Texas On-Site Insights
Information about On-Site Wastewater Treatment Systems in Texas
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Response to Austin On-Site Conference Overwhelming

More than 170 participants and 15 exhibitors from across Texas and the U.S. were in Austin in August to take part in the Texas On-Site Wastewater Conference. The meeting attracted politicians including Congressmen J.J. "Jake" Pickle and Greg Laughlin, Commissioner Pam Reed of the Texas Water Commission, and others. Nearly two-thirds of those who attended were regulatory officials (including State and local officials) and university scientists. More than 50 private companies (including manufacturers, salesmen, and engineers) participated.

Leo Wood, Chairman of the Texas On-Site Wastewater Treatment Research Council which sponsored the meeting, said he was pleased by the turnout.

"We knew when we prepared for the meeting that there is a desire to discover the best systems for treating and disposing of wastewater on-site in many parts of Texas," he said, "but we had no idea this many people would show up and that they would be this enthused about finding solutions."

The Council came away from this meeting with a much better understanding of the problems local agencies face when trying to develop systems and programs that work."

Some of the topics included: strategies on how to evaluate innovative technologies; chamber leaching systems; aerating sewage in septic tanks; anaerobic biologic reactors; the performance of rock and intermittent sand filters, and the National Small Flows Clearinghouse. There were also talks on disposing of larger flows with spray and subsurface trickle dosing, an analysis and evaluation of caliche soils for on-site wastewater treatment, the City of Austin's program for non-engineered low pressure dosed trench systems, and performance evaluations and design implications for microbial rock plant filters.

This issue of *On-Site Insights* features some of these talks: a presentation by Burt Carter of the LCRA dealing with that agencies response to the 1991 floods and a report by Shawn Ricklefs of the Amarillo Bi-City- County Health Department describing their program to evaluate leaching chamber systems. Other papers that were presented at the Conference will be included in future issues.

Video On How to Inspect Septic Tanks Produced by Penn State

A 39-minute training video has been produced by Penn State University that demonstrates the equipment, procedures, and knowledge needed to conduct proper inspections of septic systems.

The video, "Inspecting Septic Systems During Home Sales," costs $35 and is available from the Penn State College of Agriculture, 119 Agricultural Administration Building, University Park, PA 16802. Their phone number is (814) 865-6309.

Evaluating Innovative Systems: A Field Study of Leaching Chamber Design

By Shawn Ricklefs, Amarillo Bi-City-County Health Department

During the past few decades, various innovative ways to dispose of and treat wastewater on-site have been proposed including mound systems, evapotranspiration beds, pressure dosing systems, leaching chambers, and others.

Before any innovative system can be approved, it has to be tested to make sure it works under specific conditions and that the public health or the environment are not threatened. One factor that others conducting pilot testing programs must consider is to make the objectives and goals as clear and concise as possible so that valid data can be obtained.

In 1988, state regulations allowed local agencies that enforce on-site wastewater systems to "consider" innovative systems that were not specifically mentioned in the State construction standards. The Amarillo Health Department (AHD) contacted the Texas Department of Health (TDH) to request permission to evaluate the "infiltrator" leaching chamber design.

The infiltrator is a molded, high-density, plastic product that is intended to replace traditional gravel-filled drainfields. The infiltrator is 3 feet wide, 6.25 feet long, and 1 foot high. Units can be snapped together to form the desired length of absorption line. One major advantage is that these units can be 40% smaller than conventional gravel systems while treating the same amount of effluent.

The AHD utilized the company's research data concerning the infiltrator's structural load ratings. They then performed field tests to see if the device was crush resistant. Results of the tests showed that the infiltrator met standards for structural integrity. The tests also examined whether the smaller size of the infiltrators would decrease the amount of effluent that was absorbed into the soil.

AHD personnel selected 42 test sites at random. Systems were installed in accordance with TDH standards. Homeowners were told their systems would be evaluated periodically. Monitoring was done by lowering a 5 foot stick down into each inspection port and by measuring the amount of standing effluent (ponding) at each site.

Conscientious efforts were made to avoid penetrating the soil depth and disturbing biomats that were forming in the soil.

The infiltrator worked very efficiently in the sites that were monitored. Monitoring information was sent to the TDH for their review and the units were approved in 1991. The AHD plans to continue monitoring the test sites for the next 5 years.

Looking back at the program, there were some things that could have been improved. Percolation rates should have been tightly specified and soil analysis could have been included in the study.

NOTE: This is a condensed version of a paper that was presented at the 1992 Conference, "Texas On-Site Wastewater Treatment and Research." A full copy of the paper was included in the Proceedings. The Proceedings can be obtained by calling Maureen McReynolds at the City of Austin's Center for Environmental Research at 512-322-2777.

Corpus Christi Engineer Designs Wastewater Reclamation System for Livestock and Irrigation<

By Atlee Cunningham, Corpus Christi TX

The Pine Ridge Ranch is located six miles west of Leakey, TX. Since the soil is Edwards Limestone and very pervious, we reclaim our domestic wastewater for livestock and irrigation. The effluent is relatively clear. Monthly checks show there are no coliform bacteria. Therefore, the effluents that seep into the Edwards Aquifer are not likely to cause contamination.

The system treats an average flow of 500 gallons per week. Flows consist of all household use, including water left over from washing clothes. Flows are first treated by a 500 gallon septic tank, followed by a 500 gallon aerobic digester and aeration tank. Effluents then flow to a 500 gallon settling tank and to 60 feet of a rock/gravel aquatic ecosystem used for tertiary treatment. Effluents are eventually used for a 1,000 gallon livestock tank. Chlorine is added as a disinfectant.

The pH of the well water is 8.2 and the pH of the treated wastewater ranges from 8.2 to 8.4. Algae quickly form in the stock tank, but are controlled (not eradicated) by the chlorine and treatment of copper sulfate and citric acid each week.

Editor's Note: Cunningham, a professional engineer in Corpus Christi, designed this system for the ranch. If you would like more information, write to him at 12101 Upriver Road, Corpus Christi, TX 78410. He wrote to tell us about this system. If you want to share your experiences with our readers, please call Ric Jensen, the editor, at 409-845-8571.

Texas Engineering Extension Service (TEEX) Offers Courses in On-Site Wastewater

By Clark Benson, Water and Wastewater Training, TEEX

When asked how many miles throughout Texas he travels in a year teaching onsite sewerage facilities courses, Paul Morris replies, "25,000 miles and a few airplane rides." Morris is an instructor with the Water and Wastewater Training Division, which is part of the Texas Engineering Extension Service (TEEX).

TEEX is part of the Texas A&M University System and has been mandated by the Texas Legislature to provide vocational and technical training programs on an extension basis throughout the State. The on-site sewerage facilities training courses fall under this mandate.

These training courses are divided into program areas pertaining to the needs of basic installers, advanced installers and inspectors. The State requires that installers of septic systems be licensed by the Texas Water Commission (TWC). This necessitates passing a competency exam, attending an eight-hour training course and filling out the required paperwork. Inspectors are required to attend a 16-hour course to earn their inspector certificate.

INSTALLERS

The installer' training course provides eight hours of training required by the TWC. The installer course is designed for individuals who are engaged in the business of construction, installation or repair of septic tank systems or other types of on-site sewerage facilities. The objective of this course is to educate installers concerning the requirements of the State and to prepare them for the competency exam.

Some of the topics covered in this course are: 1) laws and regulations; 2) registration requirements; 3) site evaluation and design considerations; 4) soil absorption and percolation rates; 5) septic tanks and grease traps; 6) aerobic treatment plants; 7) soil absorption systems, and 8) unacceptable systems.

Immediately following this course, a representative from the TWC administers a competency test. Those taking the test must score 70% or better to pass. There is an 85% passing rate for those who have attended the course.

INSPECTORS

Inspectors are required by the TWC to attend a 16hour course. The inspectors first attend the Installers Course, and then receive an additional eight hours of instruction. Inspectors are involved in the implementation and enforcement of rules and regulations covering the design, construction and operation of on-site sewage disposal systems.

The second day of the inspectors' course is devoted to specific issues and extensive discussions on wastewater microbiology, soil profiles and alternative on-site systems.

ADVANCED

The Advanced On-Site Sewerage Facilities Course is the newest course offered in this program. It provides an additional sixteen hours of classroom training. It prepares the installer or inspector for involved analysis, design, construction and inspection practices for on-site systems.

The objectives of this course are to: 1) summarize and explain the criteria used for system selection for an on-site sewerage facility based on TWC regulations; 2) describe standard and nonstandard subsurface disposal systems; 3) explain the expanded regulatory framework and requirements applicable to the installation and operation of on-site disposal systems; and 4) provide detailed guidelines for the design and installation of low-pressure pipe waste treatment systems.

This course is designed to fulfill the TWC proposed criteria for the new Installer II certification.

Paul Morris, the principle on-site instructor, is a Registered Professional Sanitarian. He holds a Master of Science degree in Environmental Management from the University of Houston-Clear Lake.

To request more information about these courses or any other TEEX course, please call the Water and Wastewater Training Division at (409) 845-6246.

Proceedings of On-Site Wastewater Conference Now Available

The *Proceedings of the 1992 Texas On-Site Wastewater Treatment and Research Conference* are now available.

The Proceedings contain presentations that were made at the conference which met in August in Austin. Papers cover such topics as how to evaluate innovative systems, performance evaluations of rock and sand filters, microbial rock plant filters, aerating sewage in existing septic tanks, disposal of large flows, low pressure dosed trench systems, and other issues.

The Proceedings cost $6. To order the proceedings, contact Maureen McReynolds with the City of Austin's Center for Environmental Resources at 512-322-2777.

New TWDB Reports Summarize Wastewater Treatment Options for Small Communities

Two new reports that review on-site wastewater treatment and disposal systems that may be appropriate for small communities have been published by the Texas Water Development Board (TWDB).

Wastewater Treatment Systems for Small Communities: A Guide for Local Government Officials, and *Technical Summary: Appropriate Technologies for Small Community Wastewater Treatment Systems*, were written by Joseph Malina and Michael Barrett of the Civil Engineering Department of the University of Texas at Austin.

Both reports contain information on alternative collection systems (septic tank effluent pumps, grinder pump pressure systems, and small diameter sewers), cluster systems (community soil absorption systems, pressure dosing, evapotranspiration beds, and mounds), and centralized treatment processes (wetlands, overland flow, and aerated lagoons). The reports summarize alternative systems that are operating in Texas and contain information on constructed wetlands in the southern U.S.

The reports can be obtained by contacting the TWDB at 512-463-7869.

Brochure Describes Council Research, Technology Transfer Programs

A new color brochure that describes the On-Site Wastewater Treatment Research Council's programs and activities has been produced by the Texas Water Resources Institute. It was funded by a grant from the Council.

The brochure contains information on the Council's research and technology transfer program and tells how people can get involved with the Council's activities. A tear-off coupon lets readers request additional information.

The brochure is a great way to let others know about the Council and its programs. Copies of the brochure can be obtained by contacting Ted Johns at the Texas Water Commission at 512-463-8260 or Maureen McReynolds at the City of Austin's Center for Environmental Research at 512-322-2777.

How the LCRA Responded to Flooded On-Site Systems

By Burt Carter, Lower Colorado River Authority

In the early 1970s, the Lower Colorado River Authority (LCRA) was granted jurisdiction over on-site wastewater (OSWW) systems near Lake Buchanan, Lake Ink, Lake LBJ, Lake Marble Falls, and Lake Travis. Roughly 7,000 existing systems were inspected in the next few years. LCRA now regulates 14,300 OSWW systems.

In December,1991, storms poured record amounts of rain onto saturated ground, causing immediate runoff and rapid rises on the Llano and Pedernales Rivers and the lakes. Because the Colorado River was flowing over its banks below Austin, LCRA was forced to store inflows in Lake Travis to avert flooding downstream. Water levels in Lake Travis soon reached a record elevations. Several hundred homes and OSWW systems were inundated.

LCRA responded to the flooding by distributing warning bulletins about OSWW and potable water systems, by working with emergency response and floodplain management

agencies, by conducting field surveys of flooded systems, and by sampling waters for contamination.

Bulletins and newspaper articles cautioned OSWW users to check for disjointed sewer pipes, overflowing septic tanks, saturated drainfields and contaminated drinking water wells and lake pump systems. Persons still able to use their OSWW systems were urged to conserve water to reduce discharges to their systems. The bulletins recommend that users of OSWW systems open the septic tank manholes to check the water level in the tank to make sure that flooding had not occurred, to check for raw sewage and septic tank effluents in their yards, and to see if pipes had become disconnected.

All fees relating to the OSWW program including flood inspections, system repair permits and replacement system permits were waived. Potable water system sampling and analysis was provided free. Because many OSWW systems were malfunctioning, LCRA deployed 29 portable toilets around Lake Travis.

Roughly 300 of the 6,200 homes within 2,000 feet of Lake Travis were flooded. In most cases, the on-site system was inundated as well. The immediate questions were "What will be the impact of these systems on the lake?," and "What will the effect of flooding be on the systems?"

LCRA water quality monitoring crews and volunteers sampled dozens of locations along the Lower Colorado River system. Many of the sample sites were on Lake Travis because most of the flooded residences were located there. Sampling began on Lake Travis in January and ended after 71 samples were taken. LCRA also conducted a separate survey to look at the short-and long-term effects. Over 300 samples were collected and approximately 2,000 chemical analyses were performed.

Sample results indicate there was not a widespread water quality or human health problem from inundated or failing OSWW systems. Levels of bacteria, total suspended solids (TSS) and nutrients increased significantly, but dropped quickly after the flooding had stopped. Fecal coliform bacteria counts of 200 colonies per 100 milliliters were found, compared to normal levels of less than 10 colonies. However, testing showed that few of the samples that tested positive originated from human wastes. Of the 154 water well and lake pump potable water samples that were sampled, 64 tested positive for bacteria or showed elevated levels of total dissolved solids, total organic carbon or nitrates.

After the floodwaters receded from Lake Travis, LCRA inspectors surveyed 80 OSWW systems for potential damages. Licensed septic waste haulers who were active during the flood and heavy rain events were interviewed. They reported having pumped many tanks but stated they found no major damages to most systems. Most of the problems were caused when mobile homes, homes on piers, and other residences were shifted or moved by the floodwaters. This caused sewer pipes to become disconnected.

Editor's Note: This is a condensed version of a paper that was presented to the 1992 Texas On-Site Wastewater Treatment Conference in Austin. A full version of this paper is available in those Proceedings. The Proceedings can be obtained by contacting the City of Austin's Center for Environmental Research at (512) 322-2777.