

# WRC NEWSLETTER

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WATER RESOURCES CENTER, TEXAS TECH UNIVERSITY, LUBBOCK, TX 79409  
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## Underground Water Safe Near High Plains Feedlots

Ground water beneath High Plains feedlots has been found to be safe in two recent studies conducted in Castro, Parmer, Randall and Deaf Smith Counties. The first was a 1990 study of well water from 26 High Plains feedlots which showed that nitrate levels did not exceed EPA standards (lab analyses conducted at the Soil & Water Testing Lab at Texas A & M University). The second study in 1991 was designed to see if contaminated underground water could be detected

away from the feedlot wells (lab analyses conducted at the Environmental Science Laboratory at Texas Tech University). "The well water in all feedlot wells and in farm irrigation wells appears to be suitable for irrigation, livestock watering and human consumption," said Dr. John Sweeten, an Extension Service agricultural engineer.

Not all feedlots in the region were included in the studies. Some of the criteria for selection of feedlots included in the 1991 study were as follows:

- Feedlot capacity of 5,000 head or more.
- In operation for at least 20 years.

In this second study, water quality was measured from ground water beneath two cattle feedlots of 45,000 and 42,500 head capacity. Irrigation wells within a distance of 2/3 to 7/8 mile from the lots and the playas that collect their runoff were also tested. Laboratory

“*The well water in all feedlot wells and in farm irrigation wells appears to be suitable for irrigation, livestock watering and human consumption.*”

- Collection and storage of wastewater in holding ponds or playas, awaiting disposal by irrigation.
- Surrounded by irrigated farmland.
- Participant in the 1990 feedlot ground water sampling study.
- Upgradient and downgradient sampling potential.

analysis of ground water samples transported to the Texas Tech Environmental Science Laboratory (ESL) revealed very low nutrient and salinity values. The primary analysis was for nitrate-nitrogen concentrations. These concentrations, averaging less

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Underground Water Safe

## ANNOUNCEMENTS

### Texas Water Pollution Control Association - Call for Papers

**Description:** Abstracts for papers by students are being solicited for presentation at the annual meeting of the Texas WPCA. Abstracts can be related to any aspect of water and wastewater management.

**Eligibility:** Papers must be based on work done as a student and be presented by the student or recent graduate. Faculty advisors can be listed as co-authors.

**Deadline:** March 2, 1992

**Evaluation:** Abstract evaluation will be made by the Texas WPCA Student Activities Committee in mid-March. Papers will be chosen for relevance to the field, technical content, and clarity.

**Awards:** Presentations will be judged at the conference and cash prizes totaling \$600 will be awarded. A one-year student membership in the Water Pollution Control Federation and its Texas Section will be awarded to all eligible students who submit abstracts.

### Universities Council on Water Resources Dissertation/Thesis Award

**Description:** This award is given to the best dissertation, as evidenced by a summary paper, in each of the three areas: Engineering and Physical Science, Environmental and Biological Sciences, and Social and Behavioral Science.

**Eligibility:** Submission from a UCOWR member institution (Texas Tech is a member institution) will normally be a Ph.D. dissertation. Under limited circumstances master's theses can be submitted, but it is understood that they will be reviewed in the context of dissertation level and criteria.

**Deadlines:** Deadline for submission of the summary paper is March 1 of each year with the reviewers' comments due by May 15. The winners will be notified on June 1.

**Award:** The winners will be recognized at the UCOWR annual meeting and will receive a certificate and \$500.

### Dan M. Wells Memorial Endowed Scholarships

**Description:** Two annual scholarships are funded by family, friends and students in honor and recognition of Dr. Dan M. Wells, who served as Director of the Water Resources Center at Texas Tech University from 1967 to 1977.

**Eligibility:** Scholarships are available for Texas Tech University seniors or graduate students demonstrating interest in a career in a field directly related to water resources. Applicants are required to demonstrate their interest by writing a brief paper outlining their goals, ambitions and previous work, courses or other involvement in water resources.

**Deadline:** March 1, 1992

**Award:** Each scholarship is \$300 annually.

*For information on the above announcements, please contact Dr. Lloyd Urban, Director of the Water Resources Center.*

## GIS Update - System Benefiting Tech Researchers

Dr. Ernest B. Fish, Professor of Landscape Architecture, is involved in research concerning the application of Geographic Information Systems (GIS) in water resources and other applications. Partial funding for the initial research and the acquisition of the necessary computer software was received from the Water Resources Center in FY 1991.

PC-ARC/INFO and ERDAS are two state-of-the-art systems being used by undergraduate and graduate students. By having both systems available, students are able to compare the advantages and disadvantages of raster based systems such as the ERDAS with vector based systems such as the PC-ARC/INFO.

GIS capability has greatly

enhanced Texas Tech University research and educational support opportunities as evidenced by the following ongoing or recently completed projects:

- Graduate student Amy Blair used the geographic information system software capabilities to analyze home range habitat types for wild turkey near Post, Texas. Plotted bird locations were analyzed in terms of habitat boundaries to determine turkey preferences during various stages of their life cycle as well as dispersion patterns after nesting.

- Mr. Greg Huber, a Soil Conservation Service employee, who has returned to Texas Tech for a graduate degree, is using

LANDSAT satellite imagery to analyze pronghorn antelope fawning habitat in the Trans Pecos region of west Texas.

- A digital data base of soil mapping units, playa lake locations, and farmland in the Conservation Reserve Program (CRP) has been completed for Castro County and is being expanded into Swisher County.

- In May 1991, Charles E. Aulbach, II, completed requirements for his Ph.D. degree. His research involved the use of both satellite image analysis and geographic information system applications to complete his dissertation entitled "Detecting, Monitoring and Forecasting Land Use Change on the Southern High Plains of Texas."



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than 1.2 mg/L at Feedlot A (maximum value of 2.23 mg/L) and 5.21 mg/L at Feedlot B (maximum value of 9.54 mg/L), range below the U.S. Environmental Protection Agency standard of 10 mg/L for public drinking water.

Special care was taken to collect and transport the water samples in the 1991 study to assure true representation of water quality. Samples were packed in ice for transportation to the ESL where they were analyzed within 48 hours after collection. Sampling was con-

ducted in a 30 day period during peak seasonal use of irrigation water.

The following agencies participated in or contributed to these studies: Texas Agricultural Extension Service and Texas Agricultural Experiment Station at Texas A & M University, High Plains Underground Water Conservation District No. 1, Texas Cattle Feeders Association, and the Environmental Science Laboratory and Water Resources Center at Texas Tech University.

## MEUF Technology Shows Promise

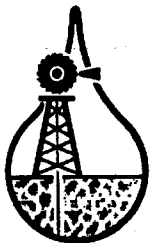
**Micellar Enhanced Ultrafiltration (MEUF)** has been under extensive investigation for over a decade as a potential technique for removal of toxic contaminants in water. MEUF has been successfully demonstrated for removal of phenol, m-cresol, benzene, toluene, as well as copper, zinc and chromate ions. However, two shortcomings of MEUF are (1) the need to use toxic anionic/cationic surfactants and (2) the fact that the technique lacks selectivity in rejecting undesirable components. If research can overcome these problems, benefits will directly impact manufacturing industries,

refineries, petrochemical plants and landfills.

Dr. R.S. Narayan and Dr. J.R. Bradford are the principal investigators involved in the WRC sponsored study that has been able to identify a polyelectrolyte instead of an ionic surfactant that could significantly impact the separation characteristics and answer the needs caused by the above-mentioned shortcomings. The polyelectrolyte in particular that will be evaluated is polystyrene sulfonate which acts like a naturally occurring soap. The big size molecules attach to the pollutants thereby allowing them to

be removed by the filtration process. While the interaction of a polyelectrolyte with ionic species is not new, the use of such a material in conjunction with an ultrafiltration membrane with specific molecular weight cut-off (especially polysulfone/polyamide based polymer) is novel.

Preliminary experimental results are expected by the end of March on this project. Plans then will be to expand the initial laboratory investigation to a pilot scale unit of 10 gallon capacity to treat industrial waste water.



# WRC

WATER RESOURCES CENTER

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