



Volume 9, Number 1, February 2000

8th Annual TOWTRC Conference Meets Feb. 29 - March 1 in Waco

The Texas On-Site Wastewater Treatment Research Council (TOWTRC) Council invites everyone interested in issues associated with the performance of septic tanks and drainfields and related technologies to its 8th Annual Conference. The Conference will convene February 29 to March 1 in Waco, TX at the Waco Convention Center.

According to Council Executive Secretary Warren Samuelson, the Conference should be interesting and useful for many groups working with on-site wastewater issues as well as the general public.

"We feel the Annual Conference is one of the most important services the Council provides," Samuelson says. "It provides a way for people working with these issues from throughout Texas and elsewhere to get together and discuss important concerns with their colleagues. We're also providing opportunities where people at the Conference can ask TNRCC staff specific questions about concerns faced by installers and designated representatives. These efforts should increase the value of the Conference."

An important feature of the Conference is that it provides eight certified hours of continuing education (CE) credits, which fulfill annual requirements set by the Texas Natural Resource Conservation Commission (TNRCC). It needs to be noted that individuals have to attend the entire Conference to receive CE credits.

In addition to providing an opportunity to listen to many experts speak about current issues, the Conference will also feature exhibits which provide demonstrations and information about on-site technologies. Attendees will also receive a copy of the Proceedings at the Conference.

A full copy of the program for the Conference is available as a PDF file [here](#). Alternatively, you can view a schedule in HTML format [here](#). A brief recap of major Conference highlights is shown below.

The Conference kicks off with a reception on February 28 from 5:30 to 7:30 PM. On February 29, a general session meets from 8:30 to 9:15 AM. Concurrent sessions, which cover a variety of topics including enforcement, soil properties, and drip irrigation, run from 9:45 AM until 11:45 AM. Afternoon sessions start at 1:15 and end at 5 PM. Some of the issues which will be discussed include long-term infiltration rates, microbial

pathogens, and shallow groundwater tables, among others. On March 1, concurrent sessions are scheduled from 8:15 AM to 11:45 AM. Some of the themes of presentations will feature the performance of chlorinators around Lake Livingston, evaluation of systems which incorporate evapotranspiration and soil absorption, and Council outreach and public information efforts.

For more details about this Conference, contact Warren Samuelson of the TNRCC at (512) 239-4799 or wsamuels@tnrcc.state.tx.us. A copy of the Conference program, which includes the registration form, can be downloaded from the Council's World Wide Web site, <http://towtrc.tamu.edu>.

Council Awards Grant to Prairie View A&M to Conduct Literature Review of Grease Traps, High-Strength Wastes

The Texas On-Site Wastewater Treatment Research Council recently awarded a grant for a literature search which will examine issues associated with the use of modern grease traps in commercial on-site wastewater facilities. The work will be carried out by Raghava Kommalapati of the Civil Engineering Department at Prairie View A&M University.



The literature search will be carried out by Raghava Kommalapati, shown here in his lab working with a unit that can simulate aeration for wastewater treatment.

The project is needed, according to Council Executive Secretary Warren Samuelson, since many restaurants and food service-related establishments utilize on-site wastewater treatment systems. The problem is that wastes from these facilities often exhibit high levels of organic matter (typically greases, oils and fats, which create a high biochemical oxygen demand or BOD) that may interfere with the performance of on-site systems. For example, most experts recommend that BOD levels of raw wastewater flowing into domestic on-site wastewater treatment systems be roughly 200 milligrams per liter (mg/l) or less. BOD concentrations from restaurants have been measured as high as 2,000 mg/l.

The focus of this project, Kommalapati says, is to study the available methods and designs for oil and grease removal from high strength wastes, based on the available literature. The work will involve developing a comprehensive bibliography which includes peer-reviewed articles. In addition, Kommalapati will use the information resulting from the literature search to assess whether the rules pertaining to on-site sewage facilities (OSSFs) in Section 30 of the Texas Administrative Code, Chapter 25, are appropriate, or if revisions need to be recommended.

The ultimate goal of this effort is to develop parameters which can be used in the design of on-site wastewater treatment systems used for restaurants which utilize modern grease traps to treat high strength wastes.

Work on this project is scheduled to begin on March 1, 2000, and run through August 31, 2000. Kommalapati will hire a graduate student to assist in this work. We will publicize results from this project in future issues of the newsletter. For details, contact Kommalapati at (409) 857-2418 or R_Kommalapati@pvamu.edu.

"Septic Systems Owner Manual" Provides Easy-to-Read Advice

A new 163-page book, "The Septic System Owner's Manual," provides a straightforward, easy-to-understand, non-scholarly book on residential wastewater disposal. This book contains information for homeowners on septic tanks, drainfields, soils, microorganisms, tank pumping, inspections, system failure, mounds, sand filters, graywater, and maintenance issues. The book was written by Lloyd Kahn, Blair Allen and Julie Jones, and was illustrated by Peter Aschwanden.

More details about the book can be viewed on Shelter Publications' World Wide Web site at http://www.shelterpub.com/_shelter/ssom_book.html. You can contact Shelter Publications at (415) 868-0280.

Bush Appoints Members of Texas On-Site Wastewater Treatment Research Council

In December 1999, Governor George W. Bush made the following appointment and reappointments to the Texas On-Site Wastewater Treatment Research Council. These terms expire on September 1, 2001:

The following members were reappointed: Danny Ray Moss from Haslet, representing the home building industry, Therese M. Baer from Austin, representing the engineering industry, Brenton L. Wade of San Angelo, representing the Texas Natural Resource Conservation Commission (TNRCC), Franz K. Hiebert from Austin, representing soil scientists, and Lois J. Koock, from Mason, representing the general public.

One new Council member was appointed. Arthur G. Carpenter of Austin will represent real estate developer interests. He replaces Thomas E. Dreiss from San Antonio, whose term has expired.

Council-Funded Literature Reviews on Disposal, Groundwater, Chlorinators, Now on TOWTRC WWW Site

A number of recent reports which summarize work performed for the Texas On-Site Wastewater Treatment Research Council (TOWTRC) have been published on the Council's World Wide Web site. The WWW site address is <http://towtrc.tamu.edu>. The reports can all be downloaded and viewed with the free Adobe Acrobat Reader software.

A series of three reports were produced by Raghava Kommalapati and Ahmed Noman of the Prairie View A&M University Civil Engineering Department, as a result of a project titled "A Literature Review of Effects of Long-Term Effluent Infiltration Rates At On-Site Sewage Disposal Systems." The full report is 29 pages long and discusses such issues as failures of sewage systems, long-term acceptance and loading rates, soil clogging, site and soil evaluation, and construction practices. It includes conclusions, tables and figures, and a bibliography. Users can also choose to download an 8-page summary report or a 14-page bibliography which identifies the source of specific items (whether they were found in a book, peer-reviewed journal article, conference proceedings, or paper). Kommalapati can be contacted at (409) 857-2418 or r_kommalapati@pvamu.edu.

"Synoptic Literature Review of Shallow Groundwater Related to On-Site Sewage Facilities," was published by a multi-university team consisting of John Jacob of the Texas Agricultural Extension Service and the Sea Grant Program, J. Lane and Richard Weaver of Texas A&M University, and Joe Yelderman, Lee Nordt, Lisa Zygo, and Katherine Kier of Baylor University. This 50-page report describes such topics as evaluating wetlands and hydric soils for suitability in on-site wastewater systems, the formation of soil drainage colors, the use of mottles as indicators of soil wetness, and the use of climate and landscape, clay pans, and soil morphology to judge soil wetness. An appendix discusses the survival and movement of fecal coliforms in soil. Jacob can be reached at (281) 291-9252 or jjacob@unix.tamu.edu.

"Trinity River Authority Report: A Study of Residential Aerobic Wastewater Treatment System Chlorinators on Lake Livingston" is a 16-page report which was developed by Richard Gerard, Marvin Taylor, Bob Steele, and Chuck Mason, Mike Knight, and Debbie Bronson of the Trinity River Authority, and Wesley Metcalf, a student at Sam Houston State University. The study provides background information, a description of the plan of work, results, conclusions and a recommendation. In addition, it includes an example of an inspection form which was used to gather data as well as a table which presents results from the individual systems which were sampled. Gerard can be contacted at (409) 365-2292.

A report by Ric Jensen discusses work to communicate the Council's programs through this newsletter and the Council WWW Site. This 10-page report is titled "Communicating On-Site Wastewater Information in Texas through the 'Texas On-Site Insights' Newsletter and the WWW." Jensen can be contacted at (409) 845-8571 or RJensen@twri.tamu.edu.

NOTE: In the future, the Texas Water Resources Institute will continue to work with the Council to post additional reports onto the TOWTRC WWW site. If you do not have access to the WWW, contact Warren Samuelson of the TNRCC at (512) 239-4799 or wsamuels@tnrcc.state.tx.us to get information on how to obtain printed copies of these reports.

Videotape Discussing Operation, Care, and Maintenance of On-Site Systems Available from Small Flows Clearinghouse

A videotape titled "Septic System Revealed: Guide to Operation, Care, and Maintenance" is now available from the National Small Flows Clearinghouse (NSFC). The video was produced by a technical advisory committee which worked with the University of Minnesota Extension Service. Team members included Barb Liukkonen, David Abaz, Dave Gustafson, and Wayne Seidel.

The program explains each component of a septic system and its function. Two basic types of soil absorption systems are detailed: mounds and conventional rock-filled trenches.

The video identifies the number one reason for system failure to be hydraulic overloading, followed by inadequate maintenance and improper installation or construction. Efficient use of water is a focus of this video as a means of preventing hydraulic overloading to the system. Helpful household tips for conserving water are discussed, along with the effects of household cleaners on septic systems.

The video states that septic tanks are typically cleaned once every 18 to 30 months, depending on the amount of water used, number of residents, and household practices. A demonstration of proper septic tank pumping methods is included. The video discourages the use of additives and stresses that they should not be considered a substitute for proper maintenance.

This 23-minute video could serve as a resource for contractors, developers, installers, designers, local officials, public health officials, and the general public.

The cost is \$12.00. To order, call the NSFC at (800) 624-8301 or (304) 293-4191, and ask for Item #WWVTPE43. You can e-mail nsfc_orders@mail.estd.wvu.edu. The Small Flows World Wide Web site is located at <http://www.nsfcc.wvu.edu>. You can also learn more by visiting the Minnesota Extension WWW site at <http://www.extension.umn.edu/water/satconf.html>.

Hood County Leaders Investigate Feasibility of Replacing Failing On-Site Systems with a Regional Sewer System

A multi-agency team is working to address the issue of inadequate and failing on-site wastewater systems in Hood County. The overall goal is to protect the water quality in Lake Granbury so it can continue to be used for contact recreation. The project is being

led by Denis Qualls and staff members of the Brazos River Authority (BRA), Greg Reynolds of the City of Granbury, James McAusland of the Hood County Health Unit, and General Manager John Chisolm of the Acton Municipal Utility District. The project is being funded, in part, by a grant from the Texas Water Development Board (TWDB), which is being administered by J.D. Beffort.

"In a large sense, much of the prosperity of Hood County depends on protecting Lake Granbury and keeping its water quality high," says Qualls, who is the regional water quality planning manager for BRA. "People build homes near the lake and like to spend a lot of time fishing and swimming on its waters. Protecting the lake has to be a major priority for this area."



Lake Granbury Ranger Gary Turner (left) and Denis Qualls of BRA go out on Lake Granbury to look for on-site wastewater treatment systems that may be failing.

Background Information

Lake Granbury was built in 1969. Since that time, more than 9,000 on-site wastewater treatment systems have been constructed around the perimeter of the lake. Of this number, Hood County and BRA regulators have data on the design and installation of roughly 7,000 systems.

Many systems were designed and installed before regulations went into effect in 1977. As a result, a substantial number of septic tanks and drainfields were installed that, if viewed by today's regulations, may be too small for adequate treatment. At first, BRA managed the on-site wastewater program near the lake, but Hood County took over this effort in 1991.

A BRA analysis suggests that roughly 27% of septic tanks now in use are too small, and that the size of nearly all drainfields (more than 99%) should be much larger. BRA staff members estimate that as many as 75% of existing septic systems around the lake have been installed in soils classified as "severe" by the U.S. Department of Agriculture's Natural Resource Conservation Service. These problem soils include tight clays, karst soils with cracks and fissures, and shallow, rocky, soils.

It should be noted, though, that most of the on-site systems which have been installed since state regulations were implemented do meet State standards and are thought to be operating safely. Many of the newer "non-conventional" systems, installed at sites which are not appropriate for septic tanks and drainfields, utilize aerobic treatment units followed by drip irrigation.

Local leaders and regulatory agencies feel that on-site wastewater failures constitute a major public health threat to the lake. In 1999, for example, the Hood County Health Unit investigated more than 100 instances in which septic systems were reported as failing. In

a few cases, homes have been condemned by the Health Unit because on-site system failures could not be corrected.

Studying the Feasibility of a Regional Sewer System

To address these concerns, governmental entities in Hood County went to BRA in 1998 and asked if the Authority would help coordinate a feasibility study. The goal is to determine if a regional sewerage system could be constructed and operated to reduce the number of failing on-site systems and, thus, improve water quality.

"A unique feature of this project is that we're addressing issues which are all located within Hood County," Qualls says. "This makes it much easier to get local leaders behind this project and reach a consensus." Throughout the project, staff from various agencies have sought public feedback and comment through town meetings, presentations to city councils, and notices in local newspapers.

Another development which may help protect water quality is recently-passed legislation (House Bill 310), which gave Hood County commissioners the authority to enact subdivision ordinances which govern wastewater treatment as well as other issues.

In 1999, BRA applied to the TWDB for a \$121,250 planning grant. Study participants contributed matching cash and in-kind services. The feasibility study is being led by Jim Glazer of HDR Engineering, Inc., and is expected to be completed in the Summer of 2000.

A major part of the feasibility study will be to identify subdivisions and neighborhoods within the primary study area (within a mile of the lake shore, along major highways, and throughout the towns of Granbury, Tolar, and Lipan) which have the highest potential for growth and, thus, may be most in need of regional sewer service. In addition, needs for a regional sewer system will be evaluated in a secondary study area, sited within five miles of the lake.

To assess the feasibility for a sewer system, HDR will develop projections for water use and wastewater flows as well as population estimates. Some of the types of solutions that may be considered include a regional wastewater treatment facility, smaller plants at many sites, and package plants. In cases where existing on-site systems are isolated geographically, it may be feasible to cluster a few on-site systems and tie them onto a common drainfield.

"We expect that a regional system will improve water quality now and will help prevent future problems. In addition, having a regional sewer in place may also foster future development," Qualls says.

NOTE: For more information, contact Qualls at BRA at (254) 776-1441 or denisq@brazos.org, or visit the Authority's World Wide Web site at <http://www.brazos.org>.

Meetings & Conferences

The Texas Environmental Health Association (TEHA) will host its annual meeting March 31 in Austin at the Doubletree Hotel. Sessions will discuss such issues as proposed changes to Chapter 285 of the Texas on-site wastewater regulations, how to properly identify soils, updates in certification and enforcement, and the use of the Internet to post and look for jobs and to talk about on-site issues. For more information, contact TEHA at (940) 322-3232.

The Texas Engineering Extension Service (TEEX) will offer the following classes. The Installer I class will be taught March 14-15 in Mesquite. The aerobic irrigation class will be offered March 16 in Mesquite. The site evaluator course will be given March 14-16 in Abilene. The Installer II class will be taught March 21-23 in Houston. To view a complete list of TEEX classes, call them at (409) 845-6245 or e-mail Gregory Lewis at psglewis@teexnet.tamu.edu.

The American Society for Agricultural Engineering (ASAE) will host the 9th National Symposium on Individual and Small Community Sewage Systems March 11-14, 2001 in Fort Worth. Topics which will be discussed include the fate of contaminants, design loading rates, small community systems, standards for on-site wastewater treatment, and diagnosing and correcting failures. For details, visit the ASAE World Wide Web site at <http://asae.org>.

GBEP, GCHD Team Up to Evaluate Performance of On-Site Systems throughout Dickinson Bayou

How well are on-site wastewater treatment systems performing in the greater Houston area and what may be the impact of failing systems on Galveston Bay? These were some of the questions discussed in a comprehensive report published in 1998 by the Galveston Bay Estuary Program (GBEP).

The report discusses a research project conducted by Martin Entringer of the Galveston County Health Department (GCHD) and Thomas Byrom of the GBEP.

"We hope that the lessons learned from this project can be transferred to many other sites throughout the Galveston Bay watershed which may be experiencing similar problems," Byrom says. "Because Dickinson Bayou is typical of many communities in the area which are trying to deal with failing on-site systems, we hope the successes generated from this effort can be replicated elsewhere."

Background Information

One of the broad thrusts of the GBEP is to protect water quality throughout Galveston Bay by limiting sources of many pollutants, including fecal bacteria and nutrients. The GBEP is part of the Texas Natural Resource Conservation Commission (TNRCC).

This project was funded through a variety of sources, including GBEP, the U.S. Environmental Protection Agency's Clean Water Act (Section 319) program, and the Houston-Galveston Area Council.

The objective was to ascertain if fecal coliform levels in the Dickinson Bayou watershed, near Clear Lake, could be reduced by identifying and rehabilitating failing on-site wastewater treatment systems. In addition, Entringer wanted to investigate if providing education and technical assistance to homeowners with problem systems is effective.

How the Study Was Conducted

One of the first tasks was to determine which areas in the watershed exhibited high fecal concentrations. This was done by evaluating existing surface water quality data. Areas which were not served by a centralized wastewater system were also detected through the use of aerial photographs and maps.

The next step was to determine whether permits and related data were available for the thousands of individual on-site systems throughout the watershed. A related effort involved looking at the locations of on-site systems and seeing if there were neighborhoods within the watershed in which a number of systems were clustered together. Near three of these sites with concentrated numbers of systems, stations were established to monitor fecal coliform levels in nearby bayous and streams.



At many sites like this one along Dickinson Bayou, Martin Entringer (left) and Tom Byrom looked for lush vegetative growth as a sign on-site systems may be failing.

Water quality samples were taken from March through August of 1997, and five samples were obtained monthly from six sampling stations.

Later, visits were made to individual homes to determine how well on-site wastewater systems were functioning. Some of the methods which were utilized include identifying areas near septic tanks and drainfields where effluents may be ponding or surfacing, the presence of lush vegetative growth in an otherwise well-manicured yard, above-ground pipes which discharge gray or black wastewater, seepage of effluents along a slope, and foul odors. At the same time, GCHD and GBEP staff interviewed homeowners, whenever possible, and obtained their perceptions of system performance as well as problems. In some cases, a tracing dye was placed in a homeowner's toilet along with a large volume of water. Observing the path of the dye provided evidence of what kinds of problems a system may be experiencing.

The team also provided a packet of education and technical assistance materials to residents which informed them of how to manage and maintain septic tanks and

drainfields. Byrom and Entringer worked with Cathy Palmer and Paul Dietert of the Galveston Bay Information Center at Texas A&M-Galveston to create a World Wide Web (WWW site) with a variety of resources about on-site wastewater resources, as well as a thorough description of this project.

Results and Discussion

An analysis of historic data reveals that all 10 sampling locations in the watershed exceeded contact recreation standards for fecal coliform bacteria at least once between 1992 and 1996. More than 10% of all samples taken during this time were greater than 400 colony forming units (cfu) per 100 milliliters (ml), or twice the limit allowed by the TNRCC.

Unfortunately, due to a lack of data it was not possible to identify all the individual systems in the study area (defined for this project as homes sited within 500 feet of Dickinson Bayou). Ultimately, of the 90 on-site wastewater treatment systems chosen for this project, only 10 of them were found to have been officially permitted by the GCHD.

Results of the geographical survey showed that there were three major clusters (sites where five or more homes on septic systems were grouped closely together) as well as two smaller clusters (where three homes using on-site technologies were sited near one another).

Water quality sampling performed for this project show that fecal coliform levels were greater than contact recreation standards roughly two-thirds (61%) of the time in surface waters downstream of clusters of on-site systems. Fecal coliform levels in these waters ranged from 20 to 16,000 cfu per 100 ml.

Results from individual neighborhoods help describe the varying level of system performance. For example, in the Pine Oak subdivision nearly half (22 of 45) of the on-site systems showed signs of failure, while in the Windcrest development, nearly all (8 of 9) the homes which were sampled exhibited performance problems. It should be noted that in other subdivisions, there were fewer malfunctioning systems.

The study team also attempted to correlate the age of systems (using information provided by homeowners and available records). Not surprisingly, older systems (installed more than 11 years ago) were found to be failing more often than more recent septic tanks and drainfields. For example, 17 older systems were classified as working properly versus 20 classified as malfunctioning. On the other hand, 13 newer systems were ranked as performing adequately compared to four which were classified as malfunctioning.

The study also shows that efforts to educate homeowners with failing systems may be paying off. For example, roughly 85% of the 46 residents surveyed said that information materials they were given about care and management of on-site systems were helpful. In

addition, 20 homeowners said they would make lifestyle changes to increase the chance their septic system would work properly.

Follow-Up Efforts

Entringer says this project provided valuable information on how on-site systems are working in the real world, as well as insights into the success that may be obtained through educational programs.

GBEP and GCHD are now working with groups representing many of the neighborhoods which face on-site wastewater challenges. Although technologies and resources have been identified which these areas can use to remedy failing systems, Entringer says it is still difficult to get the public to want to participate. One of the major obstacles is grants may not be available to assist system improvements, although possible sources of loans have been identified. However, many homeowners are reluctant to take part in a loan program they will have to help fund.

NOTE: Entringer can be contacted at (409) 938-2300. Byrom can be reached at (281) 316-3005 or tbyrom@tnrcc.state.tx.us. The report, "Galveston County Health District -- Voluntary Inspection and Information Assistance Program to Reduce Bacterial Pollution Caused by Malfunctioning Septic Systems in the Dickinson Bayou," can be downloaded as a PDF file from the GCHD WWW site, which is located at <http://www.gchd.org>