

# **WATER CONSERVATION.... LEARNING FROM THE MASTER -- SEVERN TRENT WATER, UK**

*by Barbara Payne*

It all started as an innocent comment at a Water Authority board meeting. I mentioned to Jim Gilliam with Severn Trent that I had seen many of the ST trucks during our trips to the UK, and that on our next trip I'd love to see a water treatment facility and learn about how the Brits handle their water distribution, quantity and quality issues. He put me in touch with the proper contacts in the UK, and they were gracious enough to arrange a tour of a water treatment plant in the Peak District...just 30 minutes from where we are staying.

As it turned out, we got a lot more than I bargained for -- finishing off the afternoon with a visit to the Severn Trent Visitor's Center at Carsington Water -- where the company has managed the perfect blend of recreation, education, and water supply all rolled into the country's number two tourist attraction, attracting over 1.2 million visitors a year!

But, first a little about the company, how water is distributed and sold, and about the high tech plant we visited.

Severn Trent Water Limited treats and supplies water in a large section of England's midlands -- to more than 3.2 million people just from the facilities in the area we visited. They are the largest British water supply company with a service Region that includes a territory that is roughly 150 miles from top to bottom and 200 miles wide. The company name comes from two major rivers -- the Severn, located near the Welsh border and wide enough at one point to be spanned by a toll bridge near Cardiff; and the Trent, flowing through the northeast part of the Region, feeding some major factory towns like the Potteries at Stoke on Trent, and the breweries at Burton Upon Trent.

ST has 40 reservoirs and 25,600 miles of water pipes. Rainfall "feeds" their system in a 12 month cycle, and rivers, reservoirs, and groundwater each contribute about 1/3 of the overall supply. The company has about 54,000 km of sewage pipes which, if put end to end, would go around the earth.

How customers pay for water is dramatically different than we're used to. It is in the process of change, but it is complex -- to say the very



*Our ST hosts, Tony Sixsmith (left), Treatment Works Manager; and Bill Wicks, Supply Manager, Water Supply Group East.*

least. Up until the early 1990's, there were no water meters to the individual residences; instead of paying for what you used, *you paid based on what your house was worth*. This is a difficult concept to grasp, and is controversial over here, too. Now, all new construction is metered, but anyone who lives in an older home and wants a meter installed, the company will install one (by law) at no charge.

There is a very complicated scheme for pricing, but there hasn't been a new "Ratable Value Calculation" since the early 90's, so the controversy has plenty to feed upon. Basically, a home worth 100,000 pounds (\$162,000) would pay an annual water bill of between 220 and 230 pounds (about \$375) a year. That breaks down to roughly \$31 per month -- which is about what we pay. The water companies have some wholesale "cost targets" for good customer relations, but essentially prices reflect the actual cost of water. When a plant uses state of the art technology, for example -- like the plant we visited -- those costs are included in the ultimate price.

## ***A Tale of Three Systems...***

Much of the water system in the region was built by the Victorians...clearly evidenced by the ornate extraction towers at the reservoirs. The oldest was built in the 1850's on the Vyrnwy River near Wales, and it sent raw water through pipe to supply the Liverpool area. It wasn't long before they discovered that the untreated water would "fur" up the pipe with particulates, algae and bacteria, so at their second project (Elan Valley in Wales) they installed

a coarse gravel filter -- sort of a partial treatment -- before piping it to Birmingham where it was treated further. Of course, they soon realized, there were supply points along the way that would take the partially treated water directly for drinking -- not an optimal situation. The third try was in 1900 to 1910 -- in the upper Derwent River Valley. The Derwent Valley Aqueduct sends only treated water through its system. They subsequently created a consortium -- the Derwent Valley Water Board -- made up of six governing groups (Sheffield, Derby, Derbyshire Council, Nottingham, Nottinghamshire Council, and Leicester) which was incorporated into Severn Trent Water on its formation in 1974, and still oversees operations.

I was surprised to learn that ST utilizes something very like our groundwater transfer program in their Region, and they are getting closer to “closing” the system. They have pockets of areas that are supplied mainly by groundwater wells, others supplied by conveniently nearby rivers, and the others supplied by huge reservoirs tucked into the countryside. The geography drives these choices, but as demand grows, they are “blending” the water (also to mix “soft” and “hard” supplies to get more middle range quality) and now have a grid that virtually connects all parts of their distribution system. With several strategically placed pumping stations -- powerful enough to send the water uphill over mountains -- they are getting even better equipped to deal with short- or longer-term supply problems and to get the water where it is needed.

### ***State of the Art Treatment...***

Tony Sixsmith showed us the Homesford site, for which he is responsible. It is located near Matlock and Matlock Wells, lovely Peak District towns with the River Derwent flowing through or alongside them. Matlock Wells was once a spa town where folks came to “take the waters” but it was never as successful as Bath because the weather was not as kind during harsh winters. This is a particularly scenic part of the area, one we had discovered several years ago, when we stumbled upon Masson Mills...an abandoned textile mill that has been turned into a multi-level shopping mall and



*Photos, top and middle: Rows of the membrane filters that treat the water, 11 filters each with 90 modules, each with 20,000 polypropylene fibers. Bottom: There colorful tanks are used to store chemicals needed for cleaning the filter system.*

museum. Mills were located here because of the seemingly endless supply of water.

We learned that the area had also been heavily mined for lead 150 years ago, and that water had filled the abandoned mines -- creating natural underground storage caverns. The miners tunneled into those caverns (called soughs -- pronounced "soffs, like soft without the "t") to drain the water away from the workings, which now provides stored water for a base load station.

During the company's emergency drill in 1996, the test scenario they "dealt with" influenced the company to install the high tech membrane filter at the Homesford plant. This equipment is capable of screening out even the tiniest bacteria and microbes, including the potentially deadly cryptosporidium. The new filters cost 5 million pounds, and operate at a cost of 24 pounds per Megaliter -- 2-3 pounds for the chemicals and the rest for power.

They had made arrangements for us to visit another traditional treatment plant, but when we learned about their extensive public education program, they were kind enough to change plans to take us to the Visitor Center instead. While there are other visitor centers at their other reservoirs, this is the company's "flagship" effort and was purpose-built (as they say) at a cost of 108 million pounds -- 100 million for the land and facilities, and 8 million for the Visitor Centre, displays and exhibits, along with the Sailing Club, Sailboard, car parks and Cycle hire shop.

Their education program -- **Come See, Go Tell** -- features both mobile and static displays, classroom activities at the centers, and speakers who "Go Tell" in other locations with the help of displays and exhibits. They have a comprehensive education program for ages 7 up....and they were instrumental in getting a specific water education program into the country's school curriculum.

The photos of these displays cannot do justice to the actual setting. In the complex, there is a restaurant, gift shop, many hands-on exhibits, classrooms, and various shops that lease space here. There is a massive kids playground and picnic area outside, as well as the sparkling water "playgrounds."

This company personifies corporate social responsibility in the truest sense of the phrase. Our host, **Bill Wicks**, was simply outstanding, and he is justifiably proud of what ST has accomplished. ♠



*The entrance to the Visitor Center.*



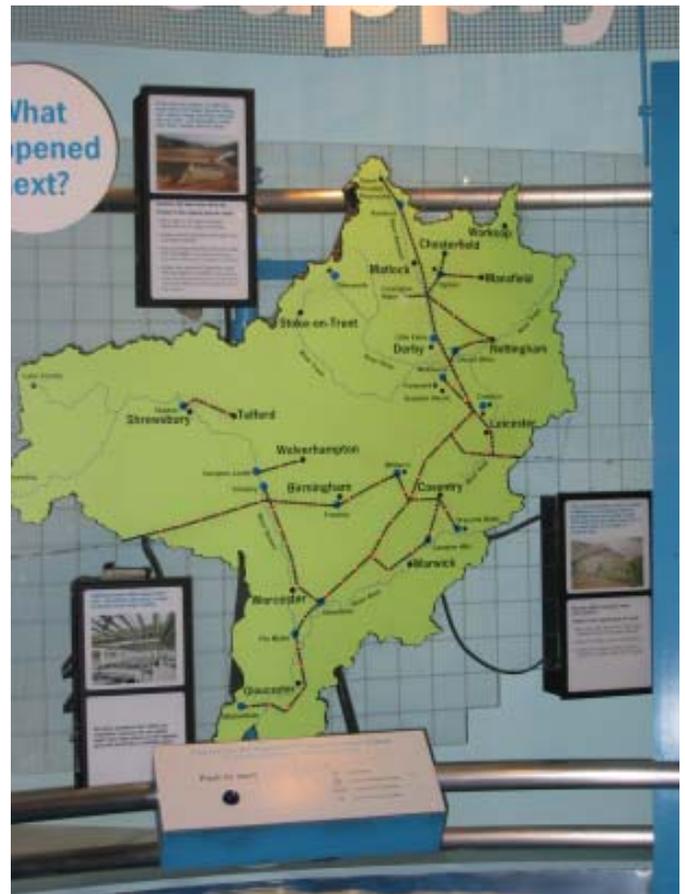
*View of the Center from the back, near the entrances to the Boat Club and the water sport area -- for wind surfing, canoeing, and fishing. The far side of the reservoir has bird watching, biking and hiking trails, and environmental areas.*



Top left: the inside courtyard, with shops and snack bar. Center and right: that is a 1-ton granite ball that is suspended -- and turns -- on a thin layer of water. The teens are able to spin the ball in the water. Top right: There is a water conservation garden area attractively planted entirely with drought tolerant plants. The area apparently lies on "leylines" the mystical, magnetic fields that are home to sites like Stonehenge. They created artificial "stones" that can just be seen at the bottom, left.



These exhibits show the reservoir system and how water flows in the regional grid. Below is a running digital meter that shows how much water ST is currently delivering....very effective!



Below, this is the hands-on exhibit that lets guests guess how much water it takes for things like baths, showers, laundry, etc.



There are even informational displays in the "loos"...in fact, these bathrooms have won top Loo of the Year awards for the past 4 years...



*These are shots of the classroom where school kids come for water related instruction. The day we were here, 150 children had been through the program.*