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TOWARD OPTIMAL UTILIZATION OF WATER RESOURCES

The "Physical Solution"

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Western Water: Expanding Uses/Finite Supplies

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I. INTRODUCTION

- A. One way to protect established water rights while increasing efficiency of water use is to mandate modification of a senior's operation in a way which provides a water supply for the senior, aids juniors and imposes the expense of the change on the latter. This approach, known in California as the "physical solution," has been recognized in several western states. Currently Colorado seems to be the most active in seeking better utilization of water resources in this way. As the pace of water project construction slows and as competition for scarce water supplies intensifies throughout the West, physical solutions are likely to become increasingly important.
- B. Examples of physical solutions
1. A downstream senior has the right to divert surface flow. An upstream junior deprives the senior of this flow. Instead of restoring the stream flow, the junior provides the senior with an equivalent amount of water from wells the junior drills in the senior's service area.
 2. A downstream senior has the right to pump groundwater. An impoundment and export

project by an upstream junior cuts replenishment water off from the aquifer from which the senior pumps. Instead of restoring replenishment water, the junior installs a surface delivery system which delivers to the senior water equivalent to what the senior had pumped.

3. An upstream senior irrigation district distributes water through a leaky system of unlined ditches. Twenty-five percent of the water escapes to a saline groundwater basin and seventy-five percent of the water is applied to the fields. A downstream junior pays for the lining of the district's ditches. The senior thereafter reduces its distribution of water by twenty-five percent and the junior uses the newly available water.

C. Main difference between an "exchange" or "transfer" and a "physical solution": the former is always consensual, whereas the latter may be compelled by law.

D. Reference Source

1. Dunning, "The 'Physical Solution' in Western Water Law," 57 U. Colo. L. Rev. 201 (1986).

II. STATEMENT OF THE PROBLEM

- A. Tension has long existed in prior appropriation doctrine between the protection of established water rights and the optimal utilization of water resources.
1. "So long as there is but a single appropriator of water on a stream it matters not how imperfect or wasteful may be the means by which he diverts But when subsequent appropriators divert the entire surplus at points above him he is required to use all reasonable diligence to husband what is left" Natoma Water & Mining Co. v. Hancock, 101 Cal. 42, 50-51, 35 P. 334, 337 (1894).
- B. The classical resolution of this tension is to limit appropriative water rights to beneficial use. Inefficient uses of water are thus denied legal protection as appropriations, water is available for appropriators who can make beneficial use of it, and in principle optimal utilization is achieved.
1. In California, the waste of water is also prohibited by constitutional provisions. Cal. Const. Art. X, Section 2.
 2. Generally, courts seem to deny protection

only where water is not used at all or where the most egregious of wasteful water practices are followed. Aware of the maxim "use it or lose it" and wishing to avoid forfeiture for nonuse, appropriators may engage in water utilization less efficient and more wasteful than otherwise would be the case in order to maintain their rights at the highest possible levels. Thus the beneficial use requirement of prior appropriation doctrine may paradoxically promote the waste of water.

- a. Williams, "The Requirement of Beneficial Use as a Cause of Waste in Water Resources Development," 23 Nat. Resources J. 7 (1983); Pring & Tomb, "License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West," 25 Rocky Mtn. Min. L. Inst. 25-1 (1979).
3. An alternative to denial of protection is the physical solution, which places the principal cost of accommodation on juniors. A physical solution allows a court to avoid the harshness of denying protection to an appropriator's established pattern of water

use while providing for some progress toward greater efficiency in the use of water.

III. EXAMPLES OF DENIAL CASES

- A. Importance for physical solution doctrine
 - 1. By suggesting the location of the line between unprotected "wasteful" or "nonbeneficial" water use practices and protected "beneficial" uses of water, denial cases indicate the broad scope for physical solutions.
 - 2. By demonstrating how valuable uses of water are sometimes unprotected, denial cases may indicate the sort of unmitigated change which may be demanded of a senior as part of a physical solution.
- B. Surface water diversions: the water wheel cases
 - 1. Importance of water wheels in the nineteenth century mill economy.
 - 2. The U.S. Supreme Court's water wheel decision: Schodde v. Twin Falls Water Company, 224 U.S. 107 (1912).
 - a. Downstream dam backed up water and destroyed current which had turned a series of upstream water wheels.
 - b. Although apparently it believed a

reasonable means of diversion should be protected as part of an appropriative right, the Court in Schodde held appropriation of the current as incidental to appropriation of the water for irrigation and mining must be denied. The claim was deemed "vast" in relation to the "meager" beneficial enjoyment. Id. at 118.

C. Other surface water applications

1. Use of natural overflow.
2. Conventional surface water diversion unprotected where groundwater protection possible?
 - a. See In re Rules and Regulations Governing the Use, Control, and Protection of Water Rights for Both Surface and Underground Water Located in the Rio Grande and Conejos River Basins and Their Tributaries, 674 P.2d 914 (Colo. 1984) ("Alamosa-La Jara"); White, "The Water Wheel Goes Underground," WNRL Commentary 25 (Summer 1984) (Alamosa-La Jara conclusion a "long anticipated next step" in applying Schodde).

D. Groundwater applications

1. Issue regarding protection of artesian pressure and shallow pumping depths.
 - a. Variation in results.
 - b. Trend to limit protection -- to move from protection of an historic pumping lift to protection of only a "reasonable" pumping lift.
 - c. Utah case law is illustrative; cf. Current Creek Irrigation Co. v. Andrews, 344 P.2d 528 (1959) (recognition of a right of static head pressure) with Wayman v. Murray City Corp., 458 P.2d 861 (1969).

E. Means of distribution or pattern of use

1. Judicial treatment of conveyance loss.
 - a. Typically allowance is made for considerable loss of carriage water. Barrows v. Fox, 32 P. 811 (1893).
 - b. Construction of distribution systems in the most scientific manner is normally not required, provided distribution is in accordance with community customs. Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, 45 P.2d 972, 997

(1935); but see Glenn Dale Ranches, Inc. v. Shaub, 494 P.2d 1029, 1032 (1972); Erickson v. Queen Valley Ranch Co., 99 Cal. Rptr. 446 (1971); CAL. WATER CODE § 100.5 (West 1985 Supp.).

2. Judicial treatment of water application.
 - a. Normally, courts do not deny protection to established patterns of water application.
 - b. Occasionally, an unusual use is unprotected, Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, 45 P.2d 972 (extermination of gophers), or irrigators are required to improve application efficiency. Hardy v. Beaver County Irrigation Co., 234 Pac. 524, 529 (1924) (seniors must "prepare their land, by leveling or otherwise, [so] that it may be irrigated with reasonable economy in the use of water").
 - c. "Duty of water" limitations are not a significant check on water application. They are set on the high side, and the courts are not vigorous in

implementation.

F. Conclusions from the denial cases

1. The rules on beneficial use/waste are framed in a way unlikely to discourage waste. They assume an "either/or" situation: either water is wasted and any right to it is forfeited, or water is used beneficially and the right is fully protected.
2. In reality, usually a spectrum of possibilities for the use of water exists. Increased efficiency can normally be obtained if funds are invested in new facilities or in new methods of water management. Courts are reluctant to compel such investment except in cases of "egregious" waste, e.g. in cases in which a once-common method of water diversion, distribution or application now seems obsolete. This general conclusion is equally true in California, despite the constitutional status of the anti-waste policy.
 - a. For the most demanding application of the California constitutional provision to date, see People v.

Forni, 54 Cal. App. 3d 743 (1976).

3. In these circumstances, not much improvement in water use efficiency can be expected merely from application of rules on beneficial use. More promising are rules on physical solutions and attempts to increase water marketing.
 - a. Water marketing is receiving great attention throughout the West today. Nonetheless, significant difficulties exist for widespread water marketing.
 - b. Physical solutions today are receiving less attention than water marketing. But the physical solution, well established in the water law doctrine of several western states, can contribute significantly to improved water use efficiency.

IV. THEORY OF THE PHYSICAL SOLUTION

- A. Equity as a basis
 1. Although a senior appropriator ordinarily is entitled to injunctive relief against interference with the senior's water right, if the junior who interferes can make good to the senior the amount of water lost then "the judgment, in common equity, should

provide accordingly." Montecito Valley Water Co. v. City of Santa Barbara, 77 P. 1113, 1118 (1904); cf. Bower v. Moorman, 147 P. 496, 503 (1915).

2. Equity courts are not limited to suggestions for physical solutions which come from the parties. Tulare Irrigation District v. Lindsay-Strathmore Irrigation District, 45 P.2d 972, 1010 (1935).

B. Necessity and the policy of optimal utilization as a basis

1. Salt Lake City v. Gardner, 114 P. 147, 152 (1911) links physical solutions to the authority of private persons to condemn property needed for water resources development. That authority in turn was said by courts to be rooted in the "absolute necessities" of the arid regions. Nash v. Clark, 75 P. 371, 373 (1904), aff'd 198 U.S. 361 (1905).
2. Public policy, which presumably results from these same arid region necessities, is mentioned as the basis for physical solutions in Arizona, Pima Farms Co. v. Procter, 245 P. 369, 374 (1926), and in the California cases applying that state's

constitutional provisions. See particularly City of Lodi v. East Bay Municipal Utility District, 60 P.2d 439, 450 (1936), which states a trial court must impose any available physical solution.

3. Several Colorado decisions approve of the physical solution without making reference to the policy of optimal utilization. Joseph W. Bowles Reservoir Co. v. Bennett, 18 P.2d 313, 315-6 (1932); City of Colorado Springs v. Bender, 366 P.2d 552, 556 (1961); In the Matter of Rules and Regulations Governing the Use, Control, and Protection of Water Rights for Both Surface and Underground Water Located in the Rio Grande and Conejos River Basins and Their Tributaries, 674 P.2d 914, 935 (1984).
 - a. Today these decisions are best understood as reflective of the policy of "maximum utilization" announced in Fellhauer v. People, 447 P.2d 986, 994 (1968), which has since been refined to a policy of "optimal" utilization. COLO. REV. STAT. 37-92-501(2)(e) (1974); In the Matter of Rules and Regulations Governing the Use,

Control, and Protection of Water Rights for Both Surface and Underground Water Located in the Rio Grande and Conejos River Basins and Their Tributaries, 674 P.2d 914, 935 (1984).

V. STATUTORY EXPRESSIONS OF PHYSICAL SOLUTION DOCTRINE

- A. In limited situations, Utah provides junior appropriators of groundwater with a "right of replacement." UTAH CODE ANN. § 73-3-23 (1980).
 - 1. Perhaps because the Utah statute applies when quantity and quality of appropriated groundwater are affected, but not when artesian pressure or pumping lift are affected, the statutory provisions have been mentioned infrequently and seem to have had little impact.
- B. Colorado's statutory provisions on physical solutions arose in part from its efforts in 1969 to apply prior appropriation principles to tributary groundwater.
 - 1. In order to integrate surface water and groundwater rights, Colorado provided for "plans for augmentation." COLO. REV. STAT. § 37-92-302(5) (1973). The plans are broadly defined, COLO. REV. STAT. § 37-92-

103(9) (1973 and Supp. 1986), but they include as one possible element a physical solution. Augmentation can come from "substitute supplies" of water, id., and substituted water "shall be accepted by the senior appropriator . . . for water derived by the exercise of his decreed rights." COLO. REV. STAT. 37-92-305(5) (1973).

2. Colorado also has authorized its state engineer to permit out-of-priority, upstream storage of water, provided the stored water can be promptly supplied to downstream storage appropriators with an insufficient water supply. COLO. REV. STAT. 37-80-120 (1973). This authority constitutes a second statutory basis for physical solutions. It is procedurally simpler than a plan for augmentation, and it serves as the basis for Colorado's largest physical solution to date.
 - a. On an annual basis over 2,000 well owners in GASP (Groundwater Appropriators of the South Platte) furnish replacement water to downstream seniors when the latter have a short supply.

- C. Wyoming has modified its "exchange" statutes in a way that includes nonconsensual as well as consensual exchange. WYO. STAT. 41-5 (1977). The former, which contemplates "the use of stored, direct flow, or groundwater from another source," id., amounts to a physical solution.
- D. Arizona and New Mexico have mine-dewatering legislation which includes provisions for a physical solution. ARIZ. REV. STAT. ANN. § 45-513(C)(2) (Supp. 1985-1986); N.M. STAT. ANN. 72-12A-4 (Repl. Vol. 1985).

VI. SOME PHYSICAL SOLUTION ISSUES

- A. Hydrological and legal uncertainty
 - 1. Need for flexibility in the design of physical solutions
 - a. The physical solution as a continuing obligation on the part of juniors.
 - b. Content of the obligation changes as notions of what a senior may reasonably expect change; continuing relevance of the standard for "denial" of protection to an established use of water resources.
- B. Complexity of administration
 - 1. Difficulty of accounting for changes in delivery obligations and administering

water delivery in accordance with the
correct rules.

C. Need for an adequate statutory foundation

VII. EXAMPLE OF AN IMPORTANT POTENTIAL PHYSICAL SOLUTION

A. The Imperial Valley situation

1. What if the "exchange" negotiations fail?

2. Relevance of physical solution doctrine

VIII. CONCLUSION