



Small Water Companies With Big Troubles

The cost of assuring clean water in America's public water systems is about to get a lot more expensive. And while the financial burden will be felt by nearly all water providers and their customers, small systems are especially vulnerable to the changing regulatory requirements.

EPA's implementation of the 1986 amendments to the Safe Drinking Water Act (SDWA) has precipitated the crisis. The SDWA amendments, which apply to all water systems with 15 or more service connections, require EPA to set maximum contaminant goals, enforceable standards, treatment methods and monitoring requirements for 83 specific contaminants. A call by the National Governors' Association and attempts in Congress in late September to freeze implementation and put a moratorium on new regulations were unsuccessful.

The new SDWA standards will
continued on page 2



Rainy days in the desert bring more than a sense of relief. Stormwater runoff from streets, parking lots, and industrial sites carries pollutants that can contaminate groundwater. Deadlines are approaching for some Arizona cities to file NPDES permit applications with the EPA. (Photo: UA Graphics)

Draft Assured Water Supply Rules to be Subject of ADWR Workshops

The Arizona Department of Water Resources has scheduled a series of workshops in mid-November on its recently completed draft Assured Water Supply (AWS) rules (see Calendar section). Public input will be sought at the meetings, and written comments accepted through February 19, 1993.

AWS rules first were promulgated in December 1989, but were withdrawn after a storm of criticism from developer, municipal, and agricultural interests. Some claimed the rules were too strict and made development of land on the urban fringes impossible; others claimed the rules were too lax, and put the bulk of the costs in achieving safe yield on the backs of municipal water departments. Still others claimed that the rules unfairly eliminated the value of existing water rights.

Subsequent efforts to develop acceptable AWS rules have included ADWR support for the Phoenix Replenishment District and Santa Cruz Valley Water District. The draft rules also reflect input from workshops held last winter on "consistency with the management goal." The draft rules are key to ADWR's goal of Safe Yield in the Phoenix, Prescott and Tucson Active Management Areas.

The draft AWS rules are the subject of this month's Guest View section.

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impose additional costs in three areas. The first is major new costs for state regulatory programs such as those of Arizona Department of Environmental Quality (ADEQ). These agencies already are overburdened with trying to enforce current standards. The irony has not gone unnoticed that additional standards are to be enforced at a time when many environmental agencies are experiencing SLIM-like budget reductions. The second area of costs occurs when water providers must install new water treatment equipment to comply with the new standards. One study estimated these costs nationally at \$13 billion.

“People could wind up paying more for their water than they pay for the land they’ve got their trailer on.”

The third area of increased costs is regular lab tests for 83 contaminants, up from the current 20, run on samples drawn from each well. These tests are projected to be up to 10 times as costly as current inorganic sampling, costing between \$700 and \$2,000 per sample per well per quarter (see “Arizona’s Small Water Systems Confront Questions, Uncertainties,” *Arroyo*, Vol. 5, No. 3, Oct. 1991).

An estimated 1,600 small water providers in Arizona face a financial crisis as a result of phase-in of regulatory requirements mandated by the 1986 Safe Drinking Water Act (SDWA) Amendments. Complying with the increasingly stringent regulations will be difficult, if not impossible, especially for small systems and those providers who have not already taken steps to finance operational changes required by the act. As of 1990, over half of the state’s small water providers were in non-compliance, with a major violation of existing regulations, according to ADEQ.

“I think the water supply is being discriminated against,” says Bob O’Leary, director of the Water Utilities Association of Arizona. “If the food supply had to meet the same standard as the water supply, ninety-seven per cent of your markets would be empty tonight because of the carcinogen aspects.”

“If I had a small water company ... and weren’t in compliance, I’d drop my keys on my desk and walk out.”

The cost of implementing SDWA regulations will be passed on to water consumers. The crisis looms for smaller systems because they have fewer customers among whom the costs can be spread. These small systems cannot take advantage of the economies of scale that larger treatment plants afford, and also tend to have far fewer customers per well. According to O’Leary, “There’s no way you can have reasonable rates if you’re trying to bring a small water utility into compliance with the Safe Drinking Water Act. People (in a

rural setting) could wind up paying more for their water than they pay for the land they’ve got their trailer on.” One study suggests the SDWA amendments could increase water rates for very small systems by several hundred percent. Whether providers have the financial reserves or borrowing power to pay for treatment facilities is in serious doubt.

The hurdles are not only financial. Most small providers lack the staffs of professional managers and engineers with expertise to deal with complex regulatory requirements such as SDWA. According to O’Leary, “That means that people are going to move somewhere else. They’re not going to live in rural Arizona anymore because they can’t afford to. If I had a small water company in rural Arizona...and if I weren’t in compliance, I’d turn off my wells. I’d drop my keys on my desk and I’d walk out. Somebody else could have the company. The liability is too great.”

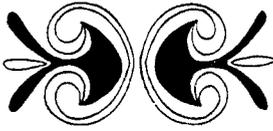
Other solutions may include consolidating small water systems within close proximity to one another, or restructuring which is when a nearby municipally-operated system buys them out. Some operators of small water systems, especially investor owned water companies, are wary of policies to encourage restructuring. They argue that small systems or companies often represent efforts by small investors who have committed time and resources to establishing businesses that might now be undermined by restructuring. It is argued that liberalizing various regulations would be more supportive and fair to these companies than promoting some form of collective restructuring. Even these drastic options are unavailable to many small systems located in remote areas. (See sidebar below for information on small water utilities conference.)

Small Water Companies to Discuss Compliance Problems

The problems small water utilities have complying with the Safe Drinking Water Act is the theme of an upcoming conference sponsored by the Water Utilities Association of Arizona. This is to be an opportunity for members of the small water utilities industry and legislators to air concerns about the industry’s inability to comply with SDWA regulations, as well as discuss the disproportionate cost/benefits ratios created by existing standards, and the actual risks vs. the chemophobia induced risks associated with drinking water consumption. The timing of the conference is critical since the SDA is currently up for reauthorization.

The conference is to be held Nov. 16-17 at the Omni Adams Hotel, 111 N. Central Ave., Phoenix, AZ 85004. For more information contact WUAA, P.O. Box 36068, Phoenix, AZ 85014; 602-234-1315.

The WUAA is an association of 150 investor-owned water companies with systems serving from 1 to 45,000 customers. WUAA is committed to protecting the interests of investor-owned water companies; alerting them to developing regulations; and ensuring that their viewpoint and interests gets attention.



Communications

One of the biggest problems with getting the *AWR* out in a timely fashion is the propensity for major water-related events to take place near the end of the month, after the newsletter has been laid out, necessitating that we add extra pages or select some stories with longer "shelf life" to be held over for the following issue. This has been a particular problem this month. As a result of a flurry of developments in late October, some of these stories will not be reported in full until next month. A brief summary of some of these developments is given below.

AUWR?

The glut of news stories in recent months on underutilization of Arizona's Colorado River resources prompted one of our staff to suggest renaming our newsletter *Arizona's Underutilized Water Resources*. For the first time in several months, however, there is no mention of CAP or underutilization on our front page.

This doesn't mean that nothing has happened on that front. To the contrary, a number of significant events have occurred, including release of a "white paper" by the Central Arizona Water Conservation District (CAWCD) and the Bureau of Reclamation on how to deal with lack of CAP water use by non-Indian agriculture, an emergency meeting of the CAWCD board called to discuss and approve the federal repayment schedule and financial relief for Harquahala Irrigation District, and a well-attended conference sponsored by the Arizona Section of the American Water Resources Association addressing underutilization issues.

Cursory coverage of these developments is found in News Briefs. Next month we'll analyze these developments in greater detail, describe Dr. Paul Wilson's soon-to-be-completed economic assessment of CAP agriculture, and

present some viewpoints on the white paper.

Western Water Law A-Changing

Discussion of the Omnibus Water Bill, which was signed by President Bush as we were going to press, also will be deferred a month. It wasn't clear whether the Bill would be signed, directly vetoed, or fall victim to a "pocket veto", and basically, we guessed wrong.

The most controversial piece of the package is an overhaul of California's Central Valley Project, something Bush had opposed. Also included in the package is funding for water projects in 16 other western states, including Arizona.

Major Arizona-specific components of the bill include the Grand Canyon Protection Act, requiring the Department of Interior to moderate water releases from Glen Canyon Dam to reduce erosion in Grand Canyon Park until a long-term program to protect the Park is developed (see June *AWR*, p. 7).

The package also includes cost-sharing provisions for repairing CAP siphons (see June *AWR*, p. 7, September *AWR*, p. 11). Settlement of San Carlos Apache water rights claims is another key component.

Reader Input Sought

Our next issue will mark the end of *AWR*'s first year. We decided this was a good time to take stock of the publication and seek some input from our

readers about what they like and don't like, the kinds of coverage they want to see more (or less) of, and other changes that could be made so that *AWR* better serves Arizona's water community.

Toward this end, we are surveying 9 percent of our readers by mail. If you received a questionnaire and have not yet filled it out, please do so as soon as possible and either mail or fax it back to us. If you lack the time or inclination and there are others who read your copy of *AWR*, pass it on. And for those of you who filled out and returned the questionnaire, thanks.

If you are among the 91 percent of our readers who didn't receive a questionnaire and you have an opinion on how the *AWR* could be improved or want to express some other sentiment, this is the time to jot it down and send it to us. We'll summarize the survey findings and how we plan to respond to them in next month's issue.

Two for One

A note to those of you submitting items for our Calendar and Announcement sections — next month's issue will be a combined December/January issue.

Correction

An eagle-eyed reader who wishes to remain anonymous noticed that our October story profiling candidates for the CAWCD board erroneously identified Sam Goddard as the head of the Democratic party in Arizona. Mr. Goddard is *former* head of the state's Democratic party.



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News Briefs

Use of Industrial Solvents Can be Cut

Up to 58 percent of the most commonly used industrial solvents in the United States could be readily eliminated within a decade, according to a study recently released by the Metropolitan Water District of Southern California and the Environmental Defense Fund.

The 12-volume study focuses on five chemical solvents, so-called halogenated compounds, and covers industries responsible for some 90 percent of the more than 800,000 metric tons of halogenated solvents consumed annually in the United States. The chemicals studied were trichloroethylene (TCE), perchloroethylene (PERC), 1,1,1-trichloroethane (TCA), methylene chloride (METH) 1,1,2-trichloro, 1,2,2-trifluoroethane (CFC-113).

The chemicals studied have caused serious groundwater contamination throughout the United States, including the Phoenix and Tucson metropolitan areas. Two of them are considered major contributors to the depletion of the ozone level, and three are known carcinogens.

"Our goal was to put some solid facts on the table for both industry and policymakers, as they face more and more stringent controls on these widely used chemicals," said David Roe, senior attorney for EDF.

For more information contact Bob Muir at MWD's Public Affairs office 213-250-6485, or Peter Cleary at EDF's Washington, D.C. Office, 202-387-3500.

Finance Strategy Offered Troubled CAP Waters

The U.S. Bureau of Reclamation and the Central Arizona Water Conservation District released a "white paper" proposing remedies for financial difficulties

plaguing the CAP project.

The Arizona Department of Water Resources' involvement in the effort also was announced. DWR Director Betsy Rieke stated, however, that DWR was not an original partner but requested involvement, and was included late in the process after the concept was worked out.

Basic to the paper is the premise that "some of the original assumptions used in projecting the project's financial structure are no longer valid." The white paper intends to rectify the situation by proposing a concept "to maintain financial and operational viability and participation in the project by as many users as possible, while spreading the costs and benefits in an equitable manner."

Debt relief for the agricultural sector is proposed, with the municipal and industrial sectors picking up the additional costs. A sense of urgency prompts the plan. If a plan is not agreed upon by early December, BuRec reserves the option of placing CAP into repayment in 1993. The adoption of a plan could delay repayment.

That the white paper is a proposal offered for discussion and not a final, done deal was carefully asserted. As stated by BuRec Regional Director Bob Towles, "The cake is not baked." Public meetings to gather responses to the plan were conducted during October.

Copies of the White Paper can be obtained by contacting Donna Micetic at 870-2329.

Diverse Participation at Sonoran Regional Forum

Participants at the conference "Land Use Changes in the Western Sonoran Desert Bioregion: A Regional Forum" discussed various multicultural and environmental concerns of the area. Although Tohono O'odham representatives along with residents from southwestern Arizona and northwestern Sonora attended the forum, government officials and others from outside the region attended in greater numbers. Not surprising, a major issue identified at the conference was residents' fear of

outside government decisions forcing change on locals.

The forum was held in Ajo, Arizona October 22-24. Tentative plans were made for a follow-up conference to continue to discuss cooperative land use planning within the region. Interested persons should contact Wendy Laird, Sonoran Institute, 6842 E. Tanque Verde, Suite D, Tucson, AZ 85719; 602-290-0828.

AZ Conservation Efforts Attract National Attention

Efforts in Arizona to conserve water have attracted considerable attention recently. Over the summer, a photographer from *National Geographic* magazine spent several weeks in the Tucson and Phoenix metropolitan areas and rural Pinal County shooting pictures of how water is used and conserved in the Southwest. The photos are for an article to appear in a special issue of *National Geographic* on water use in North America due out in late 1993.

A film crew from National Geographic's video division will be in Arizona in mid-November working on an unrelated project, a documentary on water conservation. The program will be aired as a National Geographic Special in about a year.

Also, the network program "Good Morning America" will be in Tucson the morning of November 18 to air a story on Tucson Water's conservation program and local conservation efforts.

CAP Water to Finally Flow in Tucson

Barring a last-minute court challenge, Central Arizona Project water will begin flowing to some Tucson-area homes the first week of November. Continuing jurisdictional disputes over building safety inspections and concerns about delivery and storage of chlorine used in Tucson's new \$60 million treatment plant had resulted in legal and political skirmishes between the City, Pima County, and Drexel Heights fire district. Parts of the service area will not receive CAP water for a year or more.

CAP Shutdowns Planned for Siphon Repairs

The Central Arizona Project aqueduct system will be shut down for 30 days in late 1993 and for a 90-day period beginning in late 1994 for repair of the system's seven failing siphons. The longest system shutdown to date has been approximately 45 days.

Some water will be stored in the aqueduct system to allow for minimal deliveries during the shutdown periods, but most CAP customers will have to rely on surface water stored in reservoirs and on pumped groundwater. How the shutdowns will impact CAWCD's water deliveries and water sales revenues is not known.

Agreement Near on Tucson Terminal Storage

Tucson Water, the Bureau of Reclamation (BoR) and the Central Arizona Water Conservation District (CAWCD) have agreed in principle on a reliability feature for CAP contractors in Pima County. The preferred alternative includes a 200 to 300 acre, 15,000 acre-foot reservoir supplemented by wellfields.

The reservoir alone is estimated to provide up to 22 days of backup supply for outages occurring in summer and 30 days of backup in winter. Wellfields will increase winter backup to 47 days.

The agreement ends a dispute between Tucson Water and BoR over BoR's obligation to provide terminal storage and its estimated cost. BoR had claimed a reservoir would cost \$100 to \$120 million, while Tucson Water's estimate was \$40 million. By eliminating a pumping station and recreational features including a mile-long beach and re-estimating other costs, the price tag has been reduced to \$50 million.

It will be several years before Tucson Water will be able to shut down many of its wells and rely on the terminal storage. The plan must be approved by Tucson's mayor and council in November and CAWCD's board in December before BoR incorporates it in its work plan and begins an environ-

mental impact study. Optimistically, construction will begin in 1995, with the reservoir completed in late 1996.

Lead Weighs in as Major Water Quality Problem

In June 1991, EPA's lead/copper rule went into effect, requiring large municipal water providers (> 50,000 customers) to test lead levels in water samples drawn from customer taps. The rule supplements the old Maximum Contaminant Level of 50 ppb with an Action Level of 15 ppb.

Twenty percent of the 660 large providers reporting results exceeded the Action Level. These 130 providers, which serve 32 million people, include New York, Boston, Detroit, San Francisco and Phoenix. Tucson and Mesa reported results below the Action Level.

For the first time, water providers are responsible for water quality at the tap, rather than at the service meter. The distinction is important, because most lead comes not from the water supply or distribution system, but from lead pipes, leaded solder on copper pipes, and brass fixtures in households. Samples must be drawn from high-risk homes with known lead in the plumbing. The samples are sorted by increasing lead level, and the lead level in the 90th percentile sample is compared to the 15 ppb standard.

Exceeding the Action Level is not a water quality violation, but it does require providers to initiate a public education program, perform additional monitoring of lead levels, and study how the levels might be reduced. In most cases, this will consist of reducing the water's corrosivity by chemically raising its pH, rather than by removing lead-containing plumbing. (Samples in Chicago, which has a lead-pipe distribution system but non-corrosive water were well below the Action Level.)

The more stringent lead standard reflects growing evidence that even very low levels of lead can impair the mental development of children. Some 7,400 medium-sized systems must test for lead by January 1993; testing for 78,000 small systems will follow.



Legislation & Law

Riparian Area Advisory Council Appointed

Governor Symington recently appointed members to a Riparian Area Advisory Committee. Membership of the committee, which is mandated by Arizona's new riparian law, is to represent various interests.

The committee's charge is to study the components of a riparian protection program suitable for the state and present legislative recommendations to the Governor and the legislature by 1994.

Following are names and interest areas of committee members: Jim Accomazzo (farming), Stuart Anderson (county), Bill Chase (municipal/wastewater treatment), David Chavez (sand & gravel), Don Colter (conservation district), Judy Gignac (county), John Keane (ag. improvement district), Patrick Maley (mining), Anita MacFarlane (environment), Jack Metzger (live-stock), Eva Patten (environment), Juliet Stromberg (riparian research), Barbara Tellman (environment), Connie Wilhelm (real estate), and Ed Fox (ADEQ), who will chair the committee.

Congress Fails to Fund Border Wastewater Plant

A request for \$5 million to fund expansion of the International Wastewater Treatment Plant serving Nogales, Arizona and Nogales, Sonora was cut from an appropriations bill for the EPA. Funding for treatment plants along the California-Mexico border also were cut.

The Nogales wastewater plant, run under a cost sharing agreement with Mexico, is operating near capacity. Should Maquiladora plants along the border increase due to the North American Free Trade Act, sewage inflows will quickly exceed the plant's capacity.

Arizona Senator McCain tried unsuccessfully to rescue the funding request by attaching it to another bill.



Special Projects

Current water-related studies, pilot projects and applied research are summarized below.

Coming Soon—Water Expertise Directory

The University of Arizona's Water Resources Research Center is developing an expertise directory listing the water research specialties and interests of faculty and staff at the three state universities. The directory is to enable people in quest of water information to readily determine the availability of university water expertise.

To organize the directory WRRC sent forms to university personnel involved in water issues. The forms requested such information as research areas, foreign language skills, and geographic specialization. Each respondent also indicated whether he/she would be available as a resource person to government agencies, groups seeking speakers, private consultants, news media, educators or the general public.

Faculty and staff in all research fields related to water will be listed in a computer data base, along with information about their expertise capability. All areas related to water are included — hydrology, geology, chemistry, biology, ecology, public policy, economics, etc. A list of over 200 key works is provided to enable respondents to further define their interests and specialties. Efforts will be made to keep the information current.

Beginning December 1 the directory can be accessed by phone, FAX, or in person. The directory is scheduled to be printed early in 1993 and will be the third volume of a series of WRRC reference works listing water resources. The first two volumes are *Where to Get Free (or almost free) Information about Water in Arizona* and *Where to Get Technical Information about Water in Arizona*. Single copies of the first and

second volumes in this series are still available free by requesting copies from WRRC.

Any appropriate faculty or staff member not yet invited to provide research information for the directory, please call WRRC at 792-9591. An Expertise Directory questionnaire will be sent to you.

Projects Assist Small Water Utilities

Many of Arizona's small rural drinking water systems are non-viable because they have low revenues, lack technical and management expertise, are unable to obtain capital, and frequently violate drinking water regulations.

Many of these systems are unaware of their options. EPA Region IX therefore has awarded a \$10,000 mobilization grant to Arizona Small Utilities Association through its affiliation with the Arizona Rural Infrastructure Committee to conduct two projects to promote small water systems' viability in Arizona. The two projects are Education Materials on Water Improvement District Formation and the Organization of a Regional Operator Program.

The Water Improvement District Project will develop written, along with audio visual education materials that define the types of districts and how they are formed. The materials will identify state requirements, the steps and time line involved in forming a district, and identify the advantages and disadvantages of a district.

The Regional Operator Program has three primary purposes for participating systems: 1) to assist systems without a certified operator in sharing the cost of an operator and therefore receiving the benefits; 2) to increase their economies of scale by cooperatively purchasing materials such as meters, pipe and chlorine; and 3) to cooperatively share equipment such as a back-hoe, pipe tap, or ditch witch.

The goal of these projects are to assist small rural water systems in improving their viability, provide quality water and protect their water supplies and systems. For more information,

contact Mike Lytle, Program Manager, Arizona Small Utilities Association or Karl O. Moyers at 602-620-0230.



(Photo: B. Tellman)

Stock Grazing Riparian Effects Studied

A project examining consequences of livestock grazing on riparian areas in Arizona was funded by the US Army Corp of Engineers. The project examined five pairs of streams or reaches of streams in different physiographic regions of Arizona. Streams were paired to represent currently grazed and ungrazed sections. The past history of the ungrazed streams varied in the longevity of enclosure from grazing pressure. Both vegetation and hydrologic data were gathered along transects running perpendicular to and in parallel to the stream channel. Vegetation data is currently being analyzed to quantify differences in biological diversity, life form, and vegetation cover between the grazed and ungrazed riparian and upland (terrace) zones. This data will be compiled and merged with the hydrological data collected by Oregon State University to portray potential changes as a result of livestock grazing. For more information contact Dr. Jeffrey M. Klopatek, Department of Botany, Arizona State University, Tempe, AZ 85287-1601.



Guest View

The Department of Water Resources recently released draft rules to implement the Assured and Adequate Water Supply programs mandated by Arizona's Groundwater Management Act of 1980 (Groundwater Code). Kathy Jacobs, Tucson Active Management Area Director, explains these draft rules.

The Assured Water Supply (AWS) program applies to the four Active Management Areas (AMA)—Phoenix, Pinal, Prescott, and Tucson—and is designed to help assure a long-term reliable water supply for the AMAs. Most land in an AMA may not be sold or leased unless it has an assured water supply.

A sustainable water supply is a key component of healthy economic growth. Recent experience in some neighboring states reaffirms that it is critical to manage Arizona's water supplies in anticipation of future growth and future shortages.

The draft rules reflect the differences established by the Groundwater Code in water management goals for the AMAs. They also reflect concepts included in recent enacted Arizona legislation, including the replenishment district legislation. Also, the prevailing hydrologic and water supply conditions were considered in development of the draft rules.

Phoenix and Tucson AMAs

The Department is mandated by the Groundwater Code to develop programs for the Phoenix and Tucson AMAs to eliminate the groundwater overdraft—to achieve a statutory goal of safe-yield—by the year 2025. For decades, water users in the Phoenix and Tucson AMAs have depleted the groundwater supplies by pumping out more groundwater than is replenished each year. That groundwater overdraft continues today. To achieve the safe-yield goal, those depletions must be phased out by shifting to renewable supplies, such as Central Arizona Project water and effluent.

A shift to renewable supplies will guarantee that in times of severe drought groundwater supplies that can be recovered at a reasonable cost still will be available to offset the decline in surface water supplies. Thus, future droughts will not result in the significant economic dislocation California has encountered during its current drought.

The Department recognized that a transition from a groundwater-based supply to renewable supplies will, in many cases, increase the near-term cost of municipal water supplies. However, those increased costs constitute an investment to assure that over the long term the safe-yield AMAs have sufficient supplies for both future growth and future shortages.

Prescott AMA

The Prescott AMA, like the Phoenix and Tucson AMAs, has a safe-yield goal. However, due to reduced water use in the agricultural sector, recent studies indicate the Prescott AMA is currently at safe-yield. As the area continues to grow based on groundwater, depletions will begin to occur. In view of the current safe-yield condition, the program to shift current and future municipal uses off mined groundwater will be

deferred for the Prescott AMA until the Director of the Department determines the AMA is no longer at safe-yield.

Pinal AMA

Like the Phoenix and Tucson AMAs, the Pinal AMA has experienced significant groundwater depletions and those depletions continue today. The Pinal AMA, however, has a different statutory water management goal that allows continued, long-term groundwater depletions. The Second Management Plan for the Pinal AMA clarifies that goal to mean management of depletions until the depth to groundwater from the land surface approaches 1,200 feet. The draft rules implement this approach to management of groundwater depletions.

Explanation of Draft Rules

The rules package includes several sections which are intended to explain and clarify the specific proposals that are contained in the rules. The section that is explained in the most detail is the "Consistency with Management Goal" section. This section is tailored to specific AMA conditions and responds to many of the comments received after distribution of a concept paper on this subject last spring.

The "Consistency with Management Goal" portion of the rules package contains formulas that determine the volume of "mined" or non-renewable groundwater that can be used by an applicant to prove an assured water supply (AWS). Basic concept that are included in this section include:

- A volume-based allotment of groundwater and other supplies that are approved for use by an applicant which is applying for a designation of AWS. When demand for new water supplies is expected to exceed the approved volume, the applicant must reapply to extend the AWS status.

- An annual account will be maintained for each applicant to track the volumes of various sources of water that have been used relative to the volumes of approved supplies.

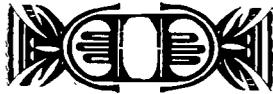
- Water use in excess of the volume of water in the account may result in revocation of the AWS status.

The components of the groundwater portion of the account differ for each AMA, but a portion of the account can be mined groundwater depending on the status and timing of the application. There is a renewable groundwater (net natural or incidental recharge) component to the account, but the approach differs substantially in each AMA. Credits for retirement of grandfathered rights also have been included.

In addition to the groundwater allotments mentioned above, the rules contain provisions to exempt groundwater from the compliance calculations if it were used: 1) to replace surface water in a drought emergency; 2) as part of a groundwater cleanup that meets certain criteria; or 3) if it is withdrawn from within an officially designated waterlogged area. All of the above exemptions are approved on an annual basis by the Director.

The AWS program is a key component of the Department's water management efforts. It has substantial implications for all Arizonans who are concerned about future growth and water resource management.

The draft rules will be the subject of workshops and a comment period to maximize public input prior to the formal rulemaking process. Information on the workshops and the comment period is on the front page of this issue of *AWR*.



Publications

Directory for the Ground Water Industry.

Compiled by Chris Reimer. This 73-page guide to groundwater information includes addresses and phone numbers for government agencies, associations, and industry organizations. Publication is available for \$10 from the National Ground Water Association Bookstore, P.O. Box 182039, Dept. 017, Columbus, OH 43218.

Arizona Department of Water Resources Annual Report, 1990-1991

This year-in-review summarizes activities for FY91. Copies are available from the Public Information Office, ADWR, 15 S. 15th Ave., Phoenix, AZ 85007; 602-246-0506.

Transfers of Water Use in New Mexico

F. Lee Brown, Charles DuMars, Michelle Minnis, Sue Anderson Smasal, David Kennedy and Julie A. Urban. This study is part of a comparative examination of the water transfer process and experience within six western states: Arizona, California, Colorado, New Mexico, Utah and Wyoming.

Copies are available at no charge from the New Mexico Water Resources Research Institute, New Mexico State University, Box 30001, Dept. 3167, Las Cruces, NM 88003-0001; 505-646-4337; FAX 505-646-6418.

1991 National Park Service WRD Annual Report

This report summarizes 1991 technical and project support provided by the National Park Service's Water Services Division. Included is information on field studies conducted for use in setting "interim" flows at Glen Canyon Dam to minimize the negative effects of dam releases on downstream natural and cultural resources in Grand Canyon National Park.

For a copy contact Water Resources Division, 1201 Oakridge, Suite 250, Fort Collins, CO 80525; 303-221-8311.

The following two publications are available from the U.S. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20877; 202-275-6241. The first copy is free, with additional copies available for \$2.

International Environment: Strengthening the Implementation of Environmental Agreements (GAO/RCED-92-188)

International agreements have increased during the last 20 years and so have problems with their implementation. The report reviews the situation.

Drinking Water: Widening Gap Between Needs and Available Resources Threatens Vital EPA Programs (GAO/RCED-92-184)

The report summarizes the major issues associated with implementation of the EPA drinking water program.



Announcements

Water Information Director to be Hired

The Universities Council on Water Resources (UCOWR) is seeking a director for a newly created Universities' Water Information Network at the Executive Director's office on the campus of Southern Illinois University at Carbondale. The individual should have an interest, background, and working knowledge of water resources, environmental terminology, and familiarity with computer networks, data base management, the use of computer bulletin boards, and computer conferencing. The individual must have a Master's degree in one of the fields of the natural sciences, water resources, environmental sciences, geography, or hydrology.

Applications will be accepted until the 12-month position is filled, about the end of the year. Send a resume and list of three references to the Chair of the Search Committee, Duane Baumann, Executive Director, UCOWR, 4543 Faner Hall, Southern Illinois University at Carbondale, Carbondale, IL 62901; 618-536-7571.

Drinking Water Information Available

The Environmental Protection Agency maintains a free safe drinking water hotline to answer questions about regulations, health issues, treatment, testing, etc. If appropriate, callers may be referred to EPA publications or to other federal, state, and local agencies and organizations. The service is available Monday through Friday, 8:30 to 5 p.m., Eastern time at 1-800-426-4791.

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Arizona Water Resource is financed in part by sponsoring agencies, including:

Arizona Department of Water Resources
 Central Arizona Water Conservation District
 Salt River Project
 Tucson AMA Water Augmentation Authority
 Tucson Water
 USGS Water Resources Division
 Water Utilities Association of Arizona

Their contributions help make continued publication of this newsletter possible.

November 1992 Arizona Water-Related Events

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 <-- Managing	2 Yav. Flood Control Water Systems Council Water Reuse <-- Geographic Water Resources	3 Tucson CWAC Information During Global	4 Chernobyl Disaster Waste Mgmt Hearing <- Petroleum Hydro- Systems in Change -----	5 CAWCD Global Partnership <-- New Mexico carbons and Organic Ground Water ----->	6 Biodiversity & Climate Water Conference --> Chemicals in GW -> Modeling --->	7
8 Casa del Agua	9 Endangered Species Act	10 AWSR Workshop Waste Mgmt Hearing <- Understanding	11 Non-Aqueous Phase <- Bioremediation <-- WATERTECH	12 AWSR Workshop Waste Mgmt Hearing Liquids --> Engineering: Principles '92 (runs through the 13th) -->	13 Santa Cruz Water Dist. AHS Conference Arizona's Aquifer & Applications ->	14 AZ Water Quality
15 Casa del Agua	16 <-- Water Utilities	17 AWSR Workshop HAZWASTE '92 <- Innovative Hazard- Assoc of Arizona -->	18 dous Waste Treatment <- Water Environ-	19 PAG/Water Quality AWSR Workshop AZ Water Rights GW Protection Issues Technologies --> ment Federation's Joint	20 Joint GUAC Mtg, Prescott Conference -->	21 Grazing & The Environment
22 Casa del Agua	23 Yav. Flood Control	24	25	26	27 <-- Scottsdale	28 Earth Rally -----
29 Casa del Agua ----->	30 National GW Sampling Symposium	December 1	2 <- Successful Tools <- Bioremediation	3 for Env Negotiations-> of Contaminated	4 ARWA Annual Conf Soil & Water Conservation Society Soils and Sludges ->	5



Calendar of Events



RECURRING

ADWR Assured Water Supply Rules Workshops. All meetings begin at 7:00 p.m. 10 November, Tucson AMA, City of Tucson Council Chambers, Tucson City Hall; 12 November, Pinal AMA, Casa Grande City Council Chambers; 17 November, Phoenix AMA, Maricopa County Board of Supervisors Auditorium; and 19 November, Prescott AMA, Prescott Sheraton Conference Center. Contact: Tucson AMA 602-628-6758.

Arizona Hydrological Society. Conference on the 13th takes place of the monthly meeting. Contact: Mike Block 602-792-1093.

Arizona Water Commission. November meeting not yet set. Meetings held at ADWR, 15 South 15th Ave., Phoenix.

Casa Del Agua. Water conservation tours hourly, Sundays noon to 4:00 p.m., 4366 North Stanley, Tucson. Contact: 602-881-3939.

Central Arizona Water Conservation District. 1st Thursday of the month, 12:30 p.m. Contact: 602-870-2333.

City of Tucson Citizens Water Advisory Committee. 1st Tuesday of the month, 7:00 a.m. 310 W. Alameda, Tucson. Contact: Trish Williamson 602-791-4331.

Phoenix AMA, GUAC. Joint GUAC meeting on the 20th. 8:30 a.m. Prescott Sheraton Resort and Conference Center, Prescott. Contact: Mark Frank 602-542-1512.

Pima Association of Governments / Water Quality Subcommittee. 3rd Thursday of the month, 9:30 a.m. 177 N. Church Ave., Tucson. Contact: Gail Kushner 602-792-1093.

Pinal AMA, GUAC. Joint GUAC meeting on the 20th. 8:30 a.m. Prescott Sheraton Resort and Conference Center, Prescott. Contact: Dennis Kimberlin 602-836-4857.

Prescott AMA, GUAC. Joint GUAC meeting on the 20th. 8:30 a.m. Prescott Sheraton Resort and Conference Center, Prescott. Contact: Phil Foster 602-778-7202.

Santa Cruz Valley Water District (formerly Tucson AMA Water Authority). 13 November, 7:30 a.m. Water Resources Research Center, 350 N. Campbell Ave., Tucson. Contact: Warren Tenney 602-326-8999.

Tucson AMA, GUAC. Joint GUAC meeting on the 20th. 8:30 a.m. Prescott Sheraton Resort and Conference Center, Prescott. Contact: Linda Stitzer 602-628-6758.

Yavapai County Flood Control District. 1st Monday of the month in Prescott; 4th Monday of the month in Camp Verde. Contact: YCFCD, 255 E. Gurley, Prescott, AZ 86301.

NOVEMBER

1-5 (Sun-Thu) Managing Water Resources During Global Change. American Water Resources Association 28th Annual Conference & Symposium. Reno, NV. Contact: Michael C. Fink, Director of Meetings, AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192; 301-493-8600.

2 (Mon) Water Systems Coordinating Council. 1:00 p.m., ADEQ Public Meeting Rm., 1st Floor, 3033 N. Central Ave., Phoenix. Contact: Barbara Stewart 602-207-4559.

2 (Mon) Water Reuse Symposium. The Embassy Suites at Rural and the Freeway, Phoenix. Sponsored by the Salt River Project. Contact: Jan Miller, 602-236-5745 or Mario Lloria, 602-236-5520.

2-6 (Mon-Fri) Geographic Information Systems in Ground-Water Modeling. Golden, CO. Contact: International Ground Water Modeling Center/Colorado School of Mines, Golden, CO 80401.

4 (Wed) Public Hearing for new Regional Waste Management site. 7:00 p.m., Pima County Fairgrounds (Thurber Hall), 11300 S. Houghton Rd., Tucson.

4 (Wed) Groundwater Problems Resulting from the Chernobyl Disaster. Dr. Paul Witherspoon. 4:00 p.m., UA Geology Rm. 206. Contact: UA Dept. of Hydrology and Water Resources, Fran Janssen 602-621-7120.

4-6 (Wed-Fri) Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Restoration. Houston, TX. Contact: National Ground Water Association 614-761-1711.

5 (Thu) Global Partnership for Environmental Solutions. Phoenix. Contact: Valley Forward Association, 100 W. Claredon, Suite 1105, Phoenix, AZ 85013.

5-6 (Thu-Fri) 37th Annual New Mexico Water Conference. Taos, NM. Contact: New Mexico Water Resources Research Institute, Box 30001 - Dept. 3167, Las Cruces, NM 88003.

6 November (Fri) The Earth Summit: Biodiversity and Climate. Lakshman D. Guruswamy, UA College of Law. Contact: UA Department of Geography & Regional Development 602-621-1652.

9 (Mon-Tue) The Endangered Species Act: On the Road to Recovery? Idaho Water Resources Research Institute. Coeur d'Alene, ID. Contact: The Endangered Species Act, Idaho WRRI, 106 Morrill Hall, Univ. of Idaho, Moscow, ID 83843.

10 (Tue) Public Hearing for new Regional Waste Management site. 7:00 p.m., Sahuarita High School (Auditorium), 350 W. Helmet Peak Rd., Sahuarita, AZ.

10-12 (Tue-Thu) **Understanding Migration, Assessment, and Remediation of Non-Aqueous Phase Liquids.** San Francisco, CA. Contact: National Ground Water Association, 6375 Riverside Dr., Dublin, OH 43017; 614-761-1711.

11-13 (Wed-Fri) **Bioremediation Engineering: Principles, Applications, and Case Studies.** Tucson. Contact: General Physics Corporation, Environmental Services, 6700 Alexander Bell Drive, Columbia, MD 21046; 410-290-2300.

11-13 (Wed-Fri) **WATERTECH '92.** Houston, TX. Contact: Miriam Slejko, Ultrapure Water, P.O. Box 621669, Littleton, CO 80162; 303-973-6700.

12 (Thu) **Public Hearing for new Regional Waste Management site.** 7:00 p.m., Tucson Convention Center (Maricopa Room), 260 S. Church Ave., Tucson.

13 (Fri) **Arizona Hydrological Society Second Annual Conference. Binational Surface and Ground Waters: Shared Resources and Problems.** Tucson. Contact: AHS, c/o David Eaker, 201 N. Stone, 8th Floor, Tucson, AZ 85701.

13 (Fri) **Arizona's Aquifer Protection Permits Program.** Tempe, AZ. Contact: GeoSystems Analysis, 1708 E. Spring St., Tucson, AZ 85719; 602-326-5848.

14 (Sat) **Arizona Water Quality Association Fall Conference: RO Systems & Compliance.** Tempe, AZ. Contact: AWQA, 6819 E. Diamond St., Scottsdale, AZ 85257.

16-17 (Mon-Tue) **Water Utilities Association of Arizona Conference '92.** Phoenix. Contact: WUAA, P.O. Box 36068, Phoenix, AZ 85067; 602-234-1315.

17 (Tue) **HAZWASTE 92: A Symposium.** Phoenix. Arizona HAZWaste Society and ADEQ. Contact: Peter Allard, 602-263-0045.

17-19 (Tue-Thu) **Environmental Drilling, Ground Water Monitoring and Sampling: A Field Practice Course.** Atlanta, GA. Contact: Env. Education Enterprises Institute, 2764 Sawbury Blvd., Columbus, OH 43234; 614-792-0005.

17-19 (Tue-Thu) **Fourth Forum on Innovative Hazardous Waste Treatment Technologies: Domestic and International.** San Francisco, CA. Contact: SAIC, 501 Office Center Dr, Ste 420, Ft Washington, PA 19034; 800-783-3870.

18-20 (Wed-Fri) **Water Environment Federation's Joint Conference on Pollution Prevention.** Dallas, TX. Contact: 703-684-2400.

19 (Thu) **Municipal Landfills and Groundwater Quality Protection Issues.** San Francisco, CA. Contact: Dr. G. Fred Lee, G. Fred Lee & Assoc., 27298 E. El Macero Drive, El Macero, CA 95618; 916-753-9630.

19 (Thu) **Understanding & Protecting Your Water Rights in Arizona.** Phoenix. Contact: The Cambridge Inst., 1960 Gallows Rd., Vienna, VA 22182; Jo Price 703-893-8500.

21 (Sat) **Grazing & The Environment: Options For The Future.** UA College of Agriculture and the Tucson Audubon Society. Contact: UA Extended University, Attn: Registrar, 1955 E. Sixth St., Tucson, AZ 85719; 602-624-8632.

27-29 (Fri-Sun) **Earth Rally.** Scottsdale Civic Plaza. Sponsored by the City of Scottsdale Office of Environmental Affairs. Contact: 602-585-4408.

30 (Mon) **National Groundwater Sampling Symposium.** Washington, DC. Sponsored by Grundfos Pumps Corporation. Contact: 209-929-1865.

UPCOMING



2-3 December (Wed-Thu) **Successful Tools for Environmental Negotiations 1992-1993.** Washington, DC. Contact: RESOLVE, 1250 24th St., NW, Washington, DC 20037-1175.

2-4 December (Wed-Fri) **Bioremediation of Contaminated Soils and Sludges.** Austin, TX. Contact: UT at Austin, College of Engineering, Continuing Engineering Studies, ECJ 10.324, Austin, TX 78712; 512-471-3506.

4 December (Fri) **1992 Arizona Rural Water Association Annual Conference and Meeting: Reflections on Arizona's Water and Views Toward the Future.** Phoenix. Contact: ARWA, Doug Nelson 602-230-7771.

4 December (Fri) **Fifth Annual Soil and Water Conservation Society Fall Conference. Water Augmentation: Issues and Attitudes.** Casa Grande, AZ. Contact: Ron Hemmer, SWCS, 1542 W. Verde Lane, Phoenix, AZ 85015; or, Doug Pease 602-839-4803.

7-9 December (Mon-Wed) **The Environmental Regulation Course.** Denver, CO. Contact: Registration Dept., Executive Enterprises, Inc., 22 West 21st Street, New York, NY 10010; 800-831-8333.

7-11 December (Mon-Fri) **Sedimentation Engineering Using HEC-6.** Tempe, AZ. ASU Center for Professional Development. Contact: Center for Professional Development, Arizona State University, Tempe, AZ 85287-7506; 602-965-1740.

9 December (Wed) **Rural Infrastructure Committee Meeting.** 9:30 a.m. - 12:30 p.m., Department of Commerce, 15th Floor Conference Room, 3800 N. Central Ave., Phoenix. Contact: Rivko Knox 602-280-1300.



Announcements cont. from p. 8.

Calls for Papers

Hydrology Days will be held from March 30 to April 2, 1993, at Colorado State University, Fort Collins, Colorado. The conference objective is to provide a forum for hydrologists and hydrology students to get acquainted and share problems, analyses, and solutions. The conference program includes a full day for student papers. Paper presentations are to run about 25 minutes including discussion. Abstracts are due Jan. 8, 1993. For information and instructions on submitting abstracts contact Professor Morel-Seytoux, Hydrology Days, 57 Selby Lane, Atherton, CA 94027-3926; Tel and FAX 415-365-4080.

The International Ground Water Modeling Center is presenting its groundwater modeling conference June 9-12 at the Colorado School of Mines Campus in Golden, Colorado. Session papers and poster presentations in the following areas are being solicited: parameter estimation/calibration, practical evaluation of uncertainty, validation, quality assurance, post audits, remediation, non-aqueous phase liquids, and unsaturated zone. Abstracts are due November 21. For additional information about the conference and submitting of abstracts contact 1993 Ground Water Modeling Conference, IGWMC, Colorado School of Mines, Golden, CO 80401-1887; 303-273-3103.

Posters Invited for Riparian Conference

Titled "Riparian Management: Common Threads and Shared Interests," a western regional conference to explore strategies for managing rivers and riparian areas is scheduled February 4-6, 1993 in Albuquerque, NM. The UA Water Resources Research Center is organizing the conference.

Speakers will describe local river management situations in varied locations including the North Raven River in Alberta, Canada the Feather River in northern California, and urban streams in Boulder, Colorado. Also addressed will be topics as diverse as the National Park Service's international program, balancing private and public property concerns, and resolving differences. A field trip along the Rio Grande River to the Bosque del Apache will complete the program.

Traditional competing interests will be represented including ranching, recreation, power, timber, and wildlife. Special sessions will offer discussions of water quality problems, legal factors, dams and dam releases, floodplain management, political factors and opportunities for financing river management packages.

The program also includes poster presentations. People interested in displaying posters on river management topics should submit abstracts by December 15 to Mary Wallace at the WRRC, 350 N. Campbell Ave., University of Arizona, Tucson AZ 85721; 602-792-9591. Additional conference information is available at the same address. Early registration is urged.

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