



Dr. Cliff Feder of Texas Tech University (left) Bo Spoons of the Texas Soil and Water Conservation Board (center) and Dr. Nick Parker (right), also of Texas Tech, are working together on an alternative waste management system for use by producers and feedlots. The system is now being tested at the Burnett Center for Beef Cattle Research and Instruction at New Deal in northern Lubbock County.

Researchers examine alternative animal waste management system

An innovative waste management system that may revolutionize the way producers deal with animal waste is being tested near New Deal in northern Lubbock County.

Animal waste management is a major challenge facing the feedlot industry—especially considering that there are 200 or more feedlots on the Texas High Plains producing more than 5.5 million head of cattle annually, as well as other operations that can produce up to 100,000 head of swine at a single location.

This challenge has led Dr. Nick Parker and Dr. Cliff Feder, both of Texas Tech University, to construct, construct, and demonstrate a natural, non-mechanical, gravity flow purification system that can treat animal waste and protect the quality of ground and surface water.

"Currently, there is enough cattle waste produced daily in the Texas High Plains to fill Jones Stadium (on the Texas Tech University campus) twice a day," said Parker. "We want to take this economic liability and turn it into an economic asset by demonstrating to producers how effectively constructed wetlands and an aquaculture production system are removing nutrients from feedlot discharges while producing useable and valuable by-products."

"In demonstrating how the system works, we also want to show producers how they can create valuable by-products as a means of recovering the cost of nonpoint source pollution control measures," said Parker. "These by-products are produced in various stages of the conversion process of the livestock generated biomass (waste). They include micro organisms, such as the purple sulfur bacteria, aquatic plants, microalgae, and fish," he said. These by-products will be marketed as dietary ingredients in feed for fish, livestock, and poultry.

Methane gas is the other by-product to be produced in the system. It will be collected and utilized by an on-site energy source for heating, drying, and producing electricity.

The waste management system that Dr. Parker and Dr. Feder have designed is a three stage process incorporating a 20 foot deep anaerobic pit surrounded by a facultative lagoon, an aquaculture pond, and a fish pond.

Water purification begins as raw feedlot waste is diverted into the anaerobic pit to begin breaking down. This process creates methane gas, which is captured beneath a plastic membrane covering the pit.

"The methane gas will be used to heat water and produce electricity on site," said Dr. Parker. "Exhaust gases and heat from the combustion of the methane gas will be recycled back into the pit to increase the temperature of the water, thus increasing the rate at which the organic material is broken down," he said.

Dr. Parker explains that as the waste breaks down, solid materials settle to the bottom of the pit and decompose while the nutrient-rich water flows into the surrounding facultative lagoon. In the lagoon, microalgae and purple sulfur bacteria further purify the water by removing some of the nutrients as the water flows through the lagoon.

The purification process continues as the water moves through the first pond where aquatic plants (knottgrass) remove nutrients from the water. From here, the water runs into a second pond where fish feed on the growing microalgae, aquatic plants, and any organic material that has flowed in from the previous pond. From the last pond, the purified water can be released into the plays for irrigation and/or to recharge ground water.

This demonstration project ("Nutrient Reduction in Plays With Feedlots Overlaying The Ogallala Aquifer") is funded by the U.S. Environmental Protection Agency (EPA) under Section 319(h) of the Clean Water Act. Funds for the project are administered by the Texas State Soil and Water Conservation Board (TSSWCB), which is the lead agency for the state's agricultural and silvicultural nonpoint source (NPS) management program.

Future plans include field days and workshops to demonstrate the operation of this animal waste management system.

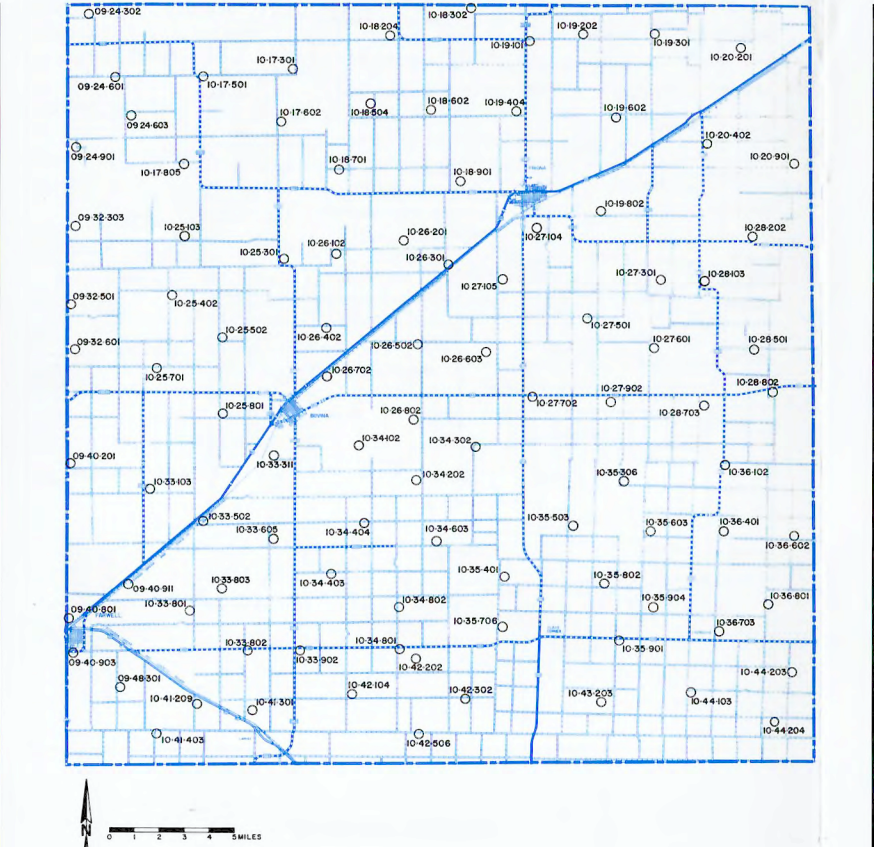
For additional information about the project, contact Bo Spoons at the Texas State Soil and Water Conservation Board, P.O. Box 658, Temple, TX 76703-0658, or by calling (817) 773-2250.

May 10th Farm Safety Day Camp set

An attempt to prevent injuries to children living on farms, Progressive Farmer magazine and Farm Safety 4 Just Kids will co-sponsor a Farm Safety Day Camp from 8:30 a.m. to 3:30 p.m. on Saturday, May 10, 1997, at the Panhandle South Plains Fairgrounds in Lubbock.

Held in conjunction with the popular Farm Safety 4 Just Kids program, the camp will provide hands-on experience and demonstrations on general farm and home safety. Children in grades K-8 will be taught the importance of a positive safety attitude.

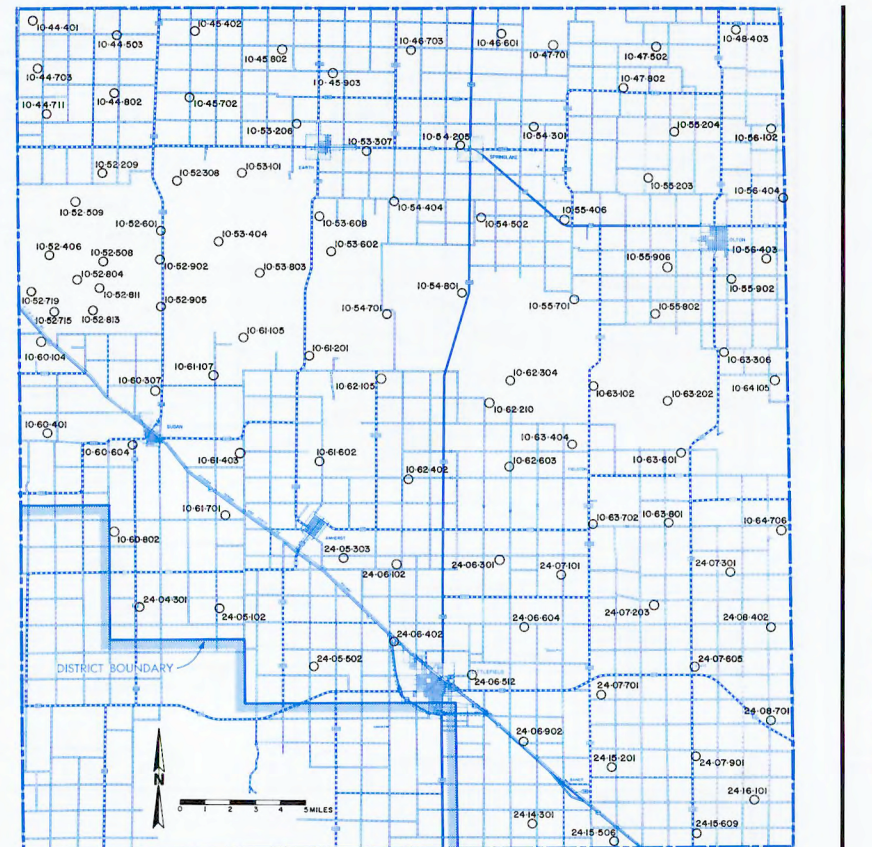
Registration fee of \$10 per family (up to four children) includes a T-shirt, noon meal, two snacks, and handouts. Registration information is available by contacting Lynn Moseley at the High Plains Underground Water Conservation District No. 1, 2930 Avenue Q, Lubbock, Texas 79405-1499, or by calling (806) 762-0181.



DEAF SMITH COUNTY
Depth to Water Below Land Surface In Feet
Total Change In Water Levels In Feet
Well Number 1987 1992 1996 1997 1987 1992 1996 1997

Well Number	1987	1992	1996	1997	1987	1992	1996	1997
02-34-001	326.12	283.85	283.67	324.98	+ 0.26	- 1.01	1.23	
02-34-003	N/A	N/A	315.36	316.59	N/A	N/A	1.23	
02-34-004	293.30	297.60	303.47	304.37	- 11.07	- 6.77	- 0.90	
02-34-005	334.74	331.04	336.84	329.28	+ 5.46	+ 2.12	+ 7.58	
02-35-001	368.35	365.10	372.91	374.85	- 15.30	- 8.55	- 0.74	
02-35-002	324.35	330.30	332.82	336.73	- 12.28	- 6.43	- 3.91	
02-35-003	289.79	284.79	336.11	337.48	- 16.69	- 12.69	- 1.37	
02-35-004	309.90	324.24	304.72	305.23	- 35.24	- 20.99	- 0.51	
02-35-005	376.51	292.04	315.10	320.72	- 44.21	- 28.68	- 5.62	
02-35-006	N/A	N/A	382.80	388.98	N/A	N/A	1.15	
02-35-007	253.87	268.08	285.20	290.12	- 36.25	- 24.04	- 4.92	
02-35-008	N/A	N/A	196.05	197.25	N/A	N/A	1.32	
02-35-009	260.60	258.75	259.55	259.37	+ 1.23	- 0.62	+ 0.18	
02-35-010	301.51	322.92	198.39	190.40	+ 1.21	+ 2.20	- 1.91	
02-35-011	N/A	N/A	225.63	226.36	N/A	N/A	0.73	
02-35-012	170.40	170.40	301.79	301.40	+ 6.31	+ 2.70	+ 0.39	
02-35-013	247.35	249.49	252.47	252.04	- 4.69	- 2.55	+ 0.43	
02-35-014	281.35	280.33	279.77	279.85	+ 1.50	+ 0.48	- 0.08	
02-35-015	304.95	303.15	301.09	300.80	+ 4.15	+ 2.35	+ 0.29	
02-35-016	293.70	246.50	251.67	249.79	+ 5.86	+ 5.86	+ 1.89	
02-35-017	188.62	269.23	278.16	280.76	- 12.14	- 11.53	- 2.60	
02-35-018	235.38	238.63	234.99	235.19	- 1.83	- 1.36	- 0.20	
02-35-019	316.06	316.06	316.06	322.26	- 8.32	- 4.82	- 1.14	
02-35-020	278.26	278.26	278.26	280.26	- 0.66	- 2.22	- 1.02	
02-35-021	242.52	248.67	248.67	251.14	- 12.22	- 6.47	- 1.10	
02-35-022	280.75	285.58	301.30	297.47	- 16.72	- 11.89	- 3.63	
02-35-023	247.07	237.66	244.31	246.38	- 12.31	- 8.72	- 2.07	
02-35-024	192.27	194.20	196.11	196.28	- 4.01	- 1.98	- 0.27	
02-35-025	280.74	285.45	283.45	284.67	- 19.16	- 1.47	+ 4.98	
02-35-026	204.87	207.86	213.20	213.65	- 8.78	- 5.79	- 0.22	
02-35-027	N/A	N/A	249.27	246.66	N/A	N/A	0.61	
02-35-028	305.89	302.00	300.22	299.95	+ 3.74	+ 2.05	+ 0.27	
02-35-029	263.44	264.97	264.32	263.88	+ 1.56	+ 1.09	+ 0.44	
02-35-030	178.87	190.90	185.46	184.00	- 2.66	- 6.22	- 1.74	
02-35-031	297.30	297.30	310.42	310.42	- 10.19	- 6.25	- 2.07	
02-35-032	256.30	256.30	310.42	310.42	- 10.19	- 6.25	- 2.07	
02-35-033	324.11	363.30	329.90	330.67	- 6.56	- 29.33	- 0.68	
02-35-034	354.15	363.32	373.68	377.28	- 21.13	- 14.96	- 3.60	
02-35-035	341.40	352.00	371.74	376.74	- 35.34	- 23.84	- 5.00	
02-35-036	280.74	285.45	283.45	284.67	- 19.16	- 1.47	+ 4.98	
02-35-037	266.48	269.48	289.68	285.25	- 29.58	- 17.57	- 4.57	
02-35-038	N/A	N/A	303.58	316.26	N/A	N/A	1.56	
02-35-039	N/A	N/A	391.92	394.04	N/A	N/A	1.712	
02-35-040	354.53	359.69	364.15	366.23	- 11.70	- 6.64	- 2.08	
02-35-041	368.48	369.83	378.26	384.30	- 10.82	- 8.47	- 1.74	
02-35-042	378.18	378.18	369.57	369.56	- 21.38	- 20.82	- 7.59	
02-35-043	308.75	317.52	332.84	339.04	- 30.29	- 21.52	- 6.20	
02-35-044	N/A	N/A	323.47	320.29	N/A	N/A	6.82	
02-35-045	N/A	N/A	398.14	370.20	N/A	N/A	11.36	
02-35-046	N/A	N/A	382.24	384.30	- 10.19	- 6.25	- 2.07	
02-35-047	362.85	369.49	381.90	386.86	- 24.01	- 18.37	- 4.98	
02-35-048	291.16	304.31	316.24	316.80	- 25.64	- 12.49	- 0.56	
02-35-049	N/A	N/A	368.61	361.25	N/A	N/A	16.55	
02-35-050	327.12	338.56	356.65	357.85	- 34.85	- 22.39	- 5.32	
02-35-051	N/A	N/A	301.26	307.86	N/A	N/A	22.04	
02-35-052	345.84	362.50	383.52	387.98	- 42.14	- 25.48	- 4.46	
02-35-053	N/A	N/A	363.65	369.24	N/A	N/A	5.59	
02-35-054	281.49	297.97	320.28	328.82	- 43.33	- 26.85	- 4.54	
02-35-055	284.87	287.80	295.20	295.20	- 41.24	- 27.31	- 0.31	
02-35-056	314.53	328.40	358.25	356.64	- 42.11	- 28.04	- 0.39	
02-35-057	248.82	263.30	280.11	286.42	- 37.60	- 23.08	- 6.31	
02-35-058	251.47	267.76	282.60	285.81	- 28.40	- 18.05	- 3.21	
02-35-059	297.52	304.72	319.95	325.10	- 31.58	- 20.38	- 5.15	
02-35-060	254.64	281.94	293.67	293.67	- 10.40	- 9.20	- 1.80	
02-35-061	304.41	325.19	345.48	348.78	- 35.77	- 24.59	- 4.30	
02-35-062	324.35	334.57	351.78	358.83	- 34.48	- 24.26	- 7.05	
02-35-063	278.89	288.79	303.28	306.28	- 27.39	- 17.49	- 3.00	
02-35-064	255.70	266.99	283.61	284.32	- 28.62	- 17.33	- 0.71	
02-35-065	281.60	287.60	307.26	311.21	- 29.61	- 18.05	- 3.65	
02-35-066	N/A	N/A	247.51	258.59	N/A	N/A	14.29	
02-35-067	290.53	303.52	312.40	314.28	- 23.75	- 11.26	- 1.88	
02-35-068	N/A	N/A	286.89	290.18	N/A	N/A	3.29	
02-35-069	238.50	238.50	261.80	266.81	- 31.23	- 21.25	- 5.81	
02-35-070	N/A	N/A	287.50	291.43	N/A	N/A	3.93	
02-35-071	278.38	289.05	304.19	308.83	- 30.45	- 19.78	- 4.64	
02-35-072	292.53	292.53	308.86	311.15	- 19.12	- 12.33	- 2.79	
02-35-073	N/A	N/A	315.60	320.73	N/A	N/A	5.13	
02-35-074	241.10	241.10	263.26	263.26	- 19.21	- 11.16	- 1.80	
02-35-075	252.59	252.59	271.46	271.46	- 19.33	- 19.33	- 5.66	
02-35-076	271.46	271.46	277.32	284.64	- 19.33	- 19.33	- 5.66	
02-35-077	N/A	N/A	254.19	264.60	N/A	N/A	15.14	

NOTE: N/A Denotes data not available



LYNN COUNTY
Depth to Water Below Land Surface In Feet
Total Change In Water Levels In Feet
Well Number 1987 1992 1996 1997 1987 1992 1996 1997

Well Number	1987	1992	1996	1997	1987	1992	1996	1997
02-44-001	188.34	199.90	217.40	224.70	- 36.36	- 24.80	- 7.21	
02-44-002	N/A	N/A	213.19	220.75	N/A	N/A	7.78	
02-44-003	141.75	145.20	157.70	159.45	- 17.70	- 14.19	- 1.75	
02-44-004	112.65	112.65	120.65	121.17	- 8.52	- 5.97	- 0.52	
02-44-005	126.19	133.95	133.13	137.90	- 21.71	- 14.65	- 4.77	
02-44-006	188.76	188.76	207.44	214.35	- 14.00	- 3.12		
02-44-007	128.30	128.30	141.54	143.52	- 15.22	- 9.66	- 1.98	
02-44-008	N/A	N/A	211.43	213.97	N/A	N/A	2.54	
02-44-009	192.75	199.55	208.04	N/A	N/A	N/A	N/A	
02-44-010	228.95	250.37	240.08	241.16	- 18.28	- 10.56	- 1.15	
02-44-011	207.00	218.85	231.10	234.10	- 15.25	- 3.00		
02-44-012	126.39	126.39	135.54	137.90	- 21.71	- 14.65	- 4.77	
02-44-013	108.84	108.84	130.70	131.48	- 0.64	- 2.54	- 0.78	
02-44-014	130.84	129.45	107.45	107.49	+ 0.89	+ 2.64	- 0.04	
02-44-015	87.93	88.86	86.86	86.56	+ 1.37	- 2.70	- 1.74	
02-44-016	92.10	92.10	92.64	93.86	- 0.54	- 1.62	- 1.22	
02-44-017	62.59	62.60	59.86	60.08	+ 2.51	+ 2.52	- 0.22	
02-44-018	98.72	96.15	86.06	82.68	+ 6.26	+ 2.64	+ 0.07	
02-44-019	60.47	62.19	61.89	62.34	- 1.37	- 0.02	- 0.55	
02-44-020	117.58	117.58	120.05	124.46	- 2.46	- 2.52	- 2.84	
02-44-021	118.79	N/A	117.83	117.89	+ 0.80	N/A	- 0.16	
02-44-022	114.72	118.81	119.78	121.00	- 5.26	+ 0.61	- 0.59	
02-44-023	101.30	101.30	101.64	101.96	+ 3.37	+ 0.66	+ 0.32	
02-44-024	105.12	105.12	107.26	107.51	- 0.46	- 2.35	- 0.25	
02-44-025	119.04	114.08	112.93	116.60	- 2.70	- 2.54	- 3.67	
02-44-026								