



# OKLAHOMA

## water news

MONTHLY NEWSLETTER OF THE OKLAHOMA  
WATER RESOURCES BOARD

Gerald E. Borelli, Chairman

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### Board, OCC Cooperate to Protect Rush Springs Sandstone's Water

An 18-month effort by the OWRB culminating in the issue of an order by the Oklahoma Corporation Commission will protect the fresh underground water of thousands of Oklahomans, most of whom never will be aware of their champions. A request by the Board to the OCC for a special field order concerning the Rush Springs Sandstone Ground Water Basin underlying parts of Dewey, Caddo, Custer, Washita, Blaine, Comanche, Grady and Stephens Counties will prevent the construction of waste disposal pits over an aquifer which is the sole source of fresh water for the area.

The OCC, which has jurisdiction over all oil and gas production activities in the state—including the disposal of oilfield wastes—made the order retroactive to May 20, 1983, the date of the oral order followed up in writing January 16, 1984. As well as denying permits for new construction of lined, earthen pits over the ground water basin, the OCC is ordering abandoned, leaking or improperly designed or operated pits drained and cleaned up as an additional safeguard.

Construction of an offsite waste disposal pit must be approved by the OCC, which first assesses the possibility of the pit's contents leaking and infiltrating the aquifer, based on geologic studies of the formations which separate the pit and the aquifer. Existing maps pinpoint the areas least likely to allow such downward migration.

Often the OWRB and the OCC cooperate in reviewing the applications received by the OCC to make sure the areas under consideration for permits do not overlie vulnerable aquifers.

However, the disposal sites and the operations which generate the wastes may lie some distance apart, in which case the companies must hire transportation to a suitable permitted site. Usually, the company that owns and operates the offsite disposal pit is not the same which hauls waste, nor do oil and gas producers generally involve themselves in building or operating offsite waste disposal pits. Oil companies count the costs of removing the wastes in their production costs and contract to have them hauled from the rig site.

The only other legal alternative is injection into a specially prepared, extremely deep, permitted disposal well separated

from the water-bearing strata above by solid, almost impermeable rock.

Unfortunately, the same black gold that brought the state wealth and well-being produces wastes that can tarnish the landscape and pollute the waters above and below the surface, if the wastes are not handled responsibly. Complaints concerning illegal dumps of deleterious by-products which may affect the state's waters grow in direct proportion to the increase in drilling activity.

Oil and gas drillers use a drilling fluid called "mud" to cool, lubricate and flush the rotary drill bit as it bores through layers of earth and rocks to the oil-bearing formation. Throughout the drilling process, this fluid is forced down the drill pipe and over the bit, washing away the cuttings between the outside of the pipe and the inside of the hole, then back to the surface. Before this circulation begins, additives are blended with the mud to "tailor" it to that particular operation; that is, to

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### Marble City, Two Rural Water Districts Receive Assistance

The rural water users of Marble City, Sequoyah County, Rural Water District #6 in Mayes County, and RWD #5 in LeFlore County were approved for Oklahoma Water Resources Board grants totaling \$239,808 last month. The announcement was made by James R. Barnett, executive director of the OWRB which administers the state financial assistance program.

Marble City, a community of 294 people, was granted \$100,000 to partially pay for construction of a new sewage treatment facility. The new sewage treatment plant was necessary after the Health Department traced recent outbreaks of hepatitis and intestinal parasites to unsanitary conditions produced when area septic tanks stopped functioning.

RWD #6 in Mayes County in northeast Oklahoma will use the \$100,000 granted last month to replace a corroded and partially obstructed four-inch water main with a six-inch PVC main that will more adequately serve the need of the 82 families in an area south of Wolf Creek.

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Board, OCC, continued from page 1

thicken, to thin, to control acidity or alkalinity or to build-in certain properties. The basic ingredient of the mud is bentonite, a chemically neutral volcanic ash which sets up as clay with the addition of water. It is certain additives which prove caustic, and the mud may acquire still other deleterious substances as it circulates and recirculates the hole from top to bottom. By the time of its final circulation, it is likely that the mud has acquired varying amounts of sodium, arsenic, barium, chlorides, crude oil, chromium and lead.

Once the drilling is completed and production begins, approximately 25,000 to 40,000 gallons of used mud is discarded in a plastic lined reserve pit at the rig site until it can be trucked to a permitted site prepared to receive it. In areas where ground water is considered extremely vulnerable, a municipality, rural water or master conservancy district or an entity with local jurisdiction can require the mud to be mixed, maintained and retained in four 8 x 8 x 28-foot above-ground tanks called "working pits." Upon completion, the contents are siphoned into tank trucks for removal to a permanent waste disposal site. Use of such closed tank systems to handle drilling fluids and other by-products of the oil patch is becoming more common as concern increases for ground water quality. Containment also eliminates the practice of spraying and/or spreading the contents of the earthen reserve pit over the land surrounding the rig, once production begins and need for the materials is past. Although this practice is somewhat controversial, farmers often agree to the dispersal of nitrogen-rich contents over their croplands.

It is construction of the huge terminal pits by commercial waste disposal companies which is specifically forbidden in areas overlying the Rush Springs Sandstone by the Oklahoma Corporation Commission special field order.

John Roles, senior ground water geologist of the OWRB's Ground Water Division, said the special field rule is the result of a year-and-a-half of intensive effort by the Board, and is only the second such exemption so far allowed. The first special field order that forbade construction of offsite waste disposal pits was issued on February 16, 1972, on lands overlying certain portions of the Garber-Wellington Ground Water basin in central Oklahoma.

Since ground water supplies more than 60 percent of the total water used in Oklahoma, Roles said he hopes residents of areas relying on ground water as the sole source will be diligent in reporting illegal dumps and activities which could pollute these vital water sources.

"With the help of Oklahomans, the OCC and the Board perhaps will be able to expand the safety net drawn over these two vulnerable aquifers," Roles concluded.



This 5-acre waste disposal pit is typical of many which dot the Oklahoma landscape, increasing in numbers as oil and gas drilling activity increases. Ruptures in the plastic or bentonite lining could allow the leakage of deleterious wastes into a vulnerable aquifer.

Mode of Storage	Locations	Water Volume (km <sup>3</sup> × 10 <sup>6</sup> )	Percentage Total Water	Residence Time
<b>Surface</b>				
	Fresh water lakes	0.13	0.006	10 years
	Saline lakes, inland seas	1.0	0.008	10 years
	Average in stream channels	0.01	0.0001	2 weeks
<b>Subsurface</b>				
	Vadose water (includes soil moisture)	0.07	0.0005	2 weeks - 1 year
	Ground water within depth of half a mile	4.2	0.31	Up to 10,000 years
	Ground water at great depths	4.2	0.31	Up to 10,000 years
<b>Other</b>				
	Atmosphere (at sea level)	0.1	0.001	10 days
	Oceans	1370.0	97.2	4000 years
	Icecaps, glaciers	29.0	2.15	10-1000 years
<b>Totals</b>		<b>1408.62</b>	<b>100</b>	

Perhaps most significant in the figure at right is the time in residence of ground water which indicates how long contamination of ground water might last. Note the contrast with contamination of surface water, which, unless it settles to the bottom as insoluble material, will clear the stream in a matter of weeks. (In figuring volume, 1 km<sup>3</sup> × 10<sup>6</sup> = 240,000 cubic miles.)

DISTRIBUTION OF THE WORLD'S ESTIMATED WATER SUPPLY

Marble City, continued from page 1

RWD #5, LeFlore County was approved for a grant of \$39,808 to be used to upgrade the water distribution system which serves the community of Howe. The grant money will raise and refurbish an abandoned water storage tank.

The three grants were made from interest accrued on the \$25 million water development fund.

Board Executive Director Barnett said that to qualify for grant assistance, the applicant must demonstrate that an emergency exists.

"Emergency is defined in the regulations governing the program as a situation where the life, health or property of the persons served by the entity is endangered," Barnett explained.

Four other communities—Prue, in Osage County; Bernice, in Delaware County; Piedmont, in Canadian County; and Krebs, in Pittsburg County—were denied grants on the basis of their needs not constituting an emergency, as required by program guidelines.



Sen. Gilmer Capps, center, and Jerry Frick of the National Water Well Association (seated behind Capps) addressed members and guests of the Oklahoma Water Well Association at the banquet held February 16, during the annual meeting of the OWWA February 15-17 in Elk City. Seated left to right: Mrs. Roy Burson, Roy Burson, OWWA president; Rep. Willie Rogers and Ken Masters, OWWA secretary.

The banquet also was the occasion for an award presented by OWWA to Duane Smith, Chief of the Board's Ground Water Division, recognizing Smith's professional contributions to the well drillers' organization.

Earlier in the day, OWRB Executive Director James R. Barnett had commended the organization's support of the Board's regulatory and licensing activities and invited continued dialogue between the drillers and the Board.

### High Plains Study Report is Ready

The report analyzes the potential impacts of depleting water and energy supplies on the 6,300 square miles of northwestern Oklahoma underlain by the Ogallala Ground Water Aquifer. State-level studies projecting water availability to the year 2020 were completed by the Board's Planning and

### ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF FEBRUARY 22, 1984

PLANNING REGION LAKE/RESERVOIR	CONSERVATION STORAGE (AF)	PERCENT OF CAPACITY
<b>SOUTHEAST</b>		
Atoka	80,800	65.1
Broken Bow	829,502	90.3
Pine Creek	77,700	100.0
Hugo	157,600	100.0
<b>CENTRAL</b>		
Thunderbird	105,925	100.0
Hefner	66,500	88.2
Overholser	9,700	61.0
Draper	78,900	78.9
<b>SOUTH CENTRAL</b>		
Arbuckle	59,681	95.4
Texoma	2,588,380	98.1
Waurika	203,100	100.0
<b>SOUTHWEST</b>		
Altus	59,814	45.0
Fort Cobb	78,423	100.0
Foss	151,114	62.0 <sup>2</sup>
Tom Steed	85,675	96.3
<b>EAST CENTRAL</b>		
Eufaula	2,190,149	94.0
Tenkiller	560,598	89.3
Wister	27,100	100.0
Sardis	297,190	98.2
<b>NORTHEAST</b>		
Eucha	54,300	68.2
Grand	1,372,199	92.0
Oologah	544,240	100.0
Hulah	30,387	99.3
Fort Gibson	365,200	100.0
Heyburn	6,600	100.0
Birch	18,861	98.2
Hudson	200,300	100.0
Spavinaw	29,200	97.3
Copan	41,990	96.8
<b>NORTH CENTRAL</b>		
Kaw	428,600	100.0
Keystone	599,781	97.4
<b>NORTHWEST</b>		
Canton	97,500	100.0
Optima	99	---
Fort Supply	13,900	100.0
Great Salt Plains	31,400	100.0
<b>STATE TOTALS</b>	<b>11,542,309<sup>3</sup></b>	<b>93.8<sup>1</sup></b>

1. In initial filling state
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.

Development Division. Agricultural impacts research was subcontracted by the OWRB to OSU, and energy production investigations assigned to OU.

"State-Level Research Results for the Six-State High Plains Ogallala Aquifer Area Study" is available without charge by writing the Board at P.O. Box 53585, Oklahoma City, 73152, or by calling (405) 271-2555.

## Come to Water Awareness Day March 20

The Third Annual Water Awareness Day sponsored by the Oklahoma Water Resources Board will attract 15 or more exhibitors to the Fourth Floor Rotunda of the State Capitol March 20. Legislators, students and the public are invited to visit the exhibits on water conservation between 10:30 a.m. and 3 p.m. and to be present for Gov. George Nigh's address at 10:45 a.m.

Organizations and state agencies preparing exhibits include the OSU Water Research Institute, OSU Extension Service, Mid-West Irrigation and Foundation, Smith's Farm and Garden Center, Oklahoma Rural Water Association, U.S. Army Corps of Engineers, Bureau of Reclamation, Oklahoma Water Well Association, Department of Tourism and Recreation; Oklahoma Conservation Commission, Department of Wildlife Conservation, Oklahoma Wildlife Federation, Moore High School Projects Research, Oklahoma State Department of Health and the Oklahoma Water Resources Board.

## OWRB, FEMA Sponsor Dam Workshop

The Engineering Division of the Board and the Federal Emergency Management Agency will sponsor a workshop entitled "Risk-Based Approach to Dam Safety Assessment" April 24-25 at Rose State College's Tom Steed Center in Oklahoma City.

The lectures and problem-solving sessions will be conducted by Stanford University personnel who will introduce engineers and dam safety managers to risk-based methods of dam safety assessment. Since enrollment is limited, advance registration is required. The \$50 fee includes printed materials, continental breakfasts, breaks and lunches on both meeting days. For more information, call Cecil Bearden at (405) 271-2535 or write to P.O. Box 53585, Oklahoma City, 73152.

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## OKLAHOMA WATER NEWS

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## Looking for Oil? Call Us First

The Oklahoma Ground Water Law calls it "Temporary Provisional" and the Stream Water Law calls it "Provisional Temporary," but whether "temporary" comes first or last, it would appear that those permits for short-term water use rate among the best-kept secrets in Oklahoma. The vast disparity between the number of oil and gas drilling rigs in the state and the number of permits issued suggests that many oilmen remain unaware of the two state laws—one requiring a permit for ground water use, the other mandating a permit for stream water use.

If the oil or gas driller intends to use water from a well he drills at the rig site, he must first obtain a "Temporary Provisional" permit from the OWRB Ground Water Division which will allow him water use up to 60 days. Other options include contracting with the landowner for water use from his permitted well, hauling water or using water from a stream water source.

If the operator intends to use water from a stream, lake or pond, he must obtain a "Provisional Temporary" permit from the Stream Water Division for water use up to 90 days—unless he is using or buying water from an individual or a municipality that holds a valid permit. (Often cities and towns will allow tank trucks to fill and refill at city taps for a fee.)

In either case, the permit is non-renewable, the application form brief, and the procedure simple.

For information on "temporary provisional" or vice versa permits, or to obtain applications for 90-day stream water use or 60-day ground water use, call the OWRB Offices in Oklahoma City (405) 271-2555, Tulsa (918) 581-2925 or Lawton (405) 248-7762.

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