



ARIZONA WATER RESOURCES NEWS BULLETIN

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WATER REQUIREMENTS OF COAL CONVERSION PROCESSES

The water requirements of coal conversion processes are a matter of increasing concern to geologists and water managers as the coal industry prepares to exploit coal reserves to meet national energy needs. A Geological Society of America symposium on the "Geologic Aspects of Coal Conversion" featured several papers estimating the amounts of water needed for processing.

Water for coal conversion at two gasification plants and three power plants in New Mexico will come from the San Juan or Little Colorado Rivers and from local sandstone aquifers. All of this water is presently in demand for conventional agricultural, domestic and industrial uses. A coal gasification plant producing 500 million cubic feet per day of high-BTU gas would require 25,000 gallons per minute of process water. Water consumption figures for a commercial plant processing 24 million tons of coal per year, to produce either synthetic natural gas or electricity to meet the energy needs of a million people, would be 35 acre-feet of water an hour for production of synthetic natural gas, or 133.4 acre-feet per hour for a conventional coal combustion plant. Generally, 90% of the process water is recycled daily.

RESOURCE MAPS AVAILABLE FROM U.S. GEOLOGICAL SURVEY

Several new Resource and Land Information (RALI) maps have been released recently by the U.S. Geological Survey. These maps are an experimental product resulting from a new program undertaken in the Tucson-Phoenix area. The maps are intended to provide accurate and objective resource and general land information in more useful ways for the planner and decision maker who must solve complex problems related to expanding populations, economic growth, resource depletion, and need for environmental protection. Scale of the maps is 1:250,000. The following maps may be purchased from the Distribution Section, U.S. Geological Survey, Denver Federal Center, Denver, Colorado 80225, at 75 cents per copy:

- Map I-843-A *Index and Description of Flood-Prone Area Maps in the Tucson-Phoenix Area, Arizona*
- Map I-844-A *Map of Land Status in the Tucson Area, Arizona -- 1973*
- Map I-844-B *Map of Irrigated Land in the Tucson Area, Arizona*
- Map I-844-C *Map Showing Distribution and Estimated Thickness of Alluvial Deposits in the Tucson Area, Arizona*
- Map I-844-D *Map Showing Depth to Water in Wells in the Tucson Area, Arizona 1972*
- Map I-844-E *Ground-Water Recharge in the Tucson Area, Arizona*
- Map I-844-F *Map Showing Distribution of Recoverable Ground Water in the Tucson Area, Arizona*
- Map I-844-G *Map Showing Potential for Copper Deposits in the Eastern Three Quarters of the Nogales 2° Quadrangle, Tucson Area, Arizona*
- Map I-845-A *Map of Land Status in the Phoenix Area, Arizona 1973*
- Map I-845-B *Map of Irrigated Land in the Phoenix Area, Arizona*
- Map I-845-C *Map Showing Distribution and Estimated Thickness of Alluvial Deposits in the Phoenix Area, Arizona*

WATER RESOURCES OF THE BIG SANDY AREA, MOHAVE COUNTY, ARIZONA, APPRAISED

The water resources of the Big Sandy area in northwestern Arizona are appraised in a report prepared by the U.S. Geological Survey in cooperation with the Arizona Water Commission and released January 21, 1974. The Big Sandy area is a broad semiarid valley drained by ephemeral streams but underlain by several hundred to a few thousand feet of water-bearing sedimentary deposits. The depth to ground water ranges from less than 1 foot to 750 feet below the land surface. The ground water generally is of good chemical quality; however, the fluoride content generally is more than 1.2 milligrams per liter (mg/l) which is greater than the



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acceptable limit for drinking water. Wells drilled in the most permeable part of the sedimentary deposits yield as much as 1,000 gallons per minute, but some exploratory wells yield too little water even for livestock supplies.

The average surface-water outflow is about 24,900 acre-feet per year and the ground-water outflow about 21,500 acre-feet per year. Most of the ground-water outflow is transpired by riparian vegetation that grows along the Big Sandy River, and only a few thousand acre-feet is used for irrigation, livestock, and public supplies.

The report, "Water Resources Appraisal of the Big Sandy Area, Mohave County, Arizona," was prepared by E.S. Davidson. Copies are available for distribution at the Arizona Water Commission, 222 N. Central Avenue, Suite 800, Phoenix, and may be inspected at U.S. Geological Survey offices at: 2555 E. First Street, Tucson; 5017 Federal Building, 230 N. First Avenue, Phoenix; 2304½ Building A, Fourth Street, Flagstaff; 224 Third Avenue, Yuma; and 5312 National Center, 12201 Sunrise Valley Drive, Reston, Virginia.

ARIZONA ENVIRONMENTAL PLANNING COMMISSION ACTIONS

The Environmental Planning Commission was recently established with statutory authority to advise the Governor on all matters assigned to the Office of Environmental Planning, including land-use planning. In fulfilling these commitments, the commission is now conducting public hearings throughout the State of Arizona. Your participation in these hearings will be mutually beneficial to you, your agency, community, and the state. These hearings are intended to produce a more accurate reflection of the range of citizen attitudes and recommendations than might be received through regional groups which are inclined to present consensus views as seen by the particular representative.

For more information concerning dates and times of hearings to be conducted in your area, contact the Environmental Planning Commission, 1740 West Adams Street, Phoenix, Arizona 85007 or phone 271-4380.

FLOOD CONTROL FOR FOOTE WASH NEAR SAFFORD, ARIZONA, UNDER WAY

The Foote Wash area, East of Safford in Graham County, has been a problem area to Graham County and the land owners immediately below the mouth of Foote Wash in the past years. The Graham County Board of Supervisors and the Gila Valley Natural Resource Conservation District (NRCD) became involved in working on flood control for the area following an August 5, 1971 flood. This flood breached two irrigation canals, flooded 400 acres, stopped Southern Pacific Railroad traffic, inundated U.S. Highway 70 for a quarter of a mile, took out a half mile of county road, and did extensive damage to several homes in the area. Two floods following the August 5th flood in later 1971 and two floods in the fall of 1972 insured the need for flood control in the minds of the Board of Supervisors and the Gila Valley NRCD.

As was stated, Graham County and the NRCD started work on the project for the area in late 1971 and early 1972. They requested assistance through the Coronado Resource Conservation and Development (RC&D) Project of Southeast Arizona. The RC&D was authorized by the Secretary of Agriculture to spend USDA funds under the Flood and Agricultural Act of 1962. The Coronado RC&D made Foote Wash top priority and directed the Soil Conservation Service to develop the necessary plans to obligate USDA funds for the project. The SCS has developed a preliminary draft for the project calling for two flood retarding structures (one on Foote Wash and one on No Name Wash) with common pipeline to drain the structures to the San Simon River.

Estimated cost for the project is \$962,000, with USDA funds through the RC&D covering over 95% of the costs. Graham County will obtain the necessary land rights and easements as local contribution to the project. The project is expected to prevent flood damage by over \$60,000 annually, improve the wildlife habitat behind the structures, and enable the land owners to apply conservation treatment to their lands that they were previously unable to apply.

Additional information is available from Mr. Joseph H. Everett, District Conservationist, U.S. Soil Conservation Service, Safford, Arizona.

PUBLICATIONS RELEVANT TO ARIZONA AVAILABLE

1. **The Environmental Protection Agency (EPA) has published a series of reports on various nonpoint sources of water pollution.** The reports provide information on alternative methods of identifying, evaluating and controlling sources of pollution. Titles of the reports are: "Methods of Identifying and Evaluating the Nature and Extent of Nonpoint Sources of Pollutants"; "Methods and Practices for Controlling Water Pollution from Agricultural Nonpoint Sources"; "Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity"; "Ground Water Pollution from Subsurface Excavations"; "Identification and Control of Pollution from Salt Water Intrusion"; and "The Control of Pollution Caused by Hydrographic Modifications." Information about the availability and costs of the publications is available from the U.S. Environmental Protection Agency, Waterside Mall (Room 329), Washington, D.C. 20460.

2. **A narrative history of the development of water supplies** in the Southwestern United States covers 60 sites of historical and technological significance in Arizona, Colorado, New Mexico, Texas and Utah. Copies of "Water for the Southwest" cost \$5 each from American Society of Civil Engineers, 345 E. 47th Street, New York, N.Y. 10017.

3. **"Recommended Methods for Water-Data Acquisition"** is a report documenting results of the Federal Interagency Work Group efforts during 1970-72 to designate recommended methods for acquisition of water data. Methods specified were identified as the most acceptable of those currently in use.

The methods designated represent the findings of six task groups established by the Federal Interagency Work Group on Designation of Standards for Water Data Acquisition. This

Work Group was established under the auspices of the Geological Survey's Office of Water Data Coordination. Members of the Work Group and task groups were agency representatives designated by the Federal Advisory Committee on Water Data as well as a representative of the National Bureau of Standards.

The task groups consisted of more than 60 technical experts in the field of water data from six Departments and two Independent Agencies of the Federal Government. Task groups covered the following areas of concern:

- (1) Surface-water stage and quantity
- (2) Chemical (inorganic) and physical quality
- (3) Biologic, bacteriologic, and chemical (organic) quality
- (4) Sediment
- (5) Ground water
- (6) Automatic water-quality monitors

The findings of the task groups are presented as separate chapters in the report. Of necessity, the degree of specificity of methodology varies from chapter to chapter. Methodologies will be updated with the development of new or improved methods.

The Advisory Committee on Water Data for Public Use endorsed the Federal commitment to this project and recommended that the non-Federal community be kept advised of progress. Involvement of the non-Federal community will increase when optimum coordination has been achieved among the Federal agencies.

Comments and suggestions are welcome. They should be addressed to: Chief, Office of Water Data Coordination, U.S. Geological Survey, Washington, D.C. 20244. A limited supply of copies of this report are available upon request to the same address.

TRANSFER OF PHREATOPHYTE LIBRARY

As of November 30, 1973, the Phreatophyte Library, previously located at the USDA Forest Service Forest Hydrology Laboratory in Tempe, Arizona, was transferred to the Department of Watershed Management, University of Arizona. The documents, whose scope pertains to the use and management of riparian and phreatophyte vegetation with emphasis on the Southwest, will be kept intact and separate from the other Watershed Department papers. New materials will be added to the collection as they become available. The library will be under the supervision of Ms. Linda White, Departmental Librarian.

The original Phreatophyte Library was developed at the request of the Vegetation Management Technical Subcommittee of the Pacific Southwest Inter-agency Committee, and was supervised by Mr. Jerome S. Horton. All of the documents referenced in Mr. Horton's bibliography, *Evapotranspiration and Water Research as Related to Riparian and Phreatophyte Management*, USDA Misc. Publ. No. 1234, 1973, are in the Phreatophyte Library.

Documents in the Phreatophyte Library will be added to the automated bibliographic information system, being developed by the Watershed Management Department and funded in part by the Office of Water Resources Research. This will expand the utility of the Phreatophyte Library, as

references to the documents appear in the subject search printouts of the bibliographic bank. A system for access to the documents themselves is being developed.

Any suggestions on reports or publications that would be pertinent to the Library would be much appreciated. Send suggestions or questions regarding the Phreatophyte Library to Ms. Linda White, Watershed Management Department, College of Agriculture, University of Arizona, Tucson 85721.

WELL DRILLING INCREASES

In spite of declining water levels in many areas, the filing of drilling notices for groundwater development evidently is increasing at a rapid pace. According to information compiled by Mr. Joe Melling, Director of the Water Rights Division at the State Land Department, 802 Notices of Intent to drill were filed in the last six months of 1973, compared to 822 Notices for the entire fiscal year 1972. In terms of annual acre-feet of production applied for, the Notices represented 145,056 acre-feet for fiscal year 1972 and 156,347 acre-feet for the recent 6-month period, signifying that the rate of new production applications has more than doubled during that time. Of the 156,347 acre-feet applied for, about 110,000 or 70% was for irrigation water, and 30% was for municipal or other uses.

GEOHERMAL LAND BIDS STIR INTEREST

Several large oil companies have expressed interest in bidding on the first section of state land designated as a likely source of geothermal land when it goes on the auction block in about a month.

A.K. Doss, director of the State Land Department's Minerals Division, said a study has been completed and is now being refined to determine which section of 421,140 acres of state land in seven counties designated for geothermal exploration will be the first to be leased.

The greatest interest in bidding for the leases has come from several major oil companies and large independent oil operators, Doss said. "The rental rate on noncompetitive acreage is \$1.50 per acre annually," Doss said. "But on competition bids, the sky's the limit."

In addition to lease fees, the state would receive a 12.5% royalty on the value of geothermal energy tapped on state land. The energy, in the form of steam created by underground water coming in contact with molten rock, would turn turbines to create electricity.

A recently completed study, funded partially by NASA, places the greatest area of designated geothermal activity on state land — 130,560 acres — in Yuma County. Also identified in the study were 89,260 acres in Cochise County, 48,120 in Greenlee, 73,360 in Graham, 41,680 in Maricopa, 23,460 in Pinal and 14,700 in Pima County.

"The study also carries over to possible geothermal sites on federal and private land," Doss noted.

The work remaining to be done involves clearing the process for auctioning; the leases will be auctioned through sealed bids.

The study was conducted by the Department of Geosciences and the Office of Arid Lands Studies, both at the University of Arizona. The work consisted of aeromagnetic surveys, gravity meter surveys, a Quaternary lineation map derived from data obtained by the ERTS imagery satellite from an altitude of 500 miles, plus the plotting of several thousand thermal gradients, Doss said.

UPCOMING EVENTS

The annual meeting of the AWRA (American Water Resources Association -- Arizona Section) will be held at Northern Arizona University in Flagstaff, April 19-20, 1974. The following topics will be discussed: (1) Forest and Range Watersheds; (2) Social and Economic Aspects of Water; (3) Water Quality; (4) Analysis of Flow and Storage Systems; (5) Resource Planning; and (6) Data Use and Handling. Each topic is to be initiated with a lead-off paper by an individual considered an expert in the topical field.

The first topic (Forest and Range Watersheds) will begin at 2:00 p.m., Friday, April 19. The topical speaker is Mr. Ron Hiebert and sub-topics to be presented are atmospheric hydrology, soil-water interaction, water-yield models, vegetation models and sediment and erosion.

The second topic (Social and Economic Aspects of Water) will begin at 4:00 p.m. To date no topical speaker has been selected; however, sub-topics will include recreation, social, legal, and economic aspects of water.

The third topic (Water Quality) begins at 8:00 a.m. Saturday and the topical speaker is Mr. John T. Maletic, Chief of the Water Quality Office in the Engineering and Research Center, U.S. Bureau of Reclamation, Denver. Mr. Maletic is in charge of the Colorado River Water Quality Improvement

Program. Sub-topics within that topical area are trace elements, salinity hazards, biological contamination, and chemical contamination.

Topic four (Analysis of Flow and Storage Systems) begins Saturday at 10:00 a.m. Sub-topics include groundwater hydrology, reservoir hydrology, river system hydrology, and major hydrologic events. The topical speaker will be either Kenneth Wright or William Lora of Wright Water Engineers in Denver.

Topic five (Resource Planning) begins at 2:00 p.m. Saturday and includes sub-topics discussing data needs and response curves, land-use planning techniques and models, hydrologic input to land-use planning, presenting and displaying information, analysis of noncommodity products, and national and regional input to local planning. The topical speaker is Mr. Lloyd Dean of the U.S. Forest Service.

Topic six (Data Use and Handling) includes sub-topics discussing missing data and extrapolation, analysis and validation, storage and retrieval systems, and determining data needs. The topical speaker is Dr. Ken Foster, Office of Arid Lands Studies, University of Arizona.

Gas is plentiful in Flagstaff. For motel reservation information contact Dr. Errol Montgomery, Department of Geology, Northern Arizona University, Flagstaff.

Please address your news items or comments on the News Bulletin to any of the three editors:

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