



YOUR TEAM FOR SECURE + RELIABLE

# Water System Solutions



PROPOSAL TO PROVIDE

## Water Loss Control

Village of Oak Park, IL., Project #19-117

March 25, 2019





March 25, 2019

James Eggen, P.E.  
Interim Water & Sewer Superintendent  
201 South Blvd.  
Oak Park, IL 60302

Dear Mr. Eggen:

M.E. Simpson Co., Inc. is pleased to present the Village of Oak Park our proposal for the Village's Water Loss Control Program, Project 19-117. We are honored to be considered for this work and are confident our team will help make the project a success.

M.E. Simpson Co., Inc. is a Professional Services Firm dedicated to developing and providing programs and services designed to maximize peak performance for our clients' water distribution systems. Many of these programs are universally recognized as a part of "Best Management Practices" (BMPs) for utilities. We pride ourselves on delivering solid solutions using the highest quality technical and professional services by way of state-of-the-art technology and a skilled and well-trained staff of professionals. Our highly educated engineers and technical team are committed to the success of this project. They will be ready at a moment's notice to relieve your staff's burden and ensure a seamless continuation of your services.

Our services were developed and refined to provide utilities with programs that can be customized to meet their needs. From complete "Turn-Key" services to assisting with the development of "in-house" programs for utilities, M.E. Simpson Co., Inc. serves our clients with this ultimate goal: to deliver to the public the implicit faith that **"the water is always safe to drink"**.

Thank you for your consideration and this opportunity to acquaint you with our Water Valve Assessment Services and offer this response. We are committed to exceeding your expectations.

Sincerely,

A handwritten signature in blue ink that reads "John H. Van Arsdel".

John H. Van Arsdel  
Vice President

John H. Van Arsdel  
Vice President

3406 Enterprise Avenue  
Valparaiso, IN 46383

800.255.1521 P  
888.531.2444 F

john@mesimpson.com

**SECTION IV**  
**PROPOSAL FORM (Pricing)**

THE UNDERSIGNED PROPOSES TO FURNISH EQUIPMENT, MANPOWER AND MATERIAL TO COMPLETE THE WORK AS SPECIFIED HEREIN AS INSTRUCTED BY THE PUBLIC WORKS DEPARTMENT, VILLAGE OF OAK PARK, 201 SOUTH BOULEVARD, OAK PARK, IL 60302.

**Fee Proposal: Water Loss Control Program**

M.E. Simpson Co., Inc. proposes to provide the necessary professional services for this project as follows:

Item	Description	Qty	Unit	Unit Cost **	Total Cost
1	SYSTEM ANALYSIS, PROJECT PLAN, AND FINAL REPORT	1	LS	\$19,900.00	\$19,900.00
2	*LARGE WATER METER EVALUATION, TESTING, AND REPAIR				\$57,700.00
3	PRODUCTION METER TESTING	1	LS	\$8,550.00	\$8,550.00
4	METER TESTING PARTS ALLOWANCE	-	-	-	\$5,000.00
5	WATER DISTRIBUTION SYSTEM LEAK SURVEY	106	MILES	\$185.00	\$19,610.00
6	LEAK SURVEY ALLOWANCE	-	-	-	\$5,000.00
<b>TOTAL PROPOSAL:</b>					<b>\$115,760.00</b>

\* Total from Proposal schedule total for Tasks 2 on following page.

\*\* All incidental costs / travel are to be included in Unit Cost for Items 1 - 6.

**SUBMITTED BY:**

M.E. Simpson Co., Inc.

Firm Name

John H. Van Arsdel

Authorized Representative

John H. Van Arsdel  
Signature

Vice President

Title

3.25.19

Date

**Complete table for item unit pricing. Quantities are approximated.**

<b>VILLAGE OF OAK PARK</b> <b>WATER LOSS CONTROL PROGRAM - 2019</b> <b>TASK 2 - LARGE WATER METER TESTING</b> <b>SCHEDULE OF PRICES</b> <b>METER TESTING &amp; REPAIR</b>					
ITEM NO.	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE	COST
1	1 1/2" TO 2" DISPLACEMENT METER PRETEST-SINK TEST	5	EACH	\$250.00	\$1,250.00
2	1 1/2" TO 2" DISPLACEMENT METER PRETEST- TEST IN PLACE	5	EACH	\$250.00	\$1,250.00
3	1 1/2" TO 2" DISPLACEMENT METER PRETEST-METER PULLED	5	EACH	\$275.00	\$1,375.00
4	1 1/2" TO 3" TURBINE OR COMPOUND METER PRETEST-IN PLACE	60	EACH	\$295.00	\$17,700.00
5	1 1/2" TO 3" TURBINE OR COMPOUND METER REPAIR & POST TEST-IN PLACE	15	EACH	\$150.00	\$2,250.00
6	1 1/2" TO 3" TURBINE METER PRETEST-MEASURING ELEMENT PULLED	30	EACH	\$335.00	\$10,050.00
7	1 1/2 TO 3" TURBINE METER - REPAIR AND POST-TEST-MEASURING ELEMENT PULLED	25	EACH	\$150.00	\$3,750.00
8	4" TO 6" TURBINE OR COMPOUND METER PRETEST-IN PLACE	25	EACH	\$295.00	\$7,375.00
9	4" TO 6" TURBINE OR COMPOUND METER REPAIR AND POST-RETEST-IN PLACE	8	EACH	\$150.00	\$1,200.00
10	4" TO 6" TURBINE METER PRETEST-MEASURING ELEMENT PULLED	5	EACH	\$375.00	\$1,875.00
11	4" TO 6" TURBINE METER, REPAIR AND POST-TEST-MEASURING ELEMENT PULLED	3	EACH	\$150.00	\$450.00
12	PRE-REPLACEMENT INSPECTION	15	EACH	\$195.00	\$2,925.00
13	2-MAN CREW RATE FOR SPECIALTY REPAIRS (LABOR ONLY)	10	HOUR	\$250.00	\$2,500.00
14	3-MAN CREW RATE FOR SPECIALTY REPAIRS (LABOR ONLY)	10	HOUR	\$375.00	\$3,750.00
TASK 2 - SUBTOTAL COST:					\$57,700.00

(Insert this schedule total as a subtotal on Item 2 line on previous page)

M.E. Simpson Co., Inc.  
 Firm Name

**MUNICIPAL QUALIFICATION REFERENCE SHEET**

Proposers shall furnish a minimum of four (4) references from projects similar in scope within the last two (2) years.

MUNICIPALITY

**\*\* References are contained in the Proposal, pages 47-54.**

ADDRESS

CONTACT

PHONE

WORK

PERFORMED

MUNICIPALITY

ADDRESS

CONTACT

PHONE

WORK

PERFORMED

MUNICIPALITY

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**SECTION V**  
**PROPOSER CERTIFICATION**

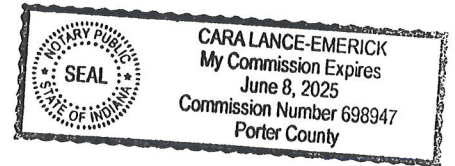
M.E. Simpson Co., Inc., as part of its Proposal on an agreement for Water Loss Control Program for the Village of Oak Park, hereby certifies that said Proposer selected is not barred from proposing on the aforementioned agreement as a result of a violation to either Section 33E-3 or 33E-4 of Article 33E of Chapter 38 of the Illinois Revised Statutes or Section 2-6-12 of the Oak Park Village Code relating to Proposing Requirement.

John A. Van Arsdale Vice Pres.  
(Authorized Agent of Proposer selected)

Subscribed and sworn to before me this 25<sup>th</sup> day of March, 2019.

Cara Lance-Emerick  
Notary Public's Signature

- Notary Public Seal -



**SECTION VI**  
**TAX COMPLIANCE AFFIDAVIT**

John H. Van Arsdel, being first duly sworn, deposes and says:  
that he/she is Vice President of  
(partner, officer, owner, etc.)  
M.E. Simpson Co., Inc.  
(Proposer selected)

The individual or entity making the foregoing Proposal or Proposal certifies that he/she is not barred from entering into an agreement with the Village of Oak Park because of any delinquency in the payment of any tax administered by the Department of Revenue unless the individual or entity is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. The individual or entity making the Proposal or proposal understands that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the municipality to recover all amounts paid to the individual or entity under the agreement in civil action.

  
By: John H. Van Arsdel  
Its: Vice President

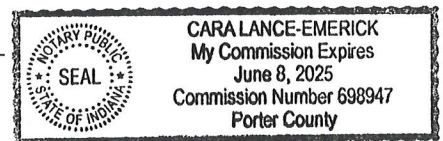
John H. Van Arsdel  
(name of Proposer if the Proposer is an individual)  
(name of partner if the Proposer is a partnership)  
(name of officer if the Proposer is a corporation)

The above statement must be subscribed and sworn to before a notary public.

Subscribed and sworn to before me this 25<sup>th</sup> day of March, 2019.

Caralance-Emerick  
Notary Public's Signature

- Notary Public Seal -



**SECTION VII**  
**ORGANIZATION OF PROPOSING FIRM**

Please fill out the applicable section:

**A. Corporation:**

The Consultant is a corporation, legally named M.E. Simpson Co., Inc. and is organized and existing in good standing under the laws of the State of Indiana. The full names of its Officers are:

President Dan Hood

Secretary Pam Hood

Treasurer Michael Simpson Illinois Corporation Service Co.,

Registered Agent Name and Address: 801, Adlai Stevenson Dr., Springfield, IL; 62703-4261

The corporation has a corporate seal. (In the event that this Proposal is executed by a person other than the President, attach hereto a certified copy of that section of Corporate By-Laws or other authorization by the Corporation that permits the person to execute the offer for the corporation.)

**B. Sole Proprietor:**

The Consultant is a Sole Proprietor. If the Consultant does business under an Assumed Name, the Assumed Name is \_\_\_\_\_, which is registered with the Cook County Clerk. The Consultant is otherwise in compliance with the Assumed Business Name Act, 805 ILCS 405/0.01, et. seq.

**C. Partnership:**

The Consultant is a Partnership which operates under the name \_\_\_\_\_

The following are the names, addresses and signatures of all partners:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature

\_\_\_\_\_

Signature

(Attach additional sheets if necessary.) If so, check here \_\_\_\_.

If the partnership does business under an assumed name, the assumed name must be registered with the Cook County Clerk and the partnership is otherwise in compliance with the Assumed Business Name Act, 805 ILCS 405/0.01, et. seq.

**D. Affiliates:** The name and address of any affiliated entity of the business, including a description of the affiliation: \_\_\_\_\_

\_\_\_\_\_

Signature of Owner

**SECTION IX  
COMPLIANCE AFFIDAVIT**

I, John H. Van Arsdel, (Print Name) being first duly sworn on oath depose and state:

1. I am the (title) Vice President of the Proposing Firm and am authorized to make the statements contained in this affidavit on behalf of the firm;
2. I have examined and carefully prepared this Proposal based on the request and have verified the facts contained in the Proposal in detail before submitting it;
3. The Proposing Firm is organized as indicated above on the form entitled "Organization of Proposing Firm."
4. I authorize the Village of Oak Park to verify the Firm's business references and credit at its option;
5. Neither the Proposing Firm nor its affiliates<sup>1</sup> are barred from proposing on this project as a result of a violation of 720 ILCS 5/33E-3 or 33E-4 relating to Proposal rigging and Proposal rotating, or Section 2-6-12 of the Oak Park Village Code relating to "Proposing Requirements".
6. The Proposing Firm has the M/W/DBE status indicated below on the form entitled "EEO Report."
7. Neither the Proposing Firm nor its affiliates is barred from agreeing with the Village of Oak Park because of any delinquency in the payment of any debt or tax owed to the Village except for those taxes which the Proposing Firm is contesting, in accordance with the procedures established by the appropriate revenue act, liability for the tax or the amount of the tax. I understand that making a false statement regarding delinquency in taxes is a Class A Misdemeanor and, in addition, voids the agreement and allows the Village of Oak Park to recover all amounts paid to the Proposing Firm under the agreement in civil action.
8. I am familiar with Section 13-3-2 through 13-3-4 of the Oak Park Village Code relating to Fair Employment Practices and understand the contents thereof; and state that the Proposing Firm is an "Equal Opportunity Employer" as defined by Section 2000(E) of Chapter 21, Title 42 of the United States Code Annotated and Federal Executive Orders #11246 and #11375 which are incorporated herein by reference. **Also complete the attached EEO Report or Submit an EEO-1.**
9. I certify that the Consultant is in compliance with the Drug Free Workplace Act, 41 U.S.C.A, 702

Signature: *John H. Van Arsdel*

Name and address of Business: M.E. Simpson Co., Inc., 3406 Enterprise Ave., Valparaiso, IN 46383

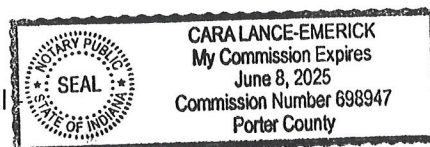
Telephone 800.255.1521 E-Mail john@mesimpson.com

Subscribed to and sworn before me this 25<sup>th</sup> day of March, 2019.

*Carlane-Emerick*

Notary Public

- Notary Public Seal



1 Affiliates means: (i) any subsidiary or parent of the agreeing business entity, (ii) any member of the same unitary business group; (iii) any person with any ownership interest or distributive share of the agreeing business entity in excess of 7.5%; (iv) any entity owned or controlled by an executive employee, his or her spouse or minor children of the agreeing business entity.

**SECTION X**  
**M/W/DBE STATUS AND EEO REPORT**

Failure to respond truthfully to any questions on this form, failure to complete the form or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal. For assistance in completing this form, contact the Department of Public Works at 708-358-5700.

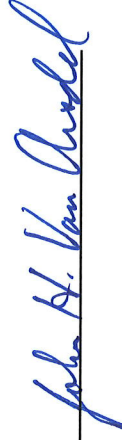
1. Consultant Name: M.E. Simpson Co., Inc.
2. Check here if your firm is:  
☐ Minority Business Enterprise (MBE) (A firm that is at least 51% owned, managed and controlled by a Minority.)  
☐ Women's Business Enterprise (WBE) (A firm that is at least 51% owned, managed and controlled by a Woman.)  
☐ Owned by a person with a disability (DBE) (A firm that is at least 51% owned by a person with a disability)  
☒ None of the above

[Submit copies of any W/W/DBE certifications]

3. What is the size of the firm's current stable work force?  

<u>55</u>	Number of full-time employees
<u>3</u>	Number of part-time employees
4. Similar information will be requested of all sub-Consultants working on this agreement. Forms will be furnished to the lowest responsible Consultant with the notice of agreement award, and these forms must be completed and submitted to the Village before the execution of the agreement by the Village.

Signature: \_\_\_\_\_



Date: 3.25.18

## CERTIFIED COPY OF CORPORATE RESOLUTION

I, the undersigned, **Do Hereby Certify**, that the following is a complete, true and correct copy of a Board of Directors Resolution for M.E. Simpson Company, Inc. a corporation duly organized and existing under the laws of the State of Indiana, which a Special Board of Directors meeting was duly held on December 30, 2015, and said minutes were duly accepted and adopted by the Board Members a quorum being present, and as set forth in the minutes of the said meeting that I am the keeper of the corporate minutes and records of this corporation; and that the same have not been rescinded or modified:

**"BE IT RESOLVED**, that any officer of the corporation can execute a contract and bind the corporation accordingly. Such officers of the corporation are: Michael D. Simpson, CEO; Dan E. Hood, President; Pamela S. Hood, Secretary; Michael D. Simpson, Treasurer; and John H. Van Arsdel, Vice President."

**In Witness Whereof**, I have hereby ascribed my name and affixed the seal of the said corporation, this 30<sup>th</sup> day of December, 2015.

Pamela Hood

Pamela Hood, Secretary

(Seal)



# EEO REPORT

Please fill out this form completely. Failure to respond truthfully to any questions on this form, or failure to cooperate fully with further inquiry by the Village of Oak Park will result in disqualification of this Proposal. An incomplete form will disqualify your Proposal. For assistance in completing this form, contact the Public Works Department at 708-358-5700.

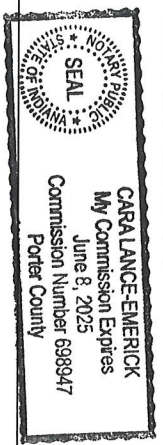
An EEO-1 Report may be submitted in lieu of this report \_\_\_\_\_

Consultant Name M.E. Simpson Co., Inc.  
Total Employees 58

Job Categories	Total Employees	Total Males	Total Females	Males				Females				Total Minorities
				Black	Hispanic	American Indian & Alaskan Native	Asian & Pacific Islander	Black	Hispanic	American Indian & Alaskan Native	Asian & Pacific Islander	
Officials & Managers	8	7	1	1	0	0	0	0	0	0	0	1
Professionals	2	2	0	0	0	0	0	0	0	0	0	0
Technicians	37	37	0	5	0	0	1	0	0	0	0	6
Sales Workers	5	5	0	0	1	0	0	0	0	0	0	1
Office & Clerical	5	2	4	0	0	0	0	0	2	0	0	2
Semi-Skilled												
Laborers												
Service Workers												
TOTAL												
Management Trainees												
Apprentices												

This completed and notarized report must accompany your Proposal. It should be attached to your Affidavit of Compliance. Failure to include it with your Proposal will be disqualify you from consideration.

John H. Van Arsdel \_\_\_\_\_, being first duly sworn, deposes and says that he/she is the Vice President  
(Name of Person Making Affidavit) (Title or Officer)  
of M.E. Simpson Co., Inc. and that the above EEO Report information is true and accurate and is submitted with the intent that it  
be relied upon. Subscribed and sworn to before me this 25<sup>th</sup> day of March, 2019.  
Caralance Emerick  
(Signature) (Date)



## SCOPE OF WORK

The Water Loss Control Program will consist of four key areas;

- ◆ **Large Water Meter Evaluation, Testing and Repair – Master/Production Water Meters.**
- ◆ **Large Water Meter Evaluation, Testing and Repair – Commercial/Industrial Water Meters.**
- ◆ **Water Distribution System Leak Survey**
- ◆ **Water Audit and Evaluation of the Utility Billing System**

### **Large Water Meter Evaluation, Testing and Repair Master/Production Water Meters**

The Field Scope of Service is understood to be the following:

Our Project Team will furnish all labor, material, transportation, tools, and equipment necessary to test production meters selected by the Utility. Our Project Team shall be required to provide such skilled and trained personnel and equipment necessary to complete the work herein specified. **There will be a minimum of Two Persons per team working on the testing program at all times.**

#### Venturi, Propeller and Mag style Large Water Meters

- ◆ Work in an orderly and safe manner to insure protection of the local residents, Utility employees, and the Field Staff so that no avoidable accidents occur.
- ◆ All Field Staff will have readily observable photo identification badges worn while in the field.
- ◆ Assess all meters listed in the test group. This assessment will include making observations of water usage on site as well as observed meter readings to determine if the meter is the correct type and size for the particular application.
- ◆ Meters and test tap locations will be inspected ahead of the testing to allow for the installation of proper test taps to insure the overall accuracy of the testing and provide for the best test conditions available, given the site conditions.
- ◆ Determine if meter can be tested in place, if not, make recommendations to Utility to correct setting so meter can be tested in place. This would include sketches, drawings, etc., of site and turned into the utility so improvements can be made.
- ◆ A meter log shall be maintained indicating all meters to be assessed in the current test group. This log will be reviewed when the Project Team is verifying the meter data supplied by the Utility and corrections will be made to provide updated records to the Utility. This log will be used as part of the periodic meter reports turned into the Utility.
- ◆ Schedule the meter test with the utility and wholesale water customer during normal working hours. Exceptions to testing times will be made on a case-by-case basis. After hours or weekend testing may be required for severe scheduling conflicts.

- 💧 Meters may be tested across a range of flows in order to determine patterns of wear at various flow rates but in most cases the meter will be tested at its normal usage flow rate. These flow rates used may be a combination of AWWA recommended flow rates (per M-6 manual of the AWWA) and meter manufacturer flow rates or what local conditions allow.
- 💧 Meters will be tested (by MESCO), calibrated (by Utility technicians) to bring them within accepted accuracy limits. The current accuracy limits used by M.E. Simpson Co. has been derived from the AWWA M-6 and M-33 Manuals and are set at 97% - 103% as compared to the flow measured by the Polcon Pitot Rod. A Statement of Accuracy for the equipment and the procedure used are listed at the end of this document.
- 💧 The equipment used will be that which was described in the “Equipment to be Used” section.
- 💧 The Project Team will document all meter testing results. Meters that require extensive repairs (not worth time and material) or if the meter is obsolete, will be brought to the attention of the Utility so a potential meter change-out can be analyzed by the Utility.
- 💧 The Project Team will report daily to the assigned Water Department Manager and go over the progress of the previous day, as well as cover what meters will be tested the current day.
- 💧 It may be necessary to conduct parts of the meter-testing program during “off hours” such as at night. This may be required in buildings that have a high daily usage but is closed at night. The Project Team will give 24-hour notice of intent to test meters that may require after hours or nighttime work. This is so the Water Utility can plan for the area to be accessed, give notification to the Police department, as well as other Public Works Divisions as to the activity that will take place.
- 💧 Meters located in confined spaces shall be tested using accepted confined space entry procedures.
- 💧 Any valves that fail or break during operation to isolate the water meter for testing will be repaired or replaced at the expense of the owner. M.E. Simpson Company cannot be held responsible for possible valve failures due to pre-existing conditions during the testing procedure.

## Pitot Testing

M.E. Simpson Co., Inc. employs the use of a Polcon® Pitot Rod to accurately measure velocity in a pipe thereby determining the accuracy of a flow meter. This procedure consists of an insertion pitot tube placed through the cross section of the pipe in the exact center to measure the average flow velocity. The Polcon® Pitot Rod measures a differential pressure between the averaged velocity head port and the averaged static head port. The fluid velocity is proportional to the square root of the differential pressure. This differential pressure is measured and recorded over time by the Polcon® Sentry electronic recorder. The results are then compared to the readings of the flow meter being tested for the same time period and accuracy is then calculated for the flow meter. According to the AWWA M33 Manual, “Flow Meters in Water Supply” pitot testing can produce results of + 1/2 % to 5% of full scale with a “Repeatability” of 0.5 %. Using the Polcon® Sentry Recorder which registers differential pressure to one one-hundredth of an inch of water column, this accuracy can be improved to the + 1/2% to + 2% range. Repeatability remains the same due to test site conditions as long as the test site conditions are within the specifications for producing un-obstructed Laminar flow.

## Typical Test Procedure

All master meters will be tested in accordance with American Water Works Association standards (reference AWWA M6 and M33 Manuals). Using an “in-line” pitot rod the master/production meter can be tested at a single flow or over a broad range of flows. M.E. Simpson Co., Inc. manufactures and uses the Polcon® Pitot Rod along with the **Polcon® Sentry** electronic flow recorder. The Polcon® Sentry electronic flow recorder is a totally unique solid state microprocessor type recorder that senses, gathers, stores, and processes differential pressure (with a range selection of –250” to 250” of water column) from our pitot rod. The sentry generates a 4-20mA signal using a Rosemount differential pressure sensor along with a 4-20mA series recorder. The recorder can be set to measure 24-hour flows from 1 day (with a sampling period of 5 seconds) up to 35 days (with a sampling period of two minutes). The data can also be exported to a spreadsheet program, such as Microsoft Excel®, so the data can be analyzed and reviewed with the Polcon® spread sheet forms. With this process we eliminate manometers, rulers, toxic indicating liquids and manual entries.

The Polcon® Sentry electronic recorder is used with the Polcon® Pitot Rod and produces test results in the plus or minus 2% range. The testing will be done through an existing 1” corporation stop. First, the pipe will be callipered, using the Polcon Pipe Caliper, to determine the exact area of the pipe. Then the Polcon Pitot Rod will be installed and connected to a Polcon® Sentry electronic recorder, an electronic differential pressure recorder, which is then programmed via a notebook computer. No manometers with toxic indicating fluids will be used.

The Utility will assist, where necessary and for general safety, with traffic control. At each test site the Utility must provide a 1” corporation stop that is located 10 pipe diameters from any type of obstruction, valve, check valve, reducer, elbow or tee. The corporation may be located either upstream or downstream of the meter. If the corporation stop cannot be installed inside a building due to space limitations and must be installed outside below ground then a vault, minimum 48” diameter, must be installed. The manhole opening must be directly over the corporation stop if the vault top is less than 30”, or the diameter of the pipe plus one-foot from the corporation stop, whichever is greater. This is to allow for sufficient room for installation of the pitot rod. If a vault cannot be installed then the Utility must provide a trench box, shoring, or an excavation that meets OSHA trenching standards.

If the corporation is not direct tapped, but is installed in a saddle, then it is very important that the pipe be drilled with a 1 ½” drill bit and a 1 ½” valve be installed.

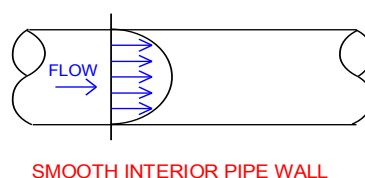
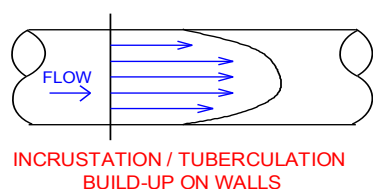
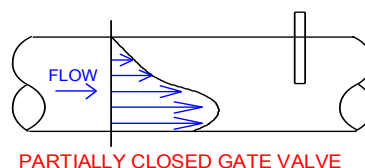
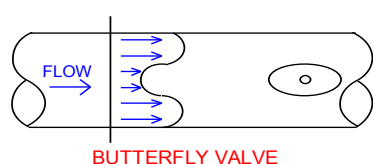
The Utility’s master water meters will be tested using our Polcon® Pitot Rod, Caliper and Polcon® Sentry Flow Recorder. These tests will be performed through corporation stops installed by the Utility at each master water meter site.

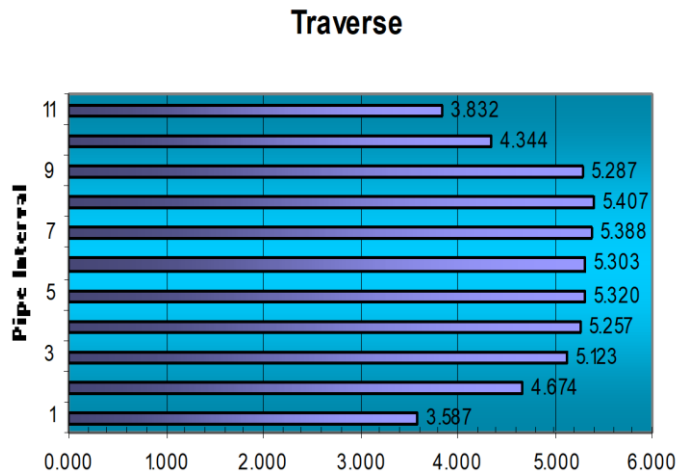
The flow data gathered from these tests will allow a better evaluation of customer metering and leak survey results, thus helping the Utility determine actual “accounted for” water as well as determining the total water loss in the distribution system.

- ◆ M.E. Simpson Co., Inc. schedules all testing with the facility owners.
- ◆ In the case of new water meter test sites or changes to an existing water meter test site where a corp will have to be changed, the Utility will install all corps used for the flow testing according to M.E. Simpson Co., Inc. specifications.
- ◆ Any valves that fail or break during an attempt to isolate a water meter for flow testing will be repaired or replaced at the expense of the Utility. M.E. Simpson Co., Inc. cannot be held responsible for possible valve failures during the flow testing procedure.

### Test-tap location, all meters

In order to have the best possible test results from flow testing on site, conditioned flow must be available at the site of the test tap. Therefore, it is imperative the test tap locations be given the upmost consideration. Inspections of test tap locations may need to be made and previously installed test tap location that produced marginal flow profiles may need to be moved and new taps installed. It is important to understand that in some cases compromised test locations are the best that can be had at the given site, due to the limitations of space, piping configurations, water treatment plant layout or other factors. If these conditions are encountered, the Utility will be made aware of the potential effect on the flow test (see following graphic).

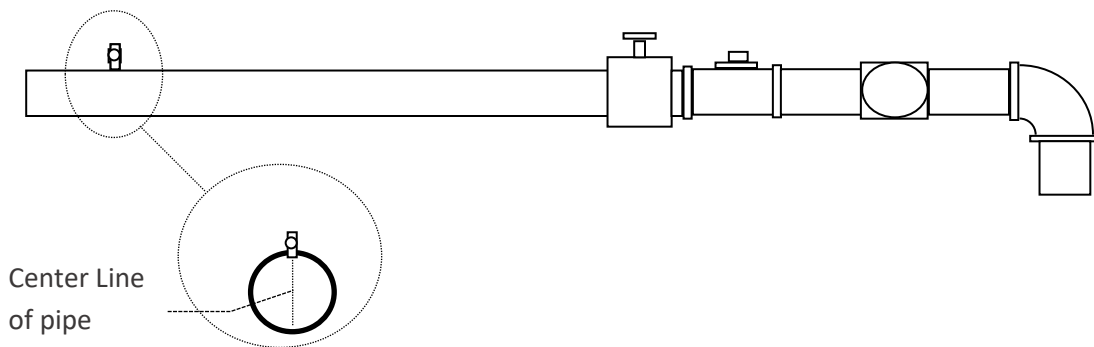




*The flow profile shown above is what is desirable for a good test.*

The Utility will assist, where necessary and for general safety, with traffic control. At each test site the Utility must provide a 1" corporation stop that is located 10 pipe diameters from any type of obstruction, valve, check valve, reducer, elbow, or tee. The corporation stop may be located either upstream or downstream of the meter. For Mag style meters it is preferred the corp stop be installed *downstream* of the meter. If the corporation stop cannot be installed inside a building due to space limitations and must be installed outside below ground then a vault, minimum 48" diameter, must be installed. The manhole opening must be directly over the corporation stop if the vault top is less than 30 inches or [the diameter of the pipe plus one-foot] from the corporation stop, whichever is greater. This is to allow for sufficient room for installation of the pitot rod. If a vault cannot be installed then the Utility must provide a trench box, shoring, or an excavation that meets OSHA trenching standards. A "surface mount" tap can also be used provided the base of the pipe is not deeper than 8'.

The 1" corporation stop must be located 10 pipe diameters from any obstruction. The corporation can have either copper flair or compression thread. Compression thread (12 threads per inch) is preferred. In a building, the corporation stop may be installed on the top or side of the pipe as long as it sits perpendicular to the pipe on the radius, and there is clearance for the pitot rod to be installed. In a vault the corporation stop must be on the top.



**\*\*If the corporation is not direct tapped, but is installed in a saddle, then it is very important that the pipe be drilled with a 1" drill bit. The standard 7/8" drill bit will not work. The pitot equipment will not fit through a hole of 15/16 of an inch or smaller.**

## Velocity of flow

Another consideration for the accuracy of the flow test is the velocity of flow where the Polcon Pitot Rod is measuring flow. Since the Polcon Pitot Rod coupled with the Polcon Sentry Recorder is essentially a "portable" differential producing flow meter, there is a limitation to how low a flow that can be accurately measured without compromising the test results. M.E. Simpson Co., Inc. highly recommends that the flow at the test site be at least 2 feet per second (one inch of water column) to insure flow test results are not compromised. If the measured flow velocity falls below 2fps, the lower the flow rate goes, the higher percentage of error gets introduced into the test results. This issue can be further complicated by low static head that is common on gravity feed lines where flow meters have been installed. However, if flow can be held at or above 2 fps during the test, and possibly a range of flows recorded, a flow curve can be generated for the meter. If the velocity of flow at a test site is below the recommended 2 fps, the Utility will be made aware of the potential for this error. The test may need to be delayed until higher flow can be achieved.

## Venturi Meter Exceptions

In certain cases where pipe material limitations came into play such as concrete pressure pipe upstream and downstream of a Venturi meter, and piping configurations, a Pitot corp stop has been installed on the diverging cone of the Venturi meter, downstream of the throat of the Venturi. While this seems to be out of order with trying to get conditioned flow at the test site, the flow profile at this location

indicated that it was acceptable as a test site location. This is something that would only be recommended as a last resort, but flow test results including flow profiles indicated this was a good location to conduct the flow test.

## Mag Style Meter Exceptions

Test corp locations for Mag style meters are very important. The test corp location must not be immediately upstream of the Mag meter because the flow at the Pitot rod will cause flow disturbances inside the Mag meter causing it to measure flow incorrectly. It is recommended that the test corp be at place downstream of the Mag meter or if placed upstream, there needs to be at least 10 pipe diameters of space between the Pitot test corp and the Mag meter.

## Quality Control for Flow Meter Testing and Calibration

The level of quality control for large flow meter testing is a matter of taking in all the above considerations and applying those considerations to each individual meter setting as it is being evaluated. As stated earlier, AWWA meter testing specifications have been stated for testing under “controlled” conditions in a meter testing shop. In the field, piping conditions and configurations are not conducive to conditioned flow sometimes making meter testing challenging if not sometimes impossible. It is the level of experience of the meter testing technicians to be able to differentiate and make the call as to when conditions are such where accurate meter tests can be conducted to allow for a reliable test. In addition, M.E. Simpson Co., Inc. has on staff engineers available that can review the data quickly and decide if the data generated is valid or if another approach is needed. When a strict methodology and field procedure is followed, the field conditions can be controlled and mitigated to produce test results that are reliable and accurate.

## Final Reports, Documentations & Communications

### *M.E. Simpson Co, Inc. will perform the following:*

- ◆ Project Team will **meet daily** with assigned Utility personnel to go over areas of testing for prior workday and plan current day and tests to be conducted.
- ◆ The field technicians will be readily available by cellular phone. This will facilitate communications between the Utility and the field technicians. A **24-hour toll-free 800 number** is available for direct contact with the Project Team for emergencies.
- ◆ **Document all meter testing**, date of testing, and all data required by the utility to analyze the meter inaccuracies. These will be reported daily to appointed Utility Personnel.
- ◆ **The Project Manager will meet** with the Utility as needed for a progress report if so requested.
- ◆ **Maintain a progression list** of the project indicating meters tested and to be tested, contact names, phone numbers, etc.
- ◆ **Prepare reports** at the completion of the project which will include all meter testing reports, pump curve data and reports, listing of data readings, and possible mechanical deficiencies that need the attention of the Utility. Recommendations for system maintenance will be a part of this report based on field observations made during the testing program. **This final**

**report shall be made available for submission to the Utility within twenty (20) working days of the completion of the fieldwork.**

### Assumptions & Services Provided by Water Utility

- ◆ The *Utility* will furnish all maps, atlases, drawings (two copies) and records necessary to properly conduct the testing program.
- ◆ The *Utility* will provide if needed, meter records such as consumption history, or any additional information that would make testing at a location easier to perform. This information shall be regarded as CONFIDENTIAL by the Project Team, and will not be shared with anyone outside of the *Utility* without consent of the *Utility*.
- ◆ The *Utility* will assist as necessary for the testing program.
- ◆ The *Utility* will also make available, on a reasonable but periodic basis, certain personnel with a working knowledge of the water system who may be helpful and for general information about the water system. This person will not need to assist the Project Team on a full time basis, but only on an “as needed” basis.
- ◆ The *Utility* will assist, if needed, to help gain entry into sites that may be difficult to get into due to security issues or other concerns.
- ◆ The *Utility* will assist with providing SCADA readings in Excel for the meters during the test periods. In addition, once new ranging limits have been calculated, the *Utility* will make those adjustments so M.E. Simpson Co. staff can re-test to verify the meter is within accuracy limits.

### Equipment to be Used

The following equipment will be used for meter testing work during the project. All material listed will be on the job site at all times.

1. All tools needed to perform testing “on site” (hand tools, pipe wrenches, etc.)
2. Confined Space Entry tripod, winch, fall protection and Gas detector

### Polcon® Equipment

The **Polcon® Sentry Recorder** is a totally unique solid state microprocessor type recorder that senses gathers, stores, and processes differential pressure from a pitot rod or other flow device. The Sentry generates a 4-20mA signal using a Rosemount differential pressure recorder along with a Telog 3000 series recorder. The recorder can be set to measure flows from 1 hour and 55 minutes (with a sampling period of 5 seconds) to 7 days (with a sampling period of two minutes) on a single set of batteries. The Sentry is self-contained, has its own power pack, weighs less than 30 lbs., and fits into the standard 20.25” manhole entrance. Data is “downloaded” using a laptop computer for further analysis. All differentia pressure flow data can be



permanently stored on a computer hard drive or floppy disk. The data can also be exported to a spreadsheet program, such as Microsoft Excel so the data can be analyzed and reviewed with the Polcon® spread sheet forms. With this process manometers and toxic indicating liquids will not be used.

The **Polcon® Pitot Rod** is constructed with high-grade brass to insure a device that is durable as well as accurate. The “O” ring packing and a locking device assures that all Polcon® Pitot Rods will provide a safe and leak proof installation. The solid orifice plate assures the upstream and downstream orifices remain in the same plane and directly opposite one another assuring an accurate measurement of the velocity in the pipe.

The **Polcon® Pipe Caliper** is constructed with high-grade brass and steel to insure a device that is durable as well as accurate. The “O” ring packing and a locking device assures that all Polcon® Pipe Calipers will provide a safe and leak proof installations. The caliper is used for the accurate determination of pipe diameter to obtain the true  $Q = AV$  relationship. The inside diameters are always taken to the 1/16-inch to maintain the true integrity of the hydraulic data. The unique design permits accurate determination of the pipe diameter even if the tap extends through the pipe wall.

## Large Water Meter Evaluation, Testing and Repair Commercial/Industrial Water Meters

### The Field Scope of Service is understood to be the following:

M.E. Simpson Co., Inc. will furnish all labor, material, transportation, tools, and equipment necessary to test and calibrate large meters selected by the Utility and complete the work herein specified.

**Teams of two (minimum) or more personnel will work on the meter testing program at all times.**



Sensus compound meter with RP2.



Sensus "W" Series fire meter

- 💧 Work in an orderly and safe manner to insure no avoidable accidents occur.
- 💧 All Field Staff will wear photo ID badges that are easily seen while in the field.
- 💧 Assess all meters listed in the test group. This assessment will include observing water usage on site, as well as observing meter readings to determine if the meter is the correct type and size for its application.
- 💧 If meters cannot be tested in place, make recommendations to Utility to correct setting so testing in place can occur. (Recommendation(s) would include submitting site sketches, drawings, etc. to Utility so improvements can be made.)
- 💧 Maintain a meter log for all meters to be assessed in the current test group, which will be reviewed by the Project Team during verification of the meter data supplied by the Utility. Corrections and/or updated records will be provided to the Utility (including periodic Utility meter reports).
- 💧 Every effort will be made to schedule water customer meter tests during normal working hours. Exceptions to testing times, on a case-by-case basis, will depend on the severity of loss of water service due to the testing procedure. Severe schedule conflicts may require after hour or weekend testing.

- ◆ Meters will be tested across a range of flows to determine patterns of mechanical wear at various flow rates. Flow rates used will be a combination of AWWA recommended flow rates (per M-6 manual of the AWWA) and meter manufacturer flow rates.
- ◆ Meters will be tested and calibrated to bring them within accepted accuracy limits.
- ◆ Some meters need to be removed from their setting(s) for “offsite” testing due to existing plumbing configurations. Efforts will be made to keep the service disruption to a minimum.
- ◆ If a water service loss for any period of time is intolerable to the water customer, recommendations will be made to the Utility to include a by-pass around the meter so service disruption will not occur during the testing.
- ◆ The equipment used will be described in the “Equipment to be Used” section.
- ◆ The Project Team will document all meter testing results and calibrations. Meters requiring extensive calibrations (not worth time and material) or obsolete meters, will be brought to the Meter Superintendent’s attention for potential meter change-out by the Utility. The cost basis for recommending a meter change out(s) will be determined at the kick-off meeting and agreed upon between M.E. Simpson Co. Inc. and the Utility.
- ◆ All calibrations will be attempted to be performed the same day of testing. After calibration, the meter shall be tested to conform to test specifications outlined elsewhere in this Specification.
- ◆ In its daily report to the Water Department Manager, the Project Team will review the previous day’s progress, and outline the meters to be tested that day.
- ◆ It may be necessary to conduct parts of the meter-testing program during “off hours” (i.e. nights). This may be required in a building(s) that has a high daily usage, but is closed at night. The Project Team will give 24-hour “notice of intent” to test meters that require after hours or nighttime work. This will allow the Water Utility to plan for area access, and give Police Department (and other Public Works Divisions) notification as to the planned testing activity.
- ◆ Calibration parts used will be NSF 61 certified. (All new meter parts available now currently meet this standard.)
- ◆ Care will be exercised when water is discharged during testing. Test meter water flow discharge will not be allowed to cause interference with private property, pedestrian or roadway traffic, and will have minimal environmental impact.
- ◆ Meters located in confined spaces shall be tested using accepted confined space entry procedures.
- ◆ Any valves that fail or break during operation (to isolate the water meter for testing) will be repaired or replaced at the owner’s expense. M.E. Simpson Company is not responsible for possible valve failures due to pre-existing conditions during the testing procedure.

## Quality Control for Meter Testing and Calibration

The level of quality control for large meter testing takes in the above considerations and apply them to each large meter setting under evaluation. When a strict methodology and field procedure are followed, the field conditions can be controlled and mitigated to produce test results that are reliable and accurate.



## Water Utility Observations

The M.E. Simpson Co., Inc. Project Team welcomes Utility staff members to observe field procedures while the Meter Testing Program is in progress. Explanation and understanding of the equipment and techniques used for testing large meters may be useful in helping Utility staff members understand how they may use large meter testing to reduce revenue losses for commercial and industrial accounts.

## Final Reports, Documentations & Communications

### *M.E. Simpson Co, Inc. will perform the following:*

- ◆ Project Team will **meet daily** with assigned Utility personnel to go over areas of survey from prior workday and plan current day and area to survey.
- ◆ The field technicians will be readily available by cell phone, as well as Nextel Direct Connect Radio. This will facilitate communications between the Utility and the field technicians. **A 24-hour toll-free 800 number** is available for direct contact with M.E. Simpson Co., Inc. for emergencies.
- ◆ **Document all meter testing**, date of testing, and all data required by the Utility to analyze the meter inaccuracies. These will be reported daily to appointed Utility Personnel.
- ◆ **The Project Manager will meet** with the Utility as needed for a progress report.
- ◆ **Maintain a project progression list** indicating meters tested and to be tested, contact names, phone numbers, etc.
- ◆ **Prepare meter reports** at the completion of the project, which will include all meter testing reports, listing of new parts installed, and possible mechanical deficiencies that need the attention of the Utility. Recommendations for system maintenance will be a part of this report based on field observations made during the testing program. **This final report shall be made available for submission to the Utility within twenty (20) working days of the completion of the fieldwork.**

## Assumptions & Services Provided by Water Utility

- ◆ The *Utility* will furnish all maps, atlases, (two copies) and meter records necessary to properly conduct the testing program.
- ◆ The *Utility* will provide customer records such as consumption history, phone numbers for appointments, or any additional information that would make the testing of a meter at a location easier to perform. This information shall be regarded as CONFIDENTIAL by M.E. Simpson Co., Inc., and will not be shared with anyone outside of the *Utility* without consent of the *Utility*.
- ◆ The *Utility* will assist as necessary to get customer cooperation for the testing program. M.E. Simpson Co., Inc. can assist in composing a letter that the Utility can submit to water customers informing them as to the procedures and benefits of the testing program.
- ◆ The *Utility* will also make available, on a reasonable but periodic basis, certain personnel with a working knowledge of the water system who may be helpful in attempting to locate particularly hard-to-find meters and for general information about the water system. *This individual(s) will not need to assist the Project Team on a full-time basis*, but only on an “as needed” basis.
- ◆ The Utility will assist, when necessary, in gaining entry into sites that may be difficult to access due to security issues or other concerns.

## Equipment to be Used

The following equipment will be used for meter testing work during the project. All material listed will be on the job site at all times.

1. Sensus test meters with electronic registers, certified accurate by volumetric testing.
2. All tools needed to perform testing “on site” (hand tools, pipe wrenches, etc.)
3. Proper lengths of 2-1/2’ fire hose for conducting the testing “on site”
4. Confined Space Entry tripod, winch, fall protection and Gas detector
5. Meter Test Bench at M.E. Simpson Co. shop for volumetric testing of Meters



Calibrated portable test meter.

## Water Distribution System Leak Survey

The Field Scope of Service for the Leak Survey is understood to be the following:

M.E. Simpson Co., Inc. will furnish all labor, material, transportation, tools, and equipment necessary to survey the water distribution system areas selected by the C. M.E. Simpson Co., Inc. shall be required to provide such skilled and trained personnel and equipment necessary to complete the work herein specified. **There will be a minimum of Two Persons per team working on the survey at all times.**



Leak Detection has come a long way since the early 1900's.

- ◆ Work in an orderly and **safe** manner to insure protection of the local residents, Utility employees, and the Field Staff so that no **avoidable** accidents occur.
- ◆ All Field Staff will have readily observable identification badges worn while in the field.
- ◆ The leak detection equipment to be used will be that which was described in the "Equipment to be used" section.
- ◆ Initially listen to **all fire hydrants, all main line valves**, and when necessary, selected service connections in the entire distribution system with the **FCS S30** electronic listening device or the **Gutermann AquaScope 3** electronic listening device by making physical contact with the valve, hydrant, pipe, or B-box. (Listening points that are not accessible will be given to the Utility and when corrected they will be listened to.) This will be done on the Utility's distribution system.
- ◆ Listening distances will not exceed 400' between points. I.E.; valves, hydrants, service valves or meter settings will be used with preference of listening points in order as follows; direct contact with the pipe, main line valves, hydrant valves, hydrants, then service valves or meter settings.
- ◆ Valve vaults full of water may be pumped out to facilitate listening. Sometimes full vaults can mask leak noise.
- ◆ Large diameter pipe (18"-36") may need to have additional listening performed by listening directly above the pipe at intervals of 6-10 feet.
- ◆ **All accessible points** along PVC water mains will be physically listened to including services, main line valves, and hydrants.

- ◆ A “suspected leak” log shall be maintained indicating all areas where suspected leak noise was heard. This log will be reviewed when the Project Team is verifying the suspected leak area for confirmation of the actual existence of a leak. This log will be a part of the periodic reports turned into the Utility regardless of an actual leak located in the area or not, with an explanation of the noise source.
- ◆ When leak noise has been detected and or suspected, the Project Team will verify the suspected area a second time to confirm the noise. At least four hours will pass between the initial listening of the area before a second listen and confirmation is attempted.
- ◆ The Project Team will line locate the water main and service lines in the immediate area so the correct pipe distances can be input into the leak correlator and also so that the Water Utility will have an idea of where the water main is located prior to excavation. Non-metallic pipe locations will be “interpolated” as best that can be identified, given the line location of metallic services, Utility knowledge of the area, or other information regarding the actual location of the main.
- ◆ The Project Team will use the following Electronic Leak Correlators (either a FCS Accu-Corr, Digi-Corr, Tri-Corr Touch; Vivax Metrotech HL6000X; Ecologics LeakFinderRT w/hydrophones leak correlator), to determine if a leak is present and use the same equipment to pinpoint the leak.
- ◆ For PVC water mains only the Ecologics LeakFinderRT w/hydrophones leak correlator, will be used for correlations because of the ability for these correlators to be able to analyze the particular sound frequencies inherent to PVC pipe.
- ◆ The leak location will be marked in the field (on the surface) using environmentally formulated Precautionary Blue paint.
- ◆ The Project Team will document all leak locations with a diagram indicating the location of the leak. Other information related to that correlation will be included as part of the field sheet such as the filters used for the correlation, line locations, distances between sensors, etc.
- ◆ The field sheets will be copied, and turned into the assigned Water Department Manager daily or an agreed time period so the leak can be dug and repaired immediately. They will be classified as to the potential severity of water loss, as well as potential danger to the general public.
- ◆ The locations of leaks requiring immediate attention (immediate threat to life, injury or traffic) will be turned in as quickly as possible to facilitate the repair process.
- ◆ **“Ground miking” will not be used as the primary determination for leak locations.** Grounding miking will be done per Utility request, or when it has been deemed to be the most efficient means to listen to the water main running under ground. Large diameter mains (18” – 36”) may need this additional evaluation. This method may be used to assist in confirmation of a leak location. However, “ground miking” is solely dependent on conditions beyond the direct observations of the leak technician such as soil conditions and composition, water table, depth of pipe bury, assumed location of the water main (such as concrete pressure pipe) and compaction of pavement material causing leak sounds to scatter and echo or simply be absorbed.

- ◆ The Project Team will report daily or per request of the Utility, to the assigned Utility Manager and go over the progress of the previous day, as well as cover what will be surveyed the current day.
- ◆ It may be necessary to conduct parts of the Leak Survey during “off hours” such as at night. This may be required in areas of high traffic volume where traffic noise may affect the ability to detect leak noise, and traffic volume may affect the ability of the Project Team to be able to safely access main line valves in the middle of the street. The Project Team will give 24-hour advanced notice of intent to survey a particular area that may require after hours surveying or nighttime surveying. This is so the Utility can plan for the area to be surveyed, give notification to the Police department, as well as other Public Works Divisions as to the activity that will take place.
- ◆ A progression map shall be maintained for each section under survey indicating leak locations on the map. This will be especially helpful in quickly determining leak locations that correspond to the field leak diagrams turned into the Utility.
- ◆ As a part of the leak program, mapping discrepancies found on the current water atlas will be noted and included as a part of the final report so the Utility can make needed corrections. This will be included as a part of the periodic reporting to the Utility, thus enabling the Utility to keep up with mapping corrections.
- ◆ Distribution assets found to be in disrepair such as issues with hydrants, valves, and service lines, will be noted and turned into the Utility.
- ◆ Leaks verified on the customer’s side of a service shut-off will not be located beyond the shut-off. If a leak appears to be on the Customers’ side, the Utility will be notified first, then the customer notified and permission granted prior to the water being shut off even for short periods of time where possible and as time allows, as well as the ability for the customer to respond.
- ◆ If the Utility requests leak locations beyond the service shut off on the customer’s side of the service line, this will result in an additional charge to the leak survey based on an hourly rate and this service must be agreed upon between the Utility and M.E. Simpson Co., Inc. prior to the start of the survey.
- ◆ Valves and hydrants will not be operated without Utility permission. Valves and hydrants that break during this type of operation are the sole responsibility of the Utility. M.E. Simpson Co., Inc. cannot be responsible for valves and hydrants that break due to pre-existing conditions.
- ◆ The Utility is encouraged to dig up and repair the leaks located as soon as possible so that the area may be re-surveyed while the Project Team is still working on the survey in that general geographical location to ensure no other leaks are present in that area.

### Quality Control and Accuracy of Leak Locations

The level of accuracy of leak detection is a matter of taking in all the above considerations and applying those considerations to each individual potential leak location as it is being evaluated. Any statement made as to the level of accuracy of leak locations must be considered based on the individual conditions of each leak.

**Leak surfacing at intersection****Hidden leak running into drain tile**

Locating leaks on a distribution system can be very challenging. It is not a perfect science. Pipes and fittings can leak for a variety of reasons (age, poor installation, material failures, bad soils, etc.), and the ability to locate leaks is dependent on the stated variables listed in the “Project Approach”. By employing a strict methodology in the field for conducting a leak survey, these variables can be accounted for and mitigated. The depth of experience of the Project Team is extremely important to maintaining the ability to have accurate locations of leaks. Additionally, crews work as Two-Person Teams in the field, double checking the progress of the work as the survey progresses. The systematic procedure for leak confirmation has been stated in the Scope of Field Service and is restated here.

“Suspected leak areas are always listened to a second time, preferably at a different time of day than originally listened to. The mains and services will be line located to insure correct pipe distances are used for the correlations. Correlations may need to be performed several times with several configurations to insure all the possible scenarios have been covered. Sewer manholes may need to be opened and flows observed. If there is any doubt as to the existence of a leak, the area may be checked and correlated at different times to rule out water usage or other factors. The progress of the survey will be monitored by the use of daily logs and a progression map with suspected leak noise indications marked and possible leak locations will be maintained. Field leak location forms will be turned into the Utility according to the agreed schedule. The Project Team will follow up on leak locations by monitoring the repair schedule of the Utility. That way in case a potential leak location is wrong, the Project Team can return to the site and determine why the leak location was incorrect, and correct it. This means maintaining a good level of communication between the Project Team in the field, and the Utility. As a matter of Quality Control for leaks in the field, the two Correlators (Accu-Corr and Digi-Corr) have the distinct ability to be able to detect and pinpoint more than one leak in the same relative area, thus allowing better leak coverage and insuring that one leak is not “masking” another leak in the same area. The use of progress reports and meetings will allow for open discussions of problems encountered so solutions can be examined.”

## Utility Observations

The M.E. Simpson Co., Inc. Project Team will welcome having staff of the Utility observe field procedures while the Leak Survey is in progress. They will be happy to explain and demonstrate the equipment and techniques that are employed by M.E. Simpson Co., Inc. for detecting and locating leaks on the Water System. This may be useful for the staff of the Utility in understanding the parameters of Leak Detection, especially during an emergency such as a main break on a critical line where a major disruption of service could occur.

## Final Reports, Documentations & Communications

### *M.E. Simpson Co, Inc. will perform the following:*

- ◆ Project Team will **meet daily** with assigned Utility personnel to go over areas of survey for prior workday and plan current day and area to survey.
- ◆ The field technicians will be readily available by cellular phone as well as Nextel Direct Connect Radio. This will facilitate communications between the Utility and the field technicians. A **24-hour toll-free 800 number** is available for direct contact with M.E. Simpson Co., Inc. for emergencies.
- ◆ **Diagram all leak locations**, date of location, and classify according to severity and an estimate of loss. These will be turned in daily to appointed Utility Personnel.
- ◆ **The Project Manager will** meet with the Utility regularly for a progress report.
- ◆ **Prepare a progress report** at monthly intervals for the Utility if requested.
- ◆ **Maintain a progression map to be included with the progress reports and final report** of the project indicating leak locations with symbols indicating type and severity corresponding to the individual leak diagrams.
- ◆ Develop a **Leak Survey log** of activity which will also have confirmed leaks listed and this list will be turned in weekly (in an Excel format). The list will also be included with the final report that will include the following;
  1. Mechanical deficiencies discovered
  2. Mapping errors on the water atlas
  3. Type of monitored appurtenances
  4. Location of same for leaks discovered
  5. Total estimated loss
- ◆ **Prepare the final report** at the completion of the project which will include all leak location reports with drawings, total of estimated water loss, total pipe distance investigated, a description of the area surveyed, and other problems found in the system during the course of the survey that need the attention of the Water Utility. The leak summary will list leak types such as main leaks, service line leaks, valve leaks, or hydrant leaks. A cost benefit analysis of the survey based on the “cost to produce” water will also be included that describes the financial impact to the Utility for water loss. Recommendations for system maintenance will be a part of this report based on field observations made during the survey. **This final report shall be made available for submission to the Utility within thirty (30) working days of the completion of the fieldwork.**

Effective communication...  
accurate documentation...  
**Insuring the success for  
the leak survey**

## Assumptions & Services Provided by the Utility

- ◆ The Utility will furnish all maps, atlases, and records necessary to properly conduct the survey. All corrected maps are to be returned to the Utility at the completion of the project.
- ◆ The Utility will assist as necessary to clean out service valves, meter pits and valve-boxes needed for listening.
- ◆ The Utility will provide a Primary Contact Person and/or secondary contact person for the Field Staff to report to on a periodic basis. This person shall act as the official liaison for the duration of the Leak Survey. This person shall have a working knowledge of the water system and will be helpful in attempting to locate particularly hard-to-find water valves for listening and for general information about the water system. This person will not need to assist the Project Team on a full time basis, but only on an “as needed” basis.
- ◆ The Utility will assist, if needed, to help gain entry into sites that may be difficult to get into due to security issues or other concerns.
- ◆ The Utility will assist, if needed, to locate all nonmetallic pipe within the service area. This would include all Concrete Cylinder pipe and Asbestos Cement Pipe.
- ◆ We will encourage the immediate digging of major leaks (main breaks) so that if there are problems with the leak location, the problems can be corrected while the Project Team is close by and can verify the site.



Leak Located



Leak repaired.

## Area to be Surveyed

The total miles of pipe to be surveyed are approximately **106** miles for the Utility. This may change during the project.

The leak survey work includes monitoring all accessible main line valves, all hydrants, and several selected services as needed to keep listening distances within the accepted bounds and Scope of the survey.

## Leak Detection Equipment to be used

The following equipment will be used for acoustic leak detection work. All material listed will be on the job site at all times during the callout.

- ◆ State of the Art Leak Correlators
  - FCS Accu-Corr, Digi-Corr or Tri-Corr Touch; Vivax-Metrotech HL6000; Echologics LeakFinder ST w/hydrophones
- ◆ State of the Art Listening Devices:
  - FCS S-30 electronically enhanced listening device
  - Guterman Aquascope 3 electronically enhanced listening device.
- ◆ RADIO DETECTION LINE LOCATORS.
- ◆ SCHONSTEDT, Fisher Labs or CHICAGO TAPE magnetic locators.

# Water Audit and Billing Review

## Determine System Input

The first phase of our Water Loss Control Survey/Audit is to evaluate your water production volumes through the master water meters to insure the input into the system has been accurately documented. All water audits have to start with verification of the distribution system input to insure reliable water production amounts. Without this validation, the audit will be flawed from the start.

## Record Review

All master meter production data for the selected audit period will be reviewed along with an examination of any past master meter test results. This should include any reports periodically submitted to the state's regulatory agencies or regional water authorities. Total pumpage amounts for the audit period will need to be determined along with the marginal costs of water production.

## Evaluations

- ◆ How water enters the distribution system from the water sources will need to be evaluated.
- ◆ The Project Team may need to assess all master meter sites. The meter settings would be analyzed to determine proper meter layout. This site assessment should be done prior to any data review so that factors possibly affecting meter accuracy can be determined.
- ◆ Schedule evaluations with the Utility during normal working hours. Exceptions to evaluations times will be made on a case-by-case basis, depending on accessibility to the meter.
- ◆ Past master meter test flow data will be examined, if available.
- ◆ Production data for at least 12 months would need to be trended, and if available, the last 36 months as well.

## Determine Authorized Consumption

All studies and reports on previous water loss for the utility will be reviewed with the goal of refining and updating previous techniques. The Project Team will also carry out a detailed review of current water loss practices to identify cost effective loss reduction strategies. A brief review of the accounting and billing system is also imperative for this phase of the program the following items must be thoroughly researched and quantified for the 12-month audit period.

- 💧 Billed Metered Water
- 💧 Billed Unmetered Water
- 💧 Unbilled Metered Water
- 💧 Unbilled Unmetered Water

### Billed Metered Water

The meter accounting and billing evaluation can help locate inconsistencies within the accounting, meter reading and billing cycles, identify problems resulting from inaccurate reading or recording of the individual accounts of metered water and to identify possible potential meter accuracy problems. The top down evaluation will allow the development of cost-effective recommendations for the correction of the problems located.

### Billed Unmetered Water

All account information regarding unmetered water that is billed such as possible bulk sales, estimated consumptions, fire service water used, etc. will be evaluated. This area of examination can often turn up water uses that have not been documented.

### Unbilled Metered Water

Water used by municipal buildings or departments that is metered but for some reason is not billed such as park departments, pools, schools, government buildings, etc., will be evaluated. This water may very well be tracked as far as consumption is concerned but no revenue is generated from its use. Hence, this would be termed as a part of “Non-Revenue Water”.

### Unbilled Unmetered Water

Water use in this area is usually hard to predict and sometimes tough to estimate. It could be seasonal hydrant flushing, fire system flushing, street cleaning, and fire suppression. Theft of water, however, is not part of this. It is covered under unauthorized consumption. Unbilled Unmetered Water is part of “Non- Revenue Water” and the utility is not gaining an income from it. The account review can sometimes uncover accounts not being billed properly.

Our Project Team has extensive experience in the evaluation of metered consumption. We will use tried and true methods developed over the last 40 years and have the ability to ferret out bad practices both in metering and accounting/billing.

Once the Authorized Consumption has been totaled, it can be subtracted from Water Supplied to yield the water loss totals. The water loss total can be split into Apparent Losses and Real Losses.

### **In Depth Authorized Consumption Analysis**

An in depth Authorized Consumption analysis will provide a comprehensive review of the customer water use for the time period chosen for the water audit. The deeper analysis of the historical water use will allow for the identification of Apparent Losses that may be occurring in the metering fleet and the potential volume of these types of water loss. The time frame to be used for the review will be the audit year selected. The Utility will need to provide metered consumption records or files for the authorized consumption analysis which has to include the historical water meter readings for the audit period, an account file and a water meter file. In addition to this core data the Audit Team will need to be provided all historical water meter test results and a file that contains the current end points for the AMR meter reading system (if the utility is using an AMR system).

The audit team may use statistical random sampling to draw certain conclusions from the meter data. It is imperative that the Utility be able to deliver the data in an Excel format so that the data analysis can be performed. The audit team will work with the utility staff to export the data from the current accounting/billing system the utility may be using.

Additional information may be requested such as the last three years of consumption data for each account as well as meter age, meter type, brand and model for each account.

Select information for various meter accounts and the historical consumption for at least 12 months of time (typical audit period of one year) may be copied from the Water Utility's database. 36 months of data would be preferred. This information would be imported to the Project Team's program for review and evaluation. The type of information maintained in the Water Utility's database will determine the depth of our evaluation.

The following consumption evaluation will be performed on the data that is available.

- ◆ Perform analysis of pumped finished water versus billed water
- ◆ Review of your account billing cycles, procedures and practices.
- ◆ Review of your account meter reading cycles.
- ◆ Review of your account meter reading procedures and practices.
- ◆ Consumption patterns and trends are developed to locate decreasing or erratic historical use.
- ◆ Usage patterns of meters by sizes and types are reviewed.
- ◆ Review of meter age and possible degradation of meters from age issues
- ◆ An evaluation of consumption and revenue is performed.

### **Determine Apparent Loss**

This effort involves assessment of the three components of Apparent Losses shown in the Water Balance: Customer Metering Inaccuracies, Systematic Data Handling Errors associated with the water utility's read-to-bill process (anticipated to be minimal AMI is employed), and Unauthorized

Consumption (typically attributed to theft, but also including unintentional and erroneous tapping of water lines).

Apparent losses will be calculated by gathering data from the utility on unauthorized use, calculating meter inaccuracies, and identification of potential data handling errors for the above task of record review. Unauthorized use is a tough area to determine and requires some estimates to be made. However, reviewing customer service requests and reporting of open hydrants, etc., will help validate this information. The use of the Utility's GIS system (if available) will contribute greatly to helping accomplish this task.

The degree of confidence in the validity of authorized consumption is largely dependent on having a firm understanding of customer meter accuracy and the completeness of the utility's customer billing database. An estimate of customer meter accuracy will be based on available testing data for residential and commercial customer meters and a sensitivity analysis will be applied, if appropriate, to assess the range of likely upper and lower limits of accuracy and resulting impacts on non-revenue water performance. Our team will also assume that the customer billing database is inclusive of all customers receiving water service.

### Commercial-Industrial Meter Accuracy Levels

In order to validate corrected consumption for the audit, the large commercial/industrial meter accuracies need to be verified. Since the majority of water use occurs through these meters, this is a much needed task. Statistically significant random sampling (95 % confidence) of the consumption/billing data can be used to select meters by age, size and types for review from the consumption records. The Project Team can evaluate through the billing and accounting processes, the 1-1/2" and larger commercial / industrial water meters for right sizing, performance and accountability. We will review accounting, billing and reading practices with the goal of increasing revenues and improving accountability. Meters that may have been tested for accuracy in the field will have the test results evaluated and the weighted results of the tests can be applied to the Apparent Losses. 12 months of totalized meter data will be needed for the audit period. 36 months of data is preferred.

### Small Commercial/Residential Meter Accuracy

In order to validate corrected consumption for the audit, the small commercial - residential meter accuracies need to be verified. While these meters may not individually be a big cause of water loss, cumulatively they can be, thus, this is a needed task. Statistically significant random sampling (95 % confidence) can be used to select meters by age, size and types for review from the consumption records. The Project Team can evaluate selected information for 5/8" through 1" water meters for performance and accountability. We will review accounting, billing and reading practices with the goal of increasing revenues and improving accountability. Meters that may have been tested for accuracy in the meter shop will have the test results evaluated and the weighted results of the tests will be applied to the Apparent Losses.

For the **Unauthorized Consumption** component, the AWWA Water Audit methodology provides for a straightforward estimate of such usage at 0.25 percent of System Input volume. We will discuss the estimation of this component with utility staff and review prior investigations conducted by the utility to

determine whether this or some other basis is most appropriate for quantifying this component of the Water Balance.

### Needed from the Utility

- The Utility will furnish all records necessary to properly conduct the evaluation program.
- The Utility will provide customer records such as the 12-month (36 months preferred) consumption history, meter sizes, meter types or any additional information that would make the meter evaluation easier to perform. This information shall be regarded as CONFIDENTIAL and will not be shared with anyone outside of the Utility without consent of the Utility.
- The Utility will also make available, on a reasonable but periodic basis, certain personnel with a working knowledge of the water system who may be helpful in the identification of particular issues and for general information about the water system. This person will not need to assist the Project Team on a full-time basis, but only on an “as-needed” basis.

Systematic data handling issues will also be looked at from the previous evaluation of the billing and accounting processes. It may be prudent to trace particular accounts through the initial meter reading process to the billing process to locate potential points of data failure.

Once the above tasks have been completed and validated, the total Apparent Losses will be calculated.

## Determine Real Losses

Once the Authorized Consumption has been determined and validated, the calculated Apparent losses derived, and then Real losses can be calculated. This will be done by subtracting the Apparent Losses from the Total Losses to yield Real Losses. Real losses are defined as water lost to actual leakage. The Real losses can be validated as well by conducting an evaluation and review of the current leak detection methods employed by the Utility.

We will review the utility’s leakage records and leak survey results initially to establish the underlying basis for estimating the recovered quantities to characterize the validity of the reported volumes. We will analyze the leak repair data to discern significant trends in leak location, materials of construction, dates of original installation, soil types, operating pressure, and installation contractors that may be useful for establishing a prioritized program of repair and replacement.

Populating the data entries for components of the Water Balance for the utility’s system is a straightforward procedure within the AWWA Water Audit Software. However, the software represents a “top-down” approach for which the individual components of Real Loss are not discretely quantified.

## Calculate Performance Indicators, Including Infrastructure Leakage Index

After the Real Losses, have been calculated, the physical parameters of the water system need to be accounted for. This is usually a straight forward process of data entry. It is assumed that since the utility has completed prior audits, this data (miles of pipe, number of service connection, operating pressure,

and number of service connections) this information is readily available. In addition, we assume the GIS system data has been continuously updated. The same would be done for the cost data portion of the audit entry. However, past experiences with several audits have revealed that this data should be given a high degree of scrutiny. Service connection counts, miles of water main, and even water production costs have been incorrectly reported in the past causing a mis-representation of the fitness of the water system.

The AWWA Water Audit Software calculates performance indicators considered by the Water Loss Control Committee to be most appropriate for assessing water system performance. The Infrastructure Leakage Indicator (ILI), is calculated as the ratio of current annual real losses to unavoidable annual real losses. The utility should consider what the appropriate range of ILI should be, given the conditions noted, so that an economically sustainable leakage level can be established once programmatic costs are compared with the benefits of leakage management. The ILI should be considered as approximate guidance for leakage reduction target-setting, where a full economic analysis of leakage control options has not been performed. Past audits may indicate the ILI at a particular level, however, changes occur from year to year that are progressive and not always noticed so tracking the ILI is a needed check and balance.

As we have done for other water systems, we will summarize the calculation of the performance indicators and review them with utility staff as to their meaning in characterizing the relative performance of water loss reduction activities to those of other systems, and as the basis for establishing the components of your water loss management program.

Non-Revenue water will be calculated indicating the amounts of water not generating revenue. Non-Revenue water can be calculated by adding the total water loss to unbilled metered water plus the unbilled unmetered water.

## Performance Indicators

Certain cost data will be gathered from the Utility to help calculate the Performance Indicators. These indicators are made up of the Financial Indicators, as well as the Operational Efficiency Indicators.

The financial indicators will indicate how much revenue is lost due to Apparent losses (metering, billing, accounting issues) and Real losses (leakage in the system). By categorizing these losses, the amount of potential recovery for each area is identified to help plan for particular remediation techniques. An important aspect of the Real loss calculation will be the Unavoidable Real Losses. These are losses that occur even in the best run water systems. The calculation of Unavoidable Losses is done by applying a theoretical formula comprised of total water main lengths, lengths of service connections, number of service connections and system pressure. This is why the scrutiny of the physical characteristics of the system is needed, as mentioned above. By dividing the Current Annual Real Losses by the Unavoidable Real Losses, the ILI, or Infrastructure Leakage Index is calculated. This ratio performance indicator is used for comparison of one water system to another.

This ILI level will help the Utility and Project Team decide on a strategy of where and how much money may need to be spent for remediation. ILI ratios are based on the current conditions of the water system

and reflect the characteristics of the system and relate water resources to financial considerations, as related to operational considerations.

Other indicators such as the Apparent losses per connection per day, Real losses per mile of pipe per day, Real losses per service connection per day, and Real losses per meter (head) pressure per day, are especially useful for smaller water systems less than 3,000 connections, or less than 80 miles of pipe in the distribution system where the ILI will be calculated but not displayed. This lack of display is because the ILI has not yet been proven for smaller water systems due to not having enough statistical data available at the time the Water Audit Spreadsheet was developed by the Water Loss Committee of the AWWA.

### Assign/Determine Cost of Apparent and Real Losses

Valuation of the utility's real and apparent losses is directly based on the unit values assigned as input to the Water Audit Software. The marginal production cost used to value the real losses will be based on a weighted composite value of system-wide costs for all wells and water treatment plants and subsequent delivery costs applied to the entire system.

Apparent losses will be valued at the retail rate charged to customers. A suitable basis for the appropriate value to be applied to apparent losses will be developed from discussions with utility staff, considering the applicable rate schedule(s) system-wide.

### Validity Scores

While the Audit Spreadsheet is being filled out, grading scores will be assigned to segments of the data. This is done to provide a basis of understanding of how robust the data from the utility is. The data grading score is a useful tool in helping determine areas of remediation in record keeping for a water utility. It also acts as a tool for "self-evaluation" to insure data integrity. The grades for each data input are then totaled to yield the "Validity Score". **This step for each data input into the audit is one of the most important steps of the audit process.** Without this data validation, the audit process is subject to serious flaws. This area will have a great deal of scrutiny applied and is by far the single most important QA/QC segment of the audit process.

### Validate All Data and Compile Total Water Balance.

While the data validation process will occur in each above task, the final system-wide Total Water Balance (example below) will be developed and presented using the AWWA Water Audit Software, version 5.0 for review by the utility. The conclusions derived from this analysis will be discussed with the utility to reach a consensus on areas of opportunity to reduce non-revenue water, prior to undertaking water loss remediation planning.

AWWA Free Water Audit Software: <u>Water Balance</u>						WAS v5.0 American Water Works Association. Copyright © 2014, All Rights Reserved.
Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>						
Reporting Year: _____						
Data Validity Score: <b>N/A*</b> * Confirm Units and Data Grading are Complete						
Own Sources (Adjusted for known errors)  0.000	Water Exported 0.000	Billed Water Exported				
	Water Supplied  0.000	Authorized Consumption  0.000	Billed Authorized Consumption  0.000	Billed Metered Consumption (water exported is removed) 0.000	Revenue Water  0.000	
				Billed Unmetered Consumption 0.000		
		Water Losses  0.000	Unbilled Authorized Consumption  0.000	Unbilled Metered Consumption 0.000	Non-Revenue Water (NRW)  0.000	
				Unbilled Unmetered Consumption 0.000		
			Apparent Losses 0.000	Unauthorized Consumption 0.000		
				Customer Metering Inaccuracies 0.000		
		Real Losses 0.000	Systematic Data Handling Errors 0.000			
	Water Imported  0.000					

## Recommendations for Economically Viable Water Loss Intervention Programs

The AWWA Spreadsheet has “built in” generalized suggestions of system improvements based on the scoring system (“ILI” or Infrastructure Leakage Indicator and Validity Score for the confidence level of data used) that can help direct long term programs. However, following the completion of the Water Audit Spreadsheet and the results of the previous tasks, the Project Team will also develop a detailed prioritized set of recommendations on cost effective ways to continue to identify and remediate Apparent and Real Losses.

Each suggested task for water loss reduction may encompass details as to length of time to implement, cost to the Utility, expected return on investment (ROI), frequency of suggested maintenance and/or replacement programs such as leak surveys, and meter testing/repair/replacements. Major CIP programs may be identified as well such as main replacements, implementation of an AMR system, or any other long-term program that may need to be considered.

## Identify and Evaluate Candidate Water Loss Control Activities

The AWWA Manual M36 presents a series of worksheets that can be used to compare the benefits of additional water loss reduction against the estimated cost of achieving those reductions. The key question to be answered by this Task is “Is the utility taking reasonable steps to control water loss and maintain it at an economically sustainable level?”

## Real Loss Control

An assessment of the leakage management program effectiveness will include elements on the utility's costs for leak survey and repair activities and, if applicable, on pressure management. The project team will examine the organization, procedures and implementation of existing components of real loss control, such as proactive/reactive leak detection and repair programs and, if appropriate, a pipe replacement program and proactive pressure management.

## Apparent Loss Control

In the Basic Scope of Services, a similar analysis will be applied for apparent losses to assess the cost effectiveness of existing revenue capture and potential additional or improved revenue recovery activities, such as refinements to meter typing, sizing, change-out and accuracy testing protocols.

We will estimate the economic level of apparent losses by looking at the effort that would be required to reduce apparent losses to the "economic level" based on staff and external costs and potential recovery, and examine how close the utility is coming to achieving that.

## Documentations & Communications, and Final Reports

### ***M.E. Simpson Co, Inc. will perform the following:***

- ◆ Project Team will meet with assigned Utility personnel to go over areas of the audit to insure data needed to populate the audit spreadsheet is gathered by the utility and delivered to the Project Team for analysis.
- ◆ **The Project Manager will** meet with the Utility regularly for a progress report.
- ◆ **Prepare a progress report** at monthly intervals for the Utility if requested.

### Assumptions & Services Provided by the Utility

- ◆ The Utility will furnish all records in an electronic format (Excel preferred) or paper records necessary to properly conduct the audit.
- ◆ The Utility will provide a Primary Contact Person and/or secondary contact person for the Technical Staff to report to on a periodic basis. This person shall act as the official liaison for the duration of the Audit. This utility staff person shall have a working knowledge of the water system and will be helpful in attempting to locate particularly hard-to-find data sets. *This person will not need to assist the Project Team on a full time basis*, but only on an "as needed" basis.
- ◆ The Utility will assist, if needed, to help gain entry into sites that may be difficult to get into due to security issues or other concerns if inspections are needed to be conducted.
- ◆ The utility will assist with providing up to date information about the water system.

### Recommend and Prioritize Water Loss Control Activities Water Loss Management Plan

Based on the outcomes of all earlier tasks, the MESCO Team will identify and prioritize a program of activities to cost-effectively reduce identified water losses. These recommendations will include anticipated costs, technical and human resource needs, and a short schedule for implementation.

### Prepare and Issue System-wide Comprehensive Water Audit Reports

The project team will prepare a draft report comprising the system-wide analyses performed in the prior tasks, summarizing the analyses performed to reach conclusions regarding the utility's water loss performance, identifying opportunities to improve this performance, if warranted, and recommendations for achieving further reductions in non-revenue water through a prioritized, cost-effective program. We can also discuss with utility staff the possibility of creating, at a later date, other suitable display formats using data and financial considerations to bring out other key findings and conclusions of this project.

The draft report will be reviewed with utility staff and comments incorporated into a Final Comprehensive System-wide Water Audit Report.

### AWWA Water Audit Software

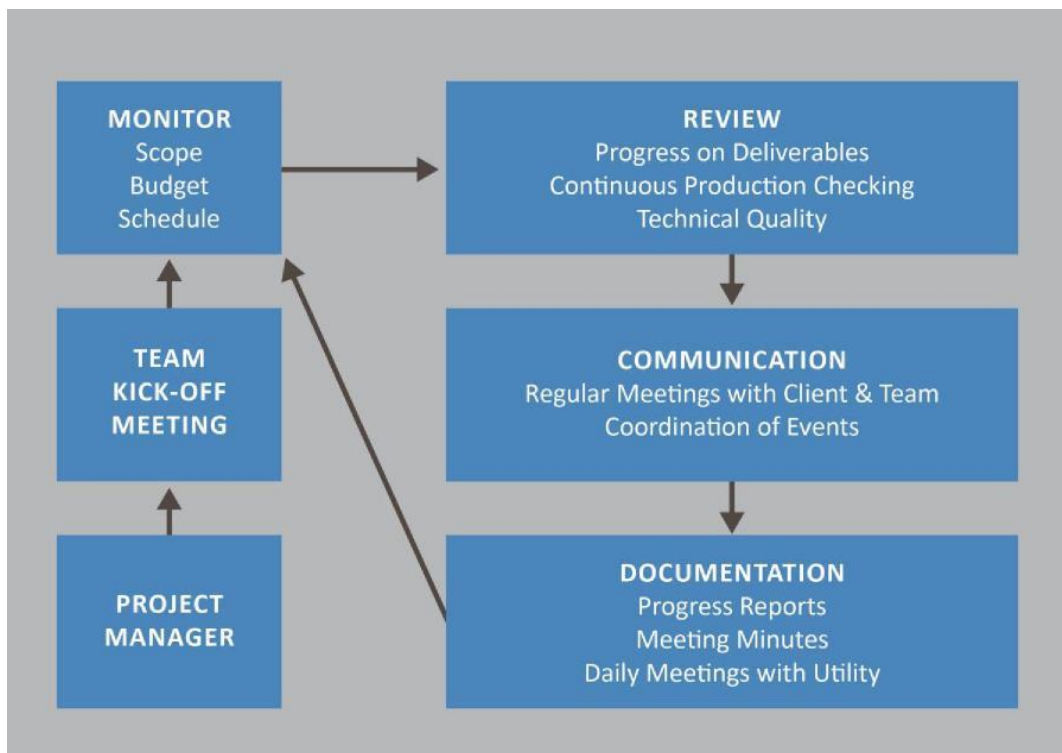
M.E. Simpson Co. Inc. will provide the Water Audit Spreadsheet in a digital format. That format will be Version 5 of the AWWA Water Audit Software. M.E. Simpson Co. Inc. staff will provide detailed instructions on how to use this software to selected water division managers.

## PROJECT APPROACH & PROJECT MANAGEMENT

M.E. Simpson Co., Inc.'s project management approach is what leads to our proven track record to complete projects on time and within the budget established. Based on our past experience, we have developed a project approach that will insure the Utility of effective communication throughout this project.

Our project management system establishes - the single project manager – who has the responsibility and authority to act on behalf of M.E. Simpson Co., Inc. This project manager will stay with the project from beginning to the successful completion. The project manager's specific responsibilities include:

- Coordination of all activities in this project
- Establishing key decisions and review milestones during this project
- Preparing an initial project development plan identifying the schedule of work tasks and key personnel to perform the work in the field to meet the milestones and objectives
- Coordinate communications and meetings with the Utility as needed or required to review technical concepts and alternatives, soliciting staff input and coordinating activities with the project team
- Prepare periodic reports as needed and meet with the Utility on a regular basis summarizing project scheduling, progress and maintaining the project within the budget stipulated
- Oversee the execution and development of the project deliverables



Project management remains an important activity during the course of the project and does not stop with the project manager. Each project team deployed into the field is dedicated to providing the best leak survey coverage that can be attained using the state of the art leak detection equipment, tools, field experience and knowledge. Each field team will be made up of two experienced leak detection technicians that also have been crossed trained in other disciplines of water loss control such as water meter assessments (residential, commercial, wholesale, and production meters), and water distribution system field maintenance such as distribution flow testing, valve exercising and locational assessments, and Unidirectional water main flushing. It is this combination of experience and knowledge that has helped shape our approach to water loss assessments in distribution systems because the technicians have the capacity to make on the spot decisions regarding any fine tuning of the leak detection program while in the field. They will maintain constant communication with the Utility and the project manager regarding their daily progress as well as any major issues needing immediate attention and discussion.

M.E. Simpson Co., Inc. believes that the selection of our team to perform this survey will provide the Utility with exceptional experience, sound decision making, and a level of service providing the following advantages:

- ◆ A professional leak detection team with a specialized expertise in water loss management
- ◆ An experienced team with the capacity to provide the highest quality work for the Utility
- ◆ A project approach that incorporates interim reporting and continuous input opportunities
- ◆ Innovative proven analysis techniques developed from the completion of several hundred similar projects that sought the same scope and results as this project

## Project Quality Assurance/Quality Control

Quality is of the utmost importance to M.E. Simpson Co., Inc. – not merely because of the Utility’s and other client’s requirements, but because it is vital to our continued success and viability. Quality management and services bring to all of us the rewards of jobs well done, satisfied Utility staff, and successful projects.

M.E. Simpson Co., Inc.’s QA/QC program is built around several key elements of M.E. Simpson Co., Inc.’s mission and values which consist of:

- ◆ Maintaining a reputation for quality performance
- ◆ Client satisfaction
- ◆ Continuous process improvement
- ◆ Open communication with the field staff and the Utility
- ◆ Team Work

The QA/QC plan for this project is very simple. No work will leave M.E. Simpson Co., Inc. until it has been verified that all the requirements and objectives of the project as well as the requirements of the project QA/QC managers have been met. During the course of the project, the project manager and/or the QA/QC manager will meet with the Utility to ensure that the work product is technically correct, but also meets the needs and expectations of the Utility.

M.E. Simpson Co., Inc.'s professional services are grounded in sound principles that meet the tests of time from past successes of hundreds of water loss projects and will satisfy the quality requirements of the Scope of Service. Each member of the project team will have a thorough understanding of the project objectives. They will apply sound methodology and principles, and are expected to produce quality, accurate and complete documents. The QA/QC procedure has been developed and implemented based on tried and proven methodologies. The prevention of poor quality service is based on four sound principles:

- ◆ Quality management of the project by using experienced personnel committed to excellence.
- ◆ Conformance to requirements by being knowledgeable of all local conditions in the field and keeping abreast of new cutting edge leak detection methods.
- ◆ Prevention of rework and errors by using teamwork in the field, cross checking the procedure every step of the way, and having data entry staff knowledgeable in all aspects of leak detection projects.
- ◆ Quality is built in - not added on. The project management and field staff have shown that a quality service is produced when the project tasks are properly sequenced and carried out to the final termination of the program using the built in system of checks and balances.



The above images were taken of a main break discovered by M.E. Simpson Co., Inc. in Princeton, Indiana in June of 2010. This leak, along with 64 others, was costing the utility upwards of \$128,246.40 a year.

## Master/Production Water Meters Evaluation, Testing and Repair Approach

Our Project Team's philosophy behind large production Venturi and Mag style water meter testing services as incorporated in this work plan is to provide the utility the following benefits:

- ◆ Conserve freshwater resources
- ◆ **Substantially reduce** the loss of revenue through improper/incorrect metering
- ◆ Help in monitoring potential system operation and maintenance problems
- ◆ Promote proper accounting and financial reporting (GASB 34)
- ◆ Reduce the risk of water shortage and customer hardship (drought management)
- ◆ Ensure a sound and reliable water service for customers of Water Utility

A number of items uniquely qualify our Project Team in performing this Pitot Testing program. The Project Team's extensive practical experience in Master Meter testing methodology, membership on the National AWWA Meter Standards Committee and Water Loss Committee, previous large Venturi Meter testing experience, coupled with other extensive Water Loss Assessment Program experience such as Water Audits, Leak Detection, and Large Meter Assessments, will allow for a thorough examination of each Master Meter and meter setting to help reduce the total water loss and revenue loss occurring in these meters. From start up to completion, our firm is committed to furnishing a quality service in a timely manner.

Our pitot testing programs go **beyond** stated AWWA meter testing specifications. This is due to a thorough understanding of the limitations of meter testing conducted in the field versus testing meters under a "controlled environment" in a laboratory or established meter testing shop. We recognize that field conditions are much different than a meter shop and that these conditions must be taken into consideration when testing meters in the field. Also, the AWWA M-6 and M-33 manuals have no set "**standards**" for **field testing**, only to try to use meter manufacturer's suggested flow rates (re: pages 72-77 of the M-6 manual). Therefore, we find it imperative to adhere to a strict method of field testing while taking into consideration the AWWA meter performance standards. This methodology is designed to allow for a systematic diagnosis of the meter's performance based on the results of the field data.

Our Project Team employs the use of a Polcon® Pitot rod to accurately measure flow in a pipe for determining the accuracy of a flow meter or obtaining a flow measurement in an unknown flow scenario. This consists of an insertion pitot tube that is placed through the cross section of the pipe in the exact center to measure the average mean flow velocity. The Polcon® Pitot rod produces a differential pressure between the averaged velocity head port and the averaged static head port. The fluid velocity is proportional to the square root of the differential pressure. This differential pressure is measured and recorded over time by the Polcon® Sentry electronic recorder. The results are then compared to the readings of the flow meter being tested for the same time period and accuracy is then calculated for the flow meter. According to the AWWA M33 manual, "Flow Meters in Water Supply" pitot testing can produce results of + 1/2 % to 5% of full scale with a "Repeatability" of 0.5 %. Using the Polcon® Sentry recorder that registers differential pressure to one one-hundredth of an inch of water

column, this accuracy can be improved to the + 1/2% to + 2% range. Repeatability remains the same due to test site conditions.

Meter testing will be performed “on site” at or near the meter setting on previously installed test corps. The primary purpose for testing large meters in place is to not have to remove a large meter from its setting, thus possibly causing many other problems, but also as a matter of practicality. Additionally, the meter setting can affect the accuracy of the meter if it is improperly configured and that would be assessed as well.

- 💧 **Meters that are found to be inaccurate from the testing will be calibrated by the Utility’s technician after new ranges have been calculated.**
- 💧 **The Project Team will work with the Utility for all test scheduling and two (2) man teams will be used to perform the work.**
- 💧 **Utility personnel may be required to assist our technicians where there are issues with gaining entry due to security or other concerns as well as providing SCADA readings in Excel for the duration of the tests. By having utility staff familiar with the particular meter setting available would be helpful in determining local conditions that may affect testing.**

The success of this program can be enhanced by reviewing all available data regarding any previous testing program. The following may need to be gathered; a listing of wholesale metered accounts and past consumption records, meter reading books, field cards, notes, Excel copies of the SCADA meter data, if available. Additionally, other records such as amounts pumped into the system may need to be reviewed. The field testing of wholesale meters along with the records reviewed, shall yield updated adjusted consumption records of the Utility’s wholesale meters as well as supplying valuable information regarding the general condition of the water meter revenue generating system.

**An organized field approach to this Master Meter Testing project will include the following:**

- 💧 **Introduce and maintain an interactive role** with the Utility Staff for the Testing Program. Conduct short interviews with staff about particulars of the selected meter locations such as changes in water use, age of the meters, meter reading systems, et al. This will allow for a greater understanding of how the wholesale meters are functioning, thus allowing priorities to be assigned to particular segments of the work.
- 💧 **Divide areas of the distribution system** into geographic areas where meters are located so they can be tested in an orderly fashion. This would include setting a schedule and maintaining a level of Field Staffing that will insure completion of the testing program within the schedule and budget allotted. This may require access to maps of the transmission system to be examined during the course of the planning sessions to formulate a workable plan of action.

- ◆ **Perform meter testing, working with the utility staff to adjust meters needing calibration, and possible retests to insure accuracy.** Document all meter testing in a manner that will allow a prioritized list of obsolete meters or un-testable meters to be replaced or piping corrected to allow testing at a future date.
- ◆ **Provide constant communication** with the Utility staff so problem meters and/or wholesale water customers can be addressed in a timely manner.
- ◆ **Provide instruction and council to Utility staff** during the course of the testing program so once the program is concluded, the Utility staff will have a complete understanding of all the parameters of conducting Pitot testing with the established goal of reducing the total revenue loss due to inaccurate metering in the system.
- ◆ **Provide daily communications with Utility staff** during the course of the project indicating pertinent details regarding the testing conducted each day.
- ◆ **Provide final meter reports** indicating all the pertinent details regarding the testing program.
- ◆ **Provide recommendations for future testing programs** such as a methodology and frequency for testing in the transmission system.

## Large Water Meter Evaluation, Testing and Repair Commercial/Industrial Water Meters Approach

M.E. Simpson Co., Inc.'s commercial/industrial water meter testing and calibration services will provide the City of Joliet with the following benefits:

- ◆ Conserve freshwater resources
- ◆ **Substantially reduce** the loss of revenue through improper/incorrect metering
- ◆ Make an immediate recovery of lost revenue by calibrating any meters not functioning correctly
- ◆ Help in monitoring potential system operation and maintenance problems by inspecting water meter settings and potential backflow issues
- ◆ Promote proper accounting and financial reporting (GASB 34)
- ◆ Reduce the risk of water shortage and customer hardship (drought management)
- ◆ Ensure a sound and reliable water service for Water Utility customers

### Project Field Approach – Large Meter Testing

M.E. Simpson Co. Inc. adheres to a strict method of field testing while taking into consideration the AWWA meter performance standards. This methodology allows for a systematic diagnosis of the meter's performance based on several flow rates across that specific meter's size and type beyond the AWWA's three tests (minimum, intermediate, and maximum).

The testing will be done by comparative methods using a **certified test meter** to test the water customer's meter within its normal operating range or by volumetric methods per AWWA M-6 Manual. Our comparative test meters are Sensus (formerly Rockwell) that record total volume and current

velocity for each of the **4 to 6** tests conducted. The test meters have “**Electronic Registers**” that are automatically reset to zero after each test. These comparative test meter units are themselves “**Tested and Certified Accurate**” at least once each year. Certificates of Accuracy are included as a part of this proposal submission.

Meter testing will be performed “on site” at the meter setting. The meter will be analyzed (as to the meter setting) to determine if the meter can be tested in place without removal, and without undue inconvenience to the water customer. *(Large meters are tested in place to avoid removing them from their setting, thus possibly causing other problems.)* Additionally, the meter setting can affect the accuracy of the meter if it is improperly configured.

An inlet and outlet valve are necessary to isolate the meter from use during testing, and a correctly sized and positioned test port is needed to attain enough velocity of flow to test that meter across the range of flow rates. If a by-pass line is available, that will be flushed (by bleed valve if one can be used) prior to using, to insure no water service interruption for critical customers (such as hospitals). Proper meter application and sizing during testing will be assure that the correct meter is in place, and the setting is correct for the application. Meter accessibility is a major concern, especially in regards to potential revenue loss for large commercial accounts.

- 💧 Meters found to be stopped, broken, or inaccurate will be calibrated by M.E. Simpson Co., Inc. and calibrated back to AWWA standards.
- 💧 Major parts such as chambers, turbine assemblies, check valves, and registers are extra.
- 💧 M.E. Simpson Co. Inc. will work with the Utility and the water customers for all test scheduling and two (2) man teams will be used to perform the work.

There is no extra charge for off-hour or weekend appointments.

- 💧 Utility personnel are not required to assist our technicians except where there are issues with gaining entry due to security or other concerns. However, having utility staff familiar with the particular meter setting available would be helpful for water customers accustomed to seeing particular utility personnel.
- 💧 All compound meters are tested at six flows rates, concentrating on the changeover rate which is the most critical flow rate in a compound water meter. (AWWA states three tests, the changeover rate being one of them. \*Reference AWWA M6 Manual, 4th edition – Chapter 5.).
- 💧 All meters are tested and calibrated, as required, in place and all calibration workmanship is covered by a 12-month warranty. Parts that break as a result of debris from a water main break or failure of the meter as a result of the same or other debris caught in the meter will not be covered.

A program’s success can be enhanced by reviewing all available data regarding any previous large meter testing and calibration program. The

**M.E. Simpson  
Co., Inc.’s  
extensive field  
experience in  
meter testing  
methodology  
will allow for a  
thorough  
examination of  
the Utility’s  
large meters.**

following will need to be gathered: A listing of large metered accounts and past consumption records and meter reading books, field cards, notes, computer copies of the large meter database, and billing data, if available. In addition, other records (such as amounts pumped into the system) may need to be reviewed. The field testing of large meters and meter calibrations, along with the records reviewed, shall yield updated adjusted consumption records of the Utility's large meters, as well as supplying valuable information regarding the general condition of the water meter revenue generating system.

**An organized field approach to this Meter Testing and Calibration project will include:**

- ◆ **Introduce and maintain an interactive role** with the Utility Staff for the Meter Testing Program. Conduct short staff interviews about selected meter locations, such as changes in building occupancy, meter age, meter reading systems, et al. This will allow for a better understanding of how large meters are functioning, allowing priorities for particular segments of the work to be set.
- ◆ **Divide distribution system** into geographic areas where meters are located to facilitate orderly testing. This would include scheduling and maintaining proper field staff to insure completion of the meter testing program on schedule and within budget. This may require access to distribution system maps for examination during the course of planning sessions to formulate a plan of action.
- ◆ **Perform meter testing, adjust and calibrate meters needing attention, and retest to insure accuracy.** Document all meter testing and calibrations in a manner that will allow a prioritized list of obsolete or un-testable meters to be replaced, or plumbing corrected to allow testing at a future date.
- ◆ **Document** each backflow device immediately downstream of the meter (if one exists) to provide information to assist and confirm backflow ordinance compliance by the commercial water customer.
- ◆ **Provide constant communication** with the Utility staff so problem meters and/or water customers can be addressed in a timely manner.
- ◆ **Provide instruction and council to Utility staff** during the meter testing and calibration program so that upon program completion, the Utility staff will have a complete understanding of conducting large meter testing and calibration. This will hopefully reduce revenue loss due to inaccurate metering in the system.
- ◆ **Provide daily communications with Utility staff** during the course of the project indicating pertinent details regarding the meter testing and calibrations conducted daily.
- ◆ **Provide final meter reports** indicating all the pertinent details regarding the meter testing and calibration program.
- ◆ **Provide recommendations for future meter testing programs** such as a methodology and frequency for testing meters in the distribution system.



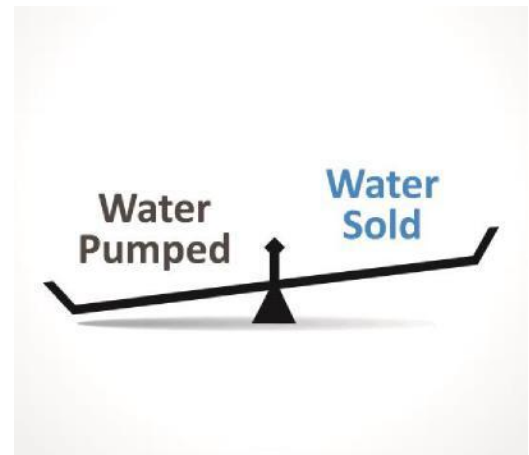
2" Sensus PT meter with remote register

## Water Distribution System Leak Survey Approach

This Leak Detection program is needed to be able to help the Utility control the water losses in the distribution system. Therefore, it is imperative the selection of a qualified Project Team be conducted with the utmost care with thorough research. Any team selected should have no trouble finding large leaks. When the first large leak is located, it will be impressive and the project team will look great. However, it is especially important to be able to locate all the leaks that can be possibly located, including all the small leaks that possibly can be masked by the larger leaks. That will be the real true test of the mettle and ability of the leak detection crew. In addition, gathering field data for the general condition of the distribution system is something the project team will need to be well versed in. Flowmeter maintenance and flowmeter testing is also a practical way of controlling real water losses in the system. Therefore, a practical project management plan with a proven QA/QC plan is needed to insure that this happens.

M.E. Simpson Co., Inc.'s philosophy behind water distribution system leak surveys and leak detection services as incorporated in this work plan is to provide the Utility the following benefits:

- ◆ Conserve freshwater resources
- ◆ Reduce the cost of lost water through leakage
- ◆ Conserve energy and reducing treatment costs by reducing pumpage
- ◆ Help in monitoring potential system operation and maintenance problems
- ◆ Promote proper accounting and financial reporting (GASB 34)
- ◆ Reduce the risk of water shortage and customer hardship (drought management)
- ◆ Ensure a sound and reliable water service for customers of the Utility



A number of items uniquely qualify M.E. Simpson Co., Inc. in performing this leak detection program. The Project Team's extensive practical experience in leak detection methodology coupled with other extensive Water Loss Assessment Program experience such as Water Audits, Meter Testing, and Master Meter Assessments, will allow for a thorough examination of the Distribution system to help reduce the total water loss occurring in the distribution system. From start up to completion, our firm is committed to furnishing a quality service in a timely manner.

## Equipment to be used

The following equipment will be used for acoustic leak detection work during the leak survey. All material listed will be on the job site at all times.

- ◆ **FCS Accu-Corr, Digi-Corr, Tri-Corr Touch Leak Correlator; Vivax-Metrotech HL6000 Leak Correlator; or Ecologics LeakFinderRT w/hydrophones Leak Correlator**
- ◆ **FCS S-30 electronically enhanced listening device or Gutermann AquaScope 3 electronically enhanced listening device.**
- ◆ **RADIO DETECTION LINE LOCATORS.**
- ◆ **SCHONSTEDT, FISHER LABS or CHICAGO TAPE magnetic locator.**



The FCS S-30 or Gutermann AquaScope 3 will be used during the initial surveying process. Both units use highly sensitive transducers to detect leak noise along the pipe or appurtenances attached to the pipe. There is an adapter plate that can be used with the transducer as a “ground microphone” so that this type of leak detection method is available for the crew to use if needed.

**The all our Correlators, amplifiers, transducers and related equipment are sent in to the manufacturer annually for software upgrades as well as system checks to insure the equipment is operating at optimum levels. Records of these system checks and calibrations are kept on file and are available upon request.**

The Radio Detection Line Locator is used to locate buried metallic water pipe. Line locating the water main and services in areas of suspected leaks is necessary so that the layout of the pipe and correct distances of the pipe can be verified. When a leak correlation is being performed on a suspected leak, the proper distance will be entered into the leak correlator. If the water lines are not properly located, it is possible that incorrect pipe distances could be entered into the correlator, thus the leak location could be inaccurate causing the digging of a dry hole. Also, when the Utility crews are ready to dig up the leak area for repair, having the proper location of the pipe is necessary.

The Magnetic locator is a required tool so that buried mainline valves and curb-stops can be located for listening and /or leak correlation if needed.

## Project Field Approach – Leak Detection

When leaks occur on a water pipe, the water escaping the pipe under pressure produces friction, and thus “leak noise.” The ability to detect, and then pinpoint leaks on water pipe is dependent on several variables. All these variables need to be analyzed by the Project Team during the course of the Leak Survey in order for successful leak locations to occur. These variables include:

- 💧 **Pipe Material.** Different pipe materials cause sound waves to travel at different velocities
- 💧 **Pipe sizes.** Different pipe sizes cause sound waves to travel at different velocities. Larger pipes will cause the sound to travel slower than on smaller pipe due to the amount of pipe material for the sound to be absorbed into
- 💧 **Water pressure on the pipe.** Lower pressure will not produce as much leak noise as higher pressure
- 💧 **Flow velocity in the pipe.** Water moving through the pipe can affect the transmission of leak noise on the pipe and the ability to detect leakage
- 💧 **Water table.** High levels of ground water can affect ability to hear leaks on the pipe. Soil conditions - types of soils can affect ability to detect leaks due to the density of the soil surrounding the pipe
- 💧 **Size of the leak in the pipe.** Larger leaks can in some circumstances produce lower noise levels than smaller leaks
- 💧 **Mechanical noise.** Pump noise from a nearby pump station can affect the ability to detect leaks as well as noise from electrical transformers

**M.E. Simpson Co., Inc.’s extensive field experience in leak detection will allow for a thorough examination of the Utility’s distribution system.**

The success of this program will be dependent upon reviewing all available data regarding the operation of the distribution system. The following will need to be gathered; all as-built drawings of the water distribution system, all original atlases, all books, field cards, notes, computer copies of the distribution system, valve cards, hydrant cards and a copy of a digital map of the Utility, if available.

Additionally, other records such as amounts pumped into the system will need to be reviewed. The field verification of leaks and associated locations, along with the records being reviewed, shall yield updated location records of the Utility’s leak locations as well as supplying valuable information regarding the general condition of the distribution system.

### An organized field approach to this Leak Survey project will include the following:

- 💧 **Introduce and maintain an interactive role** with the Utility Staff for the Leak Survey Program. Conduct short interviews with staff about particulars of the distribution system such as problem areas prone to leaks, age of pipe, pressure problems in the distribution system. This will allow for a greater understanding of how the distribution system is functioning allowing priorities to be assigned to particular segments of the work

- 💧 **Divide areas of the distribution system** into geographic areas that can be surveyed in progression and leak areas pinpointed in an orderly fashion. This would include setting a schedule and maintaining a level of Field Staffing that will insure completion of the Leak Survey within the schedule and budget allotted. This will require all maps of the distribution system to be examined during the course of the planning sessions to formulate a workable plan of action
- 💧 **Perform a Leak Survey on the distribution system** and document confirmed leak locations in a manner that will allow a prioritized list of leak repairs to be pursued according the described “Scope of Work”
- 💧 **Locate** all confirmed leaks in a manner that will allow their positions to be known and readily re-creatable by Utility personnel upon demand
- 💧 **Provide constant communication** with the Utility staff so located leaks can be addressed in a timely manner
- 💧 **Provide instruction and council to Utility staff** during the course of the Leak Survey so once the program is concluded, the Utility staff will have a complete understanding of all the parameters of conducting leak surveys with the established goal of reducing the total water loss in the system
- 💧 **Provide daily reporting** during the course of the project as well as a final report indicating all the pertinent details regarding the leak survey program.
- 💧 **Provide recommendations for future leak survey programs** such as a methodology and frequency for surveying the distribution system



## Potential Problems

Problems can occur at any point during the course of the leak survey. As outlined above, all variables need to be accounted for so these issues can be mitigated. This is done with having a good QA/QC program built into the project. Despite all precautions, things can and do go wrong.



When a major leak has been located, the Utility will need to excavate as soon as is prudent while the field team is performing the remainder of the leak survey. It is rare that a leak is missed and the Utility digs a dry hole. However, when this happens, M.E. Simpson Co., Inc. will assist in any way possible to determine why the pinpoint of the leak was off. It is imperative that if a leak is missed, that the Utility contact the project field team immediately so the field team can mobilize to the open excavation to be able to assess if a mistake was made because incorrect information was used in the initial evaluation such as; incorrect pipe material, incorrect distance between points used for correlation, size of pipe, pipes not line located correctly, or some other issue. The field team will retrace all steps used for the initial leak pinpoint and re-locate the leak. This may involve placing one or both of the transducer microphones directly on the pipe in the open excavation and performing a leak correlation to obtain a pinpoint. What matters is correctly locating the leak so it can be repaired and service restored. Once the leak has been located and confirmed, then a determination of how the pinpoint was miscalculated can be determined and rectified.

Other issues that can cause potential problems can be avoided by simply following the established field procedure described under the “Scope of Service” as well as the established QA/QC procedure. These procedures have established sequences, that when followed, yields accurate leak locations. Leak pinpointing becomes inaccurate when some or all of the variables cannot be accounted for or mitigated.

## **Water Loss Control Audit Program Approach**

A Water Loss Control Audit program is needed to be able to help the water utility identify and then control the water losses in the distribution system. This will be accomplished by using the standard AWWA Water Audit Software as well as following methods contained in the AWWA M36 manual on Water Audits and Loss Control Programs. This specific program will incorporate an approach of using a “top-down” analysis of the water system that will examine all the facets of water use and water loss in the utility. Therefore, it is imperative the selection of a qualified Project Team be conducted with the utmost care with thorough research. Any team selected should have no trouble determining some areas of water loss. It is especially important to be able to locate all areas of water loss in the system including real losses, apparent losses, including potential issues with the accounting and billing departments. That will be the real true test of the mettle and ability of the Water Loss Control Audit Team. In addition, gathering data for the general condition of the distribution system is something the project team will need to be well versed in. Therefore, a practical project management plan with a proven QA/QC plan is needed to insure this happens.

M.E. Simpson Co., Inc.’s philosophy behind water distribution system water loss audit services as incorporated in this work plan is to provide the Utility the following benefits:

- ◆ Conserve freshwater resources
- ◆ Determining the exact areas of true water losses
- ◆ Reduce the cost of lost water through leakage
- ◆ Conserve energy and reducing costs by reducing pumpage
- ◆ Help in monitoring potential system operation and maintenance problems
- ◆ Promote proper accounting and financial reporting (GASB 34)
- ◆ Reduce the risk of water shortage and customer hardship (drought management)
- ◆ Location of losses through commercial and residential meters which are improperly registering and recording water use
- ◆ Locating billing and accounting errors
- ◆ Ensure a sound and reliable water service for customers of the Utility
- ◆ Providing short- and long-term water loss reduction strategies for the Utility

A number of items uniquely qualify M.E. Simpson Co., Inc. in performing this Water Loss Audit Program. The Project Team’s extensive practical experience in various water loss control programs such as Water Audits, Meter Testing and proper meter applications, Master Meter Assessments, and Leak Detection will allow for a thorough examination of the Distribution system records and operations to help reduce the total water loss occurring in the distribution system. In addition, the Team will be made up of individuals who are members of the AWWA national Water Loss Control Committee, including a past chair of the committee.

## Water Loss Control Survey – Audit Approach

Our **Water Loss Control Audit program** is a multi-phase plan encompassing a select group of our services that will assist your Utility in improving water accountability and optimizing your distribution system's operational performance. Our program will be structured around your specific needs so that you can optimize your results and maintain flexibility in the performance of the various tasks. The Project Team will submit a questionnaire for particular details required for the review.

The Utility will provide all relevant information to conduct the water audits. In the collection and review of the data, a hierarchical approach will be used.

- ◆ Current information found in the water utility reports and files will be used as the initial set of data. Some discrepancies among the data sets will be resolved by contacting water utility staff for clarification.
- ◆ Past audits and reports will be consulted and used. Older legacy water utility data may be consulted as well. When appropriate, the information will be prorated to reflect changes in the system, including production and consumption for particular years or the audit period.
- ◆ In the absence of specific data for the water utility, information and assumptions from other audit workbooks and published literature may be used. Important references will include certain AWWA manuals and papers from the various IWA/AWWA water loss conferences (such as Leakage 2005, Leakage 2007, and Water Loss 2009), etc. For example, small and large meter accuracies have major impacts on the results of water audits. If the water utility does not have the data to support their estimated accuracy, then the Project Team may use data from the literature to estimate such Apparent Losses such as data from various Research Foundation water loss studies for AWWA. As an option to the utility, a statistical sample of meters can be tested to get a more accurate estimate of incorrect registration.
- ◆ Cost data such as the annual operational costs and marginal costs will need to be supplied to complete the audit.
- ◆ Physical parameters of the water system will need to be gathered in order to make certain calculations.

## FIRM EXPERIENCE

Working together with our clients to create secure water distribution systems is what drives our practice.

### Company Overview

For 39 years, M.E. Simpson Co., Inc. has helped utilities across the U.S. locate and resolve water loss control issues so customers could confidently provide safe, quality water to the community. We use state-of-the-art programs to assist utilities with their meters or water distribution systems condition and performance shortfalls. Simpson's trained professionals work hand-in-hand with utility team members to set up monitoring systems that help them avert future problems.

Primary line of business:	Water loss control programs
How long has the company been in business:	For 39 years; since 1979
How long has the company been providing leakage assessment services with regard to this proposal:	For almost 30 years, M.E. Simpson Co., Inc. has used a state-of-the-art computer-leak-correlator-based system to locate and pinpoint leaks in water distribution systems.

# M.E. Simpson Co., Inc.

For our clients, we deliver a team of water system experts who not only help bring their existing water systems to peak performance, but also help them build operation and maintenance programs uniquely tailored to their communities' needs. Water solutions that withstand the tests of both growth and time.

## Water system specialists ... by the numbers

### Water Loss Control Programs

**+60,000** Large water meters serviced  
**100,000** Miles of pipe leak detection serviced

### Asset Management Services

**+500,000** Valves located + exercised

### Fire Hydrant Flow Testing Program *(water main capacity)*

**75,000** Fire hydrants flowed, maintained  
+ water main capacity information developed

These numbers don't show the whole story. Behind them are M.E. Simpson Co, Inc.'s ongoing efforts to educate and grow its clients to become proud partners. Partners who can proactively deal with their municipality's unique water distribution systems, and confidently deliver safe water each and every day.



M.E. Simpson Co., Inc. was formed on the simple fact that water distribution systems cannot fail because they are critical to every community. When things are right, no one knows these systems exists. But when they are wrong, lives and livelihoods are disrupted. Our goal? To make sure yours is right. Always.



## Leading, Innovating, Educating Our Commitment to the Industry

M.E. Simpson Co., Inc.'s team works with clients, community members and peers to educate them through public presentations, training seminars, and providing continuing education credits for water operators through various water groups. Our ongoing programs are the "go-to" seminars at local, state and national AWWA seminars and conferences:

Large Water Meter Evaluation

Testing + Repair

Water Distribution System Leak Surveys

Water Distribution System Valve Location

Exercising + Computerized Documentation

Fire Hydrant Maintenance

Water Main Capacity Training

Unidirectional Flushing

Best Management Practices  
*(for distribution system maintenance)*

Providing solutions to maximize your  
water distribution + collection systems

Stop water losses  
Avert future problems  
Maximize utility revenue  
Lower distribution system losses  
Secure your utility for years

## Client References

M.E. Simpson Co., Inc. has been in business since 1979. The company continues to perform services for numerous cities across Arizona, California, Georgia, Illinois, Indiana, Maryland, Michigan, Minnesota, Ohio, Texas, Wisconsin and other regions of the United States. We began offering 24-hour On-Call Emergency Leak Detection services in the Chicago Metropolitan Area in 1989. We added these same services to the Central Indiana/Indianapolis Area in 1999.

In 2013 we provided over 560 emergency call outs in the Chicago Land Area. That year approximately 70 different utilities, the City of Joliet, Illinois being one of them used our on-call services. Most of the folks, Chicago Land Area, listed as references in the other sections of this response use our On-Call Emergency services.

In 2014 we provided over 1000 emergency call outs in the Chicago Land Area, 420 of them in an eight-week period between January 1, 2014 and March 1, 2014. That year approximately 105 different utilities, the City of Joliet, Illinois being one of them used our on-call services. Most of the folks, Chicago Land Area, listed as references in the other sections of this response use our On Call Emergency services.

In 2015 we provided over 712 emergency call outs in the Chicago Land Area. That year approximately 85 different utilities, the City of Joliet, Illinois being one of them used our on-call services. Most of the folks, Chicago Land Area, listed as references in the other sections of this response use our On Call Emergency services.

### Village of Algonquin, IL (2004-2018)

M.E. Simpson, Co., Inc. conducted a Leak Survey on approximately 160 miles as a way for the Village to reduce water losses occurring in the distribution system. The most recent completed Leak Survey Program in 2014 in the location of 32 leaks totaling 82,080 gallons of water per day. Using a price to produce of \$3.27 per thousand gallons, these leaks were estimated to be costing the Utility in excess of \$268 per day, or \$97,966 annually. **This Leak Survey paid for itself within three months.**

Contracted amount:	\$25,600.00
Time required to complete the project:	4 weeks
Findings of the project:	32 leaks/82,080 GPD
Projected annualized cost saving to the Utility authorizing the project:	\$97,966.00
Contact:	<b>Mr. Jason Schutz</b> <b>Chief Water Operator</b> Village of Algonquin 110 Meyer Drive Algonquin, IL 60102 847.658.2754 jasonschutz@algonquin.org

**Village of Carpentersville, IL (2011, 2014, 2017)**

M.E. Simpson, Co., Inc. conducted a Leak Survey on approximately 129 miles as a way for the Village to reduce water losses occurring in the distribution system. The most recent completed Leak Survey Program in 2014 in the location of 118 leaks totaling 282,240 gallons of water per day. Using a selling price of \$5.24 per thousand gallons, these leaks were estimated to be costing the Utility in excess of \$1,479 per day or \$539,812 annually. **This Leak Survey paid for itself within two months.**

Contracted amount:	\$12,000.00
Time required to complete the project:	3 weeks
Findings of the project:	118 leaks/282,240 GPD
Projected annualized cost saving to the Utility authorizing the project:	\$539,812.00
Contact:	<b>Mr. Bob Cole</b> <b>Director of Public Works</b> 1200 L.W. Besinger Drive Carpentersville, IL 60110 847.344.1973 bcole@vil.carpentersville.il.us

**Grafton Water and Utility, WI (2011-2017)**

M.E. Simpson, Co., Inc. conducted a Leak Survey on approximately 30 miles as a way for the Utility to reduce water losses occurring in the distribution system. The most recent completed Leak Survey Program in 2014 in the location of 6 leaks totaling 18,720 gallons of water per day. Using a selling price of \$2.16 per thousand gallons, these leaks were estimated to be costing the Utility in excess of \$49 per day or \$17,834 annually. **This Leak Survey paid for itself within two months.**

Contracted amount:	\$4,800.00
Time required to complete the project:	
Findings of the project:	6 leaks/18,720 GPD over 30 miles of main
Projected annualized cost saving to the Utility authorizing the project:	\$17,834.00
Contact:	<b>Mr. Tim Nennig</b> <b>Utilities Superintendent</b> Village of Grafton 1900 9 <sup>th</sup> Avenue, PO Box 144 Grafton, WI 262.375.5330 tnennig@village.grafton.wi.us

**Department of Water Management (DWM), Chicago, Illinois (2012-Current)**

M.E. Simpson Co., Inc. is currently performing large meter evaluations and testing for 2000 commercial/industrial accounts and 200 wholesale metering locations for the City of Chicago's Department of Water Management (DWM). M.E. Simpson Co., Inc. is providing the field services expertise, field supervision, testing equipment, vehicles and the field personnel for this comprehensive meter evaluation and accuracy testing project. This project was developed to assist the DWM in controlling the apparent water losses in the large commercial, industrial meters and wholesale metered accounts. Over 2000 – 3" and larger meters are being inventoried, classified, and tested for accuracy. All meter locations are having digital photos taken of each meter setting along with drawings depicting piping configurations that might have an effect on meter accuracy. A large meter database is being custom created to be used with the DWM's GIS system. The field work was started in January 2013. After the field work is completed, a complete evaluation of all the meters inspected and tested will be performed and subjected to statistical analysis for creating a complete on-going meter evaluation and maintenance program for use by DWM field staff. The large meter population will be set up so regular meter testing intervals can be based on meter revenue as well as meter size and type. This program is part of the larger effort to properly meter all water consumed in the City.

Contracted amount:	\$1,110,350.00
Time required to complete the project:	2012-2018, 2019-current (in progress)
Findings of the project:	Inaccurate commercial/wholesale meters
Projected annualized cost saving to the Utility authorizing the project:	Revenue recovery of estimated \$4.1 mil from wholesale meters
Contact:	<b>Ms. Andrea Putz, PhD</b> <b>Director of Water Research and Development</b> Department of Water Management Jardine Water Treatment Plant 1000 East Ohio St. Chicago, IL 60611 312.742.1070

**Village of Downers Grove, Illinois (2005-2008, 2010-2018)**

M.E. Simpson Co., Inc. performed a Large Meter Testing Program for the Village of Downers Grove, Illinois. A number of large meters are tested and evaluated for sizing, application and accuracy. All field data is gathered and entered into a meter database and a report written documenting the accuracy of each meter prior to repair. The meters are categorized by type and size. An individual report of each meter test was made with the test results and repair comments. This was done so that the Utility staff could easily use the information to observe the recovery of lost revenue from the meter. This project is part of an ongoing effort to reduce revenue loss in the water system.

Contracted amount:	\$15,000.00 per yr. (meter parts not included)
Time required to complete the project:	4 weeks per yr.
Findings of the project:	10% failure rate of commercial meters
Projected annualized cost saving to the Utility authorizing the project:	\$15,000.00 est.

Contact:	<b>Mr. Stan Balicki</b> <b>Assistant Director of Public Works</b> Village of Downers Grove 5101 Walnut Avenue Downers Grove, IL 60515-4074 630.434.5460
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### Village of Westmont, Illinois (1986-2013)

M.E. Simpson Co., Inc. performs a Large Meter Testing Program each year for the Village of Westmont, Illinois. A number of large meters are tested and evaluated for sizing, application and accuracy. All field data is gathered and entered into a meter database and a report written documenting the accuracy of each meter prior to repair. The meters are categorized by type and size. An individual report of each meter test was made with the test results and repair comments. This was done so that the Utility staff could easily use the information to observe the recovery of lost revenue from the meter. This project is part of an ongoing effort to reduce revenue loss in the water system.

Contracted amount:	\$14,000.00
Time required to complete the project:	3 weeks
Findings of the project:	Ongoing meter testing helped find inaccurate meters
Projected annualized cost saving to the Utility authorizing the project:	\$14,000.00
Contact:	<b>Mr. Mike Ramsey</b> <b>Director of Public Works</b> Village of Westmont 39 E. Burlington Village of Westmont, IL 60559-1790 630.829.4453

### City of Mishawaka, Indiana (1986-2013)

M.E. Simpson Co., Inc. performs a Large Meter Testing Program each year for the City of Mishawaka, Indiana. A number of large meters are tested and evaluated for sizing, application and accuracy. All field data is gathered and entered into a meter database and a report written documenting the accuracy of each meter prior to repair. The meters are categorized by type and size. An individual report of each meter test was made with the test results and repair comments. This was done so that the Utility staff could easily use the information to observe the recovery of lost revenue from the meter. This project is part of an ongoing annual effort to reduce revenue loss in the water system.

Contracted amount:	\$18,000.00
Time required to complete the project:	3 weeks
Findings of the project:	14% failure rate

Projected annualized cost saving to the Utility authorizing the project:	\$18,000.00
Contact:	<b>Mr. Brian Galletti</b> <b>Water Superintendent</b> Mishawaka Water Works 126 North Church Street P.O. Box 363 Mishawaka, IN 46546-0363 574.258.1653 <i>Dates of Service: 1986-2018</i>

### **Macon Water Authority, Macon, Georgia (2012-current)**

M.E. Simpson Co. Inc. is currently performing large meter evaluations and testing for the Macon Water Authority. The company is providing the field services expertise, field supervision, testing equipment, vehicles and the field personnel for this comprehensive meter evaluation and accuracy testing project. This project was developed to assist the Authority in controlling the apparent water losses in the large commercial and industrial meters. Over 200 – 3” and larger meters are being inventoried, classified, and tested for accuracy. A large meter database has been created to be used with the Customer Service data system. After the each phase of the field work is completed, an evaluation of all the meters inspected and tested is performed for maintaining a complete on-going meter evaluation and maintenance program for use by MWA’s staff. The large meter population has been set up so regular meter testing intervals can be based on meter revenue as well as meter size and type. Also, as part of the program, M.E. Simpson Co. conducted large meter classes for the field staff of the utility so that the utility would have a better understanding of the methods used in the field to test and evaluate large meters. This program is part of the larger effort to reduce and monitor overall water losses.

Contracted amount:	\$87,295.00
Time required to complete the project:	3 yr. contract
Findings of the project:	14% failure rate
Projected annualized cost saving to the Utility authorizing the project:	Over \$100,000.00
Contact:	<b>Mr. Kirk Nylund</b> <b>Customer Service Director</b> Macon Water Authority 790 Second Street Macon, GA 31202-0108 478.464.5619; knylund@maconwater.org

**City of Atlanta Water Management, Atlanta, Georgia (2014-current)**

M.E. Simpson Co., Inc. performs regular Production meter testing for the City of Atlanta on 72", 60" and 48" Venturi Meters that measure all the daily flow into the water system. The testing occurs at least once per year to coincide with the pre-data collection for the annual Water Audit, but now has recently increased to six month and 3 month intervals. This is done to insure accurate accounting of the total water produced can be applied to the annual water audit.

Contracted amount:	<b>\$14,150.00/deployment</b>
Time required to complete the project:	1 week
Findings of the project:	Production Meters tested within accuracy limits
Projected annualized cost saving to the Utility authorizing the project:	N/A
Contact:	<b>Quinton T. Fletcher</b> <b>Department of Watershed Management,</b> <b>Watershed Director</b> 650 Bishop Place NW Atlanta, GA 30318 office 404-546-3663 cell 770-865-2240 Email: <a href="mailto:qfletcher@atlantaga.gov">qfletcher@atlantaga.gov</a>

**Rivanna Water and Sewer Authority (2014-current)**

M.E. Simpson Co., Inc. performs regular Production meter testing for the Rivanna Water and Sewer Authority on Venturi, Mag, and insertable meters that measure all the daily flow into the water transmission system. In addition several wholesale meters to other municipalities are tested as well. The testing occurs at least once per year to help with water accountability, but occasionally has been performed at six month and some 3 month intervals.

Contracted amount:	<b>\$16,050.00/deployment depending on scope</b>
Time required to complete the project:	1 week
Findings of the project:	Production Meters tested within accuracy limits
Projected annualized cost saving to the Utility authorizing the project:	N/A
Contact:	<b>Dave Tungate</b> <b>Water Manager</b> Rivanna Water and Sewer Authority 695 Moores Creek Lane Charlottesville, VA 22902 434.906.0771 <a href="mailto:dtungate@rivanna.org">dtungate@rivanna.org</a>

**Village of Arlington Heights Water Department (2018)**

M.E. Simpson Co., Inc. performed a Level 1, “top down” Water Audit for the Village of Arlington Heights. This was done to help the Village determine where water losses were occurring in the system. The audit began with the assessment of purchased water from Northwest Water Commission, then an analysis of all Authorized water uses was performed, going through the water consumption and billing records to assess “paper” losses. Once the Apparent losses were calculated, the Real losses (leakage amounts) were calculated. After the data was thoroughly reviewed, a water loss control plan was detailed for the village.

Contracted amount:	<b>\$17,500.00</b>
Time required to complete the project:	4 months
Findings of the project:	Audit showed where losses were occurring in the system
Projected annualized cost saving to the Utility authorizing the project:	Potential recovery of \$401,800.
Contact:	<b>Jeff Musinski</b> <b>Superintendent of Utilities</b> Village of Arlington Heights 33 S. Arlington Heights Road Arlington Heights, IL 60005 (847) 368-5800 <a href="mailto:jmusinski@vah.com">jmusinski@vah.com</a>

**Village of Schaumburg Water Department (2017)**

M.E. Simpson Co., Inc. performed a Level 1, “top down” Water Audit for the Village of Schaumburg. This was done to help the Village determine where water losses were occurring in the system. The audit began with the assessment of purchased water from NSMJAWA, then an analysis of all Authorized water uses was performed, going through the water consumption and billing records to assess “paper” losses. Once the Apparent losses were calculated, the Real losses (leakage amounts) were calculated. After the data was thoroughly reviewed, a water loss control plan was detailed for the village. Included was an in-depth consumption and billing analysis on all the metered water uses in the village. Significant discoveries were made on particular areas of water loss both in metering issues and leakage.

Contracted amount:	<b>\$41,250.00</b>
Time required to complete the project:	4 months
Findings of the project:	Audit showed where losses were occurring in the system
Projected annualized cost saving to the Utility authorizing the project:	Approx. \$900,000 potentially recoverable
Contact:	<b>Brian D. Wagner</b> <b>Superintendent-Utilities</b> Village of Schaumburg Department of Engineering and Public Works 714 South Plum Grove Road, Schaumburg, IL 60193 847.923.6641 Office <a href="mailto:bwagner@villageofschaumburg.com">bwagner@villageofschaumburg.com</a>

Additional client references include:

**Mr. Jim Cates**  
**Water Superintendent**  
**Village of Westmont**

39 E. Burlington  
Village of Westmont, IL 60559-1790  
630.829.4479

**Mr. Dave Moody**  
**Water Manager**  
**Village of Downers Grove**

5101 Walnut Avenue  
Downers Grove, IL 60515-4074  
630.434.5462

**Mr. Mark Brow**  
**Water Supervisor**  
**Village of New Lenox**

2401 Ellis Road  
New Lenox, IL 60451-1580  
815.215.4800

## **Sample Water Loss Reports**

As requested, we have included samples of four reports in a separate document includes with the submittal.

**City of Joliet - Leak Detection Survey**  
**Village of Downers Grove - Large Meter Testing**  
**City of Atlanta - Master Meter tests**  
**Water Audit – Village of Arlington Heights**

## SUBLETTING OF CONTRACT

M.E. Simpson Co., Inc. will not be utilizing any subcontractors for this work.

## EXPERIENCE OF KEY PERSONNEL

Our team brings the necessary experience for a project of this magnitude, as well as the personal attributes needed to serve the Village of Oak Park with distinction.

We offer our clients the highest quality technical and professional services, using state-of-the-art technologies and highly skilled and trained professionals. The M.E. Simpson Co., Inc. team members selected to serve the City of Joliet bring significant experience and a proven track record of delivering timely, cost-effective and sound water distribution and wastewater collection solutions. They share a passionate commitment to client service and attention to detail required for a successful project.

**Two-Man Project Teams will be used at all times during the course of the project for reasons of safety and quality assurance.**

### Project Manager

#### Randy Lusk

Randy Lusk has been with ME Simpson Co., Inc. since November of 2000. He previously worked in the retail business as a Regional Manager for 10 years then was given the opportunity to work in the water industry after learning the value of water and wanting to make a difference. He has attended many classes and lectures on the operations and maintenance of water systems, small and large. Before becoming a Regional Manager, he worked in the field for 5 years where he had hands on experience with water systems and this is where he learned such skills and knowledge as valve location and exercising, hydrant flow testing and maintenance and how to find and successfully locate water leaks for communities. Randy is also an Illinois Class D Water Operator which is his proudest accomplishment to date in the water industry.

#### Professional Certifications:

- 💧 30-Hour OSHA Certified for General Industry
- 💧 American Red Cross First Aid and CPR with AED Certified
- 💧 American Traffic Safety Services Association Flagging Certified

- ◆ Extensive traffic control training
- ◆ Extensive confined space training

## **Assistant Project Manager**

### **Jerry D. Reiling**

Jerry Reiling has been with the Company since May 1996. He is a graduate of Purdue University with a B.A. in Physical Education. Jerry previously worked in both the environmental services industries and HVAC for 10 years. He is responsible for day to day operations of field crews for the M.E. Simpson Co., Inc. Dyer, Indiana office. Jerry has over 19 years of experience directing and conducting water loss reduction programs in the field, specifically leak detection and leak locating, along with meter testing. He has completed classes and attended lectures on the operation and maintenance of water meters. Jerry is very experienced in the following: the operation and maintenance of water meters; main line water valve location, exercising and mapping with GPS; hydrant flow testing and hydrant maintenance, Unidirectional Water Main Flushing, use of state of the art leak detection equipment, and the operation of our Polcon® Flow Testing equipment used for hydraulic studies.

#### **Professional Certifications:**

- ◆ 10-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training
- ◆ Extensive confined space training

## **Project Leaders**

### **Nicholas Mayo**

#### **Large Water Meter Evaluation, Testing & Repair Program Master/Production Water Meters**

Nicholas Mayo has been with M.E. Simpson Co., Inc. since 2014. Nicholas previously worked as a certified diesel truck mechanic for 10 years. He holds an Associate's Degree in Diesel Mechanics. He is a Certified First Aid Instructor for Primary Care Givers and a Volunteer Fireman. Nicholas is experienced in the following: the operation and maintenance of water meters; valve location, exercising and mapping; use of state of the art leak detection equipment, and the operation of our Polcon® Flow Testing equipment.

#### **Professional Certifications:**

- ◆ 10-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid, CPR with AED, Certified Instructor
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training

- ◆ Extensive confined space training
- ◆ Forklift Operator

## Asher Budka

### Large Water Meter Evaluation, Testing & Repair Program Master/Production Water Meters

Asher Budka has been with M.E. Simpson Co., Inc. since August 2007. He has attended numerous classes and lectures on the operation and maintenance of water meters. Asher has experience in the maintenance and installation of water meters, valve location, exercising and mapping, and the use of state-of-the-art leak detection equipment. He is experienced in the operation and maintenance of water meters, fire hydrant and main capacity flow testing, and the operation of our Polcon® Flow Testing equipment.

#### Professional Certifications:

- ◆ 10-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training
- ◆ Extensive confined space training

## Chris Peterson

### Large Water Meter Evaluation, Testing & Repair Commercial/Industrial Water Meters

Chris Peterson has been with M.E. Simpson Co., Inc. since August 2006. Chris has attended numerous classes and lectures on the operation and maintenance of water meters. He has experience in the maintenance and installation of water meters, valve location, exercising and mapping, and the use of state of the art leak detection equipment. Chris experienced in the operation and maintenance of water meters, fire hydrant and main capacity flow testing, and the operation of our Polcon® Flow Testing equipment.

#### Professional Certifications:

- ◆ 10-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training
- ◆ Extensive confined space training

**Aaron A. Embrey****Large Water Meter Evaluation, Testing & Repair  
Commercial/Industrial Water Meters**

Aaron Embrey has been with M.E. Simpson Co., Inc. since November 2014. He is a graduate of Munster High School. Aaron previously worked in the freight industry and was a manager in the retail industry. Aaron is experienced in the following: the operation and maintenance of water meters; valve location, exercising and mapping; use of state of the art leak detection equipment, and the operation of our Polcon® Flow Testing equipment.

**Professional Certifications:**

- 💧 10-Hour OSHA Certified for General Industry
- 💧 American Red Cross First Aid and CPR with AED Certified
- 💧 American Traffic Safety Services Association Flagging Certified
- 💧 Extensive traffic control training
- 💧 Extensive confined space training
- 💧 Forklift Operator

**Sandison Petretta****Water Distribution System Leak Survey  
Water Distribution System Emergency Leak Detection Call Outs**

Sandison Petretta has been with M.E. Simpson Co., Inc. since July of 2000. He previously worked in the commercial painting industry. Sandison has attended numerous classes and lectures related to the operation, maintenance, and installation of water meters, and completed classes in plumbing. Sandison has experience in the following; maintenance and installation of water meters; valve location, exercising and mapping; fire hydrant and main capacity flow testing; and the use of state of the art leak detection equipment. He is also experienced in the use of all of our Polcon® Flow Testing equipment.

**Professional Certifications:**

- 💧 10-Hour OSHA Certified for General Industry
- 💧 American Red Cross First Aid and CPR with AED Certified
- 💧 American Traffic Safety Services Association Flagging Certified
- 💧 Extensive traffic control training
- 💧 Extensive confined space training

## Adam Zagorac

### Water Distribution System Leak Survey

### Water Distribution System Emergency Leak Detection Call Outs

Adam Zagorac has been with M.E. Simpson Co., Inc. since December of 2007. He has attended numerous classes and lectures related to the operation, maintenance and installation of water meters, and also completed classes in plumbing. Adam has experience in the following: maintenance and installation of water meters; valve location, exercising and mapping; fire hydrant and main capacity flow testing; and the use of state of the art leak detection equipment. He is also experienced in the use of all of our Polcon® Flow Testing equipment.

#### Professional Certifications:

- ◆ 10-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training
- ◆ Extensive confined space training

## QA/QC

### Aaron M. Horbovetz, PE, PMP

Aaron Horbovetz has been with the Company since September of 1999. He earned his degree in Mechanical Engineering from Purdue University, completed his EIT work and recently passed the PE exam for the state of Indiana. Aaron is a regular presenter at AWWA conferences since 2012, both at section meetings and at the ACE conferences. He has attended numerous classes and lectures related to the operation, maintenance and installation of water meters, and completed classes in plumbing. Aaron has experience in the following: maintenance and installation of water meters; valve location, exercising and mapping, fire hydrant and main capacity flow testing, and the use of state of the art leak detection equipment; and is also very experienced in the use of all of our Polcon® Flow Testing equipment.

#### Professional Certifications:

- ◆ Licensed Professional Engineer, Indiana
- ◆ Certified Project Management Professional (PMP)
  - Member of Project Management's Institute Calumet Chapter
- ◆ 10 Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified
- ◆ Extensive traffic control training
- ◆ Extensive confined space training

## John H. Van Arsdel, Vice President

John H. Van Arsdel has been with M.E. Simpson Co., Inc. since May 1989. He graduated from Valparaiso University with a B.A. in Geography with an emphasis in Locational Evaluation and Research Design. John has completed water operators classes and seminars on Water Filtration and Distribution, Vulnerability Assessment Class for the Sandia Labs RAM-W method and the RAM-W “modified” for small to medium systems (currently licensed to use the Sandia Labs RAM-W Method, and licensed to teach the RAM-W “modified” for small to medium water systems), along with classes related to the operation and maintenance of water meters, and system hydraulics specifically related to the Polcon® Flow Testing equipment.

John has over 29 years of experience directing projects for water utilities concerning water audits, loss prevention, leak detection programs, meter evaluation and maintenance, flow testing using the Polcon® Flow Testing method (large flow meter assessments, C-factors, pump curves, zone flow measurements), mainline valve assessments (location, exercising and mapping programs), and fire hydrant and main capacity flow testing programs. John has been responsible for the analysis, evaluation, and CAD updating of Water Distribution, Sanitary, and Storm Sewer Atlases using GPS locating. He developed the Company’s Unidirectional Main Flushing Program and Utility Atlas Updating Program. John has presented classes for continuing education credits for water operators for over eighteen years to several local and state Water Works Organizations on Water Loss Reduction including Water Audits, Leak Detection, Meter Testing and Flow Testing. John has presented papers at the AWWA ACE in 2007, 2008, 2009, and 2012, 2015, 2018; at the 2010, 2011, 2012, 2014, 2016, and 2018 AWWA DSS, he presented papers on water loss reduction. He has presented several times at the WATERCON conferences since 2001. Since 2003, he has conducted classes on Vulnerability Assessments and Emergency Response Planning for water utilities as well as conducting several VA and ERP projects. He served from 2010 to 2014 as Chair of the AWWA Water Loss Control Committee. He is also a past Illinois Section AWWA Chair. As Vice President of M.E. Simpson Co., Inc., John serves as the main point of contact for client development, business sales and customer relations for the Eastern U.S.

### Professional Certifications:

- ◆ 10-Hour and 30-Hour OSHA Certified for General Industry
- ◆ American Red Cross First Aid and CPR with AED Certified
- ◆ American Traffic Safety Services Association Flagging Certified

## PROJECT SAFETY PLAN

M.E. Simpson Co., Inc.'s Safety Programs cover all aspects of the work performed by M.E. Simpson Co., Inc. We take great pride in our safety plan/policy/program and that is evident in our EMR scores over the last five years. The safety of our employees, the utilities employees and that of the general public is our #1 priority.

Our Safety Plan/Policy/Program, with all of its parts, is 60 pages in length. In an effort to be more efficient and less wasteful we do not print copies of the safety program for RFPs. There is nothing secretive or proprietary contained within our plan/policy/program and we are happy to share its contents. If you would like a PDF copy of our plan/policy/program please contact Alex Hood, Operations Manager, at 800.255.1521 and a copy of our program will be sent via email to you.

Below is an overview of our plan/policy/program:



**Safety** is a major part of any project. M.E. Simpson Co., Inc. always provides a safe work environment for its employees. **Our staff is trained in General Industry OSHA rules, Confined Space Entry & Self-Rescue, First Responder First Aid, CPR, and Traffic Control.**

While in the field on your project, M.E. Simpson Co., Inc. and its employees will follow all of the necessary safety procedures to protect themselves, your staff and the general public.

### **M.E. Simpson Co., Inc. uses Two-Man Teams for Safety and Quality Assurance.**

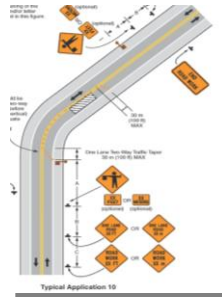
The use of a "one-person" leak detection team is dangerous and impractical where water mains run under roadways. It would be a dangerous precedent to allow a "one-person" team to access main line valves located in the roadway, attempt to listen to the valve with headphones on, and at the same time try to control traffic flow at that person's location in the street.

Therefore M.E. Simpson Co., Inc. adheres to the following:

- ◆ The Project Manager and the Field Manager will be trained in accordance with OSHA Standard 1910 (General Industry) and be in possession of an OSHA 10 Hour or 30 Hour Card.
- ◆ Any listening points located in a "confined space" such as pit and vault installations that **require entry** will be treated in accordance with the safety rules regarding **Confined Space Entry, designated by the Utility, The Department of Labor and OSHA.**
  - All personnel are **trained and certified** in Confined Space Entry & Self-Rescue.
- ◆ We will follow all safety rules regarding **First Responder First Aid & CPR, designated by the Utility, The Department of Labor and OSHA.**
  - All personnel are **trained and certified** in First Responder First Aid & CPR.
- ◆ We will follow all **traffic safety rules, designated by the Utility, The Department of Labor, OSHA, and the Illinois Department of Transportation (per MUTCD).**
  - All personnel are **trained and certified**, by the **AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA)** in Traffic Control and Safety.



**ATSSA Certified  
Traffic Control Personnel**



**Work Zone Safety Plans  
will be used**

Current documentations of safety training and certifications can be provided for all project personnel for the Utility. These certifications are current and up to date (for 2015) for all project personnel.

## **Deliverables**

The following deliverables are required for the project:

- > Project Plan
  - > Geodatabases / shapefiles in ESRI ArcGIS format showing all leak locations (from sub-meter GPS) with estimated GPM and test date (updated and delivered monthly). GPM shall be in an INTEGER type field labeled "LEAK\_GPM"
- > Meter replacement sketches.
- > Meter test reports.
  - > Meter testing geodatabase / shapefiles in ESRI ArcGIS format with sub-meter GPS locations. Include the following fields:
    - Meter description
    - Meter size
    - Enclosure type
    - Test status: Complete / Not-tested
    - Test Result: Pass, Failed / Repaired / Retested / Passed, Failed – Recommend Replacement.
- > Daily leak sketches / final leak sketches.
- > Final Project Report

## INVESTMENT

A commitment to improving and maximizing the Village of Oak Park's water distribution system for future generations.

M.E. Simpson Co., Inc. is pleased to offer our fee proposal for the Village of Oak Park's Water Loss Control Program. Fees are outlined on the next following pages.

**SECTION IV**  
**PROPOSAL FORM (Pricing)**

THE UNDERSIGNED PROPOSES TO FURNISH EQUIPMENT, MANPOWER AND MATERIAL TO COMPLETE THE WORK AS SPECIFIED HEREIN AS INSTRUCTED BY THE PUBLIC WORKS DEPARTMENT, VILLAGE OF OAK PARK, 201 SOUTH BOULEVARD, OAK PARK, IL 60302.

**Fee Proposal: Water Loss Control Program**

M.E. Simpson Co., Inc. proposes to provide the necessary professional services for this project as follows:

Item	Description	Qty	Unit	Unit Cost **	Total Cost
1	SYSTEM ANALYSIS, PROJECT PLAN, AND FINAL REPORT	1	LS	\$19,900.00	\$19,900.00
2	*LARGE WATER METER EVALUATION, TESTING, AND REPAIR				\$57,700.00
3	PRODUCTION METER TESTING	1	LS	\$8,550.00	\$8,550.00
4	METER TESTING PARTS ALLOWANCE	-	-	-	\$5,000.00
5	WATER DISTRIBUTION SYSTEM LEAK SURVEY	106	MILES	\$185.00	\$19,610.00
6	LEAK SURVEY ALLOWANCE	-	-	-	\$5,000.00
<b>TOTAL PROPOSAL:</b>					<b>\$ 115,760.00</b>

\* Total from Proposal schedule total for Tasks 2 on following page.

\*\* All incidental costs / travel are to be included in Unit Cost for Items 1 - 6.

**SUBMITTED BY:**

M.E. Simpson Co., Inc.

Firm Name

John H. Van Arsdel

Authorized Representative

Signature

Vice President

Title

3.25.19

Date

**Complete table for item unit pricing. Quantities are approximated.**

<b>VILLAGE OF OAK PARK</b> <b>WATER LOSS CONTROL PROGRAM - 2019</b> <b>TASK 2 - LARGE WATER METER TESTING</b> <b>SCHEDULE OF PRICES</b> <b>METER TESTING &amp; REPAIR</b>					
ITEM NO.	ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE	COST
1	1 1/2" TO 2" DISPLACEMENT METER PRETEST-SINK TEST	5	EACH	\$250.00	\$1,250.00
2	1 1/2" TO 2" DISPLACEMENT METER PRETEST- TEST IN PLACE	5	EACH	\$250.00	\$1,250.00
3	1 1/2" TO 2" DISPLACEMENT METER PRETEST-METER PULLED	5	EACH	\$275.00	\$1,375.00
4	1 1/2" TO 3" TURBINE OR COMPOUND METER PRETEST-IN PLACE	60	EACH	\$295.00	\$17,700.00
5	1 1/2" TO 3" TURBINE OR COMPOUND METER REPAIR & POST TEST-IN PLACE	15	EACH	\$150.00	\$2,250.00
6	1 1/2" TO 3" TURBINE METER PRETEST-MEASURING ELEMENT PULLED	30	EACH	\$335.00	\$10,050.00
7	1 1/2 TO 3" TURBINE METER - REPAIR AND POST-TEST-MEASURING ELEMENT PULLED	25	EACH	\$150.00	\$3,750.00
8	4" TO 6" TURBINE OR COMPOUND METER PRETEST-IN PLACE	25	EACH	\$295.00	\$7,375.00
9	4" TO 6" TURBINE OR COMPOUND METER REPAIR AND POST-RETEST-IN PLACE	8	EACH	\$150.00	\$1,200.00
10	4" TO 6" TURBINE METER PRETEST-MEASURING ELEMENT PULLED	5	EACH	\$375.00	\$1,875.00
11	4" TO 6" TURBINE METER, REPAIR AND POST-TEST-MEASURING ELEMENT PULLED	3	EACH	\$150.00	\$450.00
12	PRE-REPLACEMENT INSPECTION	15	EACH	\$195.00	\$2,925.00
13	2-MAN CREW RATE FOR SPECIALTY REPAIRS (LABOR ONLY)	10	HOUR	\$250.00	\$2,500.00
14	3-MAN CREW RATE FOR SPECIALTY REPAIRS (LABOR ONLY)	10	HOUR	\$375.00	\$3,750.00
TASK 2 - SUBTOTAL COST:					\$57,700.00

**(Insert this schedule total as a subtotal on Item 2 line on previous page)**

**M.E. Simpson Co., Inc.**  
 Firm Name