

April/May 2006



Newsletter of the Trinity River Authority of Texas

Lake Livingston Dam Repair Substantially Complete



Before



After

DCRWS Looking for New Discharge Point

Recent Changes in TCEQ Modeling Procedures Limit Allowable Discharge in Denton Creek

The Texas Commission on Environmental Quality has recently changed the method for assessing the impact of reclaimed water on receiving waters when those waters are tributary to a reservoir. As a result, the Trinity River Authority's Denton Creek Regional Wastewater System may have to find a new body of water in which to release part, or all, of its effluent.

DCRWS provides water reclamation services for communities located in southwest Denton and north Tarrant Counties. DCRWS' eleven customers include the cities of Fort Worth, Haslet, Keller, Roanoke and Southlake; the towns of Flower Mound, Northlake, Westlake, and Marshall Creek; and the Circle T Municipal Utility Districts Numbers 1 and 3.

Currently, DCRWS discharges reclaimed water to Cade Branch, a small tributary of Denton Creek. Denton Creek feeds into Lake Grapevine.

DCRWS will need to increase treatment capacity in the near future due to population growth and development in north Tarrant and south Denton Counties. According to population projections, by the year 2030, wastewater flow to DCRWS will increase from its current average of 3.5 million gallons per day to about 30 MGD.

Currently, DCRWS is permitted by TCEQ to discharge an annual aver-

age of 5.0 MGD to Cade Branch. To serve the future needs of its customers, TRA needs to obtain an increase in the allowable discharge to approximately 12 MGD for the next five year permit term.

Due to recent changes in TCEQ's modeling procedures for assessing impact of reclaimed water on tributaries to reservoirs, it is not likely that TCEQ will permit an increase in the volume of reclaimed water discharged into Cade Branch. Furthermore, TCEQ might not authorize the continued discharge of the full 5.0 MGD provided for in the current permit when that permit is next reissued.

At issue are state-mandated stream standards for dissolved oxygen that apply to lake backwaters or coves. A level of 5.0 milligrams of dissolved oxygen per liter of water is specified as necessary to support a healthy fish community. The main bodies of most lakes have 5.0 mg/L, or greater, of dissolved oxygen as wind and wave action mix air and water causing oxygen to be absorbed. Sunlight allows algae to carry on photosynthesis which adds oxygen to the water as well.

Coves and backwaters, those narrow fingers of water around the perimeter of a lake, can be naturally low in dissolved oxygen. The water tends to be tranquil with little agitation or movement. Wind and



DCRWS discharges an average of 3.5 MGD of beautifully clear and clean water to Cade Branch. DCRWS' effluent has an average of 7.5 mg/L of dissolved oxygen, more than enough to sustain a healthy fish community.

sun can be blocked by vegetation overhanging the water or the stream banks. Other cove conditions contribute to low levels of dissolved oxygen as well, sometimes bringing the naturally occurring level below 5.0 mg/L. However, TCEQ cannot permit a discharge of reclaimed water if it cannot be demonstrated that stream standards will be met.

The calculations used by the TCEQ to evaluate the potential effects of a discharge on receiving water indicate that dissolved oxygen standards will not be met in Grapevine Lake if the discharge from DCRWS is much greater than 3 MGD. Even though DCRWS' effluent has an average of about 7.5 mg/L of dissolved oxygen, levels of dissolved oxygen drop off as the water makes its way down Cade Branch and Denton Creek to Grapevine Lake.

It is therefore necessary to identify alternative locations to discharge all or part of DCRWS' effluent. To help with the effort, TRA has engaged Alan Plummer Associates, Inc., the consulting engineering firm already engaged in providing design and permitting services for DCRWS' upcoming expansion.

Initially, eleven potential discharge options were identified and

screened. Four of the eleven options were identified for further investigation.

Together with APAI, TRA is assessing each of the four options in terms of regulatory and water quality issues, potential reuse opportunities, future discharge quantities, probable schedules for obtaining and implementing permits, as well as capital, operation

Continued on page 5. See DCRWS Discharge.



On the cover: The repair to the rip rap on Lake Livingston Dam is substantially complete 52 days ahead of schedule. The lake will now be allowed to return to the normal pool level of 131 mean feet above sea level as sufficient rain falls in the Trinity River basin upstream from the dam. Read more in the General Manager's column on page 4.



Map by Webster Mangham, Water Quality Technician II.

The DCRWS plant discharges reclaimed water into Cade Branch, a tributary to Denton Creek which feeds into a cove in the backwater of Lake Grapevine.

Inside:

Drought Results in Water Restrictions	Page 2
CRWS Faces Challenge	Page 3
Smith Achieves Educational Goals	Page 4
CRWS Attacks Odors At Source	Page 6
AWWA Battles Misinformation	Page 7

Continuing Drought Brings Water Use Restrictions Throughout the Trinity River Basin

North Texas Cities Implement Landscape Irrigation Restrictions

Some Southeast Communities Prohibit Outdoor Water Use Except for Live Stock

According to the Palmer Drought Severity Index, the entire state of Texas is experiencing severe drought conditions except for the south central and southern regions, which are experiencing extreme conditions.

When above average amounts of rain fell during the first three months of 2006, north Texans hoped the 19-month long drought had come to an end. April and May, however, proved to be unusually dry and the Metroplex is once again below normal rainfall levels for the year.

According to the National Weather Service, the coming summer months will not bring relief. In fact, the service predicts less rain and higher temperatures than usual. North Texas may experience 30 days with temperatures in excess of 100 degrees, instead of the average 15 days.

With the continuing drought, north Texas water supply reservoirs are at below-normal water levels with the wholesale water agencies that supply raw water to north Texas cities calling for mandatory water conservation measures. Tarrant Regional Water District's supply of available water is at 80 percent. TRWD expects a 20 percent drop over the summer if the drought continues. North Texas Municipal Water District has entered Stage 3 Severe Drought Plan with its primary lake, Lake Lavon, nine feet below normal pool level.

Most cities across the Metroplex began requiring residents to comply with mandatory water conservation measures concerning outdoor water use on June 1 and continuing through September 30. Although the rules vary slightly from one city to another, nearly all are based on using common sense when irrigating the landscape. Enforcement of the rules and penalties for noncom-

pliance vary from city to city as well. The following restrictions from the city of Fort Worth are typical. Some cities have more stringent restrictions. Check your city's website to see what is required in your neighborhood.

- ♦ No landscape watering between 10 a.m. and 6 p.m., with the exception of watering by hand or with soaker hoses.
- ♦ Do not allow a substantial amount of water to fall on impervious areas (i.e. sidewalk or street) instead of a lawn or landscape. A substantial amount is enough to make a constant stream that overflows to the street or other drainage area.
- ♦ Do not water while it is raining or during any form of precipitation.
- ♦ Make sure your sprinkler system is in good repair and does not waste water.
- ♦ Rain and freeze sensors are required on all residential irrigation systems installed on or after June 1, 2007. Commercial systems have more stringent requirements. Penalties for violating city water restriction ordinances vary from city to city, ranging from



Passion Flower Vine

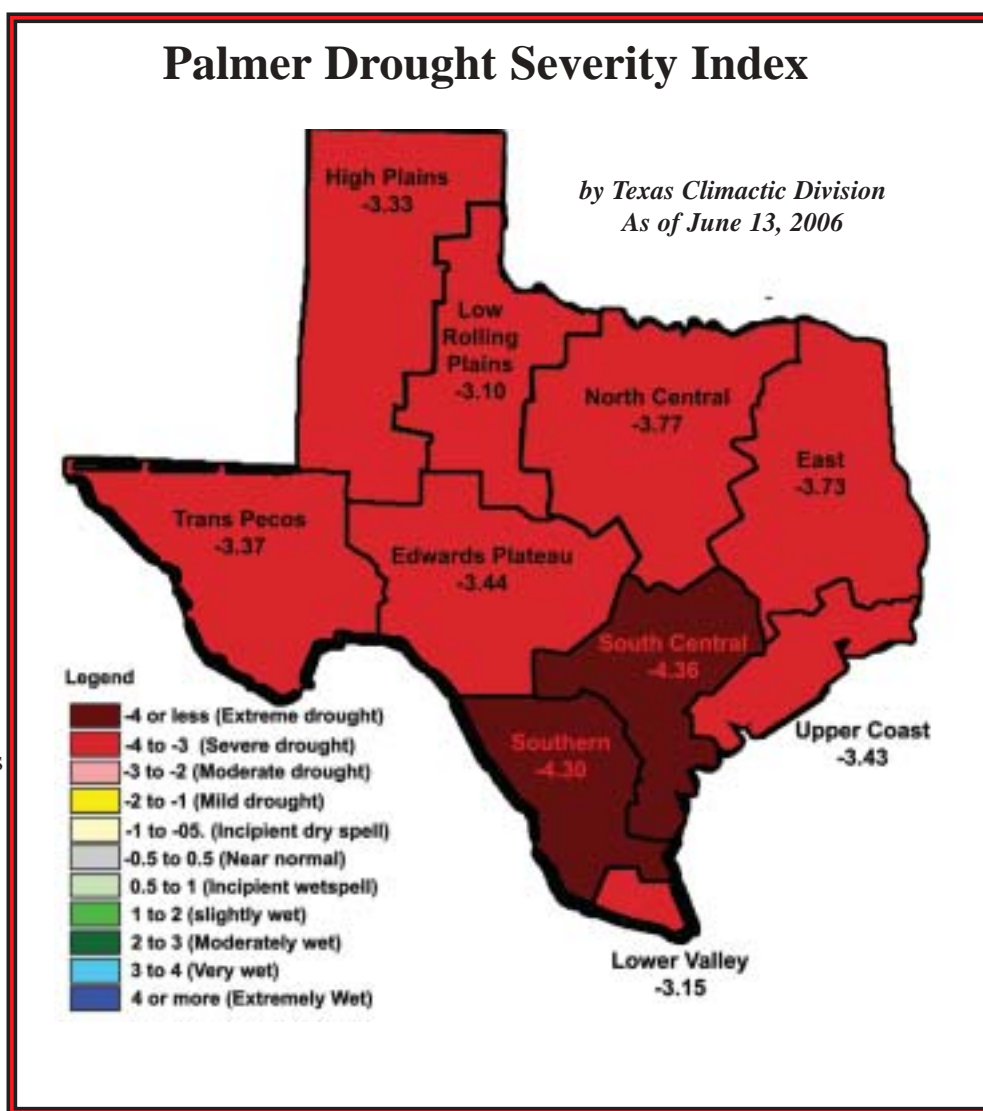


The drought tolerant plants at this vacant house have been hand watered one time since April 1.

Texas Lantana, an old-fashioned favorite, seen here on the right, loves the Texas sun. As the summer heats up, Lantana grows large and puts on lots of blooms. It will bloom until frost.

In the center, the Passion Flower Vine completely covers a shrub and threatens to take over the house. The vine puts on dozens of large, dramatic blooms. The foliage serves as food for butterfly larvae. Monarch butterflies flit around Passion Flower bringing movement and life to the garden.

Purple Cone Flowers and Butterfly Blue Pin Cushion Flower are seen in the center left.



The Palmer Drought Severity Index is primarily an index of meteorologic drought but also takes into account hydrologic factors such as precipitation, evaporation and soil moisture.

warnings to fines and disconnecting sprinkler systems.

Dotty Woodson, County Extension Agent/Horticulture, Texas Cooperative Extension offers the following advice for complying with landscape irrigation restrictions while maintaining an attractive landscape.

- ♦ Water when the landscape requires, not by the clock
- ♦ Water slowly and deeply to promote deep roots. An inch of water will generally penetrate the soil to a depth of six inches. Measure the water as the irrigation system runs to see how long it takes to distribute an inch of water. Turn it off when runoff occurs. Wait 20 minutes for water to penetrate into the soil. Dig a test hole to see how deep the water penetrated. Repeat steps until the water penetrates six inches deep.
- ♦ Never water on windy days.
- ♦ Add mulch two to three times a year on flower, garden and shrub beds to slow evaporation.
- ♦ Water newly planted flowers and shrubs separately and more often so they can establish their root systems.
- ♦ Choose plants native and adapted to this region and soil conditions. Check the Texas SmartScape Web site for plant suggestions at www.txsmartscape.com. In the southern Trinity River

basin, the Trinity Rural Water Supply Corporation, which receives a major portion of its water from the Trinity River Authority's Trinity County Regional Water Supply System, has issued a "Notice of Water Rationing" to its customers.

Four of the other wholesale customers of the Trinity County Regional Water Supply System have issued similar notices to their customers.

TRWSC's Emergency Water Rationing Program, on file with the Texas Commission on Environmental Quality, is triggered by Stage III Severe Drought Conditions. The water rationing measures, which began on May 25, prohibit outdoor water use except for watering livestock. Customers are not allowed to water landscapes, wash vehicles or fill pools.

Flow restrictors can be installed on the line of those found to be in violation of the water rationing program. Subsequent violations may result in temporary termination of service and a charge for restoration of service.

Although most water systems in the lower half of the Trinity River basin are not yet experiencing water supply problems due to the drought, TRA's Trinity County Regional Water Supply System has been forced to decrease production due to a decreased level of water in Lake Livingston.

CRWS Faces Wet Weather Challenge with Plant at Half Capacity

Plant Management, Staff, Engineering Consultant, Construction Services and Contractors Scramble to Find Solution

In late February, the D/FW metroplex got some much needed rain after a protracted dry spell. While most of us was relieved to finally see rain, the staff at Trinity River Authority's Central Regional Wastewater System was concerned, and with good reason.

Wet weather creates a challenge for wastewater treatment plants for a number of reasons. Rain water runoff flows down manholes and covers and infiltrates wastewater collection pipes, dramatically increasing the volume of water flowing to the plant. How much it increases depends on how much it rains, where the rain falls and how much pipe carries water to the plant. CRWS has 200+ miles of collection pipes but is also connected to city pipelines, which are in turn connected to private pipelines. Some experts have estimated approximately 9,000 miles of pipelines are ultimately connected to CRWS' plant.

The dramatic increase in wastewater volume due to rain is recognized by the Texas Commission on Environmental Quality, the agency that grants CRWS a permit to operate. CRWS is permitted for 162 million gallons per day but is allowed a two-hour peak of 281,250 gallons per minute which calculates to 405 MGD.

Rain not only changes the quantity of the water, it changes the quality. Rainwater dilutes wastewater.

Over and above the normal concerns a wastewater treatment plant would have about wet weather, CRWS was concerned about the late February rains because half of CRWS treatment capacity had been shut down to accommodate a construction project.

Construction crews were rehabilitating the large pipe that transports water from primary clarifiers I and II to the equalization basins. Flow to the clarifiers, which feed water to half of the plant, had been shut off.

CRWS staff had carefully and thoroughly planned for the pipe repair and subsequent shutdown of half of the plant. For months, plant management had been working with engineering consultants to devise a method to treat all of the wastewater flow, including wet-weather flows, with only half of the plant.

Wastewater flows by gravity to the plant where it is first pumped through the barscreens and then continues onto the clarifiers. There it slows down allowing heavy particles to fall to the bottom and light particles to rise to the top.

Plant staff knew they had plenty of pump capacity to move wastewater to the barscreens even with half of the pumps shut down. The barscreens too should be able to handle approximately 300 MGD which would be more than needed



An earthen berm cradles the 140-foot long, 60-inch diameter pipe that transports rain-swelled wastewater from a moth-balled Primary Clarifier basin to an aeration basin at the CRWS plant. The pipe was installed to temporarily provide additional capacity while half of the plant was shut down for repairs. Installation of the pipe was complete shortly before a weekend of record-setting rainfall at the plant and surrounding cities.

for any likely rain event. In the year 2005, the peak flow had been 211.320 MGD.

The clarifiers, however, would not be able work at a fast enough pace to accommodate a large rain event. The plant staff put their heads together to find a method to increase the proficiency of the clarifiers.

They settled on Enhanced Chemical Treatment in the clarifiers, a process using chemicals to increase efficiency of the clarification process for solids removal.

On Friday, February 24, 2006 the Dallas/Fort Worth metroplex experienced heavy rains. As rains began to fall, CRWS plant management and staff kept a close watch on the system to make sure all went well with the chemical feed/clarification process. The chemical process worked well, but a problem developed upstream from the clarifiers.

As the volume of water flowing to the barscreens increased beyond 220 MGD, water rose in the barscreen channels approaching a level that would overflow the building, threatening the barscreen motors. Operators knew if one motor quit, the barscreen would quickly become clogged causing water to rapidly rise in the Headworks Building, spill into the adjoining barscreen channel and flood that area of the plant. The operators had no choice but to slow the main influent pumps moving water to the barscreens.

Wastewater backed up into the collection system and four outflows occurred along the Elm Fork of the Trinity River. While it is never desirable to have wastewater escape the system, these outflows were relatively minor and were highly diluted by rainwater.

As soon as the rains slowed and the volume of water to the plant decreased, plant management and staff began looking for an alternative for handling wet-weather flows.

Bill Tatum, CRWS Project Manager, pulled together a team of plant staff, consulting engineers, TRA's construction services staff and a contractor to devise and evaluate a number of plans.

By March 6, the team had settled on a solution that could be quickly constructed. Approximate cost would only be about \$50,000. Over the next week and a half, plans were drawn up and materials were gathered to divert effluent from the headworks to a moth-balled Primary Clarifier basin, part of the original plant built in 1959, located near the aeration basins. Plans called for contractors to insert a 140-foot long, 60-inch diameter pipe into the old clarifier and extend it across a plant roadway. An earthen berm was constructed to support the pipe and allow water to gravity flow into the aeration basin.

With the forecast calling for rain, the contractor worked around the clock starting on Thursday morning, March 16, and was completely done by Friday evening. On Friday, rain started to fall and continued through Sunday with a two-hour period of the heaviest rain the plant has ever experienced.

The cities surrounding the plant recorded a record-setting seven inches in 24 hours. Nine inches of rainfall were recorded at the plant.

Plant operators and maintenance personnel struggled to deal with the huge volume of wastewater while experiencing treacherous flooding conditions in the plant grounds.

There was concern that the hastily constructed earthen berm supporting the 60-inch diameter pipe could possibly fail due to the heavy rains falling on the newly constructed area.

Operators, maintenance staff, construction contractors, TRA's construction inspectors, engineers and plant managers were at the plant continuously for 24 hours. The storm water pipe held and handled 50 million gallons of rain-swelled wastewater that day. The plant received a total of 270 MGD.

Even with the added capacity provided by the stormwater pipe, CRWS' collection system did experience 1.53 million gallons of outflows in three separate locations. All agreed a much greater outflow was prevented by the quick action in building the pipe.

"Everybody worked together and did an outstanding job during a difficult time," says Bill Tatum, CRWS Project Manager. "We succeeded in overcoming an unforeseen problem in a short time frame and for a reasonable cost," he added.

\$50,000 is a fraction of the sum it would have cost to rent pumps, and, the pump rental cost would have continued until the rehabilitation project was complete and the plant was once again at full capacity.

"When we are done using the 60-inch diameter pipe to handle storm water, it will be used for a critical testing project at the aeration basins. Having the pipe at that location is an unexpected gift," Tatum said. "Ultimately, the pipe will be dismantled and used in the collection system for future repairs as needed," he added.

General Manager's Message

Substantial Completion of Lake Livingston Repair Opened Door for Raising Water Level

While it is difficult to find anything positive to say about the damage done to Lake Livingston Dam by Hurricane Rita, the timely achievement of substantial completion of the repair work by TRA's primary contractor Archer Western Contractors, Ltd. was clearly good news.

As the result of excellent weather and logistics, the prime contractor was able to complete the replacement of the rip rap, or large rock protective covering, which provided upstream slope protection on the structure, 52 days ahead of the original construction schedule. When officially mobilized by TRA in early January 2006, Archer Western forecasted substantial completion in 160 days and final completion in 200 days.

Substantial completion was defined as having replaced or relocated all of the rip rap stripped from the upstream face by winds, storm surge and wave action on the back side of Hurricane Rita on September 23, 2005. This required the movement of 72,215 tons of 32-inch rock in 3,183 truck loads; and 15,808 tons of eight-inch bedding rock in 687 truckloads from the quarry in Navarro County to the work site on the dam, a distance of 153 miles.

TRA sustained some of the most severe and extensive damage that has been witnessed on the upstream slope of a structure like Lake Livingston Dam. With substantial completion, the Authority could begin capturing inflow for the purpose of raising the surface elevation back to 131 feet above mean sea level, the lake's normal pool elevation.

Full completion of the repair calls for the restoration of the single lane road on the dam's crest. The original roadway was destroyed by the heavy equipment and rock trucks used to replace the rip rap.

Depending on the weather, it should take a few weeks or months to achieve final completion. It will not be necessary to maintain the lower lake level for the road repair.

The lake level had been lowered by TRA to 127 MSL to prevent further erosion of the clay structure that was protected by the rip rap. By the end of May 2006, the surface elevation had increased to 128.48 MSL.

Lake Livingston represents approximately 72 percent of the city of Houston's available water supplies. The city continued to use water from the lake during construction and will increase the vol-

ume used as the hot, dry summer conditions take hold.

This means that if we are not fortunate enough to receive rain in sufficient quantities to refill and maintain the lake level, it may go down again. In 1988, the surface elevation of Lake Livingston dropped almost six feet, two feet lower then was required to complete the repair, as the direct result of downstream water demands and extremely dry conditions in the 16,583 square miles of the Trinity River watershed that drains toward the lake.

In 1988, a wet winter solved that problem and everyone went about their business as usual the following summer. Trend wise, however, the Trinity River watershed is still experiencing persistent drought conditions.

In the upper Trinity River basin, we have experienced above average rainfall since the first of the year. The Palmer Drought Severity Index has reflected this rainfall by moving the drought index in the upper Trinity watershed from Extreme -4 or less, the most serious, to Moderate -2.14, the third most serious drought rating. The east Texas region, which includes the lower Trinity River



General Manager Danny Vance

watershed and Lake Livingston, has remained stable at Severe -3.00, the second most serious drought rating. As of early June, both regions are now at the Severe level after an unseasonably dry spring.

The Palmer Drought Severity Index is most effective at determining long term drought over several months and is not as good for short term forecasts involving weeks. The drought of record for the Trinity River watershed extended from 1950 to 1958. The long term forecasts are the ones that really count when considering the major impacts of a sustained drought.

While the fact that our contractor finished a very difficult task almost two months ahead of schedule and presented us with an opportunity to impound water, we will not be able to capitalize on his performance if it does not rain.

Son of TRA Staff Overcomes Challenges to Graduate College

Helen Smith, Southern Region Accounting Clerk, Proud of Her Son's Accomplishments

Ross Smith, son of Helen Smith, Accounting Clerk at TRA's Southern Region office, graduated from Sam Houston State University with a degree in art, with a specialty in advertising and graphic design.

Born deaf, Ross was mainstreamed in elementary school and high school in Huntsville, Texas.

"He went to regular classrooms with all the others," said Helen. Ross graduated high school in 2000.

Ross notes that college takes hard work and perseverance.

"I love the challenges," Smith said through his sign language interpreter, Kim Moon. "I'm not just a disability. I still want to be like everybody else and do what they do."

Kim Moon has been Smith's classroom interpreter for the past 16 years, starting in the third grade. Smith has only had one class without her.

The two have become close friends.

Ross is not able to take notes in class because he must watch his interpreter carefully. A volunteer note taker helps Ross with notes.

Sam Houston State has made

Ross feel welcome and done a great deal to help him succeed. Case in point, Professor Charlotte (Chuck) Drumm helped him prepare for his internship at Adventures in Advertising.

"She helped me through my job experience," Ross said. "I had to interview with people, and she really helped me a lot with that."

Ross' internship allowed him to get some real-world experience designing and producing products for the company's clients.

"I made t-shirts and did research that gave them the opportunity to sell various things for college," Smith said. "I designed hats, but just basic things with the hats."

Kim Moon said she is incredibly impressed with Ross' progress and success, since deaf students on a university campus are rare.

"Not a lot of deaf go to college, first of all, especially to a university," Kim said. "A lot of the ones that go to college end up going to a junior college to get their basics."

She said it can be very difficult for a deaf student, because the language used in the classroom is not always spoken in familiar words to someone who is only able to understand signs.

Writing papers can be especially challenging because English is a second language to deaf students.

Ross agrees there are difficulties especially when communicating with those who do not understand sign language but he refuses to let obstacles stand in his way and finds out how to get his point across.

"I have a lot of struggles and sometimes it's frustrating, but it doesn't really bother me," he said. "I just try and go with the flow, and I try talking with my voice, my gestures and by signing. I write back and forth sometimes."

With graduation behind him, Ross is looking for a job.

"I'm not really looking for the perfect job, but I'd like to be an artist at any place I would feel comfortable," Ross said. "It doesn't matter if it is high pay or low pay, just as long as it's something to help people."



Ross Smith

Until then, Ross has been keeping busy with free lance work redesigning a logo for a local church.

Although Ross himself has done a lot of hard work to get where he is today, he knows he did not walk this journey alone.

"I want to thank all my family, my friends and all the people who were supporting and encouraging me in life and school," Ross said.

Employee Milestones

New Hires

Angela B. Otts joined CRWS as Senior Secretary. CRWS welcomes **Christopher J. Kennedy** as Operator I. **Christopher M. Nabors** joined CRWS as Maintenance Mechanic I. **Tommy R. Burns, Allen C. Sandwell** and **Kenneth W. Moore** joined CSS as Inspector I. **Jeffrey D. Ward** joined DCRWS as Operator I. TCWSP welcomes **Michael E. Lee** as Operator I.

Promotions

TCWSP promoted **Keith Franklin** to Operator II. CRWS promoted **Marina**

Shepelev to Senior Chemist.

TCWSP promoted **David Mickelson** to Senior Instrument Technician.

Current Events

Jeff Ward, DCRWS Operator I, passed his D Wastewater License after only 3.5 weeks of employment.

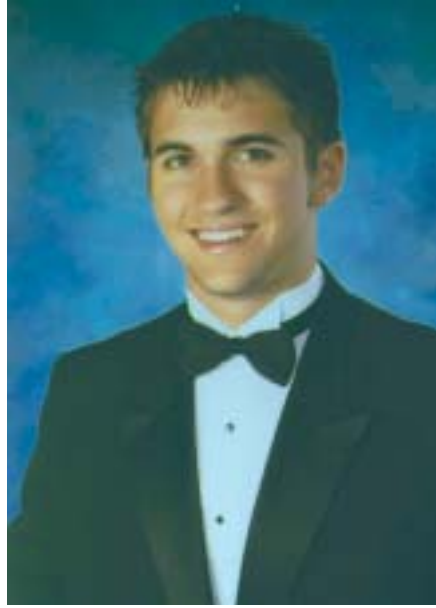
Keith Franklin, Operator II at TCWSP received his Class C Surface Water License

R. Scott Parker, C.P.A., Internal Auditor, and his wife, Shea, celebrated their 2nd wedding anniversary on June 5, 2006.

Bill Smith, Northern Region Manager of Development, and his wife, Beth, celebrated their 29th wedding anniversary on May 14, 2006.



Will Holder, son of Bill Holder, LLP Manager, graduated from Livingston High School this spring. Will finished in the top 10% of his class of 256 students and will attend the University of Texas in Austin in the fall to study Architecture and Graphic Design.



Patrick James Mackey, son of Alison Mackey, Assistant to the General Manager, graduated from Martin High School on May 27 and will attend Texas A&M in College Station this fall.



Keinu Aylese McKnight, daughter of Debra McKnight, Senior Secretary at CRWS, has been selected for the National Junior Honor Society. Keinu is 14 years old and attends Desoto East Junior High School in Desoto, Texas. In addition Keinu received the Academic Recognition Award for maintaining an "A" average for the entire school year from Desoto Mayor, Michael Hurtt. Debra is excited and proud of her only child and says Keinu has been a blessing and inspiration.



Christen Holder, daughter of Bill Holder, LLP Manager, a May 2005 graduate of the University of Texas at Austin, has been accepted into the Ph.D. program for the school of Psychology.



Angela Edwards, daughter of Doug Smith, Construction Inspector II and Tammy Smith, graduated from Summit High School on May 25, 2006.



Connie Jones, Executive Secretary at the general office, holds her new grandson! Koen Ryan Jones was born on April 29th weighing 7.4 pounds and 19 inches long. Koen's daddy, Tim Jones, is in the U.S. Navy stationed in California.



Cathy and Ron waiting for the minister shortly before their wedding ceremony. Cathy Henderson, QAQC Coordinator at CRWS, and Ron Sieger were married on Wednesday, April 19th. Ron passed away two weeks later after a lengthy battle with cancer.



Carson Gilbert, grandson of Sue Beard, NR Secretary, turned three years old on May 29, 2006.



Dylan Gilbert, grandson of Sue Beard, NR Secretary, turned one year old on March 25, 2006.



Kristie Munoz, LLP Biologist, has a new baby girl. Brooke Ann Munoz was born on April 22, 2006 weighing 8 pounds, 2 ounces and stretching 20.5 inches long.

DCRWS Discharge.

Continued from page 1.

and maintenance costs.

To consider these issues, TRA and APAI are in the process of conducting site reconnaissance on the four sites. The team is examining aerial photographs and maps to identify potential routes for pipelines and sites for a new outfall. TRA and APAI staff and engineers are constructing water quality models, identifying stakeholders, land uses and any physical features that could impact permit feasibility or permit limits. Limited field reconnaissance may also be conducted.

Once the field of possible options has been narrowed to two sites, TRA will proceed with more detailed analysis and preliminary engineering to make the final site selection for DCRWS effluent discharges.

Other alternatives that may be available to DCRWS include committing part of the reclaimed water to reuse, constructing a second plant with a different discharge location, or conducting a study to secure a more appropriate dissolved oxygen standard for the Denton Creek backwater area of Grapevine Lake.

In some cases, when there is evidence to suggest that an existing water quality standard is inappropriate, as may be the case with the Denton Creek backwater, TCEQ can grant a three-year variance from the standards. This allows a permittee time to conduct studies to determine the appropriate standard before the permit is revised to incorporate more restrictive effluent limits. TRA is currently exploring this possibility. The three-year variance would also allow time to more fully investigate the feasibility of an alternative discharge site, reuse, or a second plant.

CRWS Attacks Odor at Source

Unique Application of New Technology Saves 80% Over Traditional Approach

The characteristic egg-like odor of wastewater is caused by a build up of hydrogen sulfide.

Hydrogen sulfide is produced in wastewater as the result of biological and chemical processes that cause a reduction in dissolved oxygen. Absence of dissolved oxygen allows the hydrogen sulfide molecule to form.

Hydrogen sulfide is released when wastewater undergoes turbulence such as flowing over the weirs of primary clarifiers or discharging into a junction box or wet well.

In addition to producing a foul odor, hydrogen sulfide is corrosive when released into the surrounding air. Under those conditions, microbes and oxygen in the air can convert it to sulfuric acid, which corrodes concrete pipe and steel.

The industry standard for controlling odors produced by wastewater is to mechanically cover the equipment, and then capture and scrub the odors using various technologies. The long-used approach is expensive, makes observation of equipment difficult and creates a

confined space for maintenance staff. Furthermore, it does nothing to alleviate the corrosive properties of wastewater and wastewater gases.

For some time, experts have known that adding oxygen to wastewater in the presence of bacteria changes hydrogen sulfide into nearly odorless compounds and minimizes formation of hydrogen sulfide. One method of introducing oxygen to wastewater is to add oxidizing chemicals such as nitrate, permanganate or peroxide. But, chemicals are expensive and create an ongoing expense.

Mechanical methods of adding dissolved oxygen to wastewater proved to be inefficient with low rates of oxygen absorption and the oxygenated condition lasting for a brief period of time. To be effective and safe, introduced oxygen has to be completely dissolved in the water.

Recent technological advances have improved the method for introducing oxygen into water. Superoxygenation technology utilizes a reactor, such as a Speece

Cone, named after the inventor, which functions similar to a hyperbolic chamber to maximize oxygen absorption. The process is simple, does not use chemicals and has no moving parts other than standard wastewater pumps.

Best of all, superoxygenation saves millions of dollars over traditional methods of odor control.

Odors at the Trinity River Authority's Central Regional Wastewater System plant site began to be an issue in the 1970s when the system underwent expansion and the geographic area surrounding the plant began to experience substantial development.

Since the 1970s, CRWS has practiced a good neighbor policy of odor control. The philosophy of the Authority has been to evaluate and identify the most significant odor sources, make modifications to control those odors and then evaluate the next most significant odor sources and so on. With the exception of transporting and disposing of solids, most of CRWS odor control measures have been the mechanical covering of equipment to capture and scrub odorous gases. See the side bar for a history of odor control projects at CRWS.

During the last odor control evaluation, the aerated grit basins and the primary clarifiers were identified as the last remaining major sources of odor at the CRWS plant. The estimated cost for tradi-

tional measures to cover and scrub odorous gases emitted by these units was about \$45 million.

TRA elected to replace the aerated grit basins with vortex concentrator units to reduce odorous emissions and provide much-needed capacity. This left the primary clarifiers as the last major uncontrolled odor source.

Over the last year, TRA evaluated the potential effectiveness of superoxygenation for odor control at the plant. Testing on a field scale and a bench scale indicated the system could be effective and safe.

As a result, TRA has purchased, and will soon be installing, the first stage of a superoxygenation system to serve half of the CRWS plant. This installation will be the first-ever use of superoxygenation to treat odors at a wastewater treatment plant. The system has been effectively used in force mains, or wastewater pipes, but not in a treatment plant.

Once the new technology is installed, it will be tested and evaluated before a second stage is installed on the remaining half of the plant.

Cost of purchasing and installing the superoxygenation system equipment is approximately \$3.3 million, a savings of \$38 million, or more than 90 percent over traditional cover and scrub methods of odor control at the primary clarifiers.



One of Two Speece Cones to be installed at CRWS this summer. Superoxygenation technology utilizes a reactor, such as a Speece Cone, to maximize oxygen absorption in wastewater, which eliminates most of the odor. The process is simple, does not use chemicals and has no moving parts other than standard wastewater pumps.

A History of Success

When the Trinity River Authority's Central Regional Wastewater System went on-line in 1959, it was located in the undeveloped area between the cities of Dallas and Fort Worth. Today, development has filled in the stretch between the cities and the plant is surrounded by residential development, schools, commerce, and recreational facilities with extensive commercial development planned in the future.

From its early expansion days in the 1970s, CRWS has practiced a good neighbor policy of odor control. The philosophy of the Authority has been to evaluate, identify the most significant odor sources, control the most significant, re-evaluate, identify the next most significant odor sources, control the odors and so on. In doing so, CRWS has made significant progress in controlling odors and made maximum use of odor-control funds.

CRWS' KEY ODOR CONTROL MILESTONES

- ◆1970s: The dissolved air flotation units and gravity thickeners were covered and the foul air exhausted through carbon scrubbers.
- ◆East Sludge-Only Monofill covered. West monofill minimizes odors through operational changes; minimizing the operating face, daily cover.
- ◆CRWS begins beneficial reuse of 100% of solids in 1990s.
- ◆In response to an odor evaluation study in the late 1980s, early 1990s, six chemical scrubbers were added for odor control during an plant expansion from 100 MGD to 135 MGD.
- ◆The west, sludge-only monofill is partially covered leaving a small portion open to dispose of grit and screenings.
- ◆In the late 1990s, CRWS implements an odor control project in which many of the odor sources at the plant were manifolded together in a wide-ranging foul air collection system. Foul air is delivered to four biofilters constructed by plant personnel. Also, two bioscrubbers, some of the earliest to be installed in the state of Texas, are installed at CRWS to treat foul air collected from the solids return flow pump station and the sludge holding tank. Sludges awaiting dewatering are aerated to remove odorous substances prior to being dewatered. The foul air from the sludge holding tanks is treated in a multistage bioscrubber reducing

odors in the sludge dewatering building to nonproblematic levels. Iron salt addition at the headworks reduces odors in the influent pump station wet well and downstream grit removal units.

- ◆Between 2000 – 2002, the foul air treatment system is expanded to include two additional biofilters. The primary clarifier effluent weirs are covered and gases are exhausted to the foul air collection system. The solids dewatering building, one of the influent pump station wet wells and a portion of the expansion headworks are connected to the foul air collection system.

- ◆CRWS evaluates the effectiveness of the odor control projects and identifies the remaining odor sources, developing an implementation plan for the next stage of odor control projects. With the aid of two customer cities, CRWS evaluates nonplant sources of odors in geographical areas adjacent to the plant. Results of the observations indicate that there are some potentially significant nonplant odor sources that may become more significant as odors from the plant continue to decrease.

- ◆Enclosed vortex grit basins are replacing the current aerated grit system, which is a major source of odors at the



Dispersion model showing effectiveness of CRWS' odor control projects at the system's plant. The CRWS wastewater treatment plant is seen at the center of colored circles. CRWS was developed in the late 1950s when much of the geographic area surrounding the plant was undeveloped. As the area filled in with commercial and residential development, CRWS took a pro-active, good neighbor approach to controlling odors at the plant. With the new superoxygenation technology, odors will be contained within the plant boundaries.

plant.

- ◆Currently, CRWS is installing a superoxygenation process to introduce pure oxygen to the wastewater stream prior to the primary clarifiers to control odors in the primary clarifiers.

- ◆CRWS is conducting an evaluation of corrosion and odor control in the

collection system, showing that the addition of iron sulfate can significantly reduce the levels of hydrogen sulfide in the collection system. A major odor/corrosion control master plan project is initiated.

- ◆Summary: As shown on the figure on this page, each odor control

project has decreased the area in which odors from the plant can be perceived. Upon completion of the final stages of the superoxygenated system, it is anticipated that odors from the plant will be contained within the perimeter of the plant boundaries.

AWWA Battles Misinformation About Tap Water

The American Water Works Association has notified their membership of a series of print and television commercials, employed by the Brita Canada Corporation, designed to elicit irrational fears about tap water.

The AWWA is an international nonprofit scientific and educational society dedicated to the improvement of water quality and supply. Founded in 1881, AWWA is the largest organization of water supply professionals in the world. TRA has long been affiliated with this organization and supports their initiatives.

Before the turn of the century, one of the primary measures of public health in Dallas was the number of cholera cases reported. Cholera and other waterborne diseases are still one of the leading causes of premature deaths, particularly for children, in third world countries.

Cholera and other waterborne diseases have been eliminated in the U.S and Canada due to the high quality of water available to the citizens of those nations. Continuous advances in water treatment science over the last century are a direct result of committed water treatment professionals and strong

regulatory programs.

The new Brita ad campaign, promoting the sale of home treatment devices, attempts to create irrational doubt about the quality of tap water by emphasizing that water used to flush the toilet comes from the same source as tap water.

A Brita television commercial airing in Canada shows a glass of tap water draining to the sound of a toilet flushing. A Brita print ad in *Homemakers Magazine* shows a woman with a mop on her head with the caption, "You deserve better water than you mop with."

Jack Hoffbuhr, AWWA's Executive Director, has written two letters to Brita's management about this questionable campaign. In the first, he expressed his disappointment that Brita employed the sound of a flushing toilet to imply that tap water is of questionable quality. He said, "By connecting the image of water in a glass and water in a toilet, the commercial elicits irrational apprehension, if not revulsion, at the tap water delivered to our homes everyday."

Hoffbuhr also noted that this was not the first time Brita has employed unsavory tactics to differentiate its products in the market

place. In 2003, a TV commercial that suggested Brita "turns tap water into drinking water" was pulled from the air after Hoffbuhr expressed AWWA's extreme concern about such a tactic. He expressed the AWWA's gratitude for their prompt cancellation of the ad campaign on that occasion and was hopeful that Brita would do so again.

This time, however, Hoffbuhr has not received a response and the commercials are still airing. After two weeks, Hoffbuhr sent a second letter to Brita management noting that he had distributed an advisory to AWWA's 4,700 utility members informing them of Brita's "You Deserve Better" campaign that demeans tap water quality in order to sell their products.

Hoffbuhr said, "I was surprised that Brita would simultaneously mislead consumers and insult the work of water professionals who protect public health every day." He continued by saying, "The AWWA regards this as an unwarranted attack on tap water and an attempt to mislead the public about the merits of your filters. We ask again that you withdraw the commercials and print ads immediately,



Due to the high quality of tap water available in the U.S. and Canada, waterborne diseases have been eliminated in those countries.

because in fact, consumers do "deserve better."

According to Hoffbuhr, Brita is by no means the only profit driven private enterprise to play fast and loose with the sterling reputation of the potable water industry in the United States and Canada. Salesmen on commission selling installed home water filtration systems have employed fear tactics by making unfounded claims about the quality of tap water. These people take a shred of water science and extrapolate it beyond all reasonable limits to make a dollar.

Anniversaries

30 years

Patty Cleveland, Northern Region Manager of Operations
Donald Thompson, Chief Maintenance Mechanic, TMCRWS

25 years

Keith Bass, Southern Region Support Staff Chief Operations & Maintenance

20 years

James Swords, Chief Maintenance Mechanic, TCWSP
Cecil Alec, Security Guard, LLP
Sam Colvin, Chief Operator, TMCRWS

15 years

David Hatley, Lab Supervisor, CRWS
Stephen Lee, Senior Operator, TCRWSS

10 years

Melvin Blaylark, Field Technician II, CRWS
Rey Cortez, Senior Electronics Technician, CRWS
Kelly Logsdon, Inspector II, CSS
Randy Brooks, Manager, Wastewater Services Planning, Northern Region

5 years

Rusty Moss, Operator II, HRWSS
Craig Harvey, Chief Lab Division, CRWS
James Metcalf, Lab Technician II, LLP
David Poole, Operator II, TCRWSS

3 years

David Monroe, Operator II, CRWS
John Smith, Operator II, HRWSS



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Trinity River Authority of Texas
P.O. Box 60
Arlington, Texas 76004
(817) 467-4343

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