

Water Loss Control for Small Utilities - How to Identify and Control Water Losses

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Information upcoming

Data to identify and

control water losses

Indicators of a Problem

What are the data points to be aware of?

-master meter / pumping station volume.

- Reservoir / storage levels dropping.
- Pumping run times increasing.
- Inability to maintain pressure / flow to distribution.

Customer Reports are a Great Resource

When there are issues at the customer level you will likely hear from them, as example low pressure / dirty water.

- If not a regular procedure, set up a process to record and document customer feedback.
- Follow up with an onsite visit to put eyes on the situation to determine validity of report and what action is needed to resolve the problem.

Recording of Data Will Be a Good Tool to Identify Trends

Multiple calls from one general service area is good field feedback.

- For this presentation topic; a number of low pressure complaints are likely an indicator of pump failure and or leak within the distribution network.
- Follow up with an onsite visit to put eyes on the situation

How Well Do You Know Your System?

Water losses can be challenging to determine for systems that are not fully metered.

- Small systems are at a disadvantage if only metering source usage / demand from storage system.
- During a drought condition (summer months) higher usage may be actual not due to leaks.

Process to Implement Regardless of Metering Status

Conduct water audit procedure on an ongoing basis for your system.

- Objective is to compare water production vs. water used within the distribution network.

Water Out vs. Water Used

Objective is to determine gallons used in the network for a given time period.

- For systems that are not fully metered (for all connections in the distribution network) what options are there to determine volume out?

Water Audit Benchmark

For situations where leaks are suspected standing audit info can be referenced to determine increase in water demand is unusual or within specified parameters and or consistent with customer needs.

Various Reasons for Water Loss Other Than Leaks

Meter inaccuracy

- Human errors reading / recording info
- Unmetered connections
- Theft

Have Trigger Determined in Advance of High Usage Situations

As noted in earlier portion of the webinar more stringent conservation measures are implemented based on a *trigger* volume.

- Your system should have historical data recorded/plotted.
- Compare current use situation to averages and totals from past operational periods.

Use Master Meter to Check Flow

For system with majority residential check flow rate in early morning hours.

- Example: Check flow out to distribution from 2 am to 3 am.
- Idealized example here and piping arrangements determine if this technique is valid



1-Hour Volume Check

Determine GPM flow for time of day noted - flow rates should be, “low.”

- A relative term in this instance and you will have to determine if reasonable for your system.
- With this approach should obtain a low figure.



Is Isolation Procedure Needed?

Many small pws don't meter off the storage system but only have master meter at source(s).

- Could be scenarios where an supply to the given storage system is stopped and physical measurement of head level drop over certain time period can be used to calculate GPM sent to distribution network.

Variations on Process to Determine Use in Distribution

If hydro-pneumatic system (and or series of pressure tanks) may not be an option to get flow out.

- Variations of procedures to measure supply volume to the distribution network are as varied as number of systems.
- Be sure to record your check process in Operation and Maintenance Manual Reference.

Actual Use May Appear as Leak

A leaking toilet valve or dripping faucet can result in significant losses that could be interpreted as a leak.

- Update customers and have them check faucets and toilets.

With Data Indicating a Leak

Implement leak detection process.

- In advance of specialized procedures such as listening device and or data logger work you can check for normal operating pressure in various locations of the distribution network.
- One challenge is leaks don't always surface, particularly in well drained soils.

For systems with stormwater collection inspect inverts for unusually inflow.

Pressure as an data point

For many small systems I have done leak investigations on this is a valuable tool.

- Can check pressure at fire hydrants for those with them and can use a standard pressure gauge with a hose bibb adapter for checks at various customer locations.
- As with other information for your system you should have some historical data on normal operating pressures.

Implement Isolation Procedures for Certain Portions of Distribution

As field investigations progress isolating certain service sections is often needed.

Given the character of many New England systems as with Connecticut many have linear distribution networks so shutdowns can impact many customers.

Eyes on the Distribution Network / System

Certain times of the year and or given climatic conditions can be useful in field investigations.

- Examples: Drought conditions - area not regularly watered - grass is green instead of brown.
- Light snow covered and an area melted out due to warmer ground due to leaked water from the distribution network.

Problems Causing Losses / Leaks

Storage tank overflows

- Stuck air relief valves
- Pumps (stuck in on mode)
- New or recently repaired lines
- Cracked meter bottoms
- Improper operation (closing of hydrants)

Button Up The Leaks

Multiple benefit from continually repairing leaks;

-lost water is waste of the resource and a direct cost to your bottom line.

-if losing water recognize this means the integrity of system is compromised; if water can get out than untreated water can get in and that is a cross connection scenario.

Leak Detection

Specialized instrumentation that may be tool inhouse and or hired out service.

- Will be conducting direct listening on hydrants, valves, curb stops, any other direct listening locations.
- Can use ground microphone for paved and other hard surface areas. For this application, location of water line is needed as listening is occurring directly over the buried line.

Leak Sounds are Unique Signatures

Volume of leak, pressure, type of pipe material where leak is occurring all contribute to sound signature.

- In addition, soil types, overburden, frost vs. not and soil moisture can impact sound signature of a given leak.

Listening Devices Not Just Auditory Indicator

Listening device amplifies unique sound.

- Individual operating the device is listening for this unique sound signature.
- Bit of art and science to listening techniques and takes practice.
- Some devices have LCD read-out with intensity indicated and or option to fine listening frequency.

Problems Identified at Curb Stop Locations

Frequently for small systems leaks are identified at a curb stop locations.

- Your system should have very clear policy on where responsibility for infrastructure repairs are delegated.
- If problem indicated at a curb stop exercise process to evaluate upstream or downstream. additional process of exercising the curb stop may be needed.

Data Logging

Next step up from direct listening device is data logging equipment.

- Pertinent for those systems with hydrants and or gate valves in the distribution network. Not a good option if majority of system consists of curbstops only.

Data Logging

Minimum of two reading devices are deployed (attached via magnet to direct listening points). ext step up from direct listening device would be data logging equipment. One brand name is Z Corr.

These devices record the specific sounds emitted from attachment point.

The devices are then download to computer base and program provides info on area analyzed.

Data Logging

For sound signature indicating leak program plots a graph with peak to indicate intensity and distance from / between data log devices.

- Follow up step is to ground mike the area indicated to obtain another piece of data to validate the problem.



When a Leak Sound is Determined

Prior to digging a suspected leak follow digsafe procedures and other worker safety protocol (trenching, confined space, traffic safety control, etc.)

Implement Repair Actions When Issues Identified

Leaks Do Not Repair Themselves.

Implement a Repair Plan Now.

- Delays in Repair Procedures Often Lead to a Bigger Problem.



For Those You Supply With Master Meters

Supplying to users such as mobile home park or similar with a master meter feeding the given development - check with their operations personnel regarding troubleshooting and or getting their feedback on suspected problems. out contact the department.

Absolutely Check and Put Eyes on Vacant Locations

Unoccupied locations need to be checked.

If still in a service provided scenario what is integrity of the system from curbstop / meter to that locations plumbing network.

No Luck Finding Problem - Ask For Assistance From Customers

If field investigations do not lead to an identifiable problem put a notice out to your service audience.

- Indicate you suspect a leak and in the event anyone is experiencing lower than normal pressure or has observed standing water or melt out contact the department.

Take Away Info

Conduct audits and leak surveys on a regular basis.

- Record Data.
- Update Records (normal usage, pressure, map info).
- If you suspect or are aware of a problem resolve the issue, leaks do not repair themselves.

Questions / Comments

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