



OKLAHOMA

water news

MONTHLY NEWSLETTER OF THE OKLAHOMA
WATER RESOURCES BOARD

Gerald E. Borelli, Chairman

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Salt and Water Equal Energy in Solar Pond Power Plants

New technology using old stand-bys of salt and water to form power-producing solar ponds is the latest development in solar energy, and the ponds are becoming the object of increasing fascination among Oklahoma energy and water planners.

Interest in solar pond power plants runs high among federal, state and local planners in the Upper Red River Basin area, as the Tulsa District Corps of Engineers conducts studies to determine the feasibility of constructing a plant in conjunction with a brine collection project near Truscott, Texas.

Water quality in the Red River Basin is degraded by more than five thousand tons of salt swept daily into tributaries in Texas and Oklahoma, severely limiting irrigation and crop yield, damaging municipal pipes and equipment, and threatening to make the water unfit for drinking.

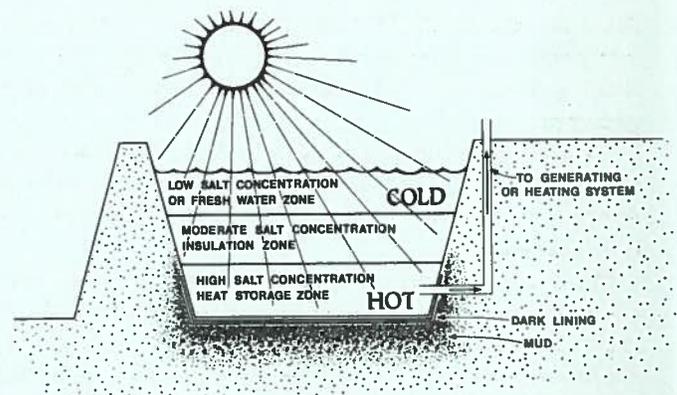
The Corps will deal with the problem by diverting salty tributaries and pumping brine to a natural storage basin. Their design, obtained from the Solar Energy Research Institute, proposes a 135-acre solar pond that would generate 100 percent of the required pumping power for both the chloride control and solar pond projects.

The solar pond concept is ecologically sound enough to draw endorsement from the Oklahoma Wildlife Federation, but it's the energy aspects of the idea that are gaining the most attention.

Utilities in the Red River Basin are expressing strong interest in exploring avenues for commercial development of the ponds.

As part of the Department of Energy study, the Benham Group of Oklahoma City is conducting a 30-city survey to determine how much land is available for small-scale ponds for use in generating electricity or heat for homes and businesses.

Although solar pond technology has been studied for 20 years, interest is just now heating up because the concept only recently became feasible for large-scale energy production.



The necessary components of a solar pond: A heat-absorbing bottom, a lower layer to store heat, an insulating middle layer and a top layer that further prevents loss of heat.

Board Planners Assist SODA in Water Supply Strategies

Recommendations in the Oklahoma Comprehensive Water Plan are progressing from the drafting table to reality in a 10-county area of southern Oklahoma, as dedicated local and state planners cooperate in the design of a regional water delivery system to meet the area's future water needs.

Led by the Southern Oklahoma Development Association (SODA), the Oklahoma Water Resources Board, the Corps of Engineers and the Bureau of Reclamation, southern Oklahomans seek to apply the Water Plan tenet which calls for regional water development.

"Such regional plans to develop local water sources are precisely what we hope for before we consider major interbasin transfer," said Rick Smith, OWRB Chief of Planning and Development.

It's a first-time-ever effort that can serve as a prototype for the OWRB and other sub-state planning districts throughout the state.

"From this regional plan we'll learn how to put together a legal and institutional mechanism that will work in solving water problems elsewhere in the state,"

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The ponds require at least a half-acre to be functional, and operate by collecting energy from the sun's rays and storing it for the generation of heat or electricity.

The salt gradient solar ponds are composed of three parts, with the bottom covered by a dark lining of mud to absorb heat.

In the design under consideration by the Corps the top, fresh-water zone is approximately 12 inches deep. In the three-to-five-foot-deep middle layer, salinity and temperature increase with depth. This is the insulating zone; it reduces convection to prevent heat loss. In the bottom storage zone, salinity and temperature reach their peak.

The higher the salt content at the bottom, the warmer the water gets, making it hot enough to generate power. Brine as hot as 212°F from the bottom of the pond is pumped to an evaporator, where the energy held in the heat is used to drive a turbine linked with an electric generator.

By using salt to control the density of the water to cut thermal losses, the lower layer of the pond can supply energy at a nearly constant rate — day and night, summer and winter.

It's a concept already come of age in Israel, which operates the world's largest solar pond plant, and has more on the drawing board. Currently under development is a 250-acre pond at the Dead Sea which officials expect to produce 25,000,000 kilowatt hours of electricity a year, enough to supply 2,000 average Oklahoma residents all of their power needs for a year.

Although there are no solar pond power plants operating in the U.S., interest indicates it won't be long. With an abundance of brine and sunny days, interest in new energy sources and demands for cheaper power, production of heat and electricity from solar ponds seems to hold bright promise for Oklahoma. As well as producing a marketable commodity, the technology could offer the potential benefits of desalinated water supplies for agriculture and lower maintenance costs for municipal water systems.



Board Planners, continued from page 1

Smith said. "Rising construction and capital costs make it increasingly harder for any one town to fund projects on its own, but by banding together into regional entities communities can pool their resources to deal with these problems."

The current project began when SODA contacted the OWRB in early 1980 for help in developing a water delivery system to meet the long-range needs in the area.

Aware of probable industrial growth and the projected completion date of the McGee Creek Reservoir in 1985, SODA officials needed a plan that would make the most of their 10 counties' water resources.

Member counties in SODA are Garvin, Pontotoc, Coal, Carter, Atoka, Bryan, Johnston, Love, Marshall and Mur-

ray. Several adjacent counties have been added to the study to more closely correspond to the planning regions designated in the Water Plan.

Since that first call for assistance, planning participants have set up an administrative structure in which the OWRB is lead agency in plan formulation, coordinating research efforts and presenting alternatives to a local steering committee. OWRB personnel also serve on study teams which help to collect basic research data for the project.

As part of that effort, Smith, planning intern Art Cotton, draftsman Mike McCaugh and engineer Walid Maher toured the 10 SODA counties in mid-July inventorying present water use, supplies, distribution systems and specific water problems.

"We interviewed local officials in about 60 cities, towns and rural water districts," Smith said. "We found that 80 percent of the cities did not maintain emergency, stand-by stores of water for use in difficult times.

"During the survey, we also took the opportunity to inform local leaders about our financial assistance programs."

Within restrictions set by the legislature, the OWRB is empowered to sell bonds to provide loans of up to \$1.5 million per project to assist communities in water and sewer improvements, according to Smith.

With the legislature's adoption and approval of the Water Plan last session accompanied by current efforts towards its partial fulfillment, Smith views the coming period in water development as a time for further grassroots involvement.

"SODA started us off," Smith said, "and the key is still local initiative. It's the localities that must provide the interest and impetus to start regional planning."



Osages and Corps Agree on Skiatook Site

Corps of Engineers and Osage Indian Tribal Council negotiators settled on a price of \$7.4 million for the mineral rights underlying Osage lands at northeastern Oklahoma's Skiatook Lake site. Completion of the dam and reservoir had been delayed for months by the Osages' asking price of one billion dollars and the Corps' offers which ranged from \$4.3 million to \$13.2 million.

Col. James Harmon, Tulsa District Engineer, said the agreement will permit the dam to be used for flood control in 1983 and for water supply and water quality control soon after that.

The tribe had also asked that the Corps drop the new Candy Creek reservoir project, but aides to Sen. David Boren said the senator would not agree to withdraw legislation authorizing construction of that reservoir.

Seventh in a Series of Nine

A Lifetime in Western Oklahoma Breeds Appreciation for Water

Water was scarce for Ralph G. McPherson as a small boy in the 1930's. Living on a water-barren parcel of land given to his family by the federal government for homesteading, they were forced to "haul in every drop" of the treasured, sustaining commodity.

Water was no less on McPherson's mind 17 years ago when he took up residence in Altus. He watched with concern as a rapidly growing population in the mid-1960's increased demands upon available water supplies, forcing the city to struggle as far as U.S. District Court to secure adequate amounts.

The courtroom battle only served to emphasize what McPherson was already cognizant of.

"Living in western Oklahoma, one is always aware of water problems," he says.

When Gov. David Boren's office called to offer him a membership on the Oklahoma Water Resources Board, McPherson was ready. His mindful regard for the water shortages and declining ground water supplies in western Oklahoma prompted him to accept the position in September, 1976.

McPherson is now charged with the responsibility of helping to govern all of the state's water resources. His notions of how to deal with the state's water problems are as clear as a dry, summer sky in Oklahoma.

"We must develop specific plans to alleviate water distribution and/or shortage problems in all areas of the state," he says. "Each community must be studied, and plans made to provide the necessary money for water development."

McPherson sees no options except the Oklahoma Comprehensive Water Plan as the means to develop Oklahoma's water resources. He proposes the state

STAFF PHOTO BY GARY GLOVER



Ralph G. McPherson

ACTIVE CONSERVATION STORAGE IN SELECTED OKLAHOMA LAKES AND RESERVOIRS AS OF AUGUST 18, 1981

| PLANNING REGION LAKE/RESERVOIR | CONSERVATION STORAGE (AF) | PERCENT OF CAPACITY |
|-----------------------------------|------------------------------|-------------------------|
| SOUTHEAST | | |
| Atoka | 77,100 | 62.4 |
| Broken Bow | 851,410 | 92.7 |
| Pine Creek | 62,190 | 80.0 |
| Hugo | 150,480 | 95.5 |
| CENTRAL | | |
| Thunderbird | 82,770 | 78.1 |
| Hefner | 72,900 | 96.7 |
| Overholser | 15,169 | 100.0 |
| Draper | 78,400 | 78.4 |
| SOUTH CENTRAL | | |
| Arbuckle | 59,890 | 95.7 |
| Texoma | 2,413,600 | 91.5 |
| Waurika | 131,590 | 64.8 ¹ |
| SOUTHWEST | | |
| Altus | 13,299 | 10.0 |
| Fort Cobb | 61,574 | 78.5 |
| Foss | 134,520 | 55.2 ² |
| Tom Steed | 64,580 | 72.6 |
| EAST CENTRAL | | |
| Eufaula | 2,073,240 | 89.0 |
| Tenkiller | 620,430 | 98.9 |
| Wister | 27,100 | 100.0 |
| NORTHEAST | | |
| Eucha | 53,000 | 66.6 |
| Grand | 1,370,880 | 91.9 |
| Oologah | 544,240 | 100.0 |
| Hulah | 17,750 | 57.4 |
| Fort Gibson | 359,590 | 98.5 |
| Heyburn | 6,560 | 99.5 |
| Birch | 18,850 | 98.2 |
| Hudson | 200,300 | 100.0 |
| Spavinaw | 25,000 | 83.3 |
| NORTH CENTRAL | | |
| Kaw | 397,950 | 92.9 |
| Keystone | 616,000 | 100.0 |
| NORTHWEST | | |
| Canton | 49,150 | 40.6 |
| Optima | 4,340 | — ¹ |
| Fort Supply | 12,579 | 90.5 |
| Great Salt Plains | 31,400 | 100.0 |
| STATE TOTALS | 10,691,491 | 89.2³ |

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

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

begin by spending surplus funds to alleviate water shortages.

"We can't do it in one year, of course. But we can progressively improve by spending to alleviate more pressing needs," he says.

McPherson sees a need for more legislative action appropriating funds to meet water requirements.

Action is a strategy McPherson has always taken seriously. He spent 12 years as an Army helicopter pilot, followed by a year-long stint as an experimental test

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pilot for Cessna. His first profession of flying demanded exactness and precision, a way of looking at reality he retains as an OWRB member.

Currently it's his car dealership in Altus that keeps him busy, where the experience handling administrative details has provided him the background to represent industrial interests on the Board.

McPherson's colleagues on the Board recognize him as a man with few words to spare, speaking only after quiet deliberation. When he speaks, his words are strong and worth the listening, ringing true in the measured peal of a finely tempered bell. His stands are decisive and tenaciously defended. Shadows seldom dilute the strength of his black-and-white thinking.

On any issue, at any time, Ralph McPherson is committed to the betterment of Oklahoma's water resources, and he pledges to continue to assist the OWRB in working for statewide water development.

AUGUST CROP AND WEATHER SUMMARY

Cool weather and scattered rains across much of the state mid-month improved the condition of most row crops and pastures and produced topsoil moisture supplies adequate to surplus.

By mid-August 95 percent of fall wheat ground had been worked. All row crops, alfalfa hay, peaches and the pecan crop continued in good condition. Pastures and ranges throughout the state are providing adequate to surplus forage and livestock is in good condition.

Temperature departure from normal ranged from one degree below in the east central and southeast to seven degrees below in the Panhandle. Rainfall ranged from .56 inch in the east central to 1.51 inches in the west central by mid-month.

Oklahoma Crop and Livestock Reporting Service

OML-MESO Meeting Sept. 16-18

Municipal officials of Oklahoma's cities and towns will meet at the Hilton Inn West in Oklahoma City mid-month for the Oklahoma Municipal League and Municipal Electrical Systems of Oklahoma annual convention.

Highlights will include a luncheon address by Gov. George Nigh on September 17. Gerald E. Borelli, OWRB chairman, will be a panelist in a discussion of water concerns and legislation to solve water problems.

Tulsa to Host 1983 NWRA Convention

Pat O'Meara, executive director of the National Water Resources Association, recently announced that NWRA will accept Gov. Nigh's invitation to Tulsa for the association's annual meeting in 1983. The NWRA last visited in the state in 1968, when Oklahoma City hosted the national meeting.

R.G. Johnson, OWRB board member from Clinton who also serves on Board of Directors of the NWRA, said the week-long meeting is expected to draw more than 1,200 conventioners to Tulsa.

Keep America Beautiful Awards to Corps

The Keep America Beautiful Organization recently recognized the lake and recreation area cleanup efforts organized by the Corps by presenting two KAB awards to the Tulsa District Corps of Engineers.

More than 1,300 volunteers swept over shorelines and recreation areas at Oologah Lake and the seven Corral lakes in the Northern Oklahoma Area, picking up trash and aluminum cans in an effort coordinated by the Corps. More than 17,000 pounds of trash were removed from the Oologah area and over 1,000 pounds of aluminum cans were recycled.

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