Avoiding Problems With Water Meter Retrofitting

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Water meter retrofitting, which enables customers to be charged for the water they actually use as opposed to a flat rate, may seem to be virtually devoid of pitfalls. Visions of easy, uncomplicated installation and greatly increased revenues may be tempting, but there are a few warnings to keep in mind.

In July 1979, the city council of Loveland, Colo., passed an ordinance requiring all new residential construction and ownership transfers to install water meters. In June 1980, the council passed a subsequent ordinance requiring all water services to be metered. This same ordinance provided for city funding of those meter installations on residences receiving water service before July 1979, and for reimbursement of those customers who paid the cost of providing said facilities prior to July 1979. The amount of reimbursement was to be determined after receipt of bids to install water meters on all remaining unmetered properties.

The Bidding Process

In an effort to encourage smaller contractors to bid on the job, the city was separated into six geographic areas. Four of the areas contained an estimated 1065 meter installations each, and the remaining two areas contained an estimated 2130 meter installations each. The great majority of these installations were to be made behind the curb in a fiber pit. An additional contract was prepared that provided for the installation of remote meter readouts on all existing installations throughout the city. Approximately one year was allowed for completion of the work.

The contract documents were prepared on a unit price basis, since the number of installations in each area was an estimate and the city did not have time to determine the exact quantities involved. Estimated quantities for each bid item were identified in the contract documents. The bidders were warned in their instructions that those quantities could, and probably would, vary considerably.

The bidding documents were set up so that a bidder could bid on one or more geographic areas, but only accept up to what his bonding capacity would allow. This was done to provide more competition and give the smaller contractors a better chance. A deductive alternative was also allowed for award of more than one area. As it turned out, the smaller local contractors had to form partnerships in order to meet bonding requirements, which increased their overhead, and were still not competitive with the larger contractors bidding the job. In addition, this arrangement made evaluating the bids a very tedious process for which a computer program could have been used.

In December 1980, the bids were received. It was determined that one large contractor would install the meters in the two larger areas and in two of the smaller ones. Another smaller contractor would take the two remaining geographic areas and a third would place the readouts on all existing meters.

The city council awarded the contracts in December 1980. At the same meeting it passed a resolution allowing customers to pay their own plumbers to install their meters and then receive a refund from the city. This practice continued for a few months until growing pressure from the contractors who had been awarded the contracts forced the council to rescind its earlier resolution and not allow further installations by anyone other than the contractors.

Problems Arise

In February 1981, all three contractors were under way, installing approximately 60 to 70 meters per day. This "accelerated" schedule caused the first problem. Although the city was supplying all the materials, the rate at which installations were being made exceeded the delivery schedule for meters by a large margin. As a result, continual requests were made of the manufacturers to accelerate delivery. The manufacturer obliged to the best of his ability, but the city did get caught short a few times. On these occasions the contractors were, at first, given rebuilt meters that were on hand. When those ran out, jumpers were supplied to put in the yokes in place of meters. In addition to the delivery problem, there were considerable amounts of defective materials. Although the manufacturer stood behind his product admirably, it was a tremendous hassle for the city. The moral—require the contractor to provide all materials and let him deal with the problems.

In Colorado, underground sprinkler systems are plentiful, and damage to sprinkler systems was therefore covered in the specifications. However, it was not (continued on page 3)
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August 1984

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Older Installations
 Serious problems were anticipated on
some of the older installations and we
were not disappointed. Many of the older
lines in town are galvanized steel, and
some of these were in such poor
condition that just disturbing the soil near
them caused them to fail. It was
anticipated that replacement of the service
line from the main to a point 5 ft (1.5 m)
beyond the meter pit might be necessary.
However, it became apparent that fail-
ures were not going to confine them-
selves to that area. Since the Municipal
Code requires that homeowners main-
tain their service lines in good condition
from the property line to the house, it
was not considered appropriate or
 economical for the city to repair or
replace that portion. Therefore, if the
contractor uncovered a service line that
he felt was in such poor condition that
it would fail if disturbed, a release was
obtained from the property owner. The
release stated that if the service line did
fail, the property owner would have it
replaced immediately at his cost. This
was not popular, but for the most part it
worked well.
The meters that were purchased
included a removable ball check valve
inserted in the inlet side of the meter. It
was decided that this would be a definite
advantage to the city, and we were
pleased that the installation of check
valves on all service lines would be so
simple. It was not long, however, before
numerous calls were received complain-
ing about pressure relief valves on hot
water heaters constantly opening. Most
of these were only plumbed to the floor,
not to a drain or outside the building as
the Uniform Plumbing Code (IAMPO
1979) suggests. Worse yet, it was dis-
covered that many of the older water
heaters did not even have pressure relief
der valves. Apparently before the ball
check valves were installed in the service
line, the pressure had built up in the hot water
tank, exceeded the pressure in the main,
and allowed the water to back up into the
main. With the check valve this was not
possible, and a potentially dangerous
situation was created. Because of a
strong desire to keep those check valves
in the service lines, the cost of installing
pressure relief valves on hot water tanks
was investigated and found to be pro-
hibitive. Therefore, the 1000 meters
installed to that point were removed, the
check valves pulled, and the meters
reinstalled.

Last Problems
 The last two major problems en-
countered related to billing. There were
quite a few instances of multiple proper-
ties on one water tap, a practice that is
no longer allowed unless it is a town-
house arrangement with a homeowner’s
association. Prior to having water
meters, each of these properties paid a
flat rate water charge. Now, with meters,
someone had to be responsible for the
bill. The city did not want to have subtract
meters on a service line; therefore, if
they desired, the owner on whose
property the meter was installed was
designated as the one responsible for
the bill. The owners could also elect to
get a new service line of their own. If they
chose the first option, they had to get a
new service line when the property was
sold.

When the project was started, it was
intended that customers would be con-
verted to metered rates as their meters
were installed. However, it was soon
discovered that in many instances the
remote readout and the meter did not
agree. Due to a defective gear in the
remote readout, it was not reacting to all
of the electrical pulses that the generator
on the meter was sending, and the actual
water usage was greater than the remote
readouts indicated. The meter readers
were reading only the remote readout
and customers were billed for the
amount. When it was determined there
was a problem, the meter readers read
the meters. This led to the computer
sending out some rather large bills.
Although the city allowed extra time to
pay these bills, the billing clerks were
the objects of a considerable amount of
verbal abuse by some disgruntled cus-
tomers. Anyone considering a meter
retrofit program should not attempt to
convert any customers to a metered rate
until all of the meters are installed and
debugged.

Costs
 The costs of the metering program did
run considerably more than the pro-
jected $2.7 million for materials and
installation. When salaries of city em-
ployees, refunds to those who had
already installed their own meters, and
miscellaneous materials were added, the
actual cost came to about $3.66 million.
The city employees’ salaries and mis-
cellaneous materials were charged to
the job for capitalization purposes. The
breakdown on this is:
Contractor payments—$2.31 million
Materials—$ .76 million
City salaries and miscellaneous—$ .59
million
Total—$3.66 million.

Typical costs for basic meter installa-
tion, various extras, and average reim-
bursements to homeowners were as
follows:
Typical outside meter set with remote
readout—$351.50
Typical inside meter set with remote
readout—$188.40
Place generator on existing meter and
install readout—$66.50
Replace existing meter and install
remote readout—$84.00

Typical extras encountered were
moving of sprinkler taps, unanticipated
saw cutting of concrete, and hand
digging due to proximity of installation
to fences, hedges, etc. These extras
were associated primarily with outside
meter sets and increased the average
price to $356.50.

Several large meters from 1 1/2 in. to 4
in. were installed, totaling $132,630.
Readout installations on existing meters
cost an additional $125,000. In addition,
the total number of inside and outside
sets varied from that originally projected
due to the reimbursements to home-
owners. The total number of inside and
outside sets was 419 and 7679, respec-
tively.

Using these figures the following
calculations apply:
Outside sets—(7679 x $356.50) =
$2,737,560
Inside sets—(419 x $188.40) =
$78,940
Large meters—$132,630
Salaries, reimbursements, miscellaneous—$590,000
Total—$3,539,130.

The figure for both the inside and
outside sets includes materials and
labor. Materials supplied for an outside
set include meter, meter pit, bonnet, lid,
yoke, and readout. Materials supplied
for an inside set include meter, readout,
and vertical meter setter.

The average reimbursement for home-
owners was determined by averaging
the approximate items from the succes-
sful bidders and came to $216 for inside
sets and $380 for outside sets. The
discrepancy between these figures and
those given earlier arose from differ-
ences in assumed quantities of materials
required.

Results
 The results of the metering program
were better than expected from a water
(continued on page 7)
Exhaust Blower Unclogs Curb Stops

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The following invention was the first place winner in the 1983 Annual Gimmicks-and-Gadgets Contest, which was held at this year’s annual conference in Dallas.

Frozen or dirt-filled curb stops can present quite an expense to field crews, both in terms of lost time and the cost of bringing out a steam truck or line truck with an air compressor, to either thaw out the curb stop or blow the dirt out of it. An exhaust blower (Figure 1) has shown a big savings both in time and money, especially on after-hour calls and when a customer has a break on his property that is causing damage.

The exhaust blower is a pressure hose, approximately 15-ft (4.5-m) long, fitted with a screw-on cap for attaching it to the exhaust pipe of the field truck (Figure 2). A 6- to 8-ft (2- to 2.5-m) copper pipe, ½ in. (13 mm) in diameter, is attached to the other end of the hose and used to blow out the curb stop. Each unit costs approximately $50.00 for the hose and clamp fittings. The adaptors for the exhaust pipe and copper wand can be put together in almost any service shop.

CAUTION—Do not sit in the vehicle while the device is in use. This device is not recommended for use in underground vaults or pits where an employee would be exposed to inhalation of the exhaust fumes.—Editor

(Earl Ramp, Leonard Pfeifer, and John Bruns, previously with the customer service section of the Anchorage Water & Wastewater Utility, were instrumental in developing the exhaust blower.)

Meter Retrofitting

(continued from page 3)

conservation standpoint. Table 1 illustrates the effect on water use that the installation of water meters had on Love
town. The maximum day use corresponds to 491 gpcd (1858 L/d per capita). The average daily use corresponds to 198 gpcd (749 L/d per capita). Furthermore, in 1981, lawn watering restrictions were in effect that allowed watering only every third day. In May 1982, no water restrictions were put into effect.

With this considerable amount of water conservation, the negative side effect is less revenues. Utilities should be careful to conservatively estimate their revenues after a retrofit program until a history can be developed.

Summary

In summary, those contemplating a water meter retrofit program need to be aware of problems that can arise during such a program. Some suggestions are:

• Require the contractor to supply all materials. Otherwise the utility will be responsible for delivery and material problems.

Table 1 Effects of Water Meter Installation

<table>
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<tr>
<th></th>
<th>1981</th>
<th>1982</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum day (mgd)</td>
<td>19.5</td>
<td>15.0</td>
<td>-23.0</td>
</tr>
<tr>
<td>Low day (mgd)</td>
<td>1.6</td>
<td>1.9</td>
<td>+18.8</td>
</tr>
<tr>
<td>Average day (mgd)</td>
<td>7.18</td>
<td>6.04</td>
<td>-15.9</td>
</tr>
<tr>
<td>Total year production (mil gal)</td>
<td>2620.4</td>
<td>2203.8</td>
<td>-15.9</td>
</tr>
<tr>
<td>Total year precipitation (in.)</td>
<td>12.51</td>
<td>13.64</td>
<td>+9.0</td>
</tr>
</tbody>
</table>

• Beware of the proximity of underground sprinklers as well as other utilities. It may be impossible to install a meter pit without moving them.
• Old galvanized or lead service lines may be prevalent in older parts of town. These tend to fall apart very easily.
• Be careful of check valves. Their drawbacks may outweigh their benefits.
• Have all of the meters installed and debugged before converting any customers to a metered rate. This will alleviate billing hassles and possible legal action by customers on the basis of selective enforcement of regulations.
• Be prepared to deal with multiple properties on the same service line.
• There can be a considerable amount of direct labor involving utility personnel. Be sure there is adequate staff to handle inspection, locate curb stops, and repair or replace service lines to the curb stop. If there is not adequate staff to perform these duties, make sure they are covered in the contract documents.
• Do not overestimate revenues after a retrofit program. Water usage and, therefore, revenues will be reduced significantly unless the flat rate being charged previously was too low. Be conservative with those revenue estimates until a history is developed.

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