Texas Water Savers
News of Water Conservation and Reuse in Texas

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Chapter 210 status

The revision of Chapter 210 (formerly 310) of Texas Administrative Code Chapter 30 will be considered by the commissioners of the Texas Natural Resources Conservation Commission at their January 8 meeting. The revision sets new standards for the design, operational requirements, and quality criteria for reclaimed water (*Texas Water Savers,* Spring 1996).

However, Chapter 210 was removed from the commissioner's December agenda to allow study of how reuse issues affect downstream water rights. Proposed changes must be approved within a six-month time frame. If the rule is not approved by January 22, reuse rules default back to existing Chapter 310.

Proposed rules were published for public comment in the *Texas Register* on July 26; however, since then a call for clarification of water rights issues, as well as the need for industrial water reuse rules have surfaced.

Chapter 210 initially lacked directives for industrial reuse. This issue was addressed in Subchapter E, Special Requirements for use of Industrial Reclaimed Water, entered October 22, 1996 in the *Texas Register*. This new addition to Chapter 210 proposes procedures for the beneficial use of air conditioning condensate, cooling tower blowdown, fruit and vegetable wash water, non-contact cooling water, once-through cooling water, steam condensate, and other uses meeting water quality specifications.

But emerging as the sticky wicket is the extent to which water rights could be affected by indirect reuse projects.

During a recent work session, Commissioners considered the following issue: "When a water right applicant proposes to use the bed and banks of a stream to convey effluent historically discharged, should the application be evaluated as a new appropriation of state water, or a bed and banks delivery permit?"

At issue is the use of the bed and banks of a stream, instead of an engineered conveyance, to divert treated wastewater for subsequent use. Texas Water Code (Section 11.021) holds that water in any flowing body of water belongs to the state, and diversion of these waters is by permit only.

"It can be argued with validity that a water rights holder should be able to remove from the stream the amount of treated wastewater created from his own efforts, less losses, so long as the effluent is used for the purposes originally authorized," said Ralph Wurbs, Texas A&M University civil engineering professor who developed a water rights analysis program used by the TNRCC.

"It can also be argued with equal validity that the availability of water to senior water rights holders downstream takes precedence over reuse."

"The issue of water rights came to light as more and more people obtained bed and banks permits," said Steve Coonan of Alan Plummer and Associates. "As those types of requests came to the TNRCC, people became concerned about water rights issues associated with reuse."

In looking at streams in Texas, TNRCC is sometimes relying on return flows in water availability modeling.

Of course, even reclaimed water can be used only as specified in the original permit. For example, a municipality cannot sell treated wastewater to a farm. In other words, the wastewater cannot be marketed.

At TNRCC, reuse policy was considered at a Commission work session December 13. Results from those deliberations affect how the Commission will consider bed and bank permit applications in the future.

Electric utility reuses wastewater in cooling towers

SPS blowdown used for irrigation

Southwestern Public Service Company of Amarillo last year conserved enough potable water to serve the needs of 100,000 persons. They also managed to be effectively a zero-discharge industrial water user by contracting with ranchers who use cooling tower discharge as irrigation for cattle forage.

Since 1961, Southwestern Public Service Company (SPS), a power utility serving about one million people in a four-state area, has substituted secondary treated wastewater for fresh water in the cooling towers at eight steam-generation electric power units in the Panhandle and South Plains of Texas. Last year, SPS purchased and retreated more than 4 billion gallons of effluent from the cities of Amarillo and Lubbock.

In April, Southwestern Public Service was honored with the Bob Derrington Award for best water reuse project by the Texas Section of the American Water Works Association at its annual meeting.

Since 1980, substitution of retreated wastewater has conserved more than 75 billion gallons of fresh water. In 1995 alone, 5.48 billion gallons of wastewater were used, leaving fresh, potable water available for other uses.

Within the cooling towers, water is recycled five times, then a portion is dishcharged and routed to lined storage ponds. Because evaporation concentrates minerals in cooling water, discharge of cooling water, called blowdown, is necessary to protect the cooling tower structures. An equal amount of makeup water compensates for the amount discharged.

The 486-megawatt, natural gas-fueled Jones Station in Lubbock has used treated wastewater in its cooling towers since 1971. Southwestern Public Service estimates use of secondary treated wastewater conserved almost 75 billion gallons of water in 1980.

Instead of disposing of the blowdown water, the utility contracts with local ranchers for grazing land irrigation, achieving beneficial use of what was considered a useless waste product, said Bill Crenshaw, environmental issues analyst for the utility.

Near Amarillo, for instance, wastewater is pumped from two plants to 17 lined holding ponds located throughout almost 2,400 acres of pastures. Holding ponds are equipped with leak detectors, and Southwestern Public Service uses neutron probes to monitor the soil before and after irrigation. From these holding ponds, ranchers pump irrigation water as needed. Runoff from either storm water or from overfilling with blowdown water is prohibited. In addition, contractors must maintain a 30-foot buffer zone between the wet subsoil and the aquifer. Ranchers keep cattle in forage year-round by rotating cool and warm season grasses.

Since the production of blowdown water is linked to electrical output, less wastewater is produced in winter months. Ranchers compensate by pumping ponds as low as possible before December, when both electricity demand and need for irrigation is lowest, then storing water for the next two to three months.

Power utilities are large-volume water users due to cooling demands of the electricity generating process. Fuel and air are burned in a boiler fired by coal or natural gas to convert water to steam. Steam, under great pressure, drives turbines. Electricity is generated by the action of the turbines turning large magnets within wire coils. The steam is condensed by thermal exchange with cooling tower water, then repumped to the boiler to repeat the process. Water heated in the thermal exchange process is cooled by evaporation in cooling towers, producing the vapor clouds seen at power generation plants on cool days. Water lost to evaporation is then replaced with makeup water, then

the cooling process, like the steam cycle, is repeated. About 700 gallons of water are required to produce a megawatt of electricity.

In the late 1950s, when SPS planned to build new electrical generating plants near Amarillo, it set out with two objectives: to ensure high-volume supplies of cooling and other process waters and to conserve water. Southwestern surmised that as the area's economy expanded and demand grew, the amount of effluent would also grow at a comparable rate. According to SPS, "the effluent supply could match the station water needs synergistically." First on line with treated wastewater was the 470-megawatt Nichols Station near Amarillo. Use of wastewater, however, creates problems of scaling, foaming, nitrogen biofouling, high biochemical oxygen demand (BOD) and unfilterable suspended solids. SPS engineers solved these problems with a lime softening treatment, which raised the solution to high pH value. The resulting floc removed suspended solids, reduced orthophosphates and BOD. Sponge rubber balls circulating through the condenser tubes control crevice corrosion.

After its initial success at Nichols Station, the utility continued to expand the wastewater reuse project to seven addditional coal- and natural gas-fired power units, conserving potable waters. Combined generating capacity of the eight plants using wastewater in cooing towers is more than 2 million kilowatts.

In the SPS service area, the semi-arid High Plains and Panhandle, conserving water is vital. Since the expansion of agriculture in the 1940s, greater amounts of water have been pumped from the Ogallala Aquifer, the region's primary water-bearing unit, than have been recharged. Southwestern's foresight and innovation--substituting retreated wastewater for potable water in electrical generating stations--conserves significant amounts of potable water for municipal and agricultural use.

Firefighter training facility treats, reuses water

Jack Donovan, a lanky retired submariner and Navy fire safety officer, gestures toward a now-obsolete holding pond and says, "This is my pride and joy." Seven months ago, the holding pond stored a mixture of water, diesel fuel, gasoline, and fire-retardant foam captured from training exercises at Texas A&M University's Brayton Fire Training center.

Now, although its banks are still black with oil residue, the pond shows algal growth and rising air bubbles from the work of oil-digesting bacteria. Donovan looks forward to the day remediation is complete and the area will be landfilled.

In March, a water reuse system went into operation to capture and recycle water used to douse burning structures. Although water use at the training facility is not metered, Donovan estimates usage now varies from 0.2 to 1.6 million gallons per day (mgd) of potable water.

And the facility is now reviewing a proposal to pipe and use treated wastewater from the University's 11-mgd wastewater treatment plant near the Brazos River, about 2 miles west of the fire training facility.

In the oil-water separator, the mixture passes through a bar screen, pan skimmer, pre-coalescer (which coagulates emulsified oil), and finally the oil/water separating unit.

At its present site since 1960, the Brayton Fire Training Center annually trains thousands of Texas' firefighters, as well as more than 20,000 from around the world. In fact, as first prize in a "dream-come-true" contest in India last year, a rural Indian firefighter chose a training stint at Brayton.

At the facility, buildings and mock-ups are set afire with a combination of diesel fuel, gasoline, oil, and a proprietary product called Tech-Flame (a flammable product with reduced smoke output). Water from the training field is collected and pumped to the oil-water separator system. In the oil-water separator, the mixture passes through a bar screen, pan skimmer, pre-coalescer (which coagulates emulsified oil), and finally the oil-water separating unit. Sand is sent to the degritter, where it is treated with Micro-Blaze, a proprietary product containing oil-digesting bacteria.

The removed oil is sent to a 8,500-gallon settling tank where Micro-Blaze bacteria go to work digesting oil.

After several passes through the oil-water separator process, treated water is gravity-fed to a larger aeration pond lined with 36 inches of bentonite to prevent leakage. Makeup water ensures the proper ratio of treated water to fresh water. From the aeration pond water is pumped to tanks and reused for training. The facility is permitted for 2-mgd runoff into White's Creek, a tributary of the Brazos River.

The sand-oil mixture from the degritter is mixed with hay, grass, and soil and deposited at the facility's "land farm," an adjacent grass-covered 4-acre plot where final remediation of solids takes place. Micro-Blaze oil-digesting bacteria continue to break down residual oil in the sand-oil mixture. (The grass, which controls erosion, is irrigated with reclaimed water from the facility.) Five monitoring wells (at an average depth of 41 feet) allow inspection for infiltration of oil into the groundwater. Since construction in 1986, the land

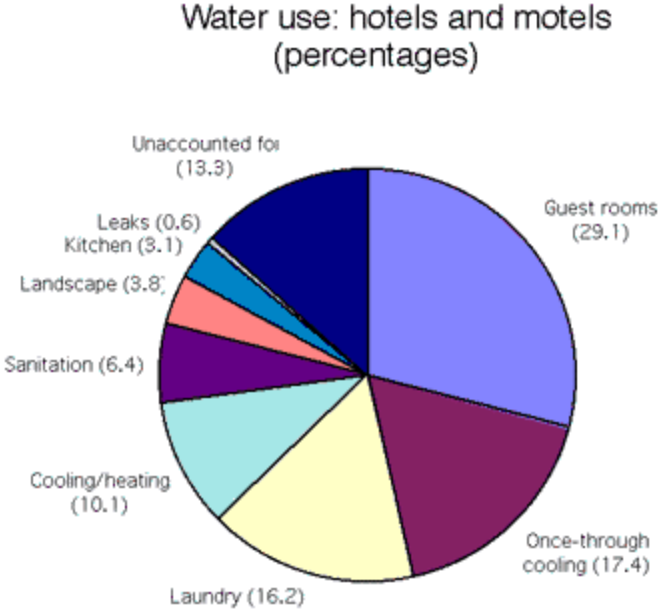
farm has been tested annually but has never recorded an incidence of infiltration into groundwater.

Hotels strive for water use efficiency

by Jan Gerston
Texas Water Resources Institute

"Choose to Reuse" is the new rallying cry in environmentally conscious hotels and motels. Guests at "green" establishments are now able to play an active part in conserving water when they are on the road. Towel rack hangers and night table cards offer guests the option of reusing fresh linens each day for the sake of conserving water as well as decreasing the amount of wastewater and detergent use.

According to commercial laundry equipment manufacturers, institutional washing machines use about 2.5 gallons per pound of linen laundered. Industry estimates peg linen use at 8 to 12 pounds per day per double occupancy room, depending on type of lodging and other factors, such as proximity to the beach. Foregoing fresh towels and bed linens, therefore, can result in saving as much as 30 gallons per room per day.



Since its initiation in May by the American Hotel and Motel Association, the "Good Earthkeeping" program has distributed more than a half million towel and bed linen cards. "More and more Americans are aware of dwindling earth resources. At the same time, hoteliers are more aware of the impact of their hotels on communities," said association spokeswoman Kathryn Potter.

In fact, interest in environment-friendly lodging is so great that in 1993, Patricia Griffin founded an organization focused solely on promoting earth-friendly housekeeping and maintenance. The first promotion of the Houston-based Green Hotels Association was the towel rack cards encouraging linen reuse. Griffin looks forward to the day "green" rooms are an industry standard, as no smoking rooms are now Since then Green Hotels has extended its water conservation hints to the use of low-flow showerheads and sink faucet aerators, both rated at about 2.5 gallons per minute. Griffin estimates implementation of the linen cards, low-flow showerheads and aerating faucets can save about 25 gallons per double occupancy room daily. The organization has a catalog with the retrofit devices, towel rack hangers, and other "green" in-room amenities and conservation items, such as a recycling basket. The La Quinta chain set the goal of

leak detection in each of its 30,000 guest rooms San Antonio-based La Quinta Inns oversees an aggressive water management program in its 230 facilities nationwide. Monthly water use statistics for each motel in the chain are analyzed for anomalies, and each facility's use is compared with the company average and the company goal, said Jim Ackles, Director of Energy Management. Water use above the norm is investigated. For example, last summer, one San Antonio La Quinta showed high water use, which was traced to the irrigation systems. San Antonio Water Systems technicians were called in for an irrigation audit to track down the high water use culprit.

The chain tracks water use in terms of gallons per guest during each billing period. Through September, La Quinta motels have used an average of 110 gallons per guest per billing period. Water use for the entire chain totaled more than a billion gallons in the first nine months of 1996.

Ackles' goal is to cut that figure by 10 percent. "We're not focusing on dollars; we're really interested in how we are using that water. If we control leaks or maintenance waste, then the dollars will fall in line," Ackles said.

La Quinta installs low-flow showerheads and aerating faucets in each guest room. At replacement time, toilets are changed out with power-assisted 1.6 gallons-per-flush (gpf) toilets. Although early-closure flappers were tried, experiments found them unacceptable for use in guest rooms, Ackles said. New construction, of course, requires 1.6-gpf toilets

An ambitious program slated for completion by the end of the year sets a goal of leak detection for each and every one of the chain's 30,000 guest rooms. Using the five-second calibrated bags and toilet tank color dyes, facility technicians at each motel will check for leaks, then fix them. The next stage of the water conservation effort will be underground leak detection, Ackles said.

In Texas, the hospitality industry is especially fortunate. The Texas Water Development Board (TWDB) developed an industry-specific Institutional, Commercial, Industrial water conservation workshop.

TWDB offers a Hotel and Motel Water Conservation workshop to train site managers and chief engineers to audit facility water use and to find water conservation and reuse opportunities.

To develop a curriculum for these workshops, the TWDB staff started by surveying water use efficiency at two Texas hotels and at a state school. From these initial surveys arose a range of possible conservation measures ranging from the simple--educating staff to report leaks, then fix them--to the more complex--rerouting once-through refrigeration system chill water to cooling towers for make-up water, according to John Sutton, leader of the TWDB workshops.

The TWDB surveys found about 13 percent of water use was unaccounted for. "We compare the actual water use and the accountable water use and try to bring the numbers

closer together," Sutton said. "When we surveyed these hotels, whenever we found water draining, we analyzed whether that water could be used somewhere else effectively. The goal is to use water as many times as possible before disposing of it." TWDB surveys found about 13 percent of water use unaccounted for For instance, ice machines with water-cooled condensers employing once-through cooling water use about 149 gallons of cooling water per hundred pounds of ice. Machines produce almost 400 pounds of ice daily, for a daily total of almost 60,000 gallons of water per day, according to Rick Fischer of Manitowoc Equipment Works. Recycling that water would not harm the machine nor impact performance, Fischer said.

Conserving and reusing water delivers a rapid return on investment. The combined cost of water and wastewater is estimated at $6 per thousand gallons. If the cost of energy to heat and pump water is factored in, the cost can be as high as $9 per thousand gallons.

Air-cooled ice machines, as their name suggests, use air rather than water as a heat sink, saving from $50 to $100 per month, according to Green Hotels Association. Installing low-flow showerheads and faucet aerators represents a savings of $1.50 per room per month

In its initial surveys, TWDB calculated estimated return on investment for several conservation schemes. For instance, at a conference hotel in San Antonio, replacing all toilets in public areas with ultra-low flush toilets at a cost of $3,250 would show a payback in 2.1 years and an annual water saving of 180,000 gallons per year. An another hotel, installing a $200 solenoid valve on a 400-pound ice machine would render an immediate payback and an annual water savings of 1.9 million gallon per year. The solenoid valve would cut off once-through cooling water when the machine's compressor is not running. Of course, landscape irrigation audits and washing only full loads of laundry show immediate payback with no up-front cost.

The TWDB workshop curriculum trains managers to involve employees and guests, to perform water surveys, and to examine water use-intensive areas: sanitary fixtures, cooling equipment and boilers, food service, reverse osmosis units and water softeners. Participants then walk through a hotel for hands-on measurement of accessible flows and data collection.

La Quinta, as well as the Westin, ITT Sheraton, Outrigger, and Saunders, chains are partners of the Water Alliance for Energy Efficiency (WAVE), a non-regulatory partnership created by the Environmental Protection Agency to reduce water consumption in the private sector.

Started in 1993, WAVE is part of the EPA's long-term effort to reduce demands on the nation's water and energy infrastructure. WAVE encourages businesses and institutions to reduce water consumption while enhancing their competitiveness. Wave offers partners water-analysis modeling software Ultimately, the WAVE program will be directed at the entire commercial sector, but the first phase targets the hospitality industry, said director John Flowers. The nature of the hotel and motel industry presents a double-barreled

opportunity for improving water use efficiency. Hotel facilities present a myriad of opportunities for improving water use efficiency, and the number of guests served by the hospitality industry presents a ready platform for public education with in-room reminders.

WAVE partner hotels sign a memorandum of understanding obligating them to survey water use within their facilities and to install upgrades or retrofits to reduce consumption. They also agree to design new facilities to be water-efficient. In return, hotels and motels receive from WAVE free water-analysis modeling software and can use the WAVE designation in promotions.

"With information input by the user, the software allocates water use by functional area. The program then compares this model to the user's water bill, and through an iterative process, closes the gap between the two," Flowers said. "Once the model is balanced, the engineer has a detailed picture of where water is being used in the hotel, and can then play `what if' games."

For example, hotel water managers can compute water use using as variables ultra-low flush toilets, higher cooling tower concentrations, or laundry rinse water recycling.

By nature of its high public profile, the hospitality industry is poised to carry the banner of water conservation into the public eye by setting a water-wise example, Green Hotels' Griffin looks forward to the day when "green" rooms are an industry standard, such as no smoking rooms are now.

For more information

The Texas Water Development Board offers a Water Use Efficiency Workshop for Hotels and Motels. Workshops train site managers and chief engineers to recognize opportunities for water efficiency with instruction and a site walk-through. To schedule a workshop, call John Sutton of TWDB at (512) 463-7988.

Green Hotels Association is committed to promoting environment-friendly practices in the hospitality industry. The organization claims more than 100 members world-wide, including Texas members ranging from a four-room bed-and-breakfast to the 1620-room Wyndham-Anatole Hotel in Dallas. For more information, contact Patricia Griffin at (713) 789-8889.

Water Alliance for Voluntary Efficiency is a non-regulatory partnership created by the Environmental Protection Agency. Contact John Flowers at (202) 260-1827.

Reuse, water rights issues conflict

The Texas Natural Resources Conservation Commissioners will be faced with a Solomon-like choice between water reuse and transport and downstream water rights holders when they consider Chapter 210 this month.

On the one hand, the TNRCC supports the reuse of discharged effluent as a conservation measure. On the other, as water is reused rather than discharged, senior downstream water rights holders may be affected.

In Texas, impoundments of surface water require a permit from TNRCC. (Groundwater pumping does not require TNRCC authorization. Under the state's rule of capture, a landholder is authorized to pump as much water from beneath his land as can be put to beneficial use.)

Although some water rights specify the amount of water to be returned to the stream, rights without this consideration are presumed to consume the entire permitted amount of water. Historically, however, return flows have at times been taken into account when figuring water availability within a stream or watershed.

Enter bed and banks delivery permits. Instead of collecting and piping effluent through man-made conduits, bed and banks permits use stream courses to convey water from the point of discharge to the point of use. The amount of water available for use would be the amount discharged into the stream less seepage and evaporation losses.

There are two competing arguments regarding indirect water use: the developed waters argument versus the waters of the state argument. Developed water is water which would not have been in the stream but for the efforts of the discharger. The user would be permitted to comingle developed water with state water, then take out that amount less losses.

Under the waters of the state argument, once a water rights holder discharges water into a receiving stream, that amount is considered surplus to the user's needs, and thus the discharger loses any rights to that water. Any subsequent use of the water by that right holder would be considered a new appropriation.

Meetings and Conferences

Introduction to Artificial Recharge of Groundwater, January 31, 1997, both in Dallas, sponsored by the Continuing Education program American Society of Civil Engineering (ASCE), (800) 548-2723 or e-mail conted@asce.org.

The **Trans-Texas Commission Joint Policy meeting** and **Technical Advisory Committee** meeting, January 8 at Holiday Inn, Channelview. For more information, call Albert Gray of the Sabine River Authority (409) 746-2192.

South Plains Agricultural Nonpoint Source Pollution Conference, Lubbock, January 16, 1997, with sessions on LEPA irrigation, conservation tillage, and the impact of rangeland agriculture on the Conservation Reserve Program. Contact the Texas State Soil and Water Conservation Board's Hale Center office at (806)839-1030 .

Industrial/Commercial/Institutional Conservation, February 2-3, 1997, Los Angeles, California, a conference for water and wastewater utility managers to learn to increase

water use efficiency in nonresidential customers. Contact Rick Harmon at (303) 347-6195 or e-mail at rharmon@awwa.org. The **Water Conservation Committee Mid-Winter Meeting,** February 1-2 prior to the ICI meeting. Contact AWWA (303) 794-3951.

National Association of Conservation Districts 51st Annual Meeting, February 2-5, Kansas City, MO. Call (800) 825-5547.

Joint Management Conference, AWWA/WEF, February 23-26, San Francisco, CA. Contact Rick Harmon, (303) 347-6195 or e-mail at rharmon@awwa.org.

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International Symposium on Waterborne Cryptosporidium, Newport Beach, California, March 2-5, 1997. Contact: Brian Murphy at (303) 347-6194 or e-mail bmurphy@awwa.org.

Houston Metro Transit Authority scores 35% savings

The Metropolitan Transit Authority in the City of Houston mounted a full-court press against water waste and a year later scored a 35 percent reduction in water consumption.

The Metropolitan Transit Authority (Metro) operates the bus system in the Houston metro area. Two years ago, the high water consumption at four of its five bus operating facilities tagged Metro with the dubious distinction of being significant contributors to Houston's sanitary sewer system, and Metro was being billed a surcharge in water utility fees by the city. (Wastewater costs are based on water consumption.) Metro's total water use was more than 92 million gallons per year.

In December 1994, in an effort to decrease water consumption without negatively impacting service, Al Sailer, Metro's Maintenance and Engineering Director, formed an "action team" to develop and implement water conservation measures. Using a multi-pronged approach of conservation and reuse, Metro recorded a 35-percent overall reduction in water use at all five bus operating facilities, its park-and-ride lots, transit centers, and field service center. Now, of five bus washing facilities, two have been reclassified as nonsignificant contributors to the sanitary sewer system.

Water use decreased from 96.2 million gallons in fiscal year 1994 to 61.9 million gallons due to conservation measures implemented.

Metro Wastewater Treatment Plant Operator Carl Sanders acted as project manager of the action team, which included two master plumbers, two facility foremen, and a manager of facility programs. A budget/cost specialist provided statistical data.

The single largest contributor to the water savings was routing cooling tower water to large air compressor aftercoolers at the Kashmere facility. This modification allowed recycling of water instead of once-through cooling from a 1-inch city line flowing 24-hours per day. After determining the cooling tower was able to accept the additional heat transfer load, plumbing was rerouted, saving approximately 500,000 gallons per month.

The"action team" which orchestrated changes resulting in a 35 -percent decrease in water use by Houston's Metropolitan Transit Authority are (l. to r.) Tom Womble, facility foreman; Carl Sanders, wastewater treatment plant operator; Jim Arenz, manager of facility programs; Winfield Fisk, master plumber; Harry Adkins, facility foreman; and Victor Flores, master plumber. Ruth Ralph (not pictured), budget/cost specialist, provided statistical data.

Other significant savings were realized in the operating facilities' bus washers. Rinse water is captured, fed through a sand filter, and stored in a tank for use in the "brush arch." Water is reclaimed as many time as possible without impacting the cleanliness of buses, according to Sanders.

Bus wash sand filters which were formerly backwashed two to three times weekly on a timer are now flushed only once per week manually, and even then the process is closely monitored so flushing ceases as soon as water runs clean from the filters.

Regeneration of the bus wash water softeners was a major water-consuming process. Before the action team's recommendations, each water softener was backflushed and regenerated two to three times weekly with a 3-inch city water line, a tremendous use of water, Sanders said. Now, using a $10 field water hardness test kit, each water softener is tested and regenerated only as needed.

Submeters were installed at each of the operating facilities with bus washers. The submeters are read daily to insure problems underlying abnormal or high readings are corrected immediately. For example a programmable logic control glitch caused a backwash rinse cycle valve on a water softener to stick. The problem was corrected, resulting in a 300,000-gallon decrease in water consumption the following month.

Irrigation submeters are read and monitored at the park-and-ride and transit centers to detect leaks or perform necessary climate adjustments.

Hardware replacements also contributed to the overall 35 million gallon-per-year savings. The action team recommended replacing existing spray tips with smaller aperture tips engineered for greater efficiency and less water consumption. In lavatories, plumbing

fixtures are replaced as needed with lower-flow devices, such as aerating and motion-sensing faucets.

The team is also evaluating low-water use landscaping at its field facility and park-and-ride stations. The City of Houston is planning to do an irrigation audit at the field office, and Metro is considering water-thrifty alternatives to lawns at the field office, where the driver training facility, motor pool, and engineering and maintenance shops are located.

For more information on Metro's water conservation program, call Carl Sanders, (713) 635-0305.

AWWA Conservation and Reuse Awards

The Texas Section of the American Water Works Association is accepting entries for the annual Water Conservation and Reuse Awards. For the fourth year, the Section will recognize water and power utilities, industry, and government agencies for innovative and successful methods of water efficiency, conservation, and reuse.

Entries are evaluated on conservation activity that best supports and promotes efficient use and reuse of water, and can include completed projects, or projects in the initiation or implementation phases. Criteria for evaluation have been established by the Texas Section/AWWA Water Conservation and Reuse Committee. Entries will be judged on innovation, implementation, execution, benefits and results, transferability, and program evaluation.

Entries should be submitted in either of two categories: direct programs, which reduce water consumption and increase water use efficiency, and indirect programs that include education or demonstration projects in which results may not be measured in tangible terms. Awards divisions are large utility, small utility, and non-utility.

For the third year, the Texas Section will recognize reuse projects with the Bob Derrington Award, in honor of the late Director of Utilities for the City of Odessa from 1978 until his death in 1990. Last year two awards were given, to the Southwestern Public Service Company (see article) and to Turkey Creek Farms *(Water Savers, Summer 1995).*

This award program is open all who promote and support water conservation and reuse in Texas. Entries must be received by January 31, 1997, and should include a completed entry form, project summary (maximum of 2 pages) with description, information on research, planning, execution, and evaluation. Supporting material should be kept to a minimum.

Awards will be presented in April at the Texas Section Annual Conference in Arlington. Entries should be mailed to John T. Sutton, Texas Water Development Board, AWWA Conservation and Reuse Committee, P.O. Box 13231, Austin, TX 78711. For additional information, call John at (512) 463-7988 or e-mail jsutton@twdb.state.tx.us.