# REUSE OF PRODUCED WATER: RELEVANT LAW AND POLICY

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1. **MAGNITUDE OF POTENTIAL ISSUES**. As of October, 2013, there were nearly 52,000 active oil and gas wells in Colorado. *See* Colorado Oil and Gas Conservation Commission, Colorado Weekly & Monthly Oil & Gas Statistics at 13.[1]

2. **WATER QUALITY CONCERNS**. Water quality issues associated with produced water include, without limitation, (1) Sodium Adsorption Ratio ("SAR"); and (2) chemicals and other constituents. *See* Colorado Oil & Gas Association, Fast Facts: Produced Water at 1.[2] *See also* USGS, Environmental Impacts Associated with Disposal of Saline Water Produced During Petroleum Production – Osage-Skiatook Petroleum Environmental Research Project;[3] USGS, Fact Sheet FS-003-97: USGS Research on Saline Waters Co-produced with Energy Resources.[4]

3. **REUSE OF PRODUCED WATER**. Oil and gas companies may reuse produced water ***amongst themselves within the same geological basin*** for: (1) roadspreading; (2) enhanced recovery; (3) drilling; (4) well stimulation; (5) well maintenance; (6) pressure control; (7) pump operations; (8) dust control on or off-site; (9) pipeline and equipment testing; (10) fire suppression; and (11) discharge into state waters. None of these uses require a water well permit. *See* C.R.S. § 37-90-137(7)(a).

4. **LEGAL CONSTRAINTS ON REUSE**.

   **a. Colorado Law and Policy**

      i. <u>*Public Policy*</u>. Overarching public policy is "to conserve state waters and to protect, maintain, and improve, where necessary and reasonable, the quality thereof for public water supplies, for protection and propagation of wildlife and aquatic life, for domestic, agricultural, industrial, and recreational uses, and for other beneficial uses." C.R.S. § 25-8-102(2).

      ii. <u>*Vance v. Wolf*</u>. Coalbed methane ("CBM") ground water diverters must get a well permit. *See* 205 P.3d 1165 (Colo. 2009). The Colorado State Engineer has interpreted this to apply to all oil and gas wells not just CBM wells.

         (a) *Augmentation Plans*. *Vance* requires these for ***tributary*** oil and gas wells to ensure water is replaced in quantity and quality required to protect vested water rights. "Any substituted water shall be of a quality and quantity so as to meet the requirements for which the water of the senior appropriator has

[1] http://cogcc.state.co.us/Library/Statistics/CoWkly&MnthlyO&GStats.pdf.
[2] http://www.coga.org/pdfs_facts/produced_water_fastfacts.pdf.
[3] http://toxics.usgs.gov/sites/ph20_page.html.
[4] http://pubs.usgs.gov/fs/1997/fs003-97/FS-003-97.html.

normally been used . . . ." C.R.S. § 37-92-305(5). As discussed below, this requirement does not apply to ***nontributary*** wells.

(b) *Substitute Water Supply Plans*. Generally used to allow wells to operate until final augmentation plan decree is approved by the water court. In approving a substitute water supply plan, the Colorado State Engineer must determine that the plan will provide water of a "quality and continuity to meet the requirements of use to which the senior appropriation has normally been put." C.R.S. § 37-92-308(3)(b)(IV).

iii. *House Bill 1303*. This legislation was designed to help the State Engineer deal with permitting issues in the wake of *Vance*, by allowing the State Engineer to make nontributary determinations for oil and gas wells through rulemaking. *See* C.R.S. § 37-90-137(7)(c). All ground water in Colorado "is presumed to be tributary absent clear and convincing evidence to the contrary." *Colorado Ground Water Comm'n v. North Kiowa-Bijou Groundwater Management Dist*., 77 P.3d 62, 70 (Colo. 2003). However, nontributary water is isolated from the surface stream[5] and is presumed not to impact surface flows.[6] It is not allocated based on prior appropriation.[7] Therefore, nontributary wells withdraw water that presumably does not impact surface supplies, so they do not require augmentations or well permits if water withdrawn from the wells is not beneficially used.

iv. *State Engineer Produced Nontributary Ground Water Rules*.[8] Approximately 85% of the active basins in the state at issue and majority of oil and gas producing formations were determined nontributary.

v. *Ownership of Nontributary Groundwater*. Under Colorado law, nontributary ground water belongs to the overlying landowner.[9] Ownership can also be obtained with overlying landowner consent.[10]

vi. *Unsettled Legal Issues*. By statute, nontributary ground water can be withdrawn to "facilitate or permit the mining of minerals" and used and re-used ***while mining is ongoing***. *See* C.R.S. § 37-90-137(7)(a). However, as discussed above, industry cannot ***own*** the produced water absent land ownership/consent. These competing interests in the same nontributary water raise several, as yet unsettled, legal issues. Can produced water be reused for purposes other than those specified by C.R.S. § 37-90-137(7)(a) with or without landowner consent? Is industry's use/reuse a taking? A trespass? Are landowners entitled to compensation for use of their nontributary water? Does reuse beyond that allowed under C.R.S. § 37-90-137(7)(a) subject the oil and gas producer to additional permitting/regulatory requirements?

[5] *See* C.R.S. § 37-90-103(10.5).
[6] *See id.*
[7] *See* C.R.S. § 37-90-102(2).
[8] http://water.state.co.us/groundwater/GWAdmin/NontribGW/Archive/Pages/NontribGWFinalRules.aspx.
[9] *See* C.R.S. §§ 37-90-102(2), 37-90-137(4)(b)(II).
[10] *See* C.R.S. § 37-90-137(4)(b)(II)(A).

**b. Clean Water Act** ("CWA"). Prohibits discharge of any pollutants to waters of the United States without a permit.[11] Also regulates injection of produced water, generally under Class II and Class V injection permits.[12]

**c. Colorado Department of Health and the Environment** ("CDPHE"). EPA discharge permitting under CWA in Colorado handled by CDPHE. No discharge of pollutants into state waters without a permit. "State waters" include surface and groundwater.[13]

**d. Army Corps of Engineers**. Additional regulation under Section 404 of the CWA. No discharge of dredged or fill material with a permit.

**e. Safe Drinking Water Act**. Controls injection of produced water under EPA's Underground Injection Control program.[14] Standards designed to protect public drinking water supplies.[15]

**f. Bureau of Land Management** ("BLM"). In *Center for Biological Diversity v. Bureau of Land Management*,[16] the U.S. District Court for the Northern District of California ruled that BLM must look at impacts from hydraulic fracturing in issuing oil and gas leases. Requires impact analyses under National Environmental Policy Act.[17]

**g. United States Fish and Wildlife Service**. Under Migratory Bird Treaty Act,[18] no taking, capturing or killing of any migratory bird by "any means" or in "any manner" is allowed.

**h. Tribal Issues**. Bureau of Indian Affairs regulates impacts to tribal lands.[19] Tribes may regulate water quality.[20]

**i. Colorado Oil and Gas Conservation Commission**. Rule 907(a)(3): "To encourage and promote waste minimization, operators may propose plans for managing E&P waste through beneficial use, reuse, and recycling by submitting a written management plan to the Director for approval on a Sundry Notice, Form 4, if applicable. Such plans shall describe, at a minimum, the type(s) of waste, the proposed use of the waste, method of waste treatment, product quality assurance, and ***shall include a copy of any certification or authorization that may be required by other laws and regulations***."

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[11] 33 U.S.C.A. § 407.
[12] 40 C.F.R § 144.26.
[13] C.R.S. § 37-82-101.
[14] Pub. L. No. 93-523 (underground injection control provisions are in Part C, §§ 1421−1426); 42 U.S.C. §§ 300h-300h-5.
[15] *See* 42 U.S.C. § 300h(b)(1).
[16] 43 ELR 20076, No. C 11-06174 PSG, (N.D. Cal., Mar. 31, 2013).
[17] *See* 42 U.S.C. §§ 4321−4370.
[18] *See* 16 U.S.C. §§ 703−712.
[19] *See* 25 U.S.C. § 396a−q; 25 C.F.R. §§ 211, 212, 225.
[20] *See City of Albuquerque v. Browner*, 97 F.3d 415, 423−24 (10th Cir. 1996).

5. **REUSE REQUIRES TREATMENT**.

   a. **Hydraulic Fracturing Fluid**. Ethylbenzene, toluene, naphthalene, formaldehyde, ethylene glycol, hydrochloric acid and sodium hydroxide are among the contaminants found in hydraulic fracturing fluid that are potentially harmful to humans and wildlife.[21]

   b. **Issues with SAR**. SAR is the proportion of sodium ions in relation to the concentration of calcium and magnesium.[22] High SAR levels create serious soil problems which prevent plants from effectively absorbing water.[23] May also adversely impact livestock, aquatic and human life.[24]

6. **REUSE REDUCES COSTS**. Given that 30% of energy produced currently goes towards disposal of produced water, treatment costs of 5% to 8% will yield net financial benefit to industry. *See* study by D. R. Stewart, PhD, PE and L. Takichi, PE.[25] Treatment and reuse will: (1) eliminate disposal costs; (2) remove limitations on production caused by need for disposal; (3) lower operating costs; and (4) provide an additional source of supply. *See* publication by Ned A. Godshall, CEO for Altela, Inc.[26]

7. **REUSE REDUCES DEMAND FOR NON-PRODUCTION WATER**.

   a. **Limited Water Supplies**. Water is scarce in Colorado and is dealt with on a seniority basis under the prior appropriation system. Under the prior appropriation system, the first water right on a stream is entitled to take all of the water it needs before the next most senior water right is allowed to divert, and so on until supplies run out.[27] Water rights are constitutionally-protected property rights that can be bought and sold just like real property.[28]

   b. **Water Markets**. Colorado has a thriving water market, in which those with a need will be satisfied provided they have the financial means.[29] These transactions often take place in an auction setting with needed supplies going to the highest bidder.[30] Historically, auction prices have ranged from 30 dollars for an acre-foot of water during wet periods, to the low hundreds during dry years when supplies are scarce.[31]

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[21]http://www.earthworksaction.org/issues/detail/hydraulic_fracturing_101.
[22]http://www.deq.mt.gov/CoalBedMethane/pdf/Criteria-sar-EC-h.pdf.
[23]*Id*.
[24]*Id*.
[25]http://www.riversimulator.org/Resources/farcountry/OilGas/WestwaterFarms/BeneficialUseProducedWater15dec09IPEC.pdf.
[26]http://ipec.utulsa.edu/Conf2008/Abstracts%202008/Godshall_22.pdf.
[27]*Clay Spring Cattle Co. v. Bassett*, 76 Colo. 510, 514−15, 233 P. 156, 157 (1925).
[28]*Dallas Creek Water Co. v. Huey*, 933 P.2d 27, 37 n.8 (Colo. 1997).
[29]http://www.denverpost.com/business/ci_17598524; http://library.wrds.uwyo.edu/wrp/94-33/94-33.pdf.
[30]http://www.nytimes.com/2012/09/06/us/struggle-for-water-in-colorado-with-rise-in-fracking.html?pagewanted=all&_r=0.
[31]*Id.*

**c. Industry's Needs**. The Colorado Oil and Gas Conservation Commission, the Colorado Division of Water Resources and the Colorado Water Conservation Board estimate 18,700 acre-feet of water will be required just to meet demands for hydraulic fracturing in Colorado by 2015.[32] These demands will be in many areas where water supplies are already inadequate to supply existing uses.

**d. Industry's Impacts on Water Markets**. Farmers and even municipal suppliers are being outbid at auction by oil and gas companies willing to pay thousands of dollars per acre-foot for water.[33] Historically, when municipalities had excess supplies they were sold to farmers. However, much of this water is now going to oil and gas companies who can pay a hundred times more than what farmers can afford to pay for this same water.[34]

**e. Reuse as a Win/Win**. Proper treatment and reuse of produced water can reduce industry's overall operating costs. At the same time it can reduce the new and significant water demands by industry in areas where water supplies are already, at many times, inadequate to meet existing needs.

[32] *See id.*
[33] *See supra* n.26.
[34] *Id.*