Colorado Stream Lines

QUARTERLY NEWSLETTER OF THE OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

VOLUME 1, NUMBER 2 JUNE 1988

RULES AND REGULATIONS

Since the last STREAM LINES, hearings were held on two sets of proposed rules and regulations. The hearings have been completed and both the Dam Safety and the Construction of Wells and Installation of Pumping Equipment rules are being revised prior to final adoption.

DAM SAFETY

Hearings were held before the State Engineer between April 13 and 18. Members of the staff as well as a number of dam owners and interested parties took part in the hearings and offered testimony on the development and affects of the proposed rules and regulations. Several revisions were offered by the owners and their representatives. The major concerns were with the financial impact of the proposed rules on existing dams due to the hydrologic requirements for spillway sizing, inspection of outlet works, monitoring, instrumentation, and the use of professional engineers to provide expert analysis of the structure.

Based on the testimony presented at the hearings, the State Engineer is considering revisions to the proposed rules. Revisions will be made available to the public for comment in the near future.

CONSTRUCTION OF WELLS AND INSTALLATION OF PUMPING EQUIPMENT

Hearings were held May 3rd and 4th on the "Proposed Final Draft of Revised and Amended Rules and Regulations of the Board of Examiners of Water Well Construction and Pump Installation Contractors." A total of ten organizations and individuals were granted party status and presented testimony at the hearings. In addition, written comments were accepted by the Board until May 20, 1988. The final revised rules and regulations are to be available along with the fiscal impact and basis and purpose by June 29th. The rules and regulations will become effective August 1, 1988, following publication in the July 10 Colorado Register.

The revised and amended rules will cover the following:

* Definitions
* General rules
* Exclusions from requirements
* Licensing
* Bonding
* Minimum standards for construction
* Abandonment standards
* Monitoring, observation and test holes
* Minimum pump installation standards
* Report requirements
* Minimum disinfection standards
* Variances
* Emergency well replacement criteria
* Acceptable grouts
* Persons authorized to construct various types of wells
* Minimum distances from contamination sources
* Requirements for electrical wiring to wells

For more information please contact the Office of the State Engineer at (303) 866-3581.

REAL-TIME DATA COLLECTION TECHNOLOGY AVAILABLE TO THE GENERAL PUBLIC

Do you or your organization need to monitor hydrologic conditions at a remote site on a real time basis? Satellite-linked data communication has evolved into a cost effective technology that is now available to the general public.

Any parameter that can be measured in an automated fashion can be monitored utilizing satellite-linked communications hardware. A wide variety of hydrologic conditions can be monitored including stream flow, diversion rates, groundwater levels, precipitation, water quality, evaporation rates, soil moisture, snow pack, flood monitoring and dam safety monitoring.

The cost of the remote satellite-linked hardware is now under $5,000 per station. Water level indicators range from $500 to $1,500, precipitation gages range from $500 to $2,000, and water quality sensors range from $3,500 to $5,000. All hardware is easily installed.

Operators can contract with the Office of the State Engineer to have data transmissions processed by the states receiving site and central computer. Raw data are processed and archived as per-station input. Conversions such as stage to discharge can be performed in an automated fashion. The current cost of this service is $100 per station per month. Data are accessed by modem/computer terminal and phone lines.

The cost benefits realized through real-time data collection can be significant. If the total capital cost for a station capable of monitoring stage and water temperature amounts to $6,000, the 5-year amortized cost is about $100/month. If a $100/month receive and processing fee is added, the cost of real-time collection is $200/month. Compare this to costs associated with travel to a remote site, staff time and associated data processing costs for a single visit:

Travel:	
250 miles @ $0.25/mile	$ 62.50
Staff Time:	
8 hours @ $14.00	$112.00
Data Processing:	
2 hours @ $25.00	$ 50.00
Total	$224.00

If data must be obtained on a weekly basis, the savings are estimated to be $700 per month. The cost savings increas dramatically if real-time data ar essential such as in the operation of a water treatment plant which is managed according to available inflow and water quality.

Contact John Kaliszewski, Project Manager at (303) 866-3581 for more details.

PUBLICATIONS

DENVER BASIN HYDROLOGIC ATLASES

The long awaited reduced-size Denver Basin atlases are now available. These maps have been reduced to a scale of 1:200,000 and are printed as a series of four atlases (one for each of the aquifers) and contained in 11"x 9" envelopes. Each atlas consists of a series of maps depicting the top, base sandstone/siltstone thickness and th location of non-tributary ground water. A set of atlases (4) for the Denver Basin is $60.00; individual aquifer atlases are $20.00 each.

DAM SAFETY MANUAL

The reprinting of the Dam Safety Manual has been completed. Manuals can be purchased for $8.00 through the Records Section. Unfortunately, due to budget constraints the supply is limited. We hope to print additional copies after the start of the fiscal year.

"Troubled Waters on Tap" is the title of a new report from the Nader Center for the Study of Responsive Law. This report chronicles the contamination of the drinking water supply with organic compounds, and the efforts implement the 1974 Safe Drinking Water Law. Copies are available for $10.00 from the Center a P.O. Box 19367, Washington, D.C., 20036.

LEGISLATIVE NOTES OF INTEREST

In the legislative session that recently adjourned a few bills of interest to water users in the state were signed into law by the Governor. Those bills are House Bill 1111, House Bill 1173 and House Bill 1269.

House Bill 1111 amends Section 37-92-602(3)(b)(II), C.R.S. (1973 & 1987 Supp.) and allows the user of an exempt household use only well to water non-commercial domestic animals from that household use only well. Previously issued household use only permits may be amended to provide for watering of the user's non-commercial domestic animals upon application to the State Engineer and payment of a twenty-five dollar fee. Allowances for this type of use will expire July 1, 1990. For more information regarding amending permits for this type of use, please contact the State Engineer's Office at (303) 866-3581.

House Bill 1173 amends Section 37-90-111, C.R.S. (1973 & 1987 Supp.) and gives authority to the Colorado Ground Water Commission to allocate, upon the basis of overlying landownership, any designated ground water from the Dawson, Denver, Arapahoe, and Laramie-Fox Hills aquifers.

The last bill that affects water users in the state is a general house cleaning bill regarding procedures before the Water Courts of the state (H.B. 1269), and largely affects Sections 37-92-301, 37-92-302, 37-92-303, and 37-92-304, C.R.S. (1973 & 1987 Supp). However, other changes of note were also included in this bill.

One of the highlights of this bill includes insuring that determinations of due diligence are filed in the same month every fourth calendar year to maintain a conditional water right. The law also includes plans or changes of plans created under the provisions of Section 37-45-118(1)((b)(IV), C.R.S. (1973) (trans-basin diversions out of the Colorado River Basin) into the definition of "determination of a water right or conditional water right."

House Bill 1269 also allows for the payment of reasonable attorney fees to remaining owners of water rights on structures where a mutual ditch company has changed their place of use, and injury has been proven to those remaining owners. The ditch or reservoir company that makes such a move could also be responsible for paying costs to maintain and ensure the continuation of the owner's historically available water supply.

Finally, House Bill 1269 requires that a person must obtain consent from the owner of the property before constructing a well on the property of another and the decree of the water court shall contain language stating such.

FROM THE EDITOR:

Subscriptions to STREAM LINES are still available. The subscription rate is $10.00 per year and is used to cover the cost of printing and mailing. To order your subscription, please send a check along with your name, address and any comments to STREAM LINES, Colorado Division of Water Resources, 1313 Sherman St., Room 818, Denver Colorado 80203.

A number of helpful comments were received following our first issue. We welcome all comments and hope that we can incorporate them to make this publication better.

LAWNGRASS CONSUMPTIVE USE

Over the past few years it has become increasingly important to be able to calculate the potential consumptive use of bluegrass when developing plans for augmentation. In 1983 a group of Colorado water resource consultants met to discuss the k_c values that should be considered when using the SCS Blaney Criddle formula. The values finally selected were based upon a paper by Borrelli, J., et al., "Blaney-Criddle Coefficients for Western Turf Grasses," Journal of Irrigation & Drainage, ASCE, December 1981, with minor revisions recommended by the late Raymond Hogan of Wheeler & Assoc. These values have been used to date primarily in the Front Range area; however, recently there have been several plans for augmentation submitted to Water Court which require calculating the consumptive use of bluegrass at higher altitudes. The influence of elevation on consumptive use has been recognized for years. Doorenbos and Pruitt (1977) in referring to the Blaney Criddle method stated that, "it should be used with skepticism at high altitudes due to the fairly low mean daily temperatures (cold nights) even though daytime radiation levels are high." Cuenca, et al. (1981) presented data showing the Blaney Criddle method under-predicts crop water use for high altitude arid climates. This is due to the fact that the Blaney Criddle method evenly weighs day and night temperatures in computing an average temperature. A paper presented by Pochop, L., Borrelli, J. and Burman, R., "Elevation - A Bias Error in SCS Blaney Criddle ET Estimates," 1984 Transactions of the ASAE, pp. 125-128, used data collected on alfalfa and bluegrass throughout the Western states to determine an elevation adjustment for the Blaney Criddle formula. The study indicated that an elevation correction factor of 2.9 percent for each 1000 feet over base elevation of 4129 feet should be used for the months April through October and 2.3 percent per 1000 feet over the base elevation for the summer months (June through August) should be used for bluegrass. The study indicated that an elevation correction factor of 2 percent for each 1000 feet over base elevation of 4129 feet should be used for the months April through October and 2.8 percent per 1000 feet over the base elevation for the summer months (June through August) should be used for alfalfa. This adjustment will result in an increase in the ET estimate for elevations greater than the base elevation. The paper presented the following calibrated k_c values for crop growth of bluegrass and alfalfa which must be used when using the elevation correction factors referred above:

	Bluegrass	Alfalfa
April	0.97	0.92
May	1.00	1.08
June	1.10	1.16
July	1.06	1.11
August	0.98	1.01
September	0.97	0.92
October	0.89	0.86

The paper also provided revised temperature coefficients for bluegrass and alfalfa. The equations to be used when using English units are as follows:

Bluegrass: $k_t = 0.00328T + 0.65011$

Alfalfa: $k_t = 0.0141T - 0.0757$

T is in degrees Fahrenheit

The Division of Water Resources compared the results obtained using the original k_c values recommended by the consultant group with the values obtained using the Pochop method and found that essentially the same answer is obtained for an elevation equivalent to Denver. However, DWR found significant differences in results at elevations at least 1000 feet different than at Denver. For this reason, DWR is now using the Pochop method when calculating consumptive use at elevations which are at least 1000 feet higher or lower than Denver.

RETIREMENT

As of June 3rd Bob Jesse retired as Division Engineer for Division II in Pueblo. Bob has been with the Division of Water Resources for over 28 years, starting as an hydrographer in 1960. He was Assistant Division Engineer in the Greeley and Pueblo offices prior to being appointed Division Engineer for Division II in 1974.

In this limited space we cannot credit Bob with all of his many accomplishments. A few of them include the operating plans for Trinidad and John Martin Reservoirs, the Colorado Springs and Pueblo exchange plans, implementation of the Satellite Monitoring Program for the Arkansas Valley, and the winter storage program.

Bob's retirement will be brief in that he has already accepted the position of Chief Engineer with the Southeastern Colorado Water Conservancy District. We all wish him continued success in his new job and congratulate him on his outstanding career with the Division of Water Resources.

WATER LEVEL MONITORING

The first year of the ground water level measurement program is nearing completion. A total of 890 sites were inventoried during the winter and spring. Wells were measured in the Northern High Plains (682), the Southern High Plains (18), the Denver Basin (121), Lost Creek (27), Upper Black Squirrel Creek (17), and the South Platte alluvium (25) and the data have been checked and entered into a data base. Preliminary reports are being prepared, with the Northern High Plains report already being distributed to the management districts. The preliminary reports for the other areas will be available by the end of June. Final reports with hydrographs and water level trend maps will be available in the fall.

The program will attain its goal of having data available to well users within two months of the completion of measuring. With the lessons learned this year, the time can possibly be cut to one month for next year.

Preliminary reports are provided to management districts and governmental agencies free of charge. Interested parties may obtain copies from the Office of the State Engineer at a cost to cover printing and distribution. Well owners who cooperated in the program can obtain a summary report for the area of their well at no cost from the management districts or the Office of the State Engineer.

WATER COURT NEWS

Two landmark decision where recently handed down by the Colorado Supreme Court regarding gravel pit requirements in Colorado. Those cases were Zigan Sand and Gravel, Inc. v. Cache La Poudre Water Users Association, et al., No. 86SA213, and The Three Bells Ranch Associates v. Cache La Poudre Water Users Association, No. 86SA37.

In The Three Bells decision, the court determined that reclamation of the mined property by the creation of lakes caused by the digging of gravel pits is an appropriation of water as defined in Section 37-92-103(3)(a), C.R.S. (1987 Supp.). The court also determined that gravel pits are wells as defined in Section 37-90-103(21), C.R.S. (1973), and therefore permits must be obtained from the Division of Water Resources in order to conduct mining operations.

In the Zigan decision, the Colorado Supreme Court ruled again that gravel pits are wells as defined by Section 37-90-103(21), C.R.S. (1973) and that construction of gravel pits is a "diversion" of water subject to curtailment by the State Engineer if the diversion will injure the vested water rights of others. Also, the court determined that reclamation of the area used for the mining of gravel is a beneficial use in itself and that evaporative losses caused during and after the mining must be replaced by the operator of such pits.

TABULATION

A new Tabulation of water rights will be published and available to the public on July 1, 1988. This Tabulation is an update to the 1984 Tabulation, but goes one step further. In an effort to improve the readability of the Tabulation, a new format has been adopted. This Tabulation will be in "current status" format. Each line on the Tabulation will now represent the net amounts of absolute, conditional, and alternate point decrees which are currently in effect. Past Tabulations displayed all transactions which applied to a decree, such as transfers, abandonments, and conditionals-made-absolute. The new Tabulation algebraically accumulates these adjustments into net current amounts.

In addition to the new format, we expect the quality of this Tabulation to be much higher than previously accomplished. The Division offices are now entering their own data, and our results indicate that most of the water rights records are greatly improved. In most cases, the structure ID numbers have now been assigned to the water rights records, allowing a cross-reference into diversion records.

The Tabulation will become available on July 1st, but you may place prior orders by telephone with Mrs. Millie Wanca (866-3581). In addition, you may also place orders for the water rights reports which will expand on or re-arrange the information shown in the Tabulation. The Stream Alpha, Alphabetical, and Location lists are expected to be available first, and others to follow.

The water rights data will be available in dBASE III data form, by Division, on or about July 1st. Other data formats or subsets will be available later.

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