



OKLAHOMA

water news

MONTHLY NEWSLETTER OF THE OKLAHOMA
WATER RESOURCES BOARD

Gerald E. Borelli, Chairman

Earl Walker • L.L. Males • Bill Secrest, Jr. • Ralph G. McPherson • Gary W. Smith • Ernest R. Tucker • Robert S. Kerr, Jr. • R.G. Johnson

Board and City of Alva Unite in Protecting Cimarron Terrace

The short-term gain or possible long-term pain is the issue before the Oklahoma Corporation Commission in a case involving the City of Alva versus the Oklahoma City-based Magic Circle Energy Corporation. The Oklahoma Water Resources Board is involved as a champion of the community of 6,400 in its cause for clean water only because of its statutory responsibility to manage and protect all the waters of the state. Alva's interest lies close-to-home — in protecting the area nearest the wells that furnish the town's water supply. The Board is dedicated to protecting the water quality for Alva, the entire Cimarron Terrace Basin, the second largest in the state, and the integrity of all other aquifers in Oklahoma.

The City seeks a special field order from the OCC which would require any companies drilling in the area to use a closed system for the handling of their drilling muds and fluids. In the area the OCC order would protect, deleterious liquids discharged on the ground include chlorides, common waste products of the drilling process. In March, a leak from a pit occurred in an area adjacent to the City of

Alva's water well field. Concerned citizens petitioned the city to prevent possible pollution of the city's only water supply. Because the aquifer lies only 60 feet from the surface and is composed of stream-laid deposits of permeable sedimentary material, the Cimarron Terrace is extremely vulnerable to pollution. It is more sensitive to pollution from surface sources than deeper aquifers confined by harder, less permeable materials.

The closed system the city favors employs a series of above-ground tanks from which the mud mixture is pumped down the drill pipe, out the drill bit, then up through the well. A suction device draws the used mud into another tank series where the suspended solids are separated from the liquids, which are remixed, or if their useful life is done, are trucked off to an OCC-permitted disposal site.

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Oklahoma Sun and Wind Studied as Alternate Energy Sources

If there are two things you can bank on in Oklahoma, they are that the wind will blow and the sun will shine. It's precisely these factors that prompted the Board and the Bureau of Reclamation to cooperate in a study of the economics of pumping water with solar and wind energy.

The OWRB requested assistance from the Bureau under a program providing "technical assistance to the states," says Dan Rubenthaler, Bureau planning study manager and regional research coordinator, who supervised the projects.

The solar model, a small sun-powered water pumping system, was located near Cleo Springs, where the City of Enid was drilling new water supply wells in the Cimarron Terrace ground water basin. That application of the technology was chosen because north central Oklahoma offers the extended periods of cloudless weather necessary for solar power generation. Additionally, it was a prime test site because the installation of power lines to a well so remote would have proven costly.

Included in the proposed strategy was an array of photovoltaic cells calculated to produce enough energy to run a 3.5-horsepower permanent magnet, DC motor.

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Marion Jowaisas and Fred Heitman of the water board discuss the special field order requested by the City of Alva to protect the Cimarron Terrace, the sole drinking water source for the city.

Alva request, continued from page 1

The fact that drilling fluids can seep through soil, sands and gravels to contaminate ground water was supplied at the hearing by John Roles, OWRB senior ground water geologist. Roles was one of three water board staff members who participated in the hearing.

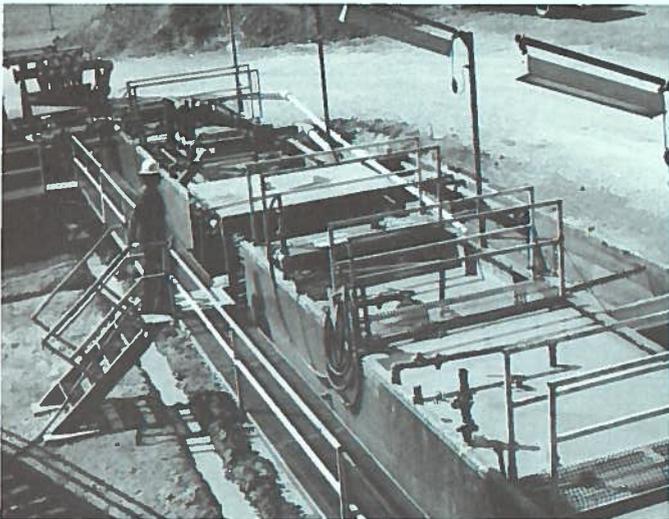
A recent report by the U.S. Geological Survey confirms that oil and gas drilling activities can contaminate water supplies, said Roles. He pointed out that the USGS study linked oil and gas activities in central Oklahoma underlain by the Vamoosa-Ada aquifer and the salt water contamination of the well water at Sasakwa.

Fred Heitman, OWRB environmental specialist supervisor, stated that the rubber, plastic or bentonite liners of oil field reserve pits can rupture or deteriorate with time. Once through the lining of the pit, the deleterious substances can seep into the aquifer.

Explaining the Board's legal position at the hearing was OWRB Attorney Marion Jowaisas.

As well as preventing pollution of the ground water, the closed system has the further advantage of economy, affirmed Robert D. McDowell, vice-president of Alexander Energy Corporation of Oklahoma City.

McDowell said his company's operations lie in areas



These large steel tanks recycle used drilling muds by separating reusable liquids and fine solids from heavy debris churned up in the drilling process. Use of such above ground tanks almost entirely eliminates leakage of deleterious substances.

where a closed system is required by local ordinance. "We've been able to save on mud costs, land usage, hauling fluids and the building and filling of reserve pits," he asserted. "The closed system requires a smaller amount of fluid, thereby minimizing the possibility of pollution due to overflow."

Other positives were expressed by Robert Brown, mud engineer and president of Monument Drilling Fluids, Inc., who said that the closed system uses one-fifth the water, expedites drilling and requires significantly less chemicals to manipulate the specific gravity of the drilling fluids. Brown said there are only about 20 rigs in Oklahoma currently using the systems, although they are the rule rather than the exception in many other states. Resistance to new technology, even a cost-effective system like these

which have been in use since the 1960s, is the reason he offers for the industry's reluctance in accepting the systems for wider use in Oklahoma.

According to John Auten, Brown's employer and vice-president of Ratliff Drilling and Exploration Company, the company soon will adopt the closed system for all its drilling activities. The company has monitored the economics of operating open pits versus closed systems and found cost savings up to 25 percent. "That edge on the competitors who haven't yet begun to use the system is valuable. I believe the economics of the system, combined with its lower pollution potential, eventually will force acceptance," he said.

The closed system is applicable to almost all normal drilling activities, ruled out only in situations involving wells drilled beyond 13,000 feet or wells with circulation problems, he concluded.

If the citizens of Alva and the Board are successful in obtaining a protective field order, the fresh waters of the Cimarron Terrace in that area will be protected against pollution from oil and gas activities. Roles and Heitman are quick to point out, however, that the Corporation Commission's ruling would apply only to the 12-section area specified. Other communities which rely on water supplies from vulnerable aquifers will be next up to bat, they agreed.

A favorable ruling for Alva would give legal precedent to other communities facing similar situations, said Jowaisas.

Sun and Wind Study, continued from page 1

According to Rubenthaler's model, the motor would drive a vertical turbine pump to raise about 100 gallons of water a minute from the Cimarron Terrace. A sun-tracking device would keep the cells oriented to the sun to maximize its output. The simplicity of the system almost eliminates maintenance, and weather damage to the fragile photovoltaic cells was prevented by an automatic device to turn the cells away from wind and precipitation as soon as the light level drops below a useful level.

The Bureau-backed study proved the system is workable although its cost of 30 cents per 1000 gallons (excluding operation, maintenance and replacement costs over a 20-year lifespan) appear to make it infeasible on such a small project. Rubenthaler predicts that the cost of the cells will decrease with mass production, and that as technology improves their energy-output efficiency, the cells may prove a practical alternative for large-scale projects. Such a project, he points out, is being examined during a 12-month test to pump irrigation water at Alamosa, Colorado.

Another project of promise under scrutiny by the Bureau and the Board proved windpower to be more practical in Oklahoma, at least for the time being. Long-term monitoring by the Bureau showed Gage ideally suited for the generation of windpower, with winds higher than 8.5 miles per hour 69.3 percent of the time. A PROBE — Portable Remote Observations of the Environment — device installed by the Bureau collected information on wind speed, direction and constancy, as well as precipitation, barometric pressure and temperature. It confirmed what the natives had known all along — that the windpower is

greatest in the spring and lowest in the summer and fall months. A particular characteristic at Gage that enhanced the value of wind for power generation was that the strongest winds occur between 9 a.m. and 6 p.m. — the time of day when power demand is greatest. Researchers recommended that power from the wind turbine be used to replace power from expensive peaking and intermediate-load plants.

The Gage turbine produces more power than the research facility it electrifies can use, so excess power is sold to the local utility company. Rubenthaler says the Gage unit, a 25-kilowatt turbine, can produce about 46,660 kilowatts of electricity annually. The total number of hours appropriate for generation during the test year was 5,403.

Following completion of the studies at Gage, the Bureau of Reclamation will continue studying the feasibility of pumping water with windpower at Beaver and Altus, where turbines will be installed.



Dry Weather Prompts Requests for Releases

Low rainfall in the weeks before late September rains prompted water users downstream from three reservoirs operated by the Corps of Engineers to ask the Board to intervene on their behalf in requesting unscheduled releases of water.

The City of Wright City asked for a release of water from Pine Creek Reservoir to flush the municipal water supply area and improve the quality of water served to city residents.

Water users below Waurika Reservoir on Beaver Creek requested a special release to supply domestic water to families downstream and for stock watering.

In the Lake Texoma area, farmers requested an unscheduled release of water from the reservoir to soften peanut fields for harvest.

J.A. Wood, OWRB Stream Water Division chief, said the Board requested the releases from water quality storage available in Pine Creek Reservoir and from inflows to Waurika and Texoma Reservoirs.

Bureau Names New State Representative

W. Brooks Gallman has recently been appointed representative for the Bureau of Reclamation for the State of Oklahoma.

Gallman will be responsible for coordination of Bureau of Reclamation policies, objectives and programs for water and related resources investigations in the state.

He has been in Bureau service 23 years, most recently serving as a planning study manager at the regional office in Amarillo, Texas.

The Oklahoma offices of the Bureau of Reclamation are located in the Alfred P. Murrah Federal Building, 200 N.W. 5th Street, Suite 922A, Oklahoma City, 73102, and can be reached by phone at (405) 231-4515.

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF SEPTEMBER 24, 1984

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
SOUTHEAST		
Atoka	78,100	62.9
Broken Bow	806,529	87.9
Pine Creek	76,239	98.1
Hugo	117,381	74.5
CENTRAL		
Thunderbird	95,058	89.7
Hefner	70,900	94.0
Overholser	13,800	86.8
Draper	72,800	72.8
SOUTH CENTRAL		
Arbuckle	57,283	91.6
Texoma	2,145,525	81.3
Waurika	179,810	88.5
SOUTHWEST		
Altus	15,253	11.5
Fort Cobb	67,687	86.3
Foss	142,257	58.4 ²
Tom Steed	64,988	73.0
EAST CENTRAL		
Eufaula	1,904,740	81.8
Tenkiller	527,996	84.1
Wister	23,320	86.1
Sardis	293,986	97.2
NORTHEAST		
Eucha	59,900	75.3
Grand	1,346,910	90.3
Oologah	488,529	89.8
Hulah	24,709	80.8
Fort Gibson	359,777	98.5
Heyburn	5,814	88.1
Birch	17,636	91.9
Hudson	200,300	100.0
Spavinaw	30,000	100.0
Copan	36,845	84.9
NORTH CENTRAL		
Kaw	417,985	97.5
Keystone	470,271	76.3
NORTHWEST		
Canton	46,182	47.4
Optima	3,000	--- ¹
Fort Supply	11,298	81.3
Great Salt Plains	20,092	64.0
STATE TOTALS	10,289,900³	83.6³

1. In initial filling stage
2. Temporarily lowered for maintenance
3. Conservation storage for Lake Optima not included in state total

Data courtesy of U.S. Army Corps of Engineers, Bureau of Reclamation, Oklahoma City Water Resources Department, and City of Tulsa Water Superintendent's Office.

Secondary Water Recovery Under Scrutiny

Experimenters in secondary water recovery techniques in the Ogallala Aquifer have the potential to substantially increase the life of this giant aquifer which supplies water for people in an 8-state area.

The High Plains Underground Water Conservation District injected compressed air down shallow wells to force capillary water trapped between rocks of the inaccessible

water-bearing strata into areas where it could be recovered by pump intakes.

Total costs to recover the water amounted to about \$50 an acre-foot, but modification of techniques and equipment in the future could lower costs to affordable levels for irrigators.

Air injection has raised the water level about nine feet in the test areas, a level which has held through two irrigation seasons.

ICWP, Corps Sponsor Financing Seminar

State water administrators will get a new look at water project planning and financing at a 2-day seminar to be held in Dallas/Fort Worth November 29-30. The workshop is jointly sponsored by the U.S. Army Corps of Engineers and the Interstate Conference on Water Problems.

According to sponsors, speakers will include Wall Street financiers, bond and tax counsel, academicians and regional water resource planners. Hands-on work sessions will let participants examine creative financing plans; figure benefits, revenues and debt capacities for particular projects; and compare project costs from both financial and economic points of view. Oklahoma's program probably will be used as one of the case studies discussed on the second day of the workshop.

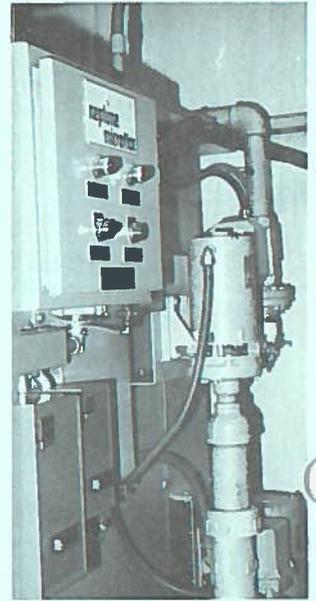
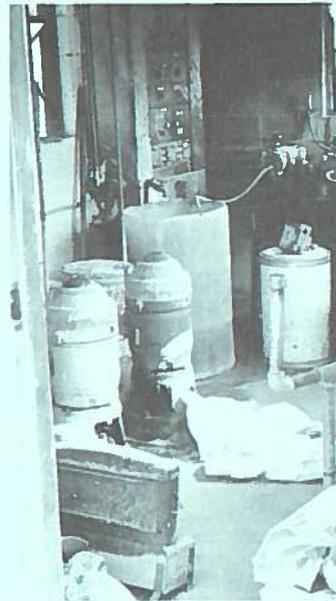
This Great Plains regional workshop is one of four regional programs geared to area needs and administrative structures. (Others are East Coast, Midwest and West Coast.) Registration costs \$45, and lodging at the AMFAC Hotel in Dallas/Fort Worth is \$59 per night. Hotel reservations and workshop registrations must be submitted by November 15. Agendas and registration forms are available by calling OWRB offices, (405) 271-2551.

Drillers' Licensing Now Offered at Lawton

Dave Dillon, Lawton branch manager, announced recently that the Lawton office of the Oklahoma Water Resources

Board now can administer tests for the licensing of water well drillers. All persons engaged in the commercial drilling or reconditioning of water wells, drilling test wells or plugging and sealing old wells are required to hold a valid license.

Dillon pointed out that the services offered in Lawton make it possible for water well drillers of southwestern Oklahoma to be licensed in Lawton instead of making a trip to Oklahoma City. In addition to a completed application and successful test, the Board requires licensees to have completed two years of supervised well drilling experience, provide a list of rigs used, pay an application fee and file a \$5,000 surety or cash bond. Dillon said prospective drillers may schedule the written exam, for which a \$25 fee is charged, by calling the Lawton Branch Office at (405) 248-7762.



Ceremonies late last month dedicated new water treatment facilities at the southeast Oklahoma town of Dustin. The automated 100-gpm system on the right which will serve the town of 500 was made possible by a \$100,000 grant from the OWRB financial assistance program.

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MARY E. WHITLOW, Editor

BARRY FOGERTY, Photographer, Writer

MIKE McGAUGH, Layout

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Oklahoma Water Resources Board
1000 N.E. Tenth, P.O. Box 53585
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