of FY98

Not an exclusive list

Estimates identified at this time for 20-25% of unbilled water

Estimates identified at this time for 44-52% of unbilled water