

# De Soto attacks water loss with reduction of nearly 350-gpm

**D**e Soto, Kansas is located in western Johnson County and has been in the water business for more than 150 years. During this time residents have gone from having an individual well at most homes to a public water system supplied by a multi-well wellfield near the Kansas River north of the city. The city's water distribution system was originally installed sometime in the early 1900s with most of the original cast iron pipelines still in use. However, older lines are now being replaced by new PVC pipe as needed. This city of 5,470 people has 1,541 residential meters and more than 135 commercial meters and presently sells water to two other water systems, Clearview

City and Johnson County Cons. RWD 6.

In 1997 the city took over operation of the old Sunflower Ammunition Plant. Before the takeover water losses were approximately 25% annually. And after, the water loss jumped

to 50% or more in some months with most of the loss coming from the ammunition plant area. This former federal installation has many old lines that still carry water with pipe sizes ranging up to 30 inches. Because of the high loss, the Kansas Water Office assigned KRWA to help De Soto reduce unaccounted for water loss and the city has appreciated the offer of help.

## Leaks at ammunition plant

It was in the old ammunition plant area that KRWA started a water loss survey in 2007. The work was initiated at the request of the Clarence Brunk, De Soto water department superintendent. The city workers knew that the system was losing water, but did not know how much. Brunk along with De Soto Water Foreman Dennis Smith, KRWA Tech Jim

Jackson and I spent many days searching the vast ammo plant grounds afoot, by truck and ATV. The ATVs proved to be a great asset in locating the many leaks that we found. Numerous old buildings are being demolished with heavy equipment being used extensively. We found where a track hoe had run over a fire hydrant. This one mishap resulted in a loss of up to 80 gpm.

Four other leaks were located by investigating patches of cattails. By knowing that cattails grow in and around water and that water flows to low areas we had the clues of where to look. If cattails are seen growing at the top of a



*Gary Armentrout  
Technical Assistant*



*Top: This image shows one of the new water meters that was installed at the city wellfield. The new master meters helped to correct the city's 'unaccounted for' water losses by more than 350 gpm.*

*Left: De Soto Water Department Superintendent Clarence Brunk and other members of the city water department begin to remove one of four old well meters; all were changed out.*



**Above:** An increase in line pressure can force a leak to the surface. On the water loss survey at De Soto, a mainline valve was fully opened increasing pressure from 25 to 76 psi. It brought the leak shown here to the surface.

**Center:** The ATVs used in De Soto at the Sunflower Ammunition Plant water loss survey made searching a wide area much easier.

**Right:** A patch of cattails is a very good spot to check for water losses as this patch proved.



hill with a water line at that location, it may well be a good spot to check for a leak. One patch of cattails had stocks that stood nearly seven feet tall. Obviously they had been growing for some time.

Along with checking cattails, following track hoes, riding ATVs and pulling many turns on 30-inch valves, KRWA also reviewed the city's meter reading policies. The



team discovered that some city areas were not being metered. After meters were installed on those services, there was a significant drop in the monthly unaccounted for water losses. This, plus the repairs made to the old lines in ammunition plant area cut the city's water losses by another good measure. But there was still more to do as the focus shifted to the city's wellfields.

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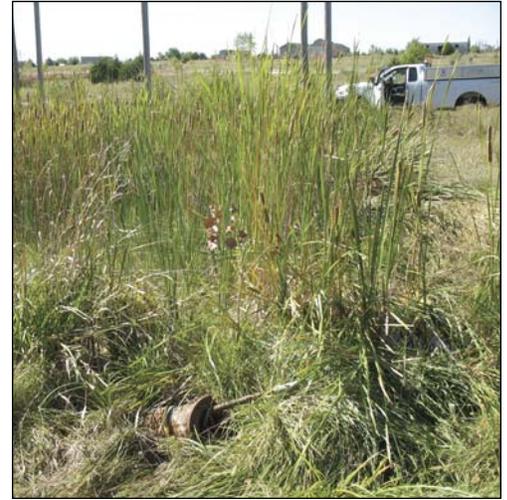


**Above:** De Soto Water Department Foreman Dennis Smith searches a patch of cattails for their source of water on the old Sunflower Ammunition Plant site.

**Right:** Looking in this patch of cattails proved fruitful as it revealed what was left of a fire hydrant that had been run over by a track hoe.

### Master meter inaccuracy

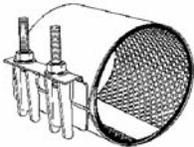
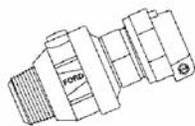
De Soto's wellfields are located north of the city. All wellfield lines are manifolded into one main that crosses under the Kansas River, then runs to the water plant at Sunflower. The distance is approximately 10 miles. A new master meter that measures the amount of water entering the plant was installed on this main line just before it entered the water plant next to the city. The quantity was compared to the totals on the well meters and a large discrepancy between the two sets of readings was obvious. The master meters at the wells had been reviewed weeks before but those master meters were not installed according to manufacturer specifications. They lacked the needed straight pipe upstream and downstream of the meter to prevent distorted flows. Making matters worse, there was not enough space in the well house to allow for proper installation.

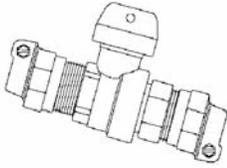


A review of the master meters on the KDHE list of approved meters for raw water revealed maybe one or two that could meet the city's conditions. Four of these were ordered and installed on the wells. They have performed as intended. It was revealing that the old meters were over-registering, one by as much as 300 gpm! This reduction in over-registering at the wells, coupled with line repairs at

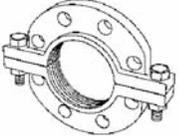


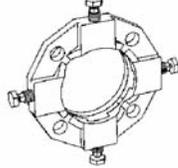
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Sunflower and installation of meters in new meter locations has accounted for a major reduction in De Soto's unaccounted for water loss. The recorded water loss for the month of November was 11,160,000 gallons or 44.5%. Water loss in the month of December was down to 3,639,000 or 19.3%.

City staff realize they still have more review and work ahead to further reduce unaccounted for water loss – but Superintendent Brunk and coworkers are aware of what still needs to be done. De Soto plans to install a meter at its new city swimming pool and to continue the search for leaks in the old Sunflower area. They also want to replace the turbine meter in the vault that meters water to Clearview City with a new compound meter. This change out will allow metering of the low flow that is not being registered by the old turbine meter.

The changes De Soto has made and those planned in the future are nothing out of the norm for public water systems that address reducing

unaccounted for water loss. De Soto had a combination of problems – with the major one being the acquisition of the Sunflower Ammunition Plant. Solving problems for them involves finding and repairing leaks and making sure all of the system's services are metered. A big chore in this was having master meters installed correctly and testing them as needed to ensure accuracy.

Most of all, ongoing problem solving involves municipal workers determined to find the answers that will correct those problems. Clarence, Dennis and the De Soto crew have been great to work with; KRWA appreciates the opportunity to be a partner to help a community address water loss or other water and wastewater related issues.

I would also like to encourage attendance at the 2008 KRWA conference. Watch especially for these sessions:

Preconference Session,  
Tuesday, March 25: Rate Setting  
for the Future.

- Wednesday, 3/26 at 10:45 a.m.: Under Pressure Installations
- Wednesday, 3/26 at 1:30 p.m.: Centrifugal Pump Fundamentals
- Wednesday, 3/26 at 2:45 p.m.: GIS/GPS Mapping
- Wednesday, 3/26 at 4 p.m.: Proper Installation, Maintenance and Repair of Tracer Wire
- Thursday, 3/27 at 9:30 a.m.: The Financial Impact of Water Loss and Leak Detection
- Thursday, 3/27 at 9:30 a.m.: Update to the 2007 Water Conservation Plan Guidelines
- Thursday, 3/27 at 10:45 a.m.: Installation and Use of Fusible PVC Pipe



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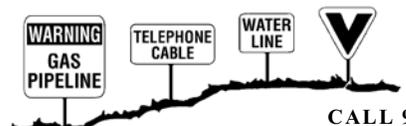
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